City of VALLEJO California

2015

Urban Water Management Plan

Prepared by: RMC water and environment

November 2016

City of Vallejo
2015 Urban Water Management Plan

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List of Abbreviations

AB	Assembly Bill
ABAG	Association of Bay Area Governments
AF	Acre-foot or Acre-Feet
AFY	Acre-foot per Year
AWWA	American Water Works Association
BMP	Best Management Practice
BO	Biological Opinion
Caltrans	California Department of Transportation
CCF	100 cubic feet of water
CDPH	California Department of Public Health Services
CII	Commercial, Industrial and Institutional
CIMIS	California Irrigation Management Information System
CUWCC	California Urban Water Conservation Council
CWC	California Water Code
DMMs	Demand Management Measures
DOF	Department of Finance
DWR	Department of Water Resources
ERP	Emergency Response Plan
ETo	Evapotranspiration
FY	Fiscal Year
GPCD	Gallons Per Capita Per Day
gpm	Gallons Per Minute
HET	High Efficiency Toilet
HEU	High Efficiency Urinal
HOA	Home Owners Association
IRWMP	Integrated Regional Water Management Plan
MG	million gallons
MGD	million gallons per day
MOU	Memorandum of Understanding
MPN	Most Probably Number
NBA	North Bay Aqueduct
NMFS	National Marine Fisheries Service
NOD	North of Delta
PDA	Priority Development Area
PG&E	Pacific Gas & Electric
SB	Senate Bill
SBX7-7	Water Conservation Bill of 2009
SCWA	Solano County Water Agency
SID	Solano Irrigation District
SWP	State Water Project
SWRCB	State Water Resources Control Board

Abbreviations (cont'd)

TDS	Total Dissolved Solids
TOC	Total Organic Carbon
USBR	U.S. Bureau of Reclamation
USFWS	U.S. Fish and Wildlife Service
UWMP	Urban Water Management Plan
VA	Vulnerability Assessment
VSFCD	Vallejo Sanitation and Flood Control District
WSCP	Water Shortage Contingency Plan
WTP	Water Treatment Plant
WWTP	Wastewater Treatment Plant

Section 1 Introduction and Overview

The City of Vallejo (City) has prepared this Urban Water Management Plan (UWMP) following California state requirements, as defined in the California Water Code (CWC). This chapter discusses the requirement for and purpose of an UWMP, and provides a summary of this plan.

1.1. Urban Water Management Planning and the California Water Code

1.1.1. Urban Water Management Planning Act

The Urban Water Management Planning Act (Act) was created by Assembly Bill (AB) 797 which was signed into law by Governor Deukmejian on September 21, 1983. The Act requires that urban water suppliers (i.e., municipal water suppliers providing water for municipal purposes to more than 3,000 customers or supplying more than 3,000 acre-feet (AF) annually) prepare and adopt Urban Water Management Plans (UWMPs) containing certain specified elements.

The Act was subsequently amended by AB 2661, which was signed into law by Governor Deukmejian on July 18, 1990. AB 2661 deleted the January 1, 1991 termination date specified in AB 797. AB 2661 also expanded the elements which are to be addressed in Urban Water Management Plans.

The Act was also amended by AB 1869, which was signed by Governor Wilson on October 13, 1991. AB 1869 requires that urban water suppliers update (not just review) Urban Water Management Plans every five years to include projections of both potable and recycled water use, identify current reclamation practices, address additional alternative conservation measures, and describe findings, actions, and planning related to a number of water conservation and reclamation measures.

The Act was further amended by AB 11X signed by Governor Wilson on October 13, 1991. AB 11X requires that urban water suppliers prepare an Urban Water Shortage Contingency Plan as an amendment to its Urban Water Management Plan. Water Shortage Contingency Plans (WSCPs) must be updated every five years and specify proposed measures for response to short- and long-term water shortages.

1.1.2. Water Conservation Bill of 2009

On November 10, 2009, the state legislature passed the Water Conservation Bill of 2009 (also referred to as Senate Bill (SB) X7-7) as a water conservation component to the Sacramento-San Joaquin River Delta (Delta) legislative package. The bill seeks a 20 percent statewide reduction in urban per capita water use in California by December 31, 2020. SB X7-7 requires that each retail agency preparing a 2010 UWMP to calculate baseline water use as well as an interim (for 2015) and final (for 2020) water use reduction target. The methodologies used to calculate both the baseline per capita water use and targets were outlined in the Draft and Final UWMP guidelines published by the California Department of Water Resource (DWR) in December 2010 and March 2011, respectively. Updates to those methodologies were released with the guidelines for the 2015 UWMPs.

1.2. UWMP Organization

This UWMP was prepared based upon the recommended organization presented in DWR's *2015 UWMP Guidebook for Urban Water Suppliers* (UWMP Guidebook). Chapter titles are included below and a DWR checklist, including the location of all required components of the UWMP, is included in Appendix A.

Section 1 Introduction and Overview
Section 2 Plan Preparation
Section 3 System Description
Section 4 System Water Use
Section 5 SB X7-7 Baselines and Targets
Section 6 System Supplies
Section 7 Water Supply Reliability Assessment
Section 8 Water Shortage Contingency Plan
Section 9 Demand Management Measures
Section 10 Plan Adoption, Submittal and Implementation
Section 11 References

1.3. UWMP Summary

The City provides water delivery to over 3,000 services, therefore requiring the preparation and adoption of an UWMP in compliance with the Act, as amended by ABs 2661, 1869 and 11X, and SB X7-7 of 2009.

Vallejo, located at the southern end of Solano County, uses surface water as its sole supply source to provide service to the City of Vallejo and surrounding unincorporated areas. The City consistently meets all drinking water standards, despite some water quality concerns during storm events. As such, constraints due to water source quality is considered to be unlikely. Due to a conservative total water supply volume, the City expects to have sufficient water supplies to meet projected future demands through 2040, during normal, single-dry and multiple-dry water year conditions. Using the California Department of Water Resources (DWR) population tool and SB X7-7 verification tables, the City's baseline per capita water use was determined to be 156 gallons per capita per day (gpcd) with a 2015 target of 140 gpcd and a 2020 target of 124 gpcd (a 20% reduction from the baseline). Thanks in part to the aggressive conservation programs employed by the City in light of the statewide drought, the City's 2015 per capita water use was calculated as 114 gpcd, well below its 2015 and 2020 targets.

Looking ahead to the City's development and water needs, the City's current plan positions it well to meet any future demands regardless of water year type. California Department of Finance (DOF) shows that the 2015 population was 116,764; future projections estimate a population slightly above 130,000 in 2040. The most recent Reclaimed Water Study (2014) evaluated the potential of utilizing recycled water coordination to further supplement and enhance the City's water supply sources. The study determined that recycled water is not currently a cost-effective solution, but may become more feasible if increased water demand due to development were to occur. Potential future development projects that are considered in this plan include two Priority Development Areas (PDAs) as well as Solano 360, which together consists of approximately 375 acres of development within the City's

service area. However, even with this growth, total demands are actually expected to decrease over the planning period of this UWMP with the implementation of water codes, conservation programs, and higher water and sewer rates. The recent drought and state-mandated restrictions have demonstrated the effectiveness of the City's water conservation and efficiency measures. Additionally, this plan includes a Water Shortage Contingency Plan prepared by the City (Chapter 8) which lays the foundation for the City's response to reductions in water availability, as well as the City's demand management measures (Chapter 9), which are in place regardless of water year type and supply availability.

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Section 2 Plan Preparation

This chapter provides information on the City's process for developing the 2015 UWMP, including efforts in coordination and outreach with other agencies in the region.

2.1. Basis for Preparing a Plan

The City acts as an urban, retail public water provider with over 3,000 connections (Table 2-1), requiring the preparation of an UWMP. This plan was prepared in compliance with the requirements of California Water Code, Division 6, Part 2.6.

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

Public Water System Number	Public Water System Name	Number of Municipal Connections 2015	Volume of Water Supplied 2015 (MG)
CA4810007	City of Vallejo	36,664	3,925
CA4810021	City of Vallejo – Lakes System	848	78
	TOTAL	37,512	4,003

2.2. Planning and Compliance Reporting

The City of Vallejo's primary sources of water are the Solano Project (Lake Berryessa), State Water Project (SWP)/Vallejo Permit Water (California Bay Delta), and Lakes Frey and Madigan. The City also receives a small amount of water from the City of Fairfield to augment service to the Lakes System. The City is a wholesale water provider to the cities of American Canyon and Benicia, as well as Travis Air Force Base. The City prepared this UWMP individually (Table 2-2), but has notified and included stakeholders as discussed in the next section.

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

X	Individual UWMP
	Regional UWMP

Information prepared for and presented in this UWMP is reported based on a calendar year and water volumes are presented in Millions of Gallons (MG), as summarized in Table 2-3.

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

Name of Agency	City of Vallejo
X	Agency is a wholesaler
X	Agency is a retailer
Fiscal or Calendar Year	
X	UWMP Tables are in Calendar Years
	UWMP Tables are in Fiscal Years
Units of Measure	
	Acre Feet (AF)
X	Million Gallons (MG)
	Hundred Cubic Feet (CCF)

2.3. Coordination and Outreach

The City of Vallejo participates in regional-wide planning efforts through the Solano County Water Agency (SCWA), is an active member of the California water community, and continually coordinates with neighboring communities and water agencies regarding water-planning activities. SCWA members include the Cities of Benicia, Dixon, Fairfield, Rio Vista, Suisun City, Vacaville and Vallejo; the Solano Irrigation and Maine Prairie Water Districts; and Reclamation District 208. Additionally, the City coordinates with Travis Air Force Base, Vallejo Sanitation and Flood Control District, and the City of American Canyon.

The City coordinated the preparation of this urban water management plan with other appropriate agencies in the area, including the SCWA, Vallejo Sanitation and Flood Control District (VSFCD), the Cities of Benicia, American Canyon and Fairfield. In June 2016, the City sent out letters to its regional stakeholders to inform them of the UWMP preparation and to welcome comments or questions they might have. The City notified both of its wholesale suppliers, Solano County Water Agency and the State Water Resources Control Board (Table 2-4), that this UWMP was being prepared. Additionally, the City encouraged public participation in the development of the 2015 UWMP and provided opportunities for public review and comment. Additional information regarding outreach and public participation is included in Section 10.

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

The retail supplier has informed the following wholesale supplier(s) of projected water use in accordance with CWC 10631.
Wholesale Water Supplier Name
Solano County Water Agency
State Water Resources Control Board

Section 3 System Description

The City of Vallejo provides water services to two, geographically distinct areas: the City of Vallejo jurisdictional limits and adjacent unincorporated areas (termed "Vallejo proper") and an area in the unincorporated western part of Solano County and southern Napa County, known as "Vallejo Lakes". This chapter describes each portion of the City's water system, including water supply source and infrastructure.

3.1. Service Area Physical Description

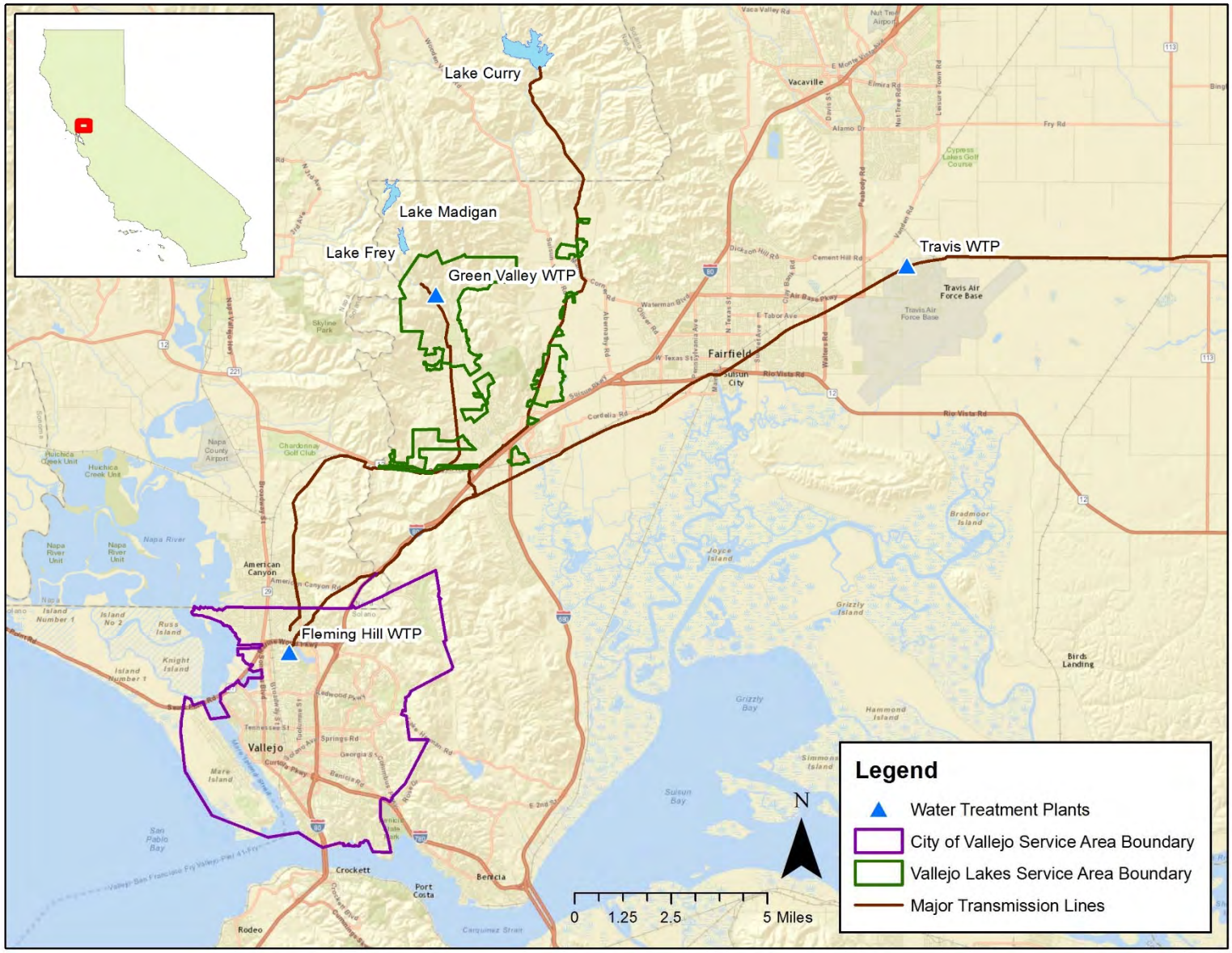
The City of Vallejo is located approximately 30 miles northeast of San Francisco at the southern end of Solano County. The City's water service area is shown in Figure 3-1 and, as previously described, encompasses the city limits, unincorporated "Vallejo proper" (i.e., the neighborhoods of Home Acres, Sandy Beach, and Starr Subdivision), as well as the Vallejo Lakes area (the area in the adjacent unincorporated western part of Solano County and southern Napa County). The service area is approximately 31 square miles of land area and includes predominantly residential and commercial users. Elevations in the existing service area range from approximately 0 feet above mean sea level to approximately 630 feet above mean sea level.

The water system is owned and operated by the City and governed by a 7-member City Council. The water system is operated and maintained by the Water Division of the Public Works Department. City management staff for the water system consists of a City Manager, Public Works Director, Assistant Public Works Director – Water, and Assistant Public Works Director – Maintenance.

The Vallejo Water system consists of two water treatment plants (WTPs): Fleming Hill WTP and Green Valley WTP. The Fleming Hill WTP is a conventional 42 million gallons per day (mgd) treatment plant with pre-ozonation that treats water supplied from Lake Berryessa (Solano Project) and from the Sacramento River Delta as delivered through the North Bay Aqueduct (NBA). Treated water from this plant is delivered to city customers. The Green Valley WTP was completed in 1998 and is a conventional 1.0 mgd plant that treats water from Lake Berryessa and Lakes Frey and Madigan. Treated water from this plant is delivered to Vallejo Lakes customers. Although not part of the City's water service area, by agreement, the City also operates the Travis WTP on behalf of the Travis Air Force Base. The Travis WTP is a conventional 7.5 mgd plant with pre-ozonation.

The City water distribution system contains multiple pressure zones. Principal water mains in the distribution system range in size from 14 to 24 inches in diameter. Most of the distribution grid piping in the older sections of the City range in size from 4 to 8 inches in diameter, while the newer areas are served by pipes 8 to12 inches in diameter.

Figure 3-1: City of Vallejo Water Service Areas



3.2. Climate

The City's climate is typical of other areas in the northern part of the San Francisco Bay area. The climate is characterized by summers that are dry and warm, and winters that are relatively mild, with the majority of rainfall occurring during this season. Regional averages of the rate of evapotranspiration of common turf grass (ETo), rainfall, and temperature are summarized in Table 3-1.

The average annual rainfall and annual ETo for the region are approximately 13 and 45 inches per year, respectively. ETo is a measurement of water evaporation combined with plant transpiration and is expressed in the form of a rate, typically inches per time period. In other words, ETo is the amount of water needed for common turf to grow in a specific region.

The average annual ETo for the region is approximately 32 inches more than the average annual precipitation. Because of this difference, and because 90 percent of the annual precipitation occurs between the months of November and April, growing turf in this region requires a significant amount of irrigation during the dry season.

Table 3-1: Climate Characteristics for the City of Vallejo

Month	Average ETo[1], (in)	Average Rainfall[2], (in)	Average Air Temp[1] (°F)
January	1.41	1.87	45.9
February	1.9	2.91	50.1
March	3.05	1.99	52.97
April	4.48	1.18	55.48
May	5.62	0.65	58.03
June	6.04	0.05	62.77
July	6.18	0.00	63.93
August	5.51	0.01	63.57
September	4.54	0.07	63.32
October	3.19	0.40	59.17
November	1.75	1.60	51.05
December	1.17	2.51	46.83
Annual	**44.84**	**13.23**	**56.09**

Table 3-1 Notes:

1. *Data was obtained from California Irrigation Management Information System (CIMIS), Station 109, Carneros, which was the closest station to Vallejo, located north of San Pablo Bay. Values reflect monthly averages from 1/2010 – 12/2015.*
2. *Data was obtained from NOAA's Global Historical Climatology Network, Station 49219, VALLEJO CA US. Values reflect monthly averages from 1/2000 – 12/2015 (n=7 to n=9 for each month within the date range).*

3.2.1. Climate Change

Sea Level Rise and Flooding

The City of Vallejo is bordered on the west by the Napa River and San Pablo Bay, and on the south by the Carquinez Straits. The City of Vallejo and surrounding areas have been threatened by floods in the past, such as overflows from the Napa River and insufficient flood control from the Lake Chabot Dam. Improvements were made to the Lake Chabot Dam in the early 1980s following a harmful 100

year flood event and the City is currently protected from Napa River flooding by Highway 37. The adjoining wetlands, known as White Slough, also provide flood protection for the City. These flood control facilities may be at risk from climate change effects such as sea level rise and increased storm severity.

Although aging levees are a concern in many parts of the Delta system, the City of Vallejo is not directly protected by levees. A levee failure could affect the portion of the City's water supply that comes through the North Bay Aqueduct and some farmland surrounding Vallejo, but would not likely affect the City itself.

The nearest NOAA tidal gage is located 24 miles from the center of the City in Alameda, CA. This gage shows that the "100-year" flood height is 3.1 feet above the mean high tide line, with the highest observed flood from 1976 to 2015 reaching 3.05 feet above the mean high tide line in 1983 (Climate Central, 2016). This gage shows a gradual increase in the mean high tide line over the past few decades, with an average increase of 0.72 mm per year (NOAA, 2016). The National Research Council and Climate Central predict a local sea level rise of 2.9 feet by 2100 from a 1992 baseline. This translates to a "34 percent multi-year risk of at least one flood exceeding 3 feet from 2016 to 2030, a 93 percent risk from 2016 to midcentury, and a 100 percent risk by 2100" (Climate Central, 2016). Under high-end projections, these risks of a 3 foot flood all increase and the likelihood of at least one flood exceeding 6 feet is 100 percent. Within the City of Vallejo, 690 acres of land, 1,854 people, and $300 million in property are currently below 3 feet above mean high tide, and thus are potentially at risk of flooding if sea level rises as expected. If floods reached 6 feet above mean high tide, 5,431 people and $672 million are at risk.

