


PETALUMA

SONOMA COUNTY

CALIFORNIA-USA

2020 URBAN WATER MANAGEMENT PLAN

JUNE 2021





DEPARTMENT OF WATER RESOURCES
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May 4 2022

Kent Carothers
Deputy Director of Operations
11 English Street
Petaluma, California 94952

RE: Urban Water Management Plan Requirements Addressed

Dear Kent Carothers

The Department of Water Resources (DWR) has reviewed the 2020 Urban Water Management Plan (UWMP) for the City of Petaluma and finds that the UWMP has addressed the requirements of the California Water Code (CWC). The results of the review will be provided to DWR's Financial Assistance Branch.

The CWC directs DWR to report to the legislature once every five years on the status of submitted UWMPs. In meeting this legislative reporting requirement, DWR reviews all submitted UWMPs. DWR's review is limited to assessing whether suppliers have addressed the required legislative elements and does not evaluate or analyze the supplier's UWMP data, projections, or water management strategies.

If you have amended the 2020 UWMP and/or the 2020 Water Shortage Contingency Plan since the submittal of the original documents(s), you must submit the amended document(s) to the DWR WUE data portal. Please contact DWR at UWMPhelp@water.ca.gov so that we can assist you in the process of this submittal. As stated in Water Code Sections 10640 and 10642, please note that amendments must have:

- 60-day notification
- Public notification
- Public hearing
- Adoption by the supplier's governing body. Documentation of the adoption must be included with the submittal.

If you have any questions regarding the review of the UWMP or urban water management planning, please contact me.

Sincerely,

Julie Ekstrom, Ph.D.
Supervisor, Urban Unit
Water Use Efficiency Branch
(916) 612-4371

Electronic cc:
Chelsea Thompson
Jim Connell

Errata Sheet for Minor Corrections to
City of Petaluma 2020 Urban Water Management Plan (UWMP)

This errata sheet logs minor content errors that were identified after final adoption of the City of Petaluma 2020 UWMP. DWR has determined that these corrections are minor and do not require the UWMP to be amended.

☒ These data errors have been corrected in the Department of Water Resources (DWR) UWMP database at https://wuedata.water.ca.gov/secure/

☒ This errata sheet has been filed with the UWMP in all locations where it is made publicly available, including the California State Library. Errata may be submitted to State Library via email to cslgps@library.ca.gov

Name and agency of the person filing errata sheet: Elizabeth Drayer, West Yost Associates

#	Description of Correction	Location	Rationale	Date Error Corrected
1	Table 8-3: Supply Augmentation and Other Actions: Added rows for Stages 1 through 6 and indicated that actions listed in the other rows of the table may be used at any stage, but most likely would be used in Stages 3-6	WUEdata Table 8-3	At DWR's request, added Stages 1 through 6 to Table 8-3. These stages were not specifically listed in the original submittal as the actions listed applied to all stages.	April 26, 2022
2	The volume of supply purchased from Sonoma Water in 2020 has been adjusted in DWR Table 6-8 and SB X7-7 Tables 4 and 4-A to be consistent with the 2020 total water use shown in DWR Table 4-1. This adjustment results in an adjusted 2020 per capita water use for the City equal to 107 gpcd, which is still well below the City's confirmed 2020 target per capita water use.	In WUEdata, DWR Table 6-8 and SB X7-7 Tables 4 and 4-A: Adjusted volume of supply purchased from Sonoma Water in 2020 (adjusted volume is 7,694 AF) In WUEdata Table 5-2, SB X7-7 Tables 5 and 9: Adjusted 2020 per capita water use (adjusted 2020 per capita water use is 107 gpcd)	In the original submittal, there was a discrepancy between the 2020 total water use shown in DWR Table 4-1 and the SB X7-7 tables. The 2020 total water use has been adjusted in the SB X7-7 tables and in DWR Table 6-8 to be consistent with the 2020 total water use shown in DWR Table 4-1. This adjustment also impacted the calculation of the City's 2020 per capita water use in the SB X7-7 tables. The adjusted 2020 per capita water use is 107 gpcd, which is still well below the City's confirmed 2020 target per capita water use.	April 26, 2022
4.	In Section 6.2.2 Groundwater it should be noted that the Petaluma Valley Groundwater Basin is not adjudicated	Section 6.2.2 Groundwater (page 6-5)	Section 6.2.2 did not specify that the Petaluma Valley Groundwater Basin is not adjudicated in the original submittal.	April 26, 2022