Ecosystem and Habitat Vulnerability

The region around the City, particularly the area north of Mare Island, contains aquatic habitats vulnerable to erosion and sedimentation. Erosion is expected to increase under climate change conditions and sedimentation is expected to shift, so habitats that are already sensitive to these issues may be additionally impacted by climate change. Additionally, the coastal areas surrounding the City may be impacted by the increased risk of storm surges due to seal level rise, making the already fragile coastal ecosystems more vulnerable.

The Delta is an ecologically sensitive estuarine habitat that is likely to be significantly impacted by climate change. The Delta relies on freshwater flows from the Sacramento and San Joaquin Rivers, which are likely to be impacted by the decrease in snowpack and shifts in snowmelt patterns. The Delta has been identified by the Endangered Species Coalitions *Top 10 Habitats Vulnerable to Climate Change*, which points out that 12 of the original 29 indigenous Delta fish are either extinct or endangered (ESA, 2011). Specifically, salmon populations make their migration run through the Delta. Salmon require specific water temperatures and salinity levels to survive, so they are likely to be impacted by changes in the seasonal shifts and overall decrease of cold freshwater in the Delta. The Delta is also used for recreational, economic, and municipal purposes, so balancing these needs with ecological needs may continue to become more challenging as the changing climate creates shifts in freshwater flow patterns.

There are many State and Federally Endangered and Threatened plant and animal species in Solano County, including Suisun Thistle, Soft Bird's beak, Contra Costa Goldfields, Colusa Grass, San Joaquin Valley Orcutt Grass, Solano Grass, Swainson's Hawk, California Black Rail, California Clapper Rail, California Tiger Salamander, California Red-legged Frog, Giant Garter Snake, Slat Marsh Harvest

Mouse, Conservancy Fairy Shrimp, Vernal Pool Fairy Shrimp, Vernal Pool Tadpole Shrimp, Delta Green Ground Beetle, Valley Elderberry Longhorn Beetle, Callippe Silverspot Butterfly, Green Sturgeon, Chinook Salmon, Steelhead, and Delta Smelt. The climate change impacts most likely to affect these species are sea level rise, increased air and water temperature, increased carbon dioxide concentrations, and changes in precipitation patterns. The *Solano Habitat Conservation Plan* provides more details about these endangered species and how they are likely to be affected by climate change (SCWA, 2012).

One of the sources of the City's water supply, the Solano Project, is subject to quantified environmental flow requirements; water is released from Lake Berryessa to Putah Creek to maintain proper water quality and quantity for Chinook salmon and steelhead trout populations. Although these requirements have gone unmet in the past, they may be difficult to maintain under climate change conditions.

Hydropower

The City receives its power from Pacific Gas and Electric (PG&E), which utilizes hydropower as an energy source. However, there are no hydropower facilities within the City's region and no hydropower facilities are planned for the future, so the City will likely not be significantly impacted by climate change impacts to hydropower production.

3.3. Service Area Population

The City of Vallejo service area can be broken into three distinct population areas, each of which will be discussed below:

- City of Vallejo
- Unincorporated Vallejo proper
- Vallejo Lakes region

From 2000 to 2010, the City of Vallejo's population dropped from 116,760 to 115,942, according to the 2010 Census. California Department of Finance (DOF) data shows that the 2015 population subsequently rose to 116,764. Future projections of City population were obtained from the Association of Bay Area Governments (ABAG) 2013 projections by city. Population projections in 5-year increments for the City of Vallejo are shown in Table 3-2.

The unincorporated Vallejo proper area includes the neighborhoods of Home Acres, Sandy Beach, and Starr Subdivision. To estimate the area's 2015 population, the area's 913 single-family residential connections were multiplied by 2.78 persons per household (as provided by 2015 DOF data for unincorporated Solano County) which comes to 2,535 people. For future projections, the growth rate was assumed to be the same as the City of Vallejo's population growth rate as determined in ABAG projections. Population projections for the unincorporated Vallejo proper area in 5-year increments are shown in Table 3-2.

In the Vallejo Lakes service area, most customer accounts are single-family residential customers, with a small number of multi-family residential connections. For 2015, the number of 774 single-family residential connections was multiplied by 2.78 persons per household (as provided by 2015 DOF data for unincorporated Solano County) to estimate that portion of the area's population. The 11 multifamily connections were multiplied by an assumed 5 persons per connection. When summed together, the total estimated 2015 population for the Lakes region is 2,298. For future projections, population in the Lakes region was assumed to increase at the rate of one new single-family service connection per year, using the same 2.78 persons per household based on 2015 DOF data for

unincorporated Solano County. Population projections for the Vallejo Lakes region in 5-year increments are shown in Table 3-2.

Table 3-2: Population – Current and Projected by Region

Population Served	2015	2020	2025	2030	2035	2040
City of Vallejo	116,764	121,032	124,222	126,190	128,617	131,790
Unincorporated Vallejo	2,590	2,685	2,755	2,799	2,853	2,923
Vallejo Lakes	2,298	2,312	2,326	2,340	2,354	2,367

A summary of the entire service area population is shown in Table 3-3.

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

Population Served	2015	2020	2025	2030	2035	2040
	121,652	126,029	129,304	131,328	133,824	137,081

Potential future development projects in the City's service area are identified below.

- Priority Development Areas (PDA) are places identified by Bay Area communities are areas for investment, new homes, and job growth. 2 PDAs exist within the City of Vallejo:
    - The Vallejo Downtown and Waterfront PDA is a 149 acre area located in the City's old downtown area and along the City's waterfront. The PDA consists of residential and commercial development in the downtown and waterfront areas. This PDA is included in the 2013 ABAG projections.
    - The Sonoma Boulevard PDA is a mixed-use 75 acre corridor along Sonoma Blvd stretching from approximately Redwood Street down to Curtola Parkway. This PDA was submitted to ABAG in 2015 and so it is not currently included in the 2013 ABAG population projections.
- Solano 360. This potential project consists of approximately 150 acres of (conceptualized) entertainment and mixed-use commercial development compatible with the adjacent Six Flags Discovery Kingdom. The land is owned by Solano County, and is currently used for the Solano County Fairgrounds. More information regarding this proposed development can be found in the "*Solano 360 Specific Plan"* prepared by Solano County. A variety of private and public funding sources will be necessary to support the future project. With the abolishment of redevelopment agencies, the funding of this project has been impacted. Average water demand for the Plan Area is estimated at 97.7 million gallons per year and up to 50 housing units are conditionally permitted (SWA Architects, 2013). The *Solano 360 Specific Plan* was updated in 2013, but not likely included in the 2013 ABAG population estimates due to timing constraints of data availability.

- Mare Island. Implementation of the *Mare Island Specific Plan* involves the redevelopment of the historic shipyard as a multi-use community with a balance of industrial, office, commercial, residential, educational, recreation, cultural, and open space uses, meeting the needs of future generations. Mare Island is located on the western edge of the City of Vallejo in southwestern Solano County. This future development project consists of approximately 1,448 acres of Reuse Areas. The City's General Plan identifies the following Policy Action (NBE-2.4A) with respect to Mare Island redevelopment: "Continue to use the *Mare Island Specific Plan* to guide development and conservation on Mare Island and support activities that contribute to the economic and social well-being of the community." The *Mare Island Specific Plan* was originally adopted in 1999, but has since undergone several revisions, most recently in August 2013. ABAG population estimates likely consider some redevelopment of Mare Island, but the extent and timing of such activities continue to evolve.

It is anticipated that there may be other developments approved between now and 2040 which have not yet been submitted for consideration. For these undefined developments, the UWMP assumes development consistent with the currently adopted General Plan. For the City's General Plan and current Housing Element, see: *http://www.ci.vallejo.ca.us*. Note that the City is currently in the process of updating its General Plan. Since the General Plan update has not yet been finalized, any changes in population projections (or assumptions relating to those projects) in the draft plan would not have been included in the ABAG population values that were used to project future water demands for this UWMP.

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Section 4 System Water Use

This chapter describes the City of Vallejo's current water use and projected water use through the year 2040.

4.1. Water Uses by Sector

Vallejo's water use is limited to treated surface water from Solano Project (Lake Berryessa), State Water Project (SWP)/Vallejo Permit Water (California Bay Delta), and Lakes Frey and Madigan. The City's water demand has historically been primarily attributed to residential use, with roughly 62 percent of all water produced serving residential demands. In 2015, 49 percent of water produced serviced single family residences and 13 percent served multi-family homes. Commercial demands (which includes institutional and industrial demands) is the next largest water user, at 17 percent in 2015. Remaining 2015 water use included irrigation demand (9 percent of water produced), other demands, such as public facilities, fire hydrants, etc. (3 percent) and water loss (9 percent).

Although water usage has decreased since 2012 due to the drought, the general split of City-wide water usage remained roughly the same in 2015 as it has been the previous decade. This can be attributed to even growth across land use types in the City, with no large commercial or industrial development that might significantly shift overall water usage. A summary of 2015 water demands in million gallons (MG) per year can be found in Table 4-1.

Table 4-1: 2015 Demands for Potable and Raw Water (DWR Table 4-1)

Use Type	2015 Actual		
	Additional Description (as needed)	Level of Treatment When Delivered	Volume (MG)
Single-Family[1]		Drinking Water	2,166
Multi-Family[1]		Drinking Water	574
Commercial[1,2]		Drinking Water	727
Irrigation[1]		Drinking Water	410
Other[1]	Fire hydrant/services	Drinking Water	126
Sales/Transfers/Exchanges to other agencies[3]	City of American Canyon treated deliveries	Drinking Water	33
Sales/Transfers/Exchanges to other agencies[3]	Raw water deliveries to American Canyon, Benicia, and Travis Air Force Base	Raw Water	850
Losses		Drinking Water	963
TOTAL			5,849

Table 4-1 Notes:

1. *Values based on study conducted by M. Cubed (2016). Projected water use by use type in each 5-year increment may not add up to listed sum due to rounding.*
2. *Institutional and industrial demands are included in commercial demand.*
3. Values based on City of American Canyon 2015 UWMP, City of Benicia 2015 UWMP, and prediction from Travis Air Force Base 2005 Water Supply Master Plan of 2.9 mgd average with 15% contingency. Includes both raw and treated water demands.

As discussed in Section 3.3, population growth is estimated to remain low, at around 1 percent, resulting in a slow increase in residential units. Additional growth in the City is expected to be proportional to the population projections, meaning that the future water use breakdown by sector will remain roughly proportional. Demand projections were calculated using population projections, forecasts of the number of metered connections, historical water use, and anticipated changes in water use practices. Though there will be some future growth, the implementation of water codes, conservation programs, and higher water and sewer rates (the effects of which have all been incorporated into the projections) will limit the increase in total City-wide demand, with total demands actually expected to decrease over the planning period of this UWMP. A technical memorandum describing the methodology used to calculate the demand projections is available in Appendix B. Table 4-2 summarizes the projected water demands in the City. Since there is no recycled water use within the City's service area, City's total water demands are equal to the potable and raw water demands, as summarized in Table 4-3.

Table 4-2: Project Demands for Potable and Raw Water (DWR Table 4-2)

Use Type	Additional Description *(as needed)*	Projected Water Use (MG)				
		2020	2025	2030	2035	2040
Single-Family[1]		2,591	2,515	2,428	2,365	2,281
Multi-Family[1]		610	602	593	590	590
Commercial[1,2]		835	806	770	738	707
Agricultural irrigation[1]		584	571	547	518	485
Other[1]	Fire hydrant/services	123	126	128	130	134
Sales/Transfers/Exchanges to other agencies[3]	(includes raw and treated)	2,599	2,783	2,783	2,783	2,783
Losses[1]		950	711	496	483	466
TOTAL (MG)		8,291	8,114	7,746	7,608	7,447

Table 4-2 Notes:

1. *Values based on study conducted by M. Cubed (2016). Projected water use by use type in each 5-year increment may not add up to listed sum due to rounding.*
2. *Institutional and industrial demands are included in Commercial demand.*
3. *Values based on City of American Canyon 2015 UWMP, City of Benicia 2015 UWMP, and prediction from Travis Air Force Base 2005 Water Supply Master Plan of 2.9 mgd average with 15% contingency. Includes both raw and treated water demands.*

Table 4-3: Total Water Demands (DWR Table 4-3)

	2015	2020	2025	2030	2035	2040
Potable and Raw Water *From Tables 4-1 and 4-2*	5,849	8,291	8,114	7,746	7,608	7,447
Recycled Water Demand *From Table 6-4*	0	0	0	0	0	0
TOTAL WATER DEMAND (MG)	5,849	8,291	8,114	7,746	7,608	7,447

4.2. Distribution System Water Losses

City water losses fall into two categories: distribution system losses (real losses) and apparent water losses. Using the American Water Works Association (AWWA) Water Audit software, the City's 2015 total water loss was calculated to be approximately 963 MG (Table 4-4). This calculation is based on a preliminary version of the City's 2015 Water Loss Audit which will not be finalized until it has been validated through DWR's Water Loss Technical Assistance Program in 2016-2017. This water loss is equivalent to a 22 percent loss rate when compared to water supplied and is consistent with the loss rate observed over the previous few years and in line with the City's water loss goal. Results of the Water Audit are available in Appendix C.

Table 4-4: AWWA Water Loss Audit (DWR Table 4-4)

Reporting Period Start Date	Volume of Water Loss[1]
January 2015	963 MG

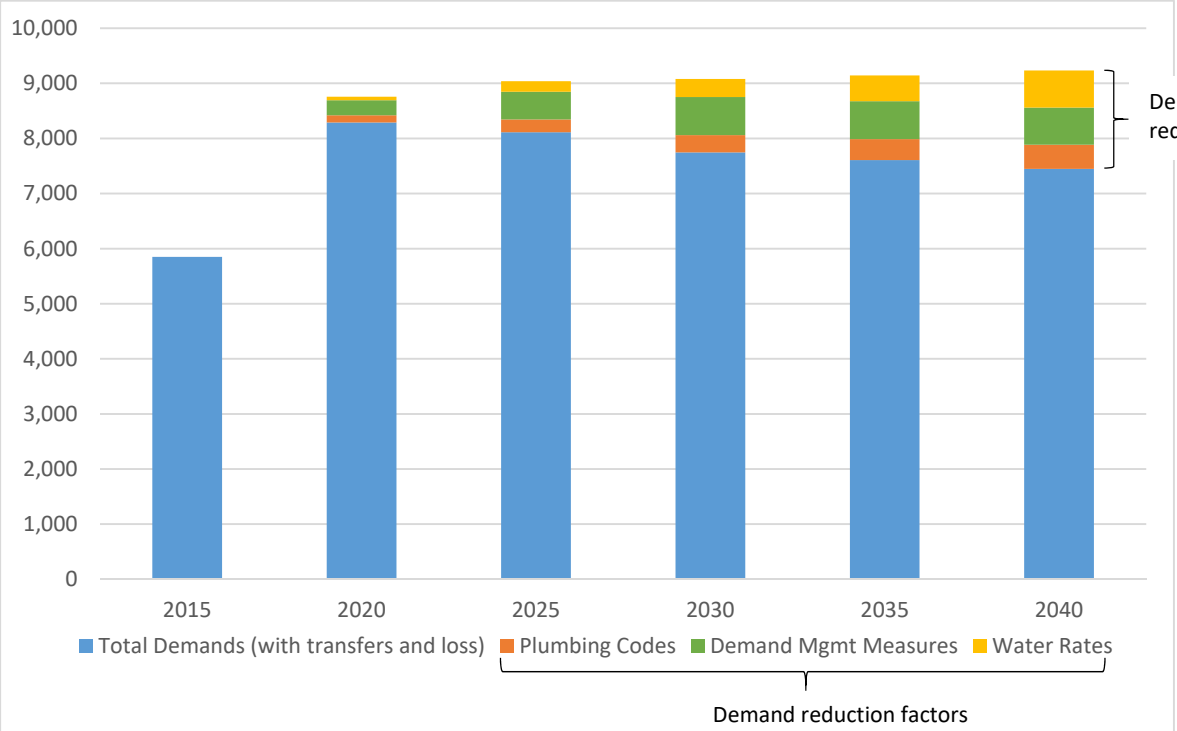
Notes:

1. *Based on the AWWA Water Audit and methods presented in Appendix L of the DWR Guidebook.*

4.3. Estimating Future Water Savings

In order to meet water use targets and continue striving for more efficient water use, the City anticipates an increase in water savings due to enforcement of new plumbing codes, conservation programs, water loss management and potentially increased water/sewer rates. The water demand projections presented in Table 4-2 (calculated by M.Cubed and included in Appendix B) accounted for these water savings measures (Table 4-5). Plumbing codes, water and sewer rate increases, and demand management measures are projected to reduce demands by roughly 26 percent by 2040 as shown in Figure 4-1.

Figure 4-1: Current and Projected Water Use



In January 2016, City Ordinance No. 1718 N.C. (2d) was enacted to ensure compliance with Section 2 of Article X of the California Constitution which specifies that the right to use water is limited to the amount reasonably required for the beneficial use. This ordinance promotes the planning, design and implementation of water efficient landscaping as both standalone projects and components of larger developments. This ordinance also establishes a maximum applied water allowance to help ensure efficient and effective water use. This ordinance will help reduce water usage City-wide as new development takes place. In addition to the ordinance, Chapter 11 of the City's Municipal Code contains prohibitions on the waste of water (11.54). City Ordinance No. 1718 N.C. (2d) and the referenced section of the City's Municipal Code are included in Appendix D.

While not in the City plumbing code, there are anticipated water savings from increases in the efficiency of toilets, urinals, showerheads, clothes washers, and dishwashers. New homes and businesses will install more efficient plumbing fixtures and water-using appliances than is currently reflected in the existing stock upon which baseline average water use is based. Additionally, existing homes will eventually replace their current fixtures and appliances as they wear out or as part of remodeling or resale (per state law) with more efficient fixtures and appliances. Over time, this will result in a predictable decline in indoor water use per dwelling unit or service meter. These water savings were calculated using the Alliance for Water Efficiency's Water Conservation Tool[1] and were included in the demand projections presented in Table 4-2. This tool is in wide use in California and throughout North America, and is specifically designed to estimate water savings associated with plumbing codes, appliance standards, and utility-based conservation programs.[2] The tool follows similar methodology to that presented in Appendix K of DWR's UWMP Guidebook, *Estimating Future*

[1] http://www.allianceforwaterefficiency.org/Tracking-Tool.aspx
[2] Currently, approximately 400 utilities throughout North America are using the Alliance for Water Efficiency's Water Conservation Tool for conservation program planning.

Water Savings from Adopted Codes, Standards, Ordinances, or Transportation and Land Use Plans (2015).

Other water savings can be attributed to increases in water and sewer rates. The City's water rates employ a combination of fixed service and volumetric charges. Users are encouraged to limit water usage to reduce the volumetric portion of their water bills. The City is likely to continue employing this rate structure in the future which will continue to encourage customers to reduce water demands.

4.4. Water Use for Lower Income Households

CWC Section 10631.1(a) requires suppliers to estimate projected water use for single-family and multi-family residential housing needed for lower income households, as identified in the Housing Element of the General Plan for the service area of the supplier. According to the City's current Housing Element Update 2015-2023 (Lisa Wise Consulting, Inc., 2015), an estimated 41 percent of households in the City are lower-income, as defined as having income below 80 percent of the area's median household income.

Further, per the Housing Element, the City's Regional Housing Need Allocation for 2014 through 2022 for lower income housing is 461 units. The Regional Housing Need Allocation does not break down the housing need by housing type (single-family versus multi-family). Therefore, the projected water demand for lower income housing was conservatively estimated based on the average 2015 water demands for single-family residential customers. At 0.066 MG per household[3] and 17,055 lower-income household units[4], the projected water demand for lower income housing units is roughly 1,130.3 MG in 2020.[5] This estimate is considered to be conservative because multi-family residential housing uses less water on a per-dwelling unit than single-family housing. As shown in Table 4-5, this demand is incorporated in overall demand projections in this UWMP by assuming lower income housing grows proportionally to City population growth.

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

Are Future Water Savings Included in Projections?	Yes
Location in UWMP	Section 4.3
Are Lower Income Residential Demands Included in Projections?	Yes

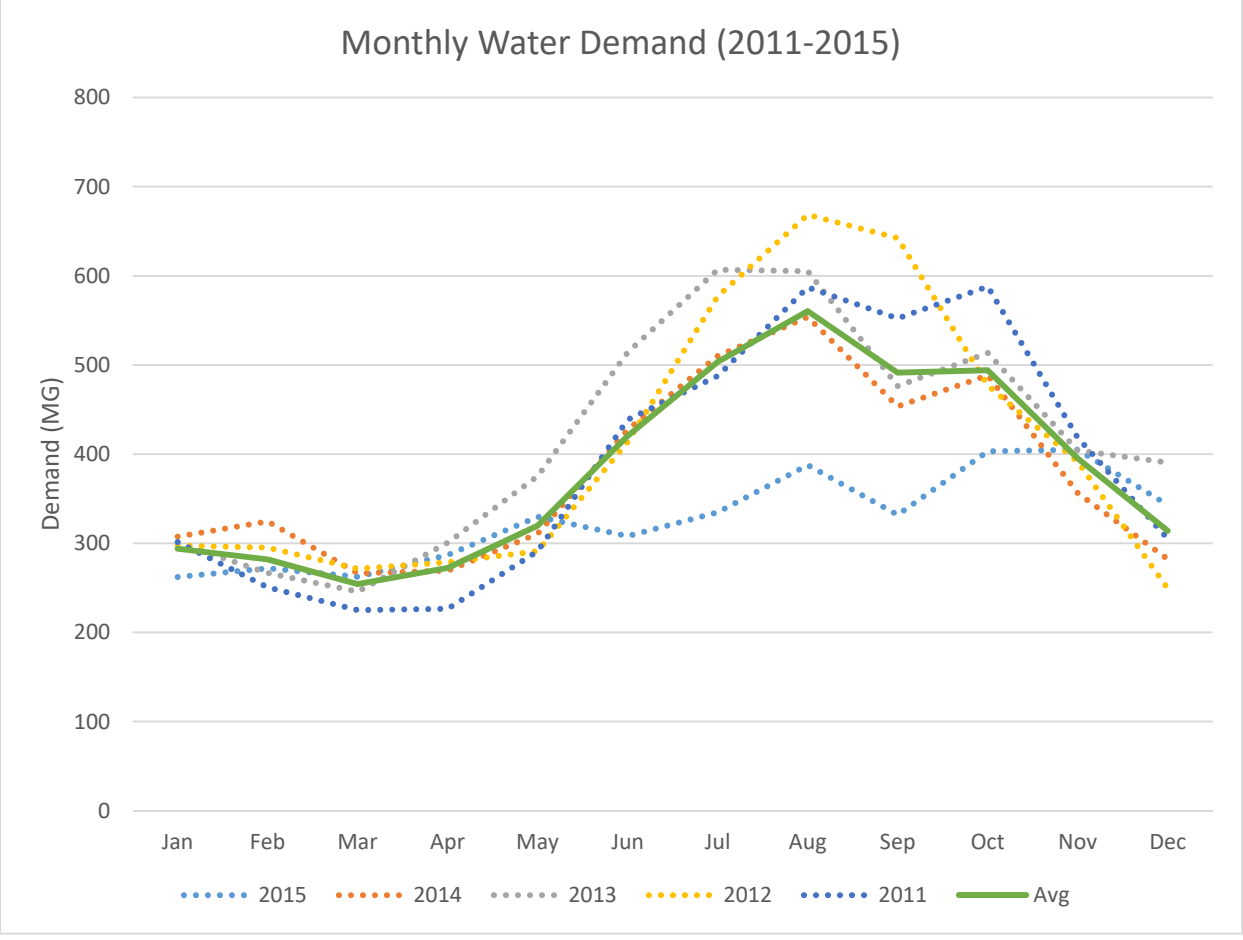
[3] Based on 32,682 single-family households with a demand of 2,166 MG in 2015.
[4] 16,594 existing low-income households plus 461 future households.
[5]While the current Housing Element does not include projections for low income housing through 2040, an estimate of growth in this sector can be estimated based on the projected growth of the general population. Assuming a 1 percent annual increase in the population of lower income residents (and a related change in lower income housing units), the projected water demand for lower income housing units is estimated to be 1,379 MG in 2040.

4.5. Climate Change

Climate change is expected to increase temperatures and increase the frequency and severity of droughts in California. This, in turn, will increase demand for outdoor irrigation, as hotter and drier conditions lead to an increase in plant evapotranspiration and fewer opportunities for natural irrigation through precipitation. Figure 4-2: shows that The City's water demand approximately doubles in summer months, indicating that demand increases with seasonal uses like outdoor irrigation. Climate change is likely to exacerbate this difference and increase summer irrigation demands even further.

The recent drought has shown that the City's curtailment measures are effective. The City and its customers worked to reduce water use in response to state-wide cutbacks, and were able to reduce summertime water use by nearly one third of the average water demand in 2015. Figure 4-2: illustrates the magnitude of this decrease in use. As droughts become more frequent, it may be challenging to further decrease already-hardened demands.

Figure 4-2: Monthly Water Demand for Vallejo (2011-2015)



Section 5 SB X7-7 Baselines and Targets

This section describes the City's urban water system demands. It presents the calculations for the City's baseline (base daily per capita) water use and interim and final water use targets, including a detailed description of how the baseline and targets were calculated. The calculations follow the guidance provided in DWR's publication *Methodologies for Calculating Baseline and Compliance Urban Per Capita Water Use* (2016a). Background information and the approach used to develop baselines and targets are also included.

5.1. Updating Calculations from 2010 UWMP

In 2010, urban water suppliers were required under SBx7-7 (the Water Conservation Bill of 2009) to develop a baseline daily per capita water use, a per capita water use target for 2020, and an interim water use target for 2015 in their UWMPs. In its 2010 Draft UWMP, the City used a baseline period from 1999 to 2008 to calculate a baseline water use of 156 GPCD. The City's 2020 water use target was 125 and its 2015 interim water use target was 141 GPCD. Since the 2010 U.S. Census data was not available when the City drafted its 2010 UWMP, it must recalculate its SBX7-7 water use baselines and targets for this Plan using 2010 Census data. The *2015 UWMP Guidelines* also state that an agency may use a different baseline period in its 2015 UWMP than its 2010 UWMP (2016b).

5.2. Baseline Periods

The purpose of developing a base daily per capita water use is to have a baseline from which to derive the water use target for 2020 and the interim target for 2015. The baseline is developed for each water supplier based on a 10-year average beginning no earlier than 1994 and ending no later than 2010. If in 2008 more than 10 percent of an urban water supplier's deliveries were from recycled water, a 15-year average may be used. The City does not have recycled water so the 15-year average does not apply.

Average water use over a 5-year baseline period beginning no earlier than 2003 and ending no later than 2010 is also calculated to confirm whether the proposed 2020 per capita water use target meets the legislation's minimum water use reduction requirement of at least 5 percent. In other words, if the calculated 2020 water use reduction target does not represent at least a 5 percent reduction from the 5-year baseline period, the urban water supplier must lower the proposed 2020 target to meet the 5 percent minimum reduction requirement.

The City's baseline is calculated using a 10-year average because its recycled water supply was less than 10 percent of the total water supply (in fact, it was zero). The City has selected its baseline over the 10-year period to be 1997 to 2006 and its 5-year period (used to calculate compliance with the 5 percent minimum reduction requirement) to be 2003 to 2007. This information is summarized in Table 5-1.

Table 5-1: Baseline Period Ranges (SBX7-7 Table 1)

Baseline	Parameter	Value	Units
10- to 15-year baseline period	2008 total water deliveries	6,721	Million Gallons
	2008 total volume of delivered recycled water	-	Million Gallons
	2008 recycled water as a percent of total deliveries	0.00%	Percent
	Number of years in baseline period[1, 2]	10	Years
	Year beginning baseline period range	1997	
	Year ending baseline period range[3]	2006	
5-year baseline period	Number of years in baseline period	5	Years
	Year beginning baseline period range	2003	
	Year ending baseline period range[4]	2007	

Notes:

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

5.3. Service Area Population

The City delivers water primarily to urban customers. Its current water customers included in the baseline population are residential and commercial users within the city limits, in pocket areas that are not in the city limits but within "unincorporated Vallejo proper" (such as Homeacres and Starr Subdivision); and in the Vallejo Lakes service area (Green Valley located in northern Solano County and the Gordon Valley located in southern Napa County). The City is a wholesale supplier to Travis Air Force Base, the City of American Canyon, and the City of Benicia. The wholesale supply customers are not included in the City's baseline population.

Since more than 95% of the area served by the City substantially overlaps with the Census-designated City of Vallejo, Department of Finance (DOF) population estimates were used for the City of Vallejo service area for the baseline period and for 2015. The relatively small population served in the Vallejo Lakes and unincorporated service areas was calculated using a combination of DOF population growth rates and population density data with City connection data. These small areas outside of the City of Vallejo account for approximately 4% of the City's customers.

The population served by the City and its gross water use for its baseline period and 2015 is summarized in Table 5-2.

5.4. Gross Water Use

"Gross Water Use" is defined in the CWC 10608.12 as the total volume of water entering the distribution system of an urban retail water supplier, excluding recycled water, water placed into long term storage, water conveyed to another urban water supplier, and water delivered for agricultural use. Table 5-2 shows the total gross water produced from 1997 through 2007 at Vallejo's water treatment plants which then is delivered to customers. Gross water use also includes raw

water customers, which constitute approximately 3 percent of total water use and take delivery of their water upstream of the Fleming Hill WTP.

Water produced from the Fleming Hill WTP is delivered to all in-city water customers, unincorporated Vallejo proper and City of American Canyon treated water sales. Total gross water use shown in Table 5-2 does not include water treated at the Fleming Hill WTP that is wholesaled to American Canyon. Water produced from the Green Valley WTP is delivered to the Lakes water customers. Starting in 2014, Lakes water customers also receive potable water purchased from the City of Fairfield.

The City does not produce any recycled water, place water into long term storage, or deliver water for agricultural use, so these potential water uses were not incorporated into the gross water use analysis.

Table 5-2: Gallons per Capita Per Day (GPCD) (SBX7-7 Table 5)

10 to 15 Year Baseline GPCD				
10 to 15 Year Baseline GPCD		10 to 15 Year Baseline GPCD	10 to 15 Year Baseline GPCD	10 to 15 Year Baseline GPCD
Year 1	1997	116,741	6,892	162
Year 2	1998	117,346	6,459	151
Year 3	1999	119,269	6,975	160
Year 4	2000	121,510	7,122	161
Year 5	2001	122,756	6,755	151
Year 6	2002	123,561	7,013	155
Year 7	2003	123,804	6,996	155
Year 8	2004	123,991	6,836	151
Year 9	2005	122,875	7,042	157
Year 10	2006	122,195	6,809	153
10-15 Year Average Baseline GPCD				**156**
5 Year Baseline GPCD				
Baseline Year *Fm SB X7-7 Table 3*		**Service Area Population** *Fm SB X7-7 Table 3*	**Gross Water Use** *Fm SB X7-7 Table 4*	**Daily Per Capita Water Use**
Year 1	2003	123,804	6,996	155
Year 2	2004	123,991	6,836	151
Year 3	2005	122,875	7,042	157
Year 4	2006	122,195	6,809	153
Year 5	2007	122,237	6,882	154
5 Year Average Baseline GPCD				**154**
2015 Compliance Year GPCD				
2015		121,652	5,067	**114**

Notes:

1. *The City's population was calculated through adding the Unincorporated and Lakes area populations determined through U.S. Census and DOF data to the City's population determined through DOF data. The City's gross water use includes water treated at the Fleming Hill and Green Valley water treatment plants, raw water served directly to customers, and potable water wheeled by the City of Fairfield to the Lakes area. It does not include treated water wholesaled to American Canyon.*

5.5. Baseline and Target Daily Per Capita Water Use

The base daily per capita use is the water supplier's average gross daily per capita use in gallons ("baseline"). The baseline includes all water entering the delivery system, including water losses.

Table 5-3 illustrates the City's 10-year baseline and is calculated at 156 gallons per capita per day (gpcd). The baseline was developed using the total service area population shown in Table 2.2 and is the average per capita usage over the 10-year period selected.

Each urban water supplier must also calculate a 5-year baseline for a period between 2003 and 2010 and adopt a target that results in at least a 5 percent reduction from that 5-year baseline. As illustrated below in Table 5-3, the City's 5-year base daily per capita water use is 154 GPCD.

As previously stated, SBx7-7 requires that the City's 2020 target must be at least 95 percent of the 5-year baseline of 154 GPCD, or 147 GPCD. Thus, the City's 2020 per capita water use target cannot exceed 146 GPCD.

SBx7-7 established requirements to reduce the statewide urban per capita water use by 20 percent by the year 2020. Each individual urban water supplier must develop a water use target for the year 2020 as well as an interim water use target for the year 2015. The interim water use target set for 2015 is numerically halfway between the baseline and the 2020 target. Depending on an agency's baseline, the resulting targets may result in something more or less than 20 percent reduction compared to current use. In accordance with Water Code Section 10608.4(k)(2), agencies not in compliance with the 2020 target by December 31, 2020 will not be eligible for state water grants or loans.

There are four methods that an urban water supplier may use to develop its 2015 and 2020 water use targets. Three methods were provided in SBx7-7 and the fourth was subsequently established by DWR. The four methods are generally described below. A more complete description can be found in DWR's *2015 UWMP Guidebook* (2016b).

- Method 1: 80 percent of 10-year baseline GPCD;
- Method 2: Performance standards based on actual water use data for indoor residential water use, landscaped area, and commercial, industrial and institutional (CII) water use;
- Method 3: 95 percent of the San Francisco Bay Hydrologic Regional Target from the 20 x 2020 Water Conservation Plan; and
- Method 4: Water Use Targets based on residential performance standards and specific savings goals for Cll and Landscape use and for water losses.

Methods 1and 3 were applied in this analysis. Methods 2 and 4 require data specificity that is not currently available to the City, such as parcel-specific landscaped area for all property (Method 2). Method 4 requires the development of a 10-year average of the GPCD of Cll use. The City's Cll sector water billing data is not reliable for the first two years of its selected 10-year range. Therefore, Method 4 was not used by the City to calculate water use targets.

Urban Water Use Target Method 1 Evaluation: 80 Percent of Base Daily per Capita Water Use

The City's baseline water use, as illustrated in Table 5-3is 156 GPCD, calculated over the period from 1997 through 2006.

- Based on a 20 percent reduction of the base daily per capita water use of 156 GPCD, the 2020 target is 124 GPCD; and

- Based on the midpoint between the base daily per capita water use of 156 GPCD and the 2020 target of 124 GPCD, the 2015 interim target is 140 GPCD.

Urban Water Use Target Method 3 Evaluation: 95 Percent of the Hydrologic Region Target

Method 3 allows the water supplier to select 95 percent of the hydrologic region's 2020 target as its target. The applicable hydrologic region for the City is Region 2 - San Francisco Bay, with a regional target of 131 GPCD.

- Based on 95 percent of the hydrologic region's target of 131 GPCD for the San Francisco Bay Region, the 2020 target is 124 GPCD; and
- Based on the midpoint between the baseline water use of 156 GPCD and the 2020 target of 124 GPCD, the 2015 interim target is 140 GPCD.

Method 1 was chosen by the City as the final methodology; thus, the City's 2020 target is 124 GPCD and its 2015 interim target is 140 GPCD. Because the 2020 target calculated under Method 1 is below 95% of the 5-year baseline (154 GPCD), the final selected target does not need to be adjusted.

Table 5-3 summarizes the City's 2015 and 2020 water use targets.

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

Baseline Period	Start Year	End Year	Average Baseline GPCD	2015 Interim Target	Confirmed 2020 Target
10-15 year	*1997*	*2006*	*156*	*140*	*124*
5 Year	*2003*	*2007*	*154*		

5.6. 2015 Compliance Daily Per Capita Water Use (GPCD)

The City's 2015 actual per capita water use was 114 GPCD. Thus, it is in compliance with the 2015 interim target of 140 GPCD. Although 2015 use may be artificially low due to state-mandated restrictions caused by the recent severe drought, the City is on track to meet its 2020 target. The City demonstrates compliance with its 2015 GPCD goal in Table 5-4. The City plans to continue to make improvements to its system as feasible, implement DMMs as described in Section 9, and encourage water use efficiency throughout its service area in an attempt to further reduce urban per capita water use.

Table 5-4: 2015 Compliance (DWR Table 5-2)

Actual 2015 GPCD	2015 Interim Target GPCD	Optional Adjustments to 2015 GPCD *From Methodology 8*					2015 GPCD	Did Supplier Achieve Targeted Reduction for 2015?
		Extraordinary Events	Economic Adjustment	Weather Normalization	TOTAL Adjustments	Adjusted 2015 GPCD		
114	140				0	114	114	Yes

Section 6 System Supplies

The City of Vallejo uses surface water as its sole supply source; no groundwater sources are used. Recycled water is limited to water treatment plant process backwash, sludge handling decant, and filtrate water, which is returned to a reclaim basin and subsequently introduced back into the headworks of the plant. The City obtains surface water from five water rights from four different sources. Surface water is conveyed to three treatment plants in order to serve customers in two different counties (Solano and Napa) and to an active military base (Travis Air Force Base). The four sources of surface water are:

- State Water Project (SWP)/ Vallejo Permit Water (California (Sacramento) Bay Delta);
- Solano Project Water (Lake Berryessa);
- Lakes Frey and Madigan; and
- Lake Curry (not currently accessible for water system supply.

6.1. Purchased or Imported Water

A summary of 2015 purchased/imported water supplies can be found below in Table 6-1, with a description of each source following in the sections below.

Table 6-1: 2015 Purchased/Imported Water Supplies

Water Supply Source	Volume (MG)	
	2015 Supply	Total Annual Right or Safe Yield
State Water Project	2,092	1,825
Vallejo Permit Water	1,261	7,429
Solano Water Project	2,667	4,757
Total	6,020	14,011

6.1.1 State Water Project

State Water Project (SWP) water is diverted from the Sacramento-San Joaquin Delta at the Barker Slough Pumping Plant and conveyed through the North Bay Aqueduct (NBA) system approximately 21 miles to the California Department of Water Resources (DWR)-operated Cordelia Forebay. A portion of SWP water is diverted to supply Travis Air Force Base before reaching the Cordelia Forebay. From the Cordelia Forebay, the water is pumped via the City's Cordelia and Jameson pumping stations and the City's two transmission pipelines to the Fleming Hill Water Treatment Plant (WTP). Solano County Water Agency (SCWA) is the managing wholesaler for Solano County agencies for purchase of SWP water.

Table A Allotment

The SCWA executed a *Water Supply Contract* with DWR for SWP water on November 12, 2003. SCWA subcontracts to member units throughout Solano County, including the City. The SWP contract between the State and SCWA can be found at the following website link: http://www.water.ca.gov/swpao/docs/wsc/SCWA_C_C.pdf

The City executed a *Water Contract for Water Supply from North Bay Aqueduct* with SCWA. In the agreement, the City is allocated annual allotments of SWP water, commonly referred to as "Table A allotment". The City's Table A allotment was accelerated in 2009 to its ultimate amount of 1,825 million gallons per year (MG/yr) starting in 2010. The City's current water contract with SCWA runs through 2035 with provisions for extensions. All member units to the SWP contract share in the same curtailment percentage as declared by the State of California for any given water year. The annual right may be exceeded in a given year due to available carryover from previous years.