2020 Urban Water Management Plan

Prepared for

City of Petaluma

Project No. 702-60-20-35

Project Manager: Jim Connell, PE	June 2021 Date
QA/QC Review: Elizabeth Drayer, PE	June 2021 Date

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LIST OF ACRONYMS AND ABBREVIATIONS

AB	Assembly Bill
ABAG	Association of Bay Area Governments
Act	Urban Water Management Planning Act
AF	Acre-Feet
AFY	Acre-Feet Per Year

AMR	Automatic Meter Reading
AWWA	American Water Works Association
Basin	Petaluma Valley Groundwater Basin
CALGreen	California Green Building Standards Code
CalWEP	California Water Efficiency Partnership
CASGEM	California Statewide Groundwater Elevation Monitoring
CDFW	California Department of Fish and Wildlife
CEQA	California Environmental Quality Act
cfs	Cubic Feet Per Second
CII	Commercial, Industrial, Institutional
City	City of Petaluma
CWC	California Water Code
DEIR	Draft Environmental Impact Report
DMM	Demand Management Measure
DOF	California Department of Finance
DRA	Drought Risk Assessment
DWR	Department of Water Resources
ECWRF	Ellis Creek Water Recycling Facility
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
EKI	EKI Environment and Water, Inc.
ESU	Evolutionarily Significant Unit
ETo	Evapotranspiration Rate
F°	Fahrenheit
FEMA	Federal Emergency Management Agency
FERC	Federal Energy Regulatory Commission
FTE	Full-Time Equivalent
GHG	Greenhouse Gas
GPCD	gallons per capita per day
gpf	Gallons Per Flush
GSA	Groundwater Sustainability Agency
GSP	Groundwater Sustainability Plan
HCF	Hundred Cubic Feet
HECW	High-Efficiency Clothes Washer
HET	High-Efficiency Toilets
HEU	High-Efficiency Urinals
kWh	Kilowatt Hour
Legislature	California State Legislature

LHMP	Local Hazard Mitigation Plan
MFR	Multi-Family Residential
MG	Million Gallons
MGD	Million Gallons Per Day
NAICS	North American Industry Classification System
NBWRP	North Bay Water Reuse Program
NIO	Notice of Intent
NMFS	National Marine Fisheries Service
PAD	Pre-Application Document
PG&E	Pacific Gas and Electric
PMC	Petaluma Municipal Code
PVP	Potter Valley Project
PW&U	Public Works and Utilities
PWS	Public Works System
RCD	Sonoma Resource Conservation District
RPMs	Reasonable and Prudent Measures
RUWMP	Regional Urban Water Management Plan
SB	Senate Bill
SB X7-7	Senate Bill Seven of the Senate's Seventh Extraordinary Session of 2009
SCADA	Supervisory Control and Data Acquisition
SFR	Single-Family Residential
SGMA	Sustainable Groundwater Management Act
SMSWP	Sonoma-Marin Saving Water Partnership
SWRCB	State Water Resources Control Board
UGB	Urban Growth Boundary
USACE	U.S. Army Corps of Engineers
USGS	United States Geological Survey
UWMP	2020 Urban Water Management Plan
WC Act	Water Conservation Act of 2009
WRFP	Water Recycling Funding Program
WSCP	Water Shortage Contingency Plan
WSTSP	Water Supply and Transmission System Project
WUE	Water User Efficiency
WWHC	Water-Wise HouseCall

EXECUTIVE SUMMARY

The purpose of this Executive Summary is to provide an easily understood summary (Lay Description) of the City of Petaluma's (City's) 2020 Urban Water Management Plan (UWMP) in compliance with California Water Code (CWC) section 10630.5:

> *CWC §10630.5. Each plan shall include a simple lay description of how much water the agency has on a reliable basis, how much it needs for the foreseeable future, what the agency's strategy is for meeting its water needs, the challenges facing the agency, and any other information necessary to provide a general understanding of the agency's plan.*