Dry-Year Water Bank

SCWA, along with a consortium of State water contractors, entered into an agreement with DWR, entitled *2009 Drought Water Bank Agreement*, which is for emergency water potentially available when there is a curtailment of SWP water and if rice farmers in the Sacramento Valley are willing to make their SWP water supply available to urban users of SWP water. This supply (commonly referred to as "dry-year water bank") is neither guaranteed nor reliable. This potential dry-year supply does not reduce available SWP Table A allotments.

Turn-Back Water Pool Program

DWR has a program for interested SWP contractors called the Turn-back Water Pool Program. A SWP contractor may choose to sell Table A water it will not use or purchase turn-back pool water that is available through the program. For purposes of this UWMP, water from this pool program is not included in the reliability assessment or the various water supply tables because this program operates on an as-available basis. The amount of pool water that would be available to the City is not a significant amount.

6.1.2 Vallejo Permit Water

Vallejo holds an Appropriative Water Rights License (No. 997848) with the State Water Resources Control Board (SWRCB), issued August 1966, pre-dating the construction of the SWP. This water supply is commonly referred to by the City as "Permit Water." Permit Water is pumped from Barker Slough and delivered through the NBA and is separate from the City's SWP Table A allotment. SCWA is the managing wholesaler for purchase of Permit Water. The license allows for a maximum diversion of 31.52 cfs or about 7,429 MG/yr. Conveyance of Vallejo Permit Water through the NBA is limited by this contract to a maximum of 5,633 MG/yr. Since the limitation is not based on a physical capacity constraint of the NBA, an additional 1,790 MG could be available upon execution of an amendment to the existing agreement between DWR and SCWA.

6.1.3 Solano Project Water

The Solano Project is a federal water project operated by the U.S. Bureau of Reclamation (Bureau) that stores water in Lake Berryessa for various agencies and users in the area, including the City of Vallejo. Solano Project water is delivered from Lake Berryessa via the Putah South Canal to the Bureau's Terminal Reservoir in Cordelia. Approximately 95 percent of the Solano Project water is pumped via the City's Cordelia pumping station, primarily to the Fleming Hill WTP. Approximately 5 percent of the Solano Project water is conveyed via Solano Irrigation District's distribution facilities to the Green Valley WTP. Approximately 98 MG/yr is delivered to the Travis WTP via the Beck Avenue Pump Station.

The City has a water entitlement of 4,757 MG/yr of Solano Project water. SCWA is the managing wholesaler for Solano County agencies for purchase of Solano Project water.

6.2. Groundwater

The City does not have any groundwater supply sources (as shown in Table 6-2). At this time, the City has no intention to seek or investigate groundwater supply.

Table 6-2: Groundwater Volume Pumped (DWR Table 6-1)

☑	Supplier does not pump groundwater. The supplier will not complete the table below.					
Groundwater Type	Location or Basin Name	2011	2012	2013	2014	2015
TOTAL		0	0	0	0	0

6.3. Surface Water

Local Vallejo Lakes surface water sources are stored in Lakes Frey, Madigan, and Curry. Currently, Lake Curry is used for voluntary instream flow purposes only; water from Lakes Frey and Madigan are supply sources for the Lakes customers (see Figure 3-1).

Lakes Frey and Madigan are located in northern Solano County. The City owns both lakes and the surrounding land. Water flows from Lake Madigan into Lake Frey, then flows into the Diversion Dam, and then continues to flow via a City gravity pipe system to the Green Valley WTP, located at the end of Green Valley Road.

Safe yield calculations by Raymond Vail and Associates in 1989 show that the safe yield of Lake Madigan and Frey is 196 MG/yr, as determined using a worst case historical two year 1976 drought scenario. The City has chosen to reduce this amount by one third to 130 MG/yr due to the lack of alternative water sources for the Lakes system.

Lake Curry is the largest lake in the Vallejo Lakes System and is located in southern Napa County. It was used as a water supply for the City as well as customers in the Lakes area until the early 1990s, but closure of the Gordon WTP at Lake Curry meant that water could no longer be pumped and treated from the lake. The City owns the lake and surrounding land. Lake Curry has a storage capacity of 3,487 MG, and according to a 1989 study by Raymond Vail and Associates, the lake has a safe yield of 1,222 MG/yr. However, Lake Curry is not currently being used or planned to be used in the near future as a drinking water source, although lake water is being used for voluntary in-stream flow into Suisun Creek.

6.4. Stormwater

The City of Vallejo does not collect stormwater for beneficial reuse. Vallejo Sanitation & Flood Control District (VSFCD) is responsible for managing stormwater runoff within the City.

6.5. Wastewater and Recycled Water

Except for a small amount of recycled water used at the VSFCD wastewater treatment plant for native plant propagation, and the City's own on-site recycling of water treatment backwash and sludge handling decant and filtrate water back to the plant headworks at Fleming Hill and Green Valley WTPs, the City does not currently have recycled water available in its service area. This section

describes the wastewater characteristics, flows, and treatment facilities that are in close proximity to the City's water service area.

6.5.1. Recycled Water Coordination

In order to further supplement and enhance the City's water supply sources, the City has had discussions about recycled water treatment, distribution, and consumption with the Vallejo Flood Control and Sanitation District (VSFCD) which is the agency that takes the lead on wastewater, stormwater, and recycled water planning in the City of Vallejo. The City supports the development of recycled water and will actively work with VSFCD and other stakeholder agencies to pursue recycled water projects and related funding. The City continues to support and contribute data to periodic reclaimed water studies that VSFCD has conducted. The most recent Reclaimed Water Study (2014) is discussed further in Section 6.5.4.

6.5.2. Wastewater Collection, Treatment, and Disposal

VSFCD provides all wastewater collection, treatment, and disposal services, and recycled water production and reuse within its wastewater service area, which includes the City of Vallejo and the unincorporated area in the greater Vallejo area.

The wastewater system consists of collection pipes that deliver wastewater to the Vallejo Wastewater Treatment Plant (WWTP). The WWTP, located at 450 Ryder Street in Vallejo, treats an average flow of 11.44 million gallons per day (mgd). The Vallejo WWTP has a dry weather capacity of 15.5 mgd and a wet weather capacity of 60 mgd. VSFCD's current dry weather flow is 9 mgd and has been decreasing due to low flow fixtures and a reduction of inflow and infiltration into the collection system. Treatment consists of conventional secondary treatment with trickling filters, short-term aeration, chlorination, and dechlorination before treated effluent is discharged to the Carquinez Strait.

In 2015, VSFCD collected, treated, and discharged 3,198 MG of wastewater. The collection system is described in Table 6-3. Treatment and discharge information is summarized in Table 6-4.

Table 6-3: Wastewater Collected Within Service Area in 2015 (DWR Table 6-2)

Name of Wastewater Collection Agency	Wastewater Volume Metered or Estimated?	Volume of Wastewater Collected from UWMP Service Area 2015	Name of Wastewater Treatment Agency Receiving Collected Wastewater	Treatment Plant Name	Is WWTP Located Within UWMP Area?	Is WWTP Operation Contracted to a Third Party?
Vallejo Sanitation & Flood Control District (VFCSD)	Metered	3,198 MG	Vallejo Sanitation & Flood Control District (VFCSD)	Vallejo Wastewater Treatment Plant	Yes	Yes
Total Wastewater Collected from Service Area in 2015:		3,198 MG				

Table 6-4: Wastewater Treatment and Discharge Within Service Area in 2015 (DWR Table 6-3)

Wastewater Treatment Plant Name	Discharge Location Name or Identifier	Discharge Location Description	Wastewater Discharge ID Number *(optional)*	Method of Disposal	Does This Plant Treat Wastewater Generated Outside the Service Area?	Treatment Level[1]	2015 volumes (MG)			
							Wastewater Treated	Discharged Treated Wastewater	Recycled Within Service Area	Recycled Outside of Service Area
Vallejo Wastewater Treatment Plant	EFF-001 and EFF-002	EFF-001: Carquinez Strait EFF-002: Mare Island Strait		Bay or estuary outfall	No	Secondary, Disinfected - 23[1]	3,198	3,198	0	0
						Total	3,198	3,198	0	0

Table 6-4 Notes:

1. *Vallejo WWTP effluent geometric mean enterococcus density analyzed in each calendar month may not exceed 35 MPN/100mL, which is slightly different than DWR's secondary disinfected treatment categories of 2.2 and 23 MPN/100mL.*

6.5.3. Recycled Water System

The City of Vallejo does not currently use recycled water. A study describing potential recycled water demands and treatment/distribution options is described in the next section.

6.5.4. Recycled Water Beneficial Uses

VSFCD commissioned a report entitled *Reclaimed Water Study*, (RMC, May 2014). The study showed that there is a potential annual recycled water demand of approximately 502 MG in the Sanitation District's service area (City of Vallejo and unincorporated Vallejo – does not include the Lakes region). The recycled water demand is primarily for irrigation demands from golf courses, parks, schools and other large landscape irrigation customers within the city limits. The report recommended a centralized treatment option which would include construction of a tertiary treatment facility at the existing WWTP with distribution pipelines radiating out from the central treatment plant. The centralized treatment option was found to be more cost-effective than a considered decentralized treatment option. The recommended alternative was implementation of a recycled water program for 93.5 MG/yr of demands identified on Mare Island, including the 18-hole Mare Island Golf Course, the City Park, and planned mixed-use residential and commercial development with open space elements. The unit cost of implementation for serving these demands was found to be comparable to potable water rates.

Recycled water delivery would require adding tertiary treatment processes to its secondary WWTP as well as construction of recycled water distribution pipelines from the tertiary WWTP. The lack of a tertiary WWTP and "backbone" infrastructure system for recycled water causes a significant financial limitation to the use of recycled water in the City's service area. As stated in the 2014 *Reclaimed Water Study*, a recycled water program could only likely occur when one of the following conditions occur:

- Implementation of more stringent wastewater discharge requirements;
- Increased water demand due to development;
- Increased vulnerability of the water supply due to drought;
- Substantial grant funding to lower the cost of recycled water development; or
- Public opinion to implement recycled water as an environmental enhancement.

For this reason, Table 6-5 does not identify potential future uses because recycled water use is not feasible nor cost-effective in the foreseeable future.

Table 6-5: Current and Projected Recycled Water Direct Beneficial Uses Within Service Area (DWR Table 6-4)

☑	Recycled water is not used and is not planned for use within the service area of the supplier. The supplier will not complete the table below.							
Beneficial Use Type	**General Description of 2015 Uses**	**Level of Treatment**	**2015**	**2020**	**2025**	**2030**	**2035**	**2040**
Agricultural irrigation								
Landscape irrigation (excludes golf courses)								
Golf course irrigation								
Commercial use								
Industrial use								
Geothermal and other energy production								
Seawater intrusion barrier								
Recreational impoundment								
Wetlands or wildlife habitat								
Groundwater recharge [Indirect Potable Reuse (IPR)]								
Surface water augmentation (IPR)								
Direct potable reuse								
Other								
		Total:	0	0	0	0	0	0

The City of Vallejo did not complete its 2010 UWMP, but the draft 2010 UWMP assumed no projected recycled water use, as shown in Table 6-6, which also shows that there was no actual recycled water use in 2015.

Table 6-6: 2010 UWMP Recycled Water Use Projection Compared to 2015 Actual (DWR Table 6-5)

☑	Recycled water was not used in 2010 nor projected for use in 2015. The supplier will not complete the table below.

Use Type	2010 Projection for 2015	2015 Actual Use
Agricultural irrigation		
Landscape irrigation (excludes golf courses)		
Golf course irrigation		
Commercial use		
Industrial use		
Geothermal and other energy production		
Seawater intrusion barrier		
Recreational impoundment		
Wetlands or wildlife habitat		
Groundwater recharge (IPR)		
Surface water augmentation (IPR)		
Direct potable reuse		
Other		
Total	0	0

6.5.5. Actions to Encourage and Optimize Future Recycled Water Use

Currently, the City does not have established ordinances and policies requiring the installation of purple pipe for new development. In addition, the City does not require the installation of separate irrigation meters for all non-residential landscapes which would facilitate identifying potential recycled water uses. While these types of policies could facilitate the installation of recycled water infrastructure and incremental conversion to recycled water, treatment upgrades at the WWTP would be required for recycled water production. Table 6-7 shows potential methods to expand future recycled water use in Vallejo in the future.

Table 6-7: Methods to Expand Future Recycled Water Use (DWR Table 6-6)

Name of Action	Description	Planned Implementation Year	Expected Increase in Recycled Water Use
Recycled Water Ordinance	Prohibit the use of potable water when recycled water is available.	Unknown	Unknown
Recycled Water Ordinance	Continue cooperation with VSFCD to facilitate future recycled water and grey water use in the City's wastewater service area and in the City's water service area.	2015 and ongoing	Unknown
Pursue funding for recycled water projects	Pursue funding for recycled water projects in coordination with VSFCD and stakeholder agencies	2017 and ongoing	Unknown
Provide ongoing technical assistance to users	Provide ongoing technical assistance to users.	Unknown	Unknown
Be proactive in public education.	Be proactive in public education, including providing information about greywater use on the City's website.	2017 and ongoing	N/A
		Total	0

6.6. Desalinated Water Opportunities

SCWA's Integrated Regional Water Management Plan (IRWM) identifies desalinating Carquinez Strait water as an available long-term action to develop a new permanent water supply for Solano County. Potential desalination plant locations include offshore in the Cities of Benicia and Vallejo. Currently, there are no planned desalination projects in Solano County. Such projects could be pursued by SCWA if grant funding becomes available or other actions are taken to improve the economics of such projects. However, feasibility studies would be needed to evaluate its cost-effectiveness relative to other sources and to identify potential permitting restrictions.

Desalination facilities are costly to construct and operate relative to the City's current supply sources. According to DWR's *California Water Plan Update 2013*, recent estimates for proposed large-scale seawater desalination plants in California range from about $4,900 to $9,200 per MG, a large component of which is energy which can fluctuate greatly in cost. While cost estimates can vary wildly based on site-specific characteristics and other assumptions used, desalinated water usually costs more than other water supplies. There are also significant environmental and permitting issues associated with disposal of brine from the desalination treatment process. Alternatives would need to be investigated for discharging brine into the Bay that would not have adverse environmental effects.

The City's water supply needs can be met without the development of a local desalination supply. Desalination could conceivably be considered as a potential, future, local emergency supply source; however, the development of such a supply would be a long-term project requiring study and evaluation to determine its feasibility and cost effectiveness.

6.7. Exchanges or Transfers

The City has existing water transfer agreements with the Cities of American Canyon and Benicia and water exchange agreements with the City of Fairfield and Solano Irrigation District (SID).

6.7.1. American Canyon Water Agreement

The Cities of Vallejo and American Canyon entered into an agreement to provide for the sale of water from the City of Vallejo to the City of American Canyon. This includes three subsets of water: (1) treated water, (2) raw Permit Water, and (3) emergency water, each of which will be discussed below.

Treated Water Supply to City of American Canyon

The Vallejo Water Agreement provided for American Canyon's purchase of 205 MG/yr of treated Vallejo water supply in 1996. Under the terms of the agreement, American Canyon also has or had an option to purchase treated water supply during 5-year increments of time from 2001 through 2021. If the option for any of the years is not exercised by the dates established in the agreement, the option expires for that block of water supply.

The proposed purchase options that have or would be taken are based on American Canyon's 2015 UWMP. The year of the options to purchase blocks of treated water and the volumes are summarized below:

Table 6-8: American Canyon Treated Water Purchase Blocks

Option Year	Volume (MG/yr)	Result
1996	205	Purchased (original agreement)
2001	236	Not purchased (option 1)
2006	236	Purchased (option 2)
2011	236	Purchased (option 3)
2016	184	Purchased (option 5)
2021	184	Pending option 5, final
Total	1,045	Ultimate total, excluding option 1

Permit Water Supply to City of American Canyon

The City sells Permit Water to the City of American Canyon. On June 4, 1998, the American Canyon Water Agreement was amended (Addendum 2) to provide for a 3-party agreement for the "wheeling" of 163 MG/yr of Permit Water to the City of Calistoga (Calistoga). For Calistoga to receive the 163 MG/yr water supply, the City of American Canyon permanently transferred 163 MG/yr of American Canyon's SWP Table A allotment to Calistoga, and in turn, the City provided 163 MG/yr of Permit Water to American Canyon.

Emergency Water for City of American Canyon

The Vallejo Water Agreement was amended (Addendum 1) on July 18, 1996 to provide for American Canyon's purchase of up to 163 MG/yr (untreated water) for *emergency* purposes. Under the addendum, an emergency is defined as a condition whereby American Canyon's SWP allotment is reduced due to environmental or other constraints. When American Canyon's Table A allotment is not curtailed, emergency water is not available for purchase. In the reliability assessment presented later in Section 7, Vallejo emergency water is not included as a sale to American Canyon. The environmental constraints cited by the State are: i) restrictions on the SWP pumping required by the biological opinions issued by the U.S. Fish and Wildlife Service (June 2009) and National Marine

Fisheries Service (December 2008), and ii) climate change, which is altering the hydrologic conditions in the State.

6.7.2. City of Benicia Water Agreement

Under Amendment No. 2 to the 1962 Vallejo/Benicia Water Agreement, dated April 28, 1989, Vallejo is to deliver 358 MG of raw water per year to the City of Benicia. A service charge applies for usage exceeding 50 days per year. The agreement expires in February 2025, but is assumed in this UWMP to be extended for purposes of this report. However, terms of any agreement extension would need to be negotiated by both parties at a future time.

6.7.3. City of Fairfield

An agreement, dated March 20, 1992, provides for temporary potable water service between the City of Fairfield and the City of Vallejo. This agreement provides for Fairfield to serve potable water to Vallejo's Lake System. Vallejo provides the raw water supply and pays for the cost of service (lease payment and user charge). Demand is not to exceed 365 MG in 12 months. This agreement is now expired.

A subsequent agreement, dated May 4, 1993, with the City of Fairfield provides for mutual water exchange or sale between Fairfield and Vallejo. In the agreement, Vallejo will provide surplus Permit Water to Fairfield at either an exchange rate of 2:1 for Solano Project water or at a price of $50 per acre-feet (initially). In exchange, Fairfield will serve potable water into the Vallejo Lakes system and provide raw water that will be added to Vallejo's Solano Project allotment. Vallejo will be charged for water service at Fairfield's in-city general service rate.

Amendment No. 1 to the agreement, dated August 4, 1993, provides for two water connections ("interties") that were added through which Fairfield can serve potable water into the Vallejo Lakes system. Vallejo pays Fairfield a user charge if the connections are activated.

As a result of a California Department of Transportation (Caltrans) project on State Route 80 in the vicinity of Green Valley Road overpass that impacted a water distribution line exclusively feeding a subset of Vallejo Lakes customers known as the Old Cordelia subarea, the City of Vallejo is unable to directly deliver potable water to this portion of its service area. Rather than replace the impacted line, the City chose to enter into a water service agreement with the City of Fairfield to wheel (deliver) water to this portion of their system in lieu of the City's direct delivery. The agreement, dated June 3, 2014, provided for the wheeling (movement) of Fairfield potable water to the City of Vallejo's distribution system through an existing intertie between the two systems for delivery to the impacted portion of the Vallejo Lakes system. This potable water service utilizes an existing 4-inch City of Fairfield-owned intertie and provides for a maximum of 21,000 gallons per hour (350 gallons per minute [gpm] rate for one hour). This agreement does not affect existing water entitlements for either city nor does it have an expiration date; the agreement is specifically for the delivery of potable water to the Old Cordelia subarea.

6.7.4. Solano Irrigation District

The City has a service exchange agreement with Solano Irrigation District. Under this arrangement, the City provides raw water to Tolenas area within Fairfield, in SID's service area, and in exchange, SID delivers an equal amount of raw water to the City's Green Valley WTP. Consequently, the City supplies Tolenas' water demand from the City's Permit Water and/or SWP water supplies (through the NBA system) and in exchange, SID augments the City's supplies with Solano Project water. The demands of both areas are typically not equal and SID usually owes the City a balance of Solano Project water at the end of each year.

6.8. Future Water Projects

At present, the City has no planned future water supply projects to meet total projected water demands or to provide additional reliability to its water supply sources.

Table 6-9: Expected Future Water Supply Projects or Programs (DWR Table 6-7)

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

Name of Future Projects or Programs	Joint Project with other agencies?		Description (if needed)	Planned Implementation Year	Planned for Use in Year Type	Expected Increase in Water Supply to Agency
	Y/N	If Yes, Agency Name				

6.9. Summary of Existing and Planned Sources of Water

Table 6-10 provides a summary of all existing water supplies in 2015, while Table 6-11 provides projections of future supply through 2040.

Table 6-10: Water Supplies – 2015 Actual (DWR Table 6-8)

Water Supply	Additional Detail on Water Supply	2015 Volumes (MG)		
		Actual Volume	Water Quality	Total Right or Safe Yield
Purchased or Imported Water	State Water Project[1]	2,092	Raw Water	1,825
Purchased or Imported Water	Permit Water	1,261	Raw Water	7,429
Purchased or Imported Water	Solano Water Project	2,667	Raw Water	4,757
Surface water	Lakes Frey and Madigan	30	Raw Water	130
Exchanges	Solano Irrigation District	85	Raw Water	0
	Total	6,135		14,142

Table 6-10 Notes:

1. *2015 State Water Project deliveries were higher than the City's total water right because of carryover from previous years.*

Table 6-11: Water Supplies – Projected (DWR Table 6-9)

Water Supply	Additional Detail on Water Supply	Projected Water Supply (MG)									
		2020		2025		2030		2035		2040	
		Reasonably Available Volume	Total Right or Safe Yield	Reasonably Available Volume	Total Right or Safe Yield	Reasonably Available Volume	Total Right or Safe Yield	Reasonably Available Volume	Total Right or Safe Yield	Reasonably Available Volume	Total Right or Safe Yield
Purchased or Imported Water	State Water Project[1]	1,466	1,825	1,466	1,825	1,466	1,825	1,466	1,825	1,466	1,825
Purchased or Imported Water	Permit Water[2]	5,633	5,633	5,633	5,633	5,633	5,633	5,633	5,633	5,633	5,633
Purchased or Imported Water	Solano Project[3]	4,723	4,757	4,723	4,757	4,723	4,757	4,723	4,757	4,723	4,757
Surface water	Lakes Frey and Madigan[4]	130	130	130	130	130	130	130	130	130	130
Total		11,952	12,346	11,952	12,346	11,952	12,346	11,952	12,346	11,952	12,346

Table 6-11 Notes:

1. *SWP Reasonably Available Volume assumes 73% allocation based on normal year conditions (based on SCWA analysis), plus a 10% North of Delta Allocation. Total Right of 1,825 MG (5,600 AF) is not expected to be met except in very wet years.*
2. *Permit Water based on appropriative water rights license of 7,429 MG/yr (22,800 AFY), but reduced to 5,633 MG/yr (17,287 AFY) due to lack of agreement for full conveyance.*
3. *Reasonably available volume assumes 99% allocation based on normal water year conditions, based on SCWA analysis.*
4. *Based on City water rights.*

6.10. Climate Change Impacts to Supply

Water Supply

Precipitation patterns are expected to shift and snowpack is expected to decline in California due to climate change. This may threaten water supply that comes from snowmelt, such as the water supplied to the City through the State Water Project (SWP). Although the City is not located in a watershed that will be directly impacted by a decrease in snowmelt, the City's supplies may be impacted by this decrease via watersheds that contribute to the SWP, such as mountainous watersheds in the northern Sierra Nevada and southern Cascades.

Additionally, the City receives its SWP water through the Delta, an area that is already ecologically sensitive. Since the Delta is a climate sensitive water body, it will likely be impacted by climate change and this will result in strains on environmental and municipal demands. For more information on the impacts of climate change on the Delta, see *Section 3.2.1 Climate Change* of this UMWP.

Water supplies in some regions in California may be threatened by invasive species, such as the Quagga Mussel. Invasive species are expected to become more prevalent under climate change conditions, which may further threaten water supply. Invasive species in Solano County include Yellow Star Thistle, New Zealand Mud Snails, Medusa-head, Pepperweed, Bullfrogs, Russian Thistle, and Cocklebur. Water facilities and conveyance structures are being monitored for invasive species, but have not yet been detected.

Water Quality

The NBA watershed has had a history of water quality issues. In the mid-1990s, the water quality in the NBA was considered "perhaps the most vulnerable in the State Water Project" (DWR, 1998). While steps have been taken to improve water quality, the City still observes water quality shifts from the NBA during rain events that impact its treatment plant operation. As rain events are likely to become more severe under climate change conditions, more erosion may occur in the watershed. This would increase turbidity in the water and further impact the City's treatment infrastructure after a severe storm event.

Section 7 Water Supply Reliability Assessment

This section compares the water demand information developed in Section 4 and the water supply information developed in Section 6 to provide an estimate of water supply reliability. Comparisons are provided using DWR's required range of hydrologic conditions, including the Normal, Single Dry Year, and Multiple Dry Year scenarios.

7.1. Constraints on Water Sources

The City has five water rights to four sources of water supply: surface water supplies from the State Water Project (SWP), Permit Water, Solano Project Water, and surface water supplies stored in Lakes Frey and Madigan. While the City also has a right to water stored in Lake Curry, there is currently no conveyance infrastructure to make use of the supply beyond in-stream flows for Suisun Creek. As illustrated in Table 6-11, the City's supply projections indicate that its 2040 water supply portfolio will be composed of the following water supply sources under normal year conditions:

- 54 percent Permit Water;
- 33 percent Solano Project water;
- 10 percent State Water Project; and
- 1 percent Lakes Frey and Madigan surface water.

Water from Lakes Frey and Madigan are available sources of supply for the Lakes service area. Although this supply source is small in comparison to the other available sources, it is an important, independent source of supply from both a reliability and operational standpoint. Table 7-1 summarizes the various factors that may affect the City's supplies. This table does not include the City's emergency water supplies as those supplies are mainly used for operational flexibility and during catastrophic emergencies.

Table 7-1: Factors Affecting Reliability of Supply

Water Supply Source	State Water Project (SWP)	Permit Water	Solano Project Water	Lakes Frey and Madigan Surface Water
Specific Sources Name (if any)	Bay-Delta surface water via Barker Slough	Bay-Delta surface water via Barker Slough	Lake Berryessa	Lakes Frey and Madigan
Limitation Quantification (Year 2040)	1,825 MG/yr (Table A allotment + NOD Settlement)	7,429 MG/yr	4,757 MG/yr	130 MG/yr
Legal	Agreement expires 2038; will need to extend	Appropriative rights under License 997848; no expiration date	Water delivery contract through SCWA for water from USBR federal project; No expiration date	Pre-1914 Appropriative rights
Environmental	Biological Opinions from USFWS[1] and NMFS[1] issued in 2008 and 2009 affect water exports from the Delta through the SWP	Same as SWP	None	None
Water Quality	Barker Slough water quality issues mainly pertaining to TOC, turbidity and taste and odor affect the cost of treatment at City and Travis WTPs	Same as SWP	None	None
Climatic	Vulnerable to climatic conditions as this directly affects the SWP system and hence, deliveries from the SWP	Appropriative rights make this supply more reliable than SWP, but was curtailed for 1st time in 2014 and 2015 due to severe drought	Vulnerable to climatic conditions as this source is surface water from runoff; however, not as vulnerable as Bay-Delta source	Vulnerable to climatic conditions as this source is surface water from runoff; however, not as vulnerable as Bay-Delta source
Additional Information	As SWP water is curtailed, dry-year water bank water may become available. Can acquire additional amount beyond entitlement from carryover water, when available	1,790 MG/yr of total entitlement is unavailable until such time agreement to allow Vallejo's full conveyance through the NBA is secured	Can bank unused entitlement for future years subject to conditions	Water from Lakes Frey and Madigan available to Lakes System only

Table 7-1 Notes

1. U.S. Fish and Wildlife Service (USFWS); National Marine Fisheries Service (NMFS)

7.1.1. Legal & Environmental Constraints

State Water Project Supply Reliability

The DWR *2015 SWP Delivery Reliability Report* is based on a model of what SWP deliveries could be, reported as a percentage of SWP full allocations. The analysis is based on several environmental factors including Biological Opinions (BOs) by the U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS). The BO by USFWS was issued in December 2008 and the BO by NMFS was issued in June 2009. The BOs affects SWP pumping operations and SWP exports from the Delta. The *Delivery Reliability Report* concludes that projected long-term average delivery amounts of Table A allotments have decreased from previous estimates.

As a result of a North of Delta (NOD) Settlement (December 31, 2013), DWR issues a separate SWP annual allocation for Solano County Water Agency (SCWA), Napa County Flood Control and Water Conservation District, City of Yuba City, and County of Butte. The NOD allocation amounts to an additional increment of annual allocation above the current SWP allocation and is being used as a way to not penalize North Bay Aqueduct (NBA) users due to conveyance restrictions that are exclusive to the South of Delta pumping plants. A copy of the Summary of the *2015 SWP Delivery Reliability Report* is included in Appendix E.

Permit Water Supply Reliability

Permit Water, although conveyed via the NBA system, is not the same as SWP water. Permit Water is an appropriative water right that Vallejo has under a license with the SWRCB. Although Permit Water is similarly subjected to Delta smelt-related pumping restrictions, it has not been subject to the same curtailment as SWP water supplies. Historically, the City has not experienced a curtailment of its Permit Water allocation, even under severe drought conditions, until recently when Permit Water was curtailed from June 2014 to November 2014 and again May 2015 to November 2015.

Solano Project Water Supply Reliability

The reliability of the Solano Project water supply is based on the SCWA *Water Supply Reliability Technical Memorandum* prepared by Kennedy/Jenks Consultants in April 2016. In general, this source is reliable, but can experience significant drawdown during long periods of drought since the local watershed will not produce as much runoff. In this case, member agencies have an agreement to reduce allocations at defined reservoir elevation thresholds and instead keep water in the reservoir as carryover for the future.

Lakes Frey and Madigan and Lake Curry Water Supply Reliability

Water stored in Lakes Frey and Madigan is used to serve the City's Lakes customers. Historically, it has not been curtailed and for this reason, during normal water years, a supply reliability of 100 percent is assumed. However, for single and multiple-dry years, the supply reliability has been assumed to be similar to that of Lake Berryessa (Solano Project water).

A reliability analysis was not conducted for the Lake Curry since, currently and into the near future, this water source is being used only for voluntary instream flows to Suisun Creek. When, in the future, the City constructs a conveyance system to access this supply, water from Lake Curry can be made available as an additional supply for City's customers. For this UWMP, however, it is assumed that this supply source will not available in the planning horizon.

7.1.2. Water Quality Constraints

A major source of the City's water supply is the SWP and Permit Water from the Barker Slough watershed. This watershed is located in the larger Sacramento River watershed, and drains an area approximately 14.5 square miles in Solano County. The source water is conveyed via the NBA system to the Cordelia Forebay, from which it is pumped and transmitted to the City's water treatment plant

by a separate pipeline. Surface water source problems pertaining to the NBA water from the Sacramento Delta are due, in part, to the location of the intake in Barker Slough. Water quality problems include excessive turbidity, color, taste and odor, and total organic carbon (TOC) concentrations of the NBA water, mostly occurring during storm events.

In addition to the Barker Slough watershed, the City receives water from the Solano Project, which is water stored in Lake Berryessa. This water supply source generally has very good water quality except after significant storms, when the turbidity in the source water can be challenging to treat. Turbidity is introduced at Putah Creek and Putah South Canal, downstream of Lake Berryessa.

The City consistently meets all drinking water standards, though the source water occasionally poses treatment challenges during storm events when elevated levels of turbidity and TOC occur. Local runoff and low pumping rates at Barker Slough during the winter result in an extended period of increased turbidity and TOC concentrations into the NBA. Taste and odor are also occasional problems. In order to reduce the significance of potential contamination sources, the cities and districts receiving NBA water have been working with the SCWA to evaluate watershed management practices that could improve water quality. The SCWA and its retailers are investigating an alternate NBA intake to mitigate against water quality and environmental concerns with the existing NBA intake.

All California Department of Public Health Services (CDPH) standards are consistently met in the potable water supplies delivered. For this reason, curtailment of the use of the City's water supplies due to water quality issues is considered to be unlikely. However, the cost of treatment is an ongoing concern, and the SCWA member agencies continuously collaborate to work towards the implementation of watershed best management practices (BMPs) within areas that drain into Barker Slough.

7.2. Reliability by Water Year Type

The City's water supply sources primarily consist of Bay-Delta surface water (for SWP and Permit Water), water from Lake Berryessa (Solano Project Water), and surface water from Lakes Frey and Madigan (used to serve the Lakes area). The basis for each water year type for each supply source is summarized in Table 7-2 through Table 7-5. The data used to determine the supply available for each water year type for the SWP and Solano Project water are from the SCWA *Water Supply Reliability Technical Memorandum*, prepared for SCWA by Kennedy/Jenks Consultants in April 2016. SCWA is the managing supplier of these sources of water for the City. Data used to determine supply availability for Permit Water was from historical supply records. A combination of historical supply records and values from SCWA's Lake Berryessa analysis were used to determine supply availability for Lake Frey and Madigan water supplies.

SCWA and the City are continuing discussions with other Bay-Delta water users regarding "area of origin" and priority water rights for Bay-Delta water. The results this discussion may affect the reliability of this source in the future.

Although the source for Permit Water is the same as for the SWP (Bay-Delta) supply, Permit Water is a much more robust supply for the City. While Permit Water is similarly subject to Delta smelt-related pumping restrictions, it is not typically subject to the same curtailments as SWP water, and therefore, the City's license for receiving this water is more reliable. However, Permit Water was curtailed for the first time in 2014 and 2015 due to the current severe drought (although full allocations were delivered in 2012 and 2013, the first 2 years of the current drought). Since Permit Water was not curtailed in 2012 or 2013 (years one and two of the current drought) but was curtailed in 2014 (year three), the City is assuming that, in the future, Permit Water will be curtailed in year 3 of a multiple-dry year scenario. The Permit Water curtailments in 2014 and 2015 averaged 54% of the calendar

year delivery, so the City is assuming 46% supply availability during the third year of multiple-dry water years.

The basis for the City's supply from water stored in Lakes Frey and Madigan is the same percent allocation for the various hydrologic water years as the Solano Project water source, Lake Berryessa. This assumption is based on the fact that the three lakes are located in the same hydrologic area. Safe yield calculations by Raymond Vail and Associates in 1989 show that the safe yield of Lake Madigan and Frey is 196 MG/yr, as determined using a worst-case historical two-year (1976-77) drought scenario. The City has chosen to reduce this amount by one third to 130 MG/yr due to the lack of alternative water sources for the Lakes system. In addition, as the scenario envisioned only a two-year drought event, the City has chosen to reduce the 130 MG/normal water year value by 20% in a single dry year (reduced to 104 MG/yr) and by 25% in multiple dry years (reduced to 98 MG/yr) to assure extension of water delivery.

Water stored in Lake Curry is not included since this water source is currently being used for voluntary instream flow to Suisun Creek and the City does not have a way to convey the water to the City's water treatment plant at this time.

Table 7-2: Basis of Water Year Data – State Water Project (DWR Table 7-1)

Year Type	Base Year	Volume Available	% of Average Supply
Average Year	Average 1922-2004	1,466	100%
Single-Dry Year	1977	396	27%
Multiple-Dry Years 1st Year	1990	454	31%
Multiple-Dry Years 2nd Year	1991	454	31%
Multiple-Dry Years 3rd Year	1992	454	31%

Table 7-2 Notes:

1. *Multiple versions of DWR Table 7-1 are being used herein; this table summarizes the City's State Water Project water source. The values above include a North of Delta Allocation estimated by SCWA based on actual amounts received since the implementation of the North of Delta Settlement in 2014.*

Table 7-3: Basis of Water Year Data – Permit Water (DWR Table 7-1)

Year Type	Base Year	Volume Available	% of Average Supply
Average Year	1966 (license)[1]	5,633	100%
Single-Dry Year	-	5,633	100%
Multiple-Dry Years 1st Year	2012	5,633	100%
Multiple-Dry Years 2nd Year	2013	5,633	100%
Multiple-Dry Years 3rd Year	2014	2,582	46%

Table 7-3 Notes:

1. *Multiple versions of DWR Table 7-1 are being used herein; this table summarizes the City's Permit Water source. Available Permit Water entitlement is 5,633 MG/yr (17,287 AFY). Due to the first historical curtailments of about 54% in 2014 and 2015 due to the current severe drought, the City is assuming 46% supply reliability in year 3 of a multiple-dry year scenario.*

Table 7-4: Basis of Water Year Data – Solano Project (Lake Berryessa) (DWR Table 7-1)

Year Type	Base Year	Volume Available	% of Average Supply
Average Year	Average of 1906-2007	4,723	100%
Single-Dry Year	1934	4,682	99%
Multiple-Dry Years 1st Year	1990	4,242	90%
Multiple-Dry Years 2nd Year	1991	4,242	90%
Multiple-Dry Years 3rd Year	1992	4,242	90%

Table 7-4 Notes:

1. *Multiple versions of DWR Table 7-1 are being used herein; this table summarizes the City's water source from Lake Berryessa (Solano Project water).*

Table 7-5: Basis of Water Year Data – Lakes Frey & Madigan (DWR Table 7-1)

Year Type	Base Year	Volume Available	% of Average Supply
Average Year	-	130	100%
Single-Dry Year	-	129	99%
Multiple-Dry Years 1st Year	-	117	90%
Multiple-Dry Years 2nd Year	-	117	90%
Multiple-Dry Years 3rd Year	-	117	90%

Table 7-5 Notes:

1. *Multiple versions of Table 7-1 are being used herein; this table summarizes the City's water source from Lakes Frey and Madigan. The basis for the City's supply from Lakes Frey and Madigan is assumed to be the same percent allocation for the various hydrologic water years as the Solano Project water source from Lake Berryessa, which is geographically close (about 15 miles north). Base year is not reported since the reliability is based on the percentages from the Solano Project source.*

7.3. Supply and Demand Assessment

Table 7-6 compares the projected Normal Year (Reasonably Available Volume) water supply available to the City (including the Lakes service area) and projected customer demands from 2020 to 2040, in five-year increments. Comparisons of supply and demand under Single Dry and Multiple Dry Years are included in Table 7-7 and Table 7-8, respectively.

Table 7-6: Normal Year Supply and Demand Comparison (DWR Table 7-2)

	2020	2025	2030	2035	2040
Supply totals	11,952	11,952	11,952	11,952	11,952
Demand totals	8,291	8,114	7,746	7,608	7,447
Difference	3,661	3,838	4,206	4,344	4,504

Table 7-7: Single Dry Year Supply and Demand Comparison (DWR Table 7-3)

	2020	2025	2030	2035	2040
Supply totals	10,840	10,840	10,840	10,840	10,840
Demand totals	8,400	8,168	7,782	7,638	7,469
Difference	2,439	2,671	3,057	3,202	3,371

Table 7-8: Multiple Dry Years Supply and Demand Comparison (DWR Table 7-4)

		2020	2025	2030	2035	2040
First year	Supply totals	10,446	10,446	10,446	10,446	10,446
	Demand totals	8,280	8,056	7,678	7,536	7,371
	Difference	2,166	2,390	2,769	2,910	3,076
Second year	Supply totals	10,446	10,446	10,446	10,446	10,446
	Demand totals	8,117	7,903	7,536	7,398	7,237
	Difference	2,329	2,543	2,911	3,048	3,209
Third year	Supply totals	7,395	7,395	7,395	7,395	7,395
	Demand totals	8,173	7,955	7,584	7,445	7,283
	Difference	(778)	(560)	(189)	(50)	113

Table 7-7 and Table 7-8 show that, in most cases, the City has sufficient water supplies available to meet dry water year conditions. However, in the third year of a multiple-dry year scenario, the City expects a shortfall of between 50 and 778 MG between 2020 and 2035 due to expected curtailment of Permit Water. Under all other dry water year conditions, the City's projected water supply is approximately 10,000 MG/yr throughout the UWMP planning horizon. The City is fortunate to have a conservative total water supply volume such that City customers will have a reduced likelihood of being subject to severe rationing and mandatory water conservation due to water supply curtailments during the studied drought conditions.