The Urban Water Management Planning Act (Act) requires water suppliers that provide over 3,000 acre-feet per year or have over 3,000 connections to prepare and submit to the State Department of Water Resources (DWR) an Urban Water Management Plan that spans at least 20-year planning horizon every 5 years. The State recommends, but does not require, a 25-year planning horizon. The City's 2020 UWMP has been prepared in accordance with the Act, as defined by the California Water Code, Division 6, Part 2.6, Sections 10610 through 10657, and the Water Conservation Act of 2009 (WC Act). The City chose to use a 25-year planning horizon for this 2020 UWMP.

The City is a retail water supplier to approximately 20,000 residential, commercial, industrial and institutional accounts located within Petaluma's service area. This 2020 UWMP addresses the City water system and includes a description of the water supply sources, historical and projected water use, and a comparison of water supply to water demands during normal, single-dry, and multiple-dry years.

This 2020 UWMP also addresses water use efficiency legislation, including the City's 2015 and 2020 water use targets, as required by the WC Act, and documents the City's success in meeting the City's 2020 water use target.

The fundamental determination of the UWMP is that the City has or will have sufficient water resources to meet the City's projected growth over the next 25 years under all anticipated hydrologic conditions, although some demand reduction should be expected during dry years.

SERVICE AREA OVERVIEW

The City of Petaluma is located in Sonoma County, California and is part of the North Bay sub-region of the San Francisco Bay Area. The City's climate is influenced by the Pacific Ocean and is divided into wet and dry seasons. Annual precipitation averages around 26 inches per year with a majority of the precipitation falling between October and April.

The City receives majority of its potable water supply from the Sonoma County Water Agency (now known as Sonoma Water). Sonoma Water provides water principally from the Russian River to the majority of the retail water providers in Sonoma County, and to a lesser degree in Marin County. The City also receives water supply from its own groundwater wells and provides recycled water from its own Ellis Creek Water Recycling Facility.

The City receives potable surface water from Sonoma Water through a series of turnouts, check valves, and direct connections.

WATER USE PROJECTIONS

To determine projected water demands through 2045, the City in conjunction with the other Water Contractors who receive water from Sonoma Water, hired EKI Environment and Water, Inc. (EKI) to perform the demand analysis. The projected deliveries are based on the population and employment projections based on the Association of Bay Area Governments (ABAG) Plan Bay Area Projections 2040 published in 2018, in context with recent historical population estimates. The projected deliveries also include implementation of the National Plumbing Code, State Plumbing Code, as well as accounting for authorized unbilled uses (for activities such as firefighting and line flushing) and water losses from the potable water system (real loss from the distribution system and apparent loss due to billing errors, etc.). Table ES-1 summarizes the total actual water use for the City in 2020 and the total demand projection for the City from 2025 to 2045. Projected demand numbers may not exactly match numbers in other documents due to rounding errors.

Table ES-1. Total Projected Water Use (Potable and Non-Potable), AF

Demand Component	2020	2025	2030	2035	2040	2045[a]
Potable Water	7,731	8,705	8,870	8,974	9,255	9,577
Recycled Water Demand	1,756[b]	2,000	2,540	2,540	2,540	2,540
Total Water Use	**9,487**	**10,705**	**11,410**	**11,514**	**11,795**	**12,117**

(a) State law requires suppliers to span a 20-year planning horizon to 2040 for their 2020 UWMPs and recommends, but does not require, a 25-year planning horizon (to 2045). The City chose to use a 25-year horizon for this 2020 UWMP.

(b) Includes 651 AF used within the City's water service area and 1,115 AF used for agricultural irrigation outside the City's water service area.

AF = acre feet

WATER CONSERVATION OVERVIEW

The City maintains a robust water conservation program that helps residential and commercial water customers conserve water through outreach and education, rebate programs, free water use evaluations, and free water saving devices. The City is a member of the California Water Efficiency Partnership (CalWEP), and an active member of the regional Sonoma-Marin Saving Water Partnership (SMSWP). The SMSWP represents 12 water utilities in Sonoma and Marin counties that have joined together to provide regional solutions for water use efficiency.