In summary, the City's combined projected water supplies are anticipated to be sufficient to meet projected future demands during normal, single-dry and multiple-dry water year conditions.

7.4. Regional Supply Reliability

As part of its water management efforts, the City of Vallejo maintains a detailed Water Shortage Contingency Plan, as discussed later in Section 8, and is continually preparing to manage supplies and demands during droughts and water shortages to ensure a high quality, reliable water supply to its customers. The City also maintains a thorough conservation program as detailed in Section 9, and plans to continue to participate in regional water conservation measures, surveys, and rebate programs. Additionally, the City supports VSFCD which takes the lead on recycled water planning and associated studies.

The City works closely with and attends regular planning meetings with the other member agencies of the SCWA to coordinate optimized water supplies for all associated agencies.

Distribution system water losses will be analyzed annually using the AWWA Water Loss Audit for improved identification and tracking of loses. The City has purchased a new maintenance system which will improve water loss auditing processes by capturing a record of leaks, breaks, flushing, and firefighting events. Ongoing leak program activities include water meter calibrations, notifying customers when a leak appears to exist on the customer side of the meter, performing distribution system leak detection when warranted and cost-effective, and repairing leaks when found.

Section 8 Water Shortage Contingency Plan

This chapter describes the City's plans for water supply shortage or catastrophic supply interruptions in compliance with Water Code Section 10632(a). Prior to the preparation of this UWMP, the last version of the City's Water Shortage Contingency Plan (WSCP) had been prepared in 2005. This updated plan reflects changes in statewide and regional water shortage planning resulting from the recent ongoing drought. Although included as a section of the UWMP, the WSCP, upon its adoption by the City Council, can be separately cited as a stand-alone plan.

8.1. Stages of Action

The City of Vallejo employs a five stage water-shortage response plan (Table 8-1) which is triggered at prescribed levels. Water-shortage stages are monitored, reported and acted upon according to the plan set out in this WSCP for each water supply condition for each stage. Each stage consists of specific prohibitions, regulations, penalties, and/or rate structure to encourage the appropriate level of conservation. Though all five stages have both voluntary and mandatory components, none can be considered a rationing program because they do not strictly limit water use. However, Stages IV and V are most restrictive primarily due to the landscape irrigation component, which prohibits irrigation of any decorative landscaping. Under drought conditions, the City does not anticipate having to implement any conservation level above Stage III. Conservation Stages IV and V are prepared to meet emergency conditions brought about by catastrophic events.

Table 8-1: Stages of Water Shortage Contingency Plan (DWR Table 8-1)

Stage	Percent Supply Reduction	Water Supply Condition
Stage I – Normal Conditions	0% Normal Usage (Voluntary Conservation)	Full deliveries of water supply to all City customers and the ability to meet maximum day demand with largest unit out of service.
Stage II – Water Warning	Up to 10% reduction of normal usage	A cutback in supply of up to 10 percent of baseline supply and the inability to obtain additional water, or demand is greater than 90 percent of available supply.
Stage III – Water Shortage	Up to 20% reduction of normal usage	A cutback in supply of 20 percent and the inability to obtain additional water, or demand is greater than 105 percent of available supply.
Stage IV – Water Crisis	Up to 35% reduction of normal usage	A cutback in supply by 20-35 percent and the inability to obtain additional water, or demand is greater than 120 percent of available supply.
Stage V – Water Emergency	Up to and above 50% reduction of normal usage	A cutback in supply of up to or greater than 50 percent and the inability to obtain additional water, or demand is greater than 125 percent of available supply.

Table 8-1 Notes:

1. Stages II through V are mandatory compliance stages.

Given the potential requirement for various levels of demand reduction due to catastrophic events and drought scenarios, prioritization of use of available water resource must be considered. The principle of maximum beneficial usage must be implemented and plans created to efficiently produce such a result. Conservation measures utilized in each stage are based on the priorities set in the

California Water Code (CWC) Chapter 3 and through public input. A summary of those priorities is presented below.

Priority 1: Maintain essential public health and safety uses.

Uses include minimum drinking, sanitation, food preparation activities, and fire protection requirements. These uses are considered the core minimum water use of the community and are estimated at approximately 50 gallons per person per day.

Priority 2: Maintain the existing economic and job base of the community.

Acceptable uses would include water sufficient to allow restaurant operation, water necessary for existing industrial uses, and additional commercial uses which protect the employment base of the communities served. All these activities would be under condition of efficient water usage or penalty.

Priority 3: Continued discretionary uses for existing customers.

Existing customers make use of large quantities of non-essential water use through such activities as outdoor landscaping, swimming pools, and car washing. These activities would be heavily discouraged and would be expected to account for a large percentage of demand reductions. Provisions may be made to allow continued irrigation of heritage trees and plants which benefit the community.

Priority 4: New Service Connections

New connections would not be permitted during times of severe shortage. Only those approved connections permitted before supply reduction events occurred would be allowed to be connected to the system. Any additional service requests would be conditioned to fund demand reduction measures which produce verifiable savings greater than the proposed connection impacts.

8.2. Prohibitions on End Use

The specific water use reduction measures for the five stages are summarized in Table 8-2. The narrative description of the stages of action and restrictions and prohibitions on end use is provided in the following sections.

Stage I: Normal Supply

Stage I is to be in place at all times as it does not require any cutback in water usage. Instead, Stage 1 establishes recommendations for voluntary water conservation and water waste restrictions. All normal water efficiency programs are in place.

Stage II: Water Warning

In Stage II, all customers are required to reduce consumption by 10% for the duration of the water warning. Customers are also required or recommended to implement the following water shortage response measures:

- No hose washing of sidewalks, walkways, driveways, parking areas, patios, porches or verandas, except flammable or other similar dangerous substances may be washed from said areas by direct hose flushing for the benefit of public health and safety. This prohibition shall not apply where hosing of sidewalks or driveways is required by law.
- No water shall be used to clean, fill, operate, or maintain levels in decorative fountains unless such water is part of a recycling system.
- No customer shall permit water to leak from any facility on his/her premises. Such facilities shall include sprinklers and irrigation systems, faucets, toilets, water heaters, or any other fixture used in providing water service. Any leak shall be repaired in 72 hours.

- No customer shall sprinkle, water, or irrigate any shrubbery, trees, lawns, grass, ground cover, plants, vines, gardens, vegetables, flowers, or any other landscaped or vegetated area between the hours of 9:00 a.m. and 6:00 p.m. Such watering shall not be in excess of needs nor be of a manner that allows water to flow into streets. Watering by hand shall be allowed.
- Non-commercial washing of privately owned vehicles, trailers, buses, boats, and equipment, except from a bucket and except with a hose equipped with a shut-off nozzle may be used.
- Any use of water from a fire hydrant, except for fire protection purposes, is prohibited unless authorized by the City.
- Use of water for construction purposes, such as consolidation of backfill, unless no other source of water or method can be used, is prohibited.
- Water will be available only for beneficial uses; all unnecessary and wasteful uses of water are prohibited.
- Water efficient plumbing fixtures, water efficient appliances, and high efficiency irrigation techniques, such as drip irrigation, are encouraged.
- Mow less frequently allowing grass to grow longer, inducing hydration.
- Check the soil moisture in the root zone to determine when irrigation is required.
- Restaurants shall serve water only upon request.

Stage III: Water Shortage

Stage III is to be implemented when water demands need to be reduced by up to 20%. Customers will be notified that Stage III water conservation measures are in effect, and compliance with the following water shortage response measures will be required:

- All Stage I and II actions remain in force.
- Further reduction in landscape irrigation is required. Reduce watering time; tolerate some plant wilting.
- Landscape, pasture, common areas, and street median irrigation shall be limited to a maximum of three days per week, when necessary, based on the following schedule:
    - Customers with street addresses that end with an odd number may irrigate only on Tuesdays, Thursdays, and Saturdays.
    - Customers with street addresses that end with an even number may irrigate only on Monday, Wednesdays, and Fridays.
    - Common areas and street medians may irrigate only on Mondays, Wednesdays, and Fridays.

Stage IV: Water Crisis

Stage IV is to be implemented when water use reductions up to 35% are required. Customers will be notified of the water shortage response measures as listed below:

- All Stage I, II, and III actions remain in force.
- Landscape, pasture, common areas, and street median irrigation shall be limited to a maximum of two days per week based on the following odd-even schedule:

  - Customers with street addresses that end with odd numbers may irrigate only on Tuesdays and Saturdays.
  - Customers with street addresses that end with even number may irrigate only on Monday and Fridays.
  - Common areas and street medians may irrigate only on Mondays and Fridays.
- Water use for ornamental ponds and fountains is prohibited.
- Automobiles or equipment shall be washed only at commercial establishments that use recycled or reclaimed water.
- Water shall not be used for cooling mists.
- Flushing of sewers or fire hydrants is prohibited except in case of any emergency and for essential operations.

Stage V: Water Emergency

Customers will be required to comply with all of the following Stage V water shortage response measures when up to a 50% usage reduction is required. The water shortage response measures are listed below:

- All Stage I, II, III and IV actions remain in force.
- Landscape and pasture irrigation is prohibited.
- Activation of additional water service connections to the City will not be allowed.

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

Stage	Restrictions and Prohibitions on End Users	Additional Explanation or Reference *(optional)*	Penalty, Charge, or Other Enforcement[1]?
II	Other - Prohibit use of potable water for washing hard surfaces		Yes
II	Water Features - Restrict water use for decorative water features, such as fountains		Yes
II	Other - Customers must repair leaks, breaks, and malfunctions in a timely manner	Leaks shall be repaired within 72 hours.	Yes
II	Landscape - Limit landscape irrigation to specific times		Yes
II	Other - Prohibit vehicle washing except at facilities using recycled or recirculating water		Yes
II	Other	Any use of water from a fire hydrant, except for fire protection purposes, is prohibited, unless authorized by the City.	Yes
II	Other - Prohibit use of potable water for construction and dust control		Yes
II	CII - Restaurants may only serve water upon request		Yes
III	Landscape - Limit landscape irrigation to specific days	Landscape, pasture, common areas and street median irrigation shall be limited to a maximum of three days per week when necessary.	Yes
IV	Landscape - Limit landscape irrigation to specific days	Landscape, pasture, common areas and street median irrigation shall be limited to a maximum of two days per week when necessary.	Yes
IV	Other	Water shall not be used for cooling mists.	Yes
IV	Other	Flushing of sewers or fire hydrants is prohibited except in case of any emergency and for essential operations.	Yes
V	Landscape - Prohibit all landscape irrigation		Yes
V	Other	Activation of additional water service connections to the City will not be allowed.	Yes

Notes:

1. *Enforcement for Stages II through V is as follows: First offense results in a warning - delivered in person to the customer or left at the premises as a "door hanger." Second offense results in a fine of $200. Third offense results in a fine of $500.*

8.3. Penalties, Charges, Other Enforcement of Prohibitions

In order to discourage non-compliance with the mandatory water use restrictions in Stages II through V, the following enforcement practices and penalties will be implemented for violation of the stage-specific unauthorized water use:

- The first offense will result in a warning to the customer, which will be personally delivered or left at the premises as a "door hanger."
- The second offense shall result in a fine of $200.
- The third offense shall result in a fine of $500.

8.4. Consumption Reduction Methods

When the Water Shortage Contingency Plan is put into effect, the City will implement various consumption reduction methods depending on the stage of action. These consumption reduction methods are described below and summarized in Table 8-3.

Starting in Stage I, the City, in partnership with SCWA, will offer water surveys to customers to help them determine effect water conservation strategies. Additionally, the City will partner with SCWA, DWR and PG&E to offer rebates on high efficiency toilets and washing machines, smart irrigation controls and turf irrigation.[6] During Stage I, all normal water use efficiency programs will continue. During Stage II, the City will, notify local jurisdictions and customers that Stage II is being implemented, initiate a public information campaign explaining the water supply condition, maintain a water conservation hotline, provide free water conservation kits, and initiate "conservation monitor" duties to existing personnel to identify and document excessive water use. Additionally, the City will host conservation events and outreach in local schools.

If Stage III is implemented, the City will notify local jurisdictions and customers, continue those outreach strategies started in Stage II and tighten restrictions on water usage.

Should Stages IV or V be implemented, timely notice will be given to customers and local jurisdictions. Consumption reduction methods in Stages IV and V will build upon the actions of previous stages and include a moratorium on new water connections.

[6] http://www.cityofvallejo.net/cms/One.aspx?portalId=13506&pageId=23562

Table 8-3: Consumption Reduction Methods (DWR Table 8-3)

Stage	Consumption Reduction Methods	Additional Reduction or Reference
II	Expand Public Information Campaign	This will include distribution of literature, direct mailers, bill inserts, restaurants message tents, educational programs in schools and weekly water shortage status update and conservation messages printed in local newspapers. Additionally, a Water Conservation Hotline will be established with specially trained conservation representatives to answer customer questions about conservation and water use efficiency.
II	Other	Provide free water conservation kits at the Water Billing Office for customer pickup.
II	Increase Water Waste Patrols	Initiate "conservation monitor" duties to existing personnel to identify and document excessive water use and advise customers regarding the appropriate watering schedule.
II	Implement or Modify Drought Rate Structure or Surcharge	
III	Offer Water Use Surveys	In partnership with SCWA.
III	Other	Provide free water savings devices such as low-flow showerheads and aerators.
III	Provide Rebates on Plumbing Fixtures and Devices	In partnership with SCWA, offer rebates on high efficiency toilets ($100) and washers (up to $150) and irrigation controllers (up to $1,000).
III	Provide Rebates for Turf Replacement	In partnership with SCWA, offer rebates on turf replacement ($1/square-foot up to $2,000).
V	Moratorium or Net Zero Demand Increase on New Connections	

8.5. Determining Water Shortage Reductions

The success of the City's response to a water shortage depends on its ability to accurately monitor water usage, to determine if current stage mandatory water use reductions are being met, and project ongoing water supply adequacy. Billing data for the City of Vallejo lags approximately 1-2 months behind usage. Given the nature of standard rotating meter reading and the inability to hire and train meter reading personnel to increase the speed of data collection, the City will use water treatment plant production volume data to monitor water use reduction goals. Depending on the level of supply reduction and the corresponding requirement for demand reduction, water plant production will be monitored on a monthly, weekly, or daily schedule as described below to ensure that the necessary level of demand reduction is being achieved.

During Stage I periods, water production/consumption is reported by the Assistant Public Works Director – Water on a monthly basis to the Public Works Director to ensure adequate demand and supply balance is maintained.

During Stage II and III periods, water production/consumption is reported by the Assistant Public Works Director – Water on a weekly basis to the Public Works Director to ensure adequate demand and supply balance is maintained. If sufficient reductions are not being realized to ensure balance of supply and demand, recommendations will be presented to the City Manager for corrective actions to be taken.

During Stage IV and V periods, water production/consumption will be monitored on a daily basis with recommendations given daily if shortages are projected.

8.6. Revenue and Expenditure Impacts

As previously noted, the success of the City's response to a water shortage depends on its ability to accurately monitor water usage, to determine if current stage mandatory water use reductions are being met, and project ongoing water supply adequacy. It also depends on the City's careful review of revenue levels to ensure steps are taken, as needed, to maintain adequate water system funding during times of reduced water sales.

The City anticipates a reduction in revenue ranging from 9% in Stage II conditions to 35% in Stage V conditions due to reduced water sales. The reduction in revenue would be partially counteracted by a reduction in operations and maintenance expenses from the reduced deliveries. However, the reductions in expenses is not expected to entirely balance the City's reduced revenue, so the water fund will need to be monitored and a drought rate structure will likely need to be implemented. The plans for water fund monitoring and a drought rate structure are discussed below.

8.6.1. Water Fund Financial Monitoring

During Stage I periods, under normal conditions, water revenue figures are provided quarterly for review by department and division heads. The Assistant Public Works Director – Water will report monthly to the Public Works Director to ensure adequate revenue is being collected to meet existing and projected budgeted needs.

During Stage II and III periods, water revenue figures will be provided monthly for review by department and division heads. The Assistant Public Works Director – Water will report monthly to the Public Works Director to ensure adequate revenue is being collected to meet existing and projected budgeted needs. If revenues are projected to be inadequate, recommendations will be presented to the City Manager for corrective actions to be taken. Such actions may include increases or decreases in either or both the service charge and consumption charge, to ensure adequate funds are collected to maintain the financial stability of the water fund.

During Stage IV and V periods, water revenue figures will be provided weekly for review by department and division heads. The Assistant Public Works Director – Water will report monthly to the Public Works Director to ensure adequate revenue is being collected to meet existing and projected budgeted needs. If revenues are projected to be inadequate, recommendations will be presented to the City Manager for corrective actions to be taken. Such actions may include increases or decreases in either or both the service charge and consumption charge, to ensure adequate funds are collected to maintain the financial stability of the water fund.

8.6.2. Drought Rate Structure

Beyond Stage II, the City's existing rate structure is not likely to be adequate to meet expenses. The City recently conducted a rate study to determine future rates under both normal and drought conditions. The recent rate study recommends a volumetric increase in rates as conservation targets are increased to account for decreasing water usage. As proposed in the rate study, in the event of a

Stage III, IV or V Shortage Contingency event, City Council would enact the volumetric drought surcharge in parallel to the stage-appropriate water use reduction measures.

A new rate structure has not yet been adopted, but the City will pursue adoption of drought rates to allow the City to generate sufficient funds to operate, manage, and maintain its facilities and services in times of severe drought and water use reduction. The final rate structure may be imposed to adjust water volume rates by a specified percentage depending on the severity of the water shortage and the City's revenue needs. If a drought rate is implemented, customers who follow conservation recommendations provided by the City would experience minimal cost changes on their water bill while customers who do not conserve will experience higher bills. The 2016 rate study (NBS 2016) can be found on the City's website.[7]

8.7. Resolution or Ordinance

The City has prepared a draft water shortage contingency resolution which can be found in Appendix F. In the event of a water shortage emergency, the draft resolution will be brought before the City Council for adoption. The resolution includes a declaration of the water shortage and signals an official implementation of the prohibitions on end use and consumption reduction methods described in this WSCP.

8.8. Catastrophic Supply Interruption

Aside from drought-caused water shortages, the City is also vulnerable to other potential disaster situations that could result in a catastrophic interruption of water supplies including, but not limited to, regional power outages, landslides, earthquakes, and water contamination. Below is a brief summary of how catastrophic events, other than extreme drought, may affect the City's water supplies from the State Water Project (delivery of both State Water Project Table A and Vallejo Permit Water) and Solano Project facilities, as provided by SCWA, the City's wholesale supplier of water through these regional supply facilities.

North Bay Aqueduct Supply Interruption

The North Bay Aqueduct (NBA) supplies water to the City from the SWP, including conveyance of both Table A allotments and Vallejo Permit water entitlements. Potential catastrophic outages may occur from earthquakes that cause major damage to the NBA facilities, prolonged loss of PG&E power required for pumping water through the NBA, or contamination at the intake to the NBA. The NBA is an underground pipeline and not subject to landslide damage.

In the event of loss of NBA supply for any reason, the City would immediately switch to Solano Project water supplies while the emergency condition was being resolved and normal water supply restored. This high level of redundancy is possible due to the geographical separation of the two sources.

Solano Project Supply Interruption

The Solano Project supplies nearly half of all water to the City under normal conditions. In the event of an earthquake, the Solano Project Emergency Response Plan is invoked. The Plan, developed in coordination with the U.S. Bureau of Reclamation, provides a detailed response for various levels of seismic activities both at the Monticello Dam site and within a specified geographical area surrounding the Solano Project. No actions are necessary from the City of Vallejo, which will be notified at the time of the condition of the Solano Project and its ability to deliver. In the event of loss of Solano Project water, the City would attempt to shift to supplies delivered through the NBA including SWP water and Vallejo permit entitlements.

[7] http://www.cityofvallejo.net/common/pages/DisplayFile.aspx?itemId=2783255

The Putah South Canal is susceptible to a landslide which could either block or damage its ability to deliver Solano Project water. SCWA recently invested in a $3 million project to provide an underground pipeline bypass of an area that is most susceptible to a landslide. Any detection of contamination of Solano Project water may result in a shut-down of the Solano Project deliveries. The City of Vallejo receives its supply at the end of the delivery canal and, as such, is more exposed to potential supply interruptions due to canal impairment. Solano Project is a gravity system and is not dependent upon power to operate.

Vallejo Lakes Supply Interruption

Delivery of water from the Vallejo Lakes – Frey, Madigan, and Curry – is via gravity systems which are susceptible to earthquake damage. Each Lakes supply is inspected after earthquakes to assure public safety and determine the viability of the supply after an event. Damage may require changeover to the Solano Project through an exchange agreement with the Solano Irrigation District.

Emergency Response Plan

The City has completed a Water System Emergency Response Plan (ERP) in accordance with the Public Health Security and Bioterrorism Preparedness and Response Act of 2002. The City's ERP identifies the City's standardized response and recovery protocols to prevent, minimize, and mitigate injury and damage resulting from emergencies or natural disasters as described previously in this section. The ERP has been exercised once previously when the State pumps delivering NBA water were down for more than 24 hours. A copy of the City's ERP is available at the Office of the Assistant Public Works Director – Water at the Fleming Hill WTP. A summary of ERP actions are illustrated in Table 8-4.

Table 8-4: Preparation Actions for Catastrophes

Decision Stage Process	Actions Taken	ERP Activation Level
Stage 1 – Possible Threat	• Evaluate available information • Determine if a threat is possible	• Implement precautionary response actions
Stage 2 – Credible Threat	• Determine that threat is credible by establishing corroborating information: o Highly credible source o Health Department/customer reports o Unusual monitoring results	• Activate portions of ERP • Initiate internal and external notifications • Issue public health advisory • Initiate water sampling and analysis • Consider partial or full activation of EOC
Stage 3 – Confirmed Major Event	• Confirm threat by verifying definitive evidence and information that establishes the major event • Perform water sampling and analysis	• Fully implement ERP • Immediately initiate appropriate action plan • Fully activate EOC

Notes:

1. These stages are not related to those defined for the Water Shortage Contingency Plan.

The City has engineered its critical pump stations and reservoirs to meet all California seismic safety standards for critical facilities. In addition, the City has, as required by law, completed and filed a Vulnerability Assessment (VA) addressing security of the City's distribution system facilities. Regional power outages are not expected to prevent the City from receiving adequate water supplies due to the multitude of facilities and the fact that due to the geographical separation of the facilities they are fed from different power grids. It is highly unlikely that all water supplies will be

simultaneously affected and prevent water delivery. The City should be able to function until regional power is available by relying on whatever raw water deliveries are available combined with available in-town treated water storage.

The City continues to work cooperatively with SCWA to investigate regional funding opportunities for measures to improve the reliability of key water supply facilities through participation in the Solano Water Agencies Committee. Through this committee, recommendations for water supply quality monitoring and modeling have been forwarded, and hydrologic studies have been undertaken to determine water quality and quantity parameters of the NBA facilities in Barker Slough. This type of modeling is necessary to determine the sources of water being pumped at the NBA intake during different times of the year and different hydrologic conditions. It will also show how NBA water quality will be affected by changes in the Delta, such as levee failures. Failures of the levees are predicted to drastically reduce the ability of the NBA pump station to provide water, and as with earthquake damage, will necessitate a changeover to Solano Project Water until mitigated.

8.8.1. Potential Emergency Preparedness Actions

In order to better prepare for potential catastrophic supply interruptions, the City has developed a list of potential projects and plans that could be implemented.

Increase existing water storage.

The City has over 87 MG of treated water storage currently available, with up to 59 MG of raw water available by gravity which may be treated during an emergency. This translates to greater than a 3 day supply at maximum day usage, or greater than 7 days with notification of water shortages. Opportunities for greater storage volume are being investigated.

Install backup power at the raw water pump station.

A backup diesel generator can be installed at the main pump station which supplies raw water to Vallejo to provide up to 50% of total water need in times of power outage.

Coordinate with other agencies for additional water supply funding sources.

The City, as noted above, participates in regional planning and grant applications with the Solano County Water Agency.

Put employees/contractors on-call.

Water maintenance and engineering currently have on-call and after hours contact lists available for use in emergencies.

Develop public communication methods/plans.

The City currently employs a Public Information Officer for timely distribution of City policies and announcements. In addition, Public Works Department staff are available to assist in public outreach, including use of social media.

Water Shortage Response Measures.

Because water supply is a sensitive and extremely valuable resource in California, all water utilities in the region practice water conservation programs. Beyond these normal practices, additional water shortage response measures are often needed when unforeseeable droughts and emergencies reduce water supplies. This WSCP includes proposed water shortage response measures which can be put into effect by the City Council.

8.9. Minimum Supply Next Three Years

Table 8-5 shows the minimum water supply available over the next three years: 2016, 2017, and 2018. This assumes that the hydrology will be the same as the hydrology during the multiple-dry year period reported in Section 7.

Table 8-5 – Minimum Supply Next Three Years (DWR Table 8-4)

	2016	2017	2018
Available Water Supply (MG)[1]	10,138	10,138	10,138

Notes:

1. *The minimum supply available in the next three years is based on the supply available in consecutive dry years.*

Section 9 Demand Management Measures

Demand management measures (DMMs) are water conservation measures based on the California Urban Water Conservation Council's (CUWCC) original Best Management Practices (BMPs) for water conservation. The purpose of this section is to provide a description of the City's currently implemented and planned water conservation programs. This section is also meant to correlate these programs to the "water use reduction plan" meant to achieve the 2015 and 2020 water use targets required by the Water Conservation Act of 2009 and described in Section 5 of this UWMP, and to document voluntary compliance with the CUWCC's Memorandum of Understanding (MOU).

The City of Vallejo is not a signatory to the voluntary CUWCC MOU but continues to complete annual reports. As a participating member of the Solano Project, the City is required by the U.S Bureau of Reclamation (Bureau) to utilize on-line BMP (or DMM) reporting and available water savings calculation tools on the CUWCC website. The City of Vallejo files and completes annual program updates for the Bureau by filling in information for urban BMPs on the CUWCC website, via the CUWCC's BMP Reporting Database, located on their web site at http://www.cuwcc.org/.

Water conservation, or demand management, is a management method available to reduce water use, thereby reducing water supply needs for the City. This section describes the conservation programs proposed for Fiscal Years 2015/2016 through 2019/2020, including methods to evaluate program effectiveness, estimate water savings, and the associated proposed budgets. The success of some of the conservation practices depends on cooperative work with other entities. To the maximum extent possible, the City designs programs in coordination with other agencies to leverage agency resources, reduce program costs, and improve cost-effectiveness. The City has participated in regional grants through the Solano County Water Agency – Urban Water Conservation Committee.

BMP reports for Fiscal Years 2008/2009 through 2013/2014 are available for viewing at the City Water Division office and online at www.cuwcc.org. The FY2014/2015 report has been submitted but has not yet been finalized.

9.1. Conservation Measure Organization

In 1991, the CUWCC adopted its *Memorandum of Understanding Regarding Urban Water Conservation in California*, outlining 14 BMPs to expedite implementation of reasonable water conservation measures in urban areas. Assembly Bill 1420 (AB1420) amended the Urban Water Management Planning Act to require, effective January 1, 2009, that urban water suppliers awarded grants or loans by the State be conditioned on the implementation of the 14 BMPs. In December 2008, the CUWCC MOU was amended such that the BMPs were restructured into new two general BMP categories: Programmatic and Foundational. Separately, the California Water Code (CWC) section describing the original 14 DMMs was modified in 2014 to describe six, more general DMM categories. This resulted in three different organizations of the DMMs/BMPs.

1. 14 BMPs described in the 1991 CUWCC MOU and AB1420.
2. Foundational and Programmatic BMPs described in the revised CUWCC's 2008 MOU.
3. Six DMMs described in the 2014 CWC amendment and DWR's 2015 UWMP Guidebook.

The City's Draft 2010 UWMP references the original 14 DMMs. This allowed for streamlined tracking of DMMs for the purposes of gaining funding eligibility through AB1420 and the associated completion of AB1420 self-certification tables. However, as of July 1, 2016, funding eligibility will be based on meeting the 2015 interim target, rather than through completion of the AB1420 self-certification tables. Therefore, to be consistent with the CWC and 2015 UWMP Guidebook, this

chapter uses the modified organization and describes the six DMMs as summarized in the 2015 Guidebook.

Table 9-1 summarizes how the original 14 DMMs fit into the six new DMM categories.

Table 9-1: 14 DMMs vs. 2015 Guidebook DMMs

New DMM	Original 14 DMMs
Water Waste Prevention Ordinance	DMM 13: Water Waste Prohibition
Metering	DMM 4: Metering with Commodity Rates for All New Connections and Retrofit of Existing Connections
Conservation Pricing	DMM 11: Conservation Pricing
Public Education and Outreach	DMM 1: Residential Water Survey Program DMM 2: Residential Plumbing Retrofit Program DMM 5: Large Landscape Conservation Programs and Incentives DMM 6: High-Efficiency Clothes Washer Rebates DMM 7: Public Information Programs DMM 8: School Education Programs DMM 9: Conservation Programs for Commercial, Industrial, and Institutional Customers DMM 10: Wholesale Agency Programs DMM 14: Residential Ultra-Low-Flush Toilet Programs
Programs to Assess and Manage Distribution System Real Loss	DMM 3: System Water Audits, Leak Detection and Repair
Water Conservation Program Coordination and Staffing Report	DMM 12: Water Conservation Coordinator
Other DMMs	Turf Removal and Irrigation Controller Rebates

9.2. Demand Management Measures Not Implemented

Each water supplier, under the provisions of the UWMP Act, is required to implement only those measures that are found to be locally cost-effective. In a previous study (see Vallejo UWMP 2005), the City prepared cost-benefit calculations (i.e., benefit-to-cost ratios) for most of the DMMs. The results showed that the programs would cost more than the value of the City's avoided water procurement and operational costs associated with the water savings. From the agency perspective, many of the DMMs are not cost-effective. This is primarily due to the pricing structure of the City's relatively inexpensive water supplies. Those conditions have not significantly changed since that time. Nonetheless, all of the DMMs, whether locally cost-effective or not, are implemented by the City at least in part, either directly by the City or as a member of a regional water conservation program.

In 2012 and 2013, the City participated in a regional water conservation program funded by Proposition 84 through the Bay Area Integrated Regional Water Management program. This funding greatly increased the City's ability to participate in various water conservation programs, including high-efficiency clothes washer rebates, high-efficiency toilet rebates, and others.

The City is continuing to actively seek additional funding in the form of grants and cost-sharing with other agencies. The Vallejo Sanitation and Flood Control District has financially supported City's DMMs in the past and may be available to partner with the City on specific projects in the future.

9.3. Demand Management Measures

9.3.1. Water Waste Prevention Ordinances

Water Waste Prohibition

Description of Program

The City Council adopted a Wasteful Water Prohibition Ordinance on March 7, 2006 which was developed according to the guidelines of DMM #13. This ordinance was updated in 2010, and then again in March, 2015 when new drought restrictions, enforcement, and penalties were added. A copy of the ordinance is included in Appendix D. The ordinance provides for City staff to respond to complaints of water waste, or observed water waste. A phone hotline (707-648-4482) and an internet-based reporting program, "SeeClickFix", are available for the public for reporting water leaks and waste. In responding to observed water waste, City staff may visit or call customers to inform them of their wasteful activity and request that the activity be corrected. Follow-up visits are made to assess whether the water wasting activity has ceased. Notices are tracked for repeat "offenders." During times of water shortage, repeat water waste violators may be fined $200 for a second violation and $500 for a third violation. City staff maintains a log of advisories and actions taken. This ordinance is enforced at all times, with additional restrictions during water shortages.

Prohibitions at all times include:

- Gutter flooding
- Single-pass cooling systems for new connections
- Non-recirculating systems in all new conveyor car wash systems
- Use of hose for washing cars, boats, trailers and other vehicles without a nozzle
- Use of hose to wash sidewalks, walkways, driveways, parking lots, or other hard surfaced areas without a nozzle, unless the washing is required for health reasons
- Outdoor irrigation that causes runoff for more than 15 minutes
- Allowing potable water to escape from breaks within the customer's system for more than 36 hours after notification or discovery of the break
- Decorative water fountains without water recirculation
- Use of potable water for construction, compaction, dust control, street sweeping, or building wash down where nonpotable or recycled water is available
- Use of nonrecirculating systems in new conveyor car wash facilities

Additional prohibitions during water shortages include:

- Limits on outdoor irrigation with potable water during the day time hours and daily restrictions
- Outdoor irrigation that causes runoff
- Washing sidewalks and driveways with potable water
- Using potable water in a fountain or decorate water feature
- Outdoor irrigation within 48 hours of measurable rainfall

- Serving drinking water other than upon request in eating or drinking establishments
- Failing to provide the option to not have towels and linens laundered daily in hotels and motels
- Limits to outdoor irrigation daily schedules

In addition to the Wasteful Water Prohibition Ordinance, the City adopted an ordinance in March of 2010 incorporating the State Model Water Efficient Landscape Ordinance requirements for new development. The requirements are detailed in Chapter 16.71 of the City's municipal code. The ordinance was updated in February 2016, as required to maintain consistency with state regulations.

Implementation Over the Past Five Years

Table 9-2 shows how many accounts were contacted due to wasteful water use from 2011 through 2015.

Table 9-2: Water Waste Prohibition Activity 2011-2015

Planned	2011 (10/11)	2012 (11/12)	2013 (12/13)	2014 (13/14)	2015 (14/15)
Waste Ordinance in effect?	yes	yes	yes	yes	yes
No. of contacts	8	8	4	15	226

Planned Implementation to Achieve Water Use Targets

The City will continue to enforce its Wasteful Water Prohibition Ordinance and update the Ordinance as needed.

9.3.2. Metering

Metering with Commodity Rates for all New Connections and Retrofit of Existing Connections

Description of Program

This DMM is complete. There are no known unmetered accounts in the City's system. All accounts are billed by volume of use.

Implementation Over the Past Five Years

All of the City's existing accounts have been metered for the past five years and all new connections are metered.

Planned Implementation to Achieve Water Use Targets

The City will continue to meter all new connections.

The City will conduct a study to identify any barriers or disincentives to retrofitting mixed-use commercial industrial and institutional (CII) accounts with dedicated landscape meters and will assess the merits of a program to provide incentives to switch mixed use accounts to separate dedicated indoor and landscape meters.

The City will conduct a study to identify any barriers or disincentives to the installation of submeters in existing and future multi-family residential developments, and will assess the merits of a program to provide incentives to switch mixed use accounts to separate dedicated indoor and landscape meters, and to measure the water use of individual residential units.

9.3.3. Conservation Pricing

Conservation Pricing

Description of Program

This DMM is complete. The City undertook a rate study in 1999 which considered uniform, inclining block, and seasonal rates. The current rate structure has an inclining block rate structure for single-family residential water usage and a uniform water rate per hundred cubic foot for multi-family residential and non-residential usage. All customers pay a fixed fee service charge. Upon adoption of the rate structure in 1999, the fixed portion of bills dropped and variable water use charges were increased, providing more incentive to save water and money.

An inclining block rate structure is considered a water conserving rate structure by providing a negative pricing signal as each unit of water consumed beyond the first tier rate allotment carries an additional incremental cost. The City's volume charge is per one hundred cubic feet (ccf) and is applied to two rate blocks for single family customers in the Vallejo service area as follows:

i) 0-2,200 cubic feet, and

ii) Over 2,200 cubic feet

Implementation Over the Past Five Years

The City has maintained its inclining block rate structure since 1999.

Planned Implementation to Achieve Water Use Targets

The City will continue to use its current inclining block rate structure.

9.3.4. Public Education and Outreach

Residential Water Survey Program

Description of Program

Residential water use surveys in Vallejo are conducted for single family homes by a program jointly sponsored and administered by the Solano County Water Agency (SCWA) and the retail agencies' urban water conservation committee. The City of Vallejo began participating in the regional program in Fiscal Year 2008/2009. SCWA performs the majority of residential surveys during the warm weather months, and City staff performs the surveys as time permits during periods when the SCWA program is not available.

SCWA provides program oversight and tracks the number of surveys offered, as well as the number of surveys performed. The surveys include:

- An interview with the homeowner;
- Historical water use report;
- An irrigation system check for malfunctioning sprinkler heads or other system parts;
- A review of irrigation scheduling and recommendations;
- Leak checks;
- Providing homeowners with information about rebate programs offered including turf replacement, high-efficiency toilets, high efficiency clothes washers, and weather-based irrigation controllers; and
- Providing high-efficiency showerheads and low flow faucet aerators.

The program focuses on the highest residential water users by sending letters to the top 20 percent of water users each year. The surveys are also provided as a customer service to homeowners requesting a survey.

Implementation Over the Past Five Years

Table 9-3 shows how many surveys have been performed from 2011-2015.

Table 9-3: Residential Surveys Performed 2011-2015

2011 (10/11)	2012 (11/12)	2013 (12/13)	2014 (13/14)	2015 (14/15)
228	116	162	80	169

Planned Implementation to Achieve Water Use Targets

SCWA has conducted small scale reviews of water use at homes before and after receiving a water use survey, and extensive pilot studies are ongoing. The program appears to be effective at reducing water use in those homes receiving a water use survey and for this reason, the surveys are planned to continue.

The City will conduct a study to identify opportunities to expand the uses of water use surveys and plumbing retrofits upon resale or as part of a City rental inspection program.

Residential Plumbing Retrofit Program

Description of Program

As calculated in an earlier study conducted by the City (see Vallejo UWMP 2005), the benefit-cost ratio for this DMM is only 0.41 from the City's perspective. (That is, the City would save 0.41 dollars for every dollar spent on the program). Therefore, the City is exempt from full CUWCC BMP implementation, but offers the following listed measures to assist its residential water customers:

- Residents participating in the residential survey program receive high efficiency showerheads and aerators at the time of their surveys.
- The City provides high-efficiency showerheads and aerators to water customers upon request and at community events.

Implementation Over the Past Five Years

Table 9-4 below shows the number of high efficiency showerheads and aerators that have been distributed over the past five years.

Table 9-4: Plumbing Devices Distributed

Devices Installed or Distributed	2011 (10/11)	2012 (11/12)	2013 (12/13)	2014 (13/14)	2015 (14/15)
Showerheads	198	231	410	399	285
Aerators	1,084	882	567	937	1,263

Planned Implementation to Achieve Water Use Targets

The City will continue to distribute high efficiency showerheads and aerators upon request, at community events, and when conducting residential surveys.

Large Landscape Conservation Programs and Incentives

Description of Program

Based on a cost-benefit analysis of this program, the City is exempt from full CUWCC BMP (DMM) implementation but offers the listed measures to assist its large landscape water customers. For example, landscape audits will be offered to a small percentage of dedicated irrigation accounts through the SCWA's regional landscape audit program. The audits consist of the following:

- Evaluation of the efficiency and distribution uniformity of the irrigation system;
- Evaluation of the condition of the system components: water pressure; broken, tilted or obstructed heads; over-spray;
- Development of a water budget based on square footage of various hydrozones and average ETo;
- Evaluate the irrigation scheduling and volume applied;
- Recommend improvements in irrigation practices; and
- A written report provided to the City as well as to the water customer.

Annual water budgets were also calculated for the city's largest outdoor areas owned by both public and private entities. Annually, the water use associated with these landscapes were monitored and evaluated against calculated water budget totals. In 2014, this monitoring effort was expanded and incorporated into a regional large landscape pilot program sponsored by SCWA with partial funding coming from the City of Vallejo. Under the program, the Vallejo Unified School District and Parks and Recreations Departments are routinely provided with water use performance reports that compare actual water consumption with calculated water budget totals.

Implementation Over the Past Five Years

Table 9-5: Number of Large Landscape Surveys and Water Budgets Performed

	2011 (10/11)	2012(11/12)	2013(12/13)	2014(13/14)	2015(14/15)
Surveys completed	1	2	2	1	1
Budgets Developed	97	124	123	123	64

Seven of the surveys performed through the City's CII water conservation program contained large landscapes owned by various Home Owners Associations (HOAs), schools, and golf courses, and hospitals. The following large landscapes were surveyed over the past five years:

- Blue Rock Golf Course – Sept 2010
- Hyde Park HOA – Dec 2011
- Kaiser Medical Center – March 2012
- Hogan Middle School – July 2012
- Mare Island Golf Course – May 2013
- Tiara Northgate HOA – January 2014
- Cerros HOA – Sept 2014

Planned Implementation to Achieve Water Use Targets

Over the next five years, the City will focus its efforts on conducting surveys at sites with the greatest potential for obtaining water savings. The City will also continue annual reviews of the water budgets developed for large outdoor areas.

High Efficiency Clothes Washer Rebates

Description of Program

The City participates in a clothes washer rebate program through its wholesaler, SCWA. The program currently provides between $50 and $150 rebates for clothes washers purchased within the service area receiving water supplied by SCWA. The new clothes washers must meet specified water efficiency standards to qualify, and the amount of the rebate paid depends on the water efficiency of the washer model purchased. The rebate amounts may vary from year to year and customers are encouraged to contact the local electrical utility for additional rebates.

Implementation Over the Past Five Years

Table 9-6 shows how many washer rebates of $50 to $150 have been paid over the past five years. The number of rebates increased in the years 2012 and 2013 due to the City's participation in the Integrated Regional Water Management Plan (IRWMP) water conservation program. This was a two-year program funded by a Proposition 84 grant.

Table 9-6: Rebates Paid

2011 (10/11)	2012 (11/12)	2013 (12/13)	2014 (13/14)	2015 (14/15)
114	185	339	207	133

Planned Implementation to Achieve Water Use Targets

The City will continue to provide rebates for high efficiency washers, likely at rates similar to those offered in 2014 and 2015.

Public Information Programs

Description of Program

The City has expanded its public information program since the 1980's. Current program elements include purchasing and providing educational materials, newspaper display ads and public information notices in Spring Home and Garden newspaper inserts, and TV-based water savings tips at Earth Day, during Water Awareness Month, office and library displays (adult and children's), and other events, such as Kaiser Hospital's Earth Day, Public Works' Week, and Fix-a-Leak Week. Financial support is provided annually for the Vallejo Downtown Earth Day event, the California Water Awareness Campaign and Loma Vista Farm.

Additional public outreach activities conducted in 2015 included:

- Distribution of multiple water savings-related articles including Sunset Magazine's "Water & Energy Savings in the West," "How to Water Your Garden," and "Water-Wise Gardening for California" through utility offices, at community events and upon request.
- Water staff (administrative, billing, meter, maintenance) answered customers' questions on leaks and reducing water use.
- Annual City-sponsored workshops in partnership with local businesses and cities, known as Water-Wise Gardening. Each year since 2006, a series of workshops provide hands-on

training at a garden site The workshops are taught by business professionals, educational consultants, and Master Gardeners. In 2014 and 2015, Bay-Friendly Landscaping and Gray Water workshops were also added. Workshop class attendance averages between 50 and 60 students.

- Water conservation web page link at: www.vallejowater.org .
- "Project Wet" teacher training workshops are offered once or twice a year and financial support is provided for teacher participation. These workshops have trained 78 teachers to incorporate interactive water education activities in the classroom.
- Partnerships with Loma Vista Farm, Vallejo Sanitation and Flood District, Valcore Recycling, East Bay Municipal Utility District, City of Benicia, Pacific Gas & Electric Company (PG&E), and Lowes and Home Depot Home Improvement Centers.
- Water Conservation presentations to HOAs, and various professional and civic groups are routinely performed throughout the year. The City gave Water Conservation presentations to the following groups:
    - Quite Harbor HOA - 2011
    - Touro University - 2011
    - Rose Society - 2014
    - Glen Cove Community Association - 2014
    - Vallejo Heights Homeowners - 2015

The City also participates in a regional public information program through the SCWA's urban water conservation committee. Regional information and outreach include:

- Climate-appropriate demonstration garden at Six Flags Discovery Kingdom Park in Vallejo.
- Public service radio announcements with drought messaging
- Water Conservation web page link at: www.solanosaveswater.org.
- Advertising published in local newspapers for Water-Wise gardening workshops.

Implementation Over the Past Five Years

Table 9-7 below summarizes the City's public outreach activities over the past five years. (Note that the SCWA's regional outreach efforts are summarized in the SCWA's Urban Water Management Plan.)

Table 9-7: Public Information Activities

Planned	2011 (10/11)	2012 (11/12)	2013 (12/13)	2014 (13/14)	2015 (14/15)
Public Information Contacts	125,391	190,491	189,579	178,936	203,000
Public Information Outreach Events	7	9	9	10	9
Public Outreach Budget	$15,000	$16,000	$16,000	$16,000	$16,000

Planned Implementation to Achieve Water Use Targets

The City will continue its public outreach program and anticipates a similar budget and level of participation as the past five years. To expand the opportunity for enhanced outreach and education to water system customers and to facilitate feedback on conservation program design

and prioritization, the City will explore the feasibility of and support for creating a Citizen Advisory Committee.

School Education Programs

Description of Program

The City has its own school education and outreach program and participates in a regional program through the SCWA's regional school education and outreach program. The City's program consists of in-classroom presentations, field trips, sponsoring teacher training workshops (outlined in the public information section, above) and provision of educational materials. Feedback forms are distributed during teaching and outreach sessions. Returned surveys are reviewed and program changes are made to improve customer satisfaction.

The City also participates in the implementation and planning of the regional education program through the Solano County Urban Water Conservation Committee. The regional program consists of:

- In-classroom presentations;
- High school video contest;
- Bookmark art contest;
- School assembly programs by professional presenters;
- Providing educational materials to schools; and
- Attendance at regional and state-sponsored water education conferences

Beginning in 2012, the City partnered with the U. S. Bureau of Reclamation and School District officials and began sponsoring watershed field trips to Lake Berryessa and Loma Vista Farm. The City funds the bus travel and coordinates visits with local Park Rangers at the lake and with Loma Vista Farm program staff. Since 2012, a total of 30 field trips have been undertaken and paid for by the City and a total of 1,650 students have participated in the program.

The City also provides funding for the Watershed Explorers, a county-wide effort.

Implementation Over the Past Five Years

Table 9-8 quantifies the City's school education programs since 2011.

Table 9-8: School Materials and Programs Provided

	2011 (10/11)	2012 (11/12)	2013 (12/13)	2014 (13/14)	2015 (14/15)
Classroom presentations	75	122	234	165	198
Students attendees	3,009	4,264	3,360	3,056	9,077
Assemblies	14	18	19	35	97
Assembly Student Attendee	2,630	4,536	5,076	4,614	19,052
Field trips	11	3	5	12	15
Attendees on field trips	1,549	150	274	623	834
School Education Budget	$16,500	$17,500	$26,449	$20,299	$28,200

Planned Implementation to Achieve Water Use Targets

The City will continue its school education programs at similar levels to the past five years.

Conservation Programs for Commercial, Industrial and Institutional (CII) Customers

Description of Program

The City has participated in regional CII programs through the Solano County Water Agency's Urban Water Conservation Committee. Since 2007, through SCWA's CII program, commercial water customers have been offered a free water survey to determine the efficiency of their existing facility. Typically, the surveys included irrigation system audits as well as audits of indoor water fixtures and appliances. More information about irrigation surveys performed for CII customers can be found in the *Large Landscape Conservation Programs and Incentives* section of this chapter of the UWMP.

During the surveys, surveyors installed faucet aerators and high efficiency showerheads, ensuring immediate water savings. Initially, pre-rinse spray valves were installed as well, however, because of the previous efforts by PG&E and other local programs, it was found that most restaurants had their pre-rinse spray valves retrofitted to efficiency models. After each survey was completed, a report was generated and provided to the customer, which included an inventory of water-using fixtures and appliances, recommendations for improving water efficiency at the site, and estimated water savings to be realized from implementing those recommendations. Those sites found to have pre-1992 toilets were also offered participation in a direct installation program of high-efficiency toilets (HET) and high-efficiency urinals (HEU).

In 2008, the CUWCC revised its BMP requirements. The CII BMP requirements shifted from an emphasis on conducting surveys to an emphasis on implementing water savings measures as appropriate for each agency. Surveys continue to be conducted as a customer service, as well as a required basis for participation in CII rebate programs. Surveys are offered to customers requesting a survey, customers requesting participation in HET and HEU installation, and those participating in rebate programs. SCWA has conducted random reviews of water use for CII customers before and after receiving a water use survey. The program appears to be effective at reducing water use, particularly for those sites where surveys act as incentives for rebates or direct installation of HETs and HEUs.

In response to changes in the BMPs, the Solano County Urban Water Conservation Committee developed a "Water Savings Incentive Program." This program has been designed to provide CII customers with assistance in upgrading fixtures, appliances, and irrigation systems for greater efficiency. The assistance comes in the form of rebates for equipment and control systems. This program is in addition to the HET, HEU, and weather-based irrigation controller rebate programs. The key element of the Water Savings Incentive Program is flexibility. Rather than being limited to the specific items typically rebated, such as toilets, urinals, or irrigation controllers, a water customer can make water efficiency repairs and/or upgrades to existing irrigation systems and apply for rebates for equipment based on specific-site conditions. Copies of the "Water Savings Incentive Program" terms and conditions are included in Appendix G.

At the outset of the program, the committee chose to focus its outreach efforts on schools, parks and other public properties, although commercial accounts could also participate. However, participation has been limited. The challenge facing program implementation is that the rebates apply to parts and equipment only, and not to labor. Although outreach to schools and other public facilities in the City's service area has been conducted, the requirement that the participating water customer provide or pay for the involved labor has been a limiting factor.

Implementation Over the Past Five Years

A summary of number of surveys and water savings devices installed is presented in Table 9-9.

Table 9-9: CII Surveys Completed

	2011 (10/11)	2012 (11/12)	2013 (12/13)	2014 (13/14)	2015 (14/15)
No. of surveys completed	3	2	3	4	3
Aerators installed	22	22	0	0	224
Showerheads installed	37	37	0	0	112
HETs	192	192	248	296	224

Planned Implementation to Achieve Water Use Targets

The City will continue its conservation programs for CII customers at similar levels to the previous five years.

Wholesale Agency Programs

Description of Program

The City is a wholesale water supplier to the Cities of American Canyon and Benicia, but does not provide a wholesale agency assistance program since each of the cities has prepared an Urban Water Management Plan and is running its own water conservation program. In addition, the City operates the Travis Air Force Base Water Treatment Plant on behalf of the U.S. Air Force, but has no responsibility for the distribution system and no influence over end users on the base.

City staff also work with the SCWA, the regional wholesaler. The City contributes funds to SCWA, and reimburses some of the joint program expenditures on a proportional basis.

Implementation Over the Past Five Years

Not applicable.

Planned Implementation to Achieve Water Use Targets

Not applicable.

Residential Ultra-Low-Flush Toilet Programs

Description of Program

The City participated in a regional high-efficiency toilet retrofit program, which began in 2007 and ended in 2015, which was managed by the Solano County Water Agency. The rebate offered per toilet was up to $100. A similar program is now being offered by the state.

There is currently no ordinance requiring a toilet retrofit upon resale in the City of Vallejo.

Implementation Over the Past Five Years

The increase in the number of rebates in 2012 and 2013 was due to the City's participation in the IRWMP water conservation program. This was a two-year program funded by a Proposition 84 grant. State legislation regarding retrofit upon resale of single family homes has also driven the number of rebates higher. Table 9-10 below shows the number of rebates paid since 2011.

Table 9-10: Residential Toilet Program Summary 2011-2015

	2011 (10/11)	2012 (11/12)	2013 (12/13)	2014 (13/14)	2015 (14/15)
Number of Rebates Paid	95	91	359	220	421

Planned Implementation to Achieve Water Use Targets

The City does not currently pay rebates for low flush toilets as SCWA has ended its regional program. Rebates will be paid if the regional program is resumed.

9.3.5. Programs to Assess and Manage Distribution System Real Loss

System Water Audits, Leak Detection and Repair

Description of Program

The City reviews its water system statistics and continues to make progress in collecting the data needed for a full system water audit using the American Water Works Association (AWWA) Water Loss Control Committee's water audit software. Leak detection equipment with "dataloggers" has been purchased and training offered to staff. Water main repairs are ongoing.

The City's program consists of the following actions:

- Ongoing water meter calibrations;
- Advising customers whenever it appears that leaks exist on the customer's side of the meter;
- Performing distribution system leak detection when warranted and cost-effective; and
- Repairing leaks when found.

Effectiveness is measured by monitoring the change in the percent of unaccounted water for the entire water system. Between the years 2005 and 2010, unaccounted water was reduced from 22 percent to 14 percent of gross water use. This is equivalent to a reduction of 732 MG per year. Water loss between 2010 and 2015 remained nearly constant, slightly increasing from 14 percent to 16 percent of total water use and remaining around 950 MG to 960 MG.

A formal Water Loss Committee chaired by Water Engineering with members from Distribution Maintenance, Water Billing, IT, Operations, and Water Administration, was formed in December 2015 to complete a comprehensive system-wide water loss analysis and make recommendations for reducing apparent water losses.

Implementation Over the Past Five Years

The City has performed calculated its water loss annually and formed the Water Loss Committee in 2015 to further efforts to analysis water loss across its entire distribution system.

Planned Implementation to Achieve Water Use Targets

The City will perform AWWA Water Loss Audits annually per DWR guidelines and the Water Loss Committee will recommend actions to reduce water loss.

9.3.6. Water Conservation Program Coordination and Staffing Support

Water Conservation Coordinator

Description of Program

The City has a Water Conservation Coordinator who spends an average of 30 - 40 percent time on water conservation. An analyst position, which provides staff support to the Water Conservation Coordinator in addition to other duties, was filled at the end of 2005 and continues to be filled full-time. A student intern is periodically assigned to the water conservation program to assist with various program duties. At times, the student intern position has been funded by the SCWA with respective costs reimbursed by the City.

The Water Conservation Coordinator, Pamela Sahin, can be reached at (707) 648-4479 (telephone), (707) 648-4060 (fax), or E-mail (Pam.Sahin@cityofvallejo.net) Program support, especially in the area of program measure implementation, is provided by Roger Judy, Administrative Analyst II/ Water Conservation Practitioner who can be reached at (707) 648-5299 (telephone) or E-mail (Roger.Judy@cityofvallejo.net)

The Water Conservation Coordinator develops and manages the conservation program and DMM implementation. The Coordinator is also responsible for preparing and submitting an annual implementation status report to the Bureau. Other duties of the Coordinator include: communication and promoting water conservation issues; coordinating City conservation programs with other City divisions; preparing annual and multi-year water conservation budgets; monitoring program impacts and recommending improvements. The Coordinator is responsible for training support staff and managing the efforts of consultants and contractors contracted to the City to implement conservation measures under the City's water conservation program. The position also coordinates preparation of the City's UWMP and the Water Management Plan updates for adoption by the City Council and submittal to the California Department of Water Resources and the Bureau, respectively. The above enumerated duties and responsibilities are performed either directly by the Water Conservation Coordinator or are delegated to support staff with oversight and direction provided, as needed.

Implementation Over the Past Five Years

The Water Conservation Coordinator position has functioned as described above for the past five years.

Planned Implementation to Achieve Water Use Targets

The City plans to maintain the current level of water conservation staffing through 2020. However, State legislative requirements under the Water Conservation Act of 2009 may impact future staffing requirements, depending on the level of effort needed to meet water demand reduction goals and the availability of SCWA-administered county-wide conservation programs.

9.3.7. Other Demand Management Measures

The City does not have any other demand management programs, but will continue to expand its programming and participate in new regional water conservation pilot program efforts that use and incorporate new Water Smart technologies. Additionally, the City provides turf removal rebates and irrigation controller rebates, through participation in county-wide programs. Although these do not fit within the original 14 DMM categories, these rebates contribute to residential irrigation water savings.

Implementation Over the Past Five Years

Table 9-11 below summarizes the number of turf removal and irrigation controller rebates paid by the City since 2011. Turf removal rebates increased in 2014 and 2015 due to the state-wide drought and an increase in public interest in decreasing residential irrigation use.

Table 9-11: Turf Removal and Irrigation Controller Rebates Paid

	2011 (10/11)	2012 (11/12)	2013 (12/13)	2014 (13/14)	2015 (14/15)
Turf Removal	4	8	6	50	51
Irrigation Controller	0	5	5	0	0

Planned Implementation to Achieve Water Use Targets

The City will continue to pay rebates for turf removal and irrigation controllers. Additionally, the City will continue to look into and participate, where appropriate, in other regional conservation programming.

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Section 10 Plan Adoption, Submittal and Implementation

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

10.1. Inclusion of All 2015 Data

The City of Vallejo conducts its reporting for UWMP preparation on a calendar year basis. As such, this 2015 UWMP includes water use and planning data for the entire 2015 calendar year, with the exception of BMP reporting which is done on a fiscal year basis.

10.2. Notice of Public Hearing

The California Water Code Section 10621(b) stipulates that a water supplier must notify any city or county within which the supplier provides water that it is reviewing and considering changes to the UWMP. This notification must occur at least 60 days before the public hearing. The City of Vallejo sent these notification letters to the entities listed in Table 10-1 on June 28, 2016 along with notices of the public availability of the Draft UWMP and the public hearing on October 4, 2016; copies of these letters are included in Appendix H.

Table 10-1: Notice of Public Hearing to Cities and Counties (DWR Table 10-1)

City Name	60 Day Notice	Notice of Public Hearing
City of American Canyon	✓	✓
City of Benicia	✓	✓
City of Dixon	✓	✓
City of Fairfield	✓	✓
City of Rio Vista	✓	✓
City of Vacaville	✓	✓
Greater Vallejo Recreation District	✓	✓
Napa County	✓	✓
Solano County	✓	✓
Solano County Water Agency	✓	✓
Solano Irrigation District	✓	✓
Suisun City	✓	✓
Travis Air Force Base	✓	✓
Vallejo Sanitation and Flood Control District	✓	✓

10.3. Notice to the Public

The City of Vallejo held a public hearing on 10/25/2016 to receive comments on the draft UWMP and to adopt the plan. Government Code 6066 requires that the water supplier notify the public of the public hearing in a local newspaper once a week for two consecutive weeks. The notice must include the time and place of the hearing, as well as the location where the draft UWMP is available for public review. The City of Vallejo published these notifications for the public in the Vallejo Times Herald newspaper on 10/02/2016, 10/11/2016, 10/16/2016, and 10/18/2016 and the Fairfield Daily Republic newspaper on 10/02/2016, 10/12/2016, 10/16/2016, and 10/19/2016. Copies of these notices are provided in Appendix H.

10.4. Public Hearing and Adoption

California Water Code 10642 states that prior to adopting the 2015 UWMP, the water supplier must hold a public hearing. The purpose of the public hearing is to allow public input on the Plan, consider economic impacts of the UWMP, and adopt a method for determining the water supplier's water use target. The City of Vallejo held a public hearing on 10/25/2016. A copy of the hearing agenda is provided in Appendix H. The City also held a three week-long public comment period from 10/5/2016 to 10/25/2016. Comments on the draft UWMP were received from the public and a City Councilperson during the public hearing. This final UWMP has been modified to address those comments.

The City adopted its 2015 UWMP at the Vallejo City Council meeting on October 25, 2016. A copy of the adopting resolution is provided in Appendix I.

10.5. Plan Submittal

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

10.6. Public Availability

California Water Code 10645 requires that water suppliers, no later than 30 days after filing a copy with DWR, must make the approved Plan available for public review during normal business hours. The City of Vallejo will provide a copy of the approved 2015 UWMP to the John F. Kennedy Library and post the plan on the City's website.

10.7. Amending an Adopted UWMP

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

Section 11 References

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