WATER CONSERVATION ACT OF 2009 TARGETS AND COMPLIANCE

In 2009, the WC Act was signed into law and set a goal of a 20 percent reduction in statewide urban per capita water use by 2020. The WC Act requires urban water retailers that must comply with the WC Act to set an interim community urban per capita water use target for 2015 and a final community urban per capita water use target for 2020. Due to the City's aggressive water conservation implementation, the City surpassed its 2015 target and met its 2020 water use target required by the WC Act without the implementation of additional conservation measures. Table ES-2 shows the City's current 2020 target compliance, compared to the WC Act per capita water use targets.

Table ES-2. WC Act 2020 Target Compliance Summary				
Gross Water Use, AFY	Population, persons	Actual Per Capita Water Demand, GPCD	Target Per Capita Water Demand, GPCD	Target Achieved?
7,360	64,251	102	141	Yes

WATER SYSTEM SUPPLIES

Chapter 6 of this UWMP assesses the City's potable and non-potable water supplies over short-term- and long-term- planning horizons. It also includes an analysis of the availability of each source out to 2045 under the following hydrologic conditions: normal water year, single-dry water year, and a drought lasting five years. It also considers water supplies in a near-term drought (2021-2025) and longer-term issues like climate change and regulatory revisions. The analysis examines each water source separately and then aggregates the information into a comprehensive picture of the City's current and future water supply reliability.

The City has three existing sources of water supply:

1. Entitlement from Sonoma Water for potable water (Section 6.1)
2. Groundwater from City's potable water wells (Section 6.2)
3. Recycled water (non-potable) from the Ellis Creek Water Recycling Facility (Section 6.3)

The City receives approximately 95 percent or more of its potable water supply from Sonoma Water under the provisions of the Restructured Agreement for Water Supply (Restructured Agreement), which was executed in June 2006. Approximately 99 percent of water delivered by Sonoma Water is from surface water sources, with the remainder from groundwater. Section 6.2.1 describes the City's entitlement of 13,400 acre-feet per year (AFY) from Sonoma Water in more detail. Sonoma Water anticipates being able to meet the obligation to deliver 13,400 AFY out to 2045 under normal water year conditions. Chapter 7 discusses dry year conditions and anticipated contract water supply in more detail.

The City produces approximately 5 percent or less of its potable water supply from groundwater wells. Since 2000, groundwater is only used for supplemental or emergency supply purposes. Section 6.2.2 describes the City's potable wells in more detail. According to past studies, the Petaluma Valley groundwater basin and its sub-basins has no known geological units that would typically provide favorable, high-yield groundwater opportunities due to the low permeability and limitations to groundwater storage from fractures rock and inconsistent alluvium opportunities. Chapter 7 discusses dry year conditions and anticipated groundwater supply in more detail.

The City offsets approximately 2-3 percent of total demand for potable water in the urban system with recycled water. The City owns and operates the Ellis Creek Water Recycling Facility (ECWRF), which produces recycled water that is approved by the State for non-potable uses. The ECWRF provides potable water offset and effluent discharge during the non-river discharge restriction period. In 2020, the City's recycled water system distributed a total of 1,756 AF of recycled water for landscape irrigation. Of that amount, 228 AF of recycled water was used for irrigated urban landscapes as potable offset within the City's water service area, 413 AF was used for golf course irrigation, and 1,115 AF was used for agricultural

irrigation. The City is planning to expand the recycled water system within the City water service area for the duration of the planning period of this 2020 UWMP as further described in Section 6.2.5.

The City does not have the following types of water sources in its urban water supply portfolio:

- Surface water rights (Section 6.2.3)
- Storm water (Section 6.2.4)
- Desalinated water (Section 6.2.6)
- Water exchanges and transfers (Section 6.2.7)

Currently, the City does not have plans to add new sources of water to meet future water demand (Section 6.2.9). However, the City does implement a robust water conservation program which reduces current water demand and ensures that future water use is efficient. The City's water conservation programs are discussed in Chapter 9 and analyzed in the Water Demand Analysis (Appendix D).

The City's current and projected water supplies are summarized in Table ES-3.

Table ES-3. Current and Projected Water Supplies, AF

Source	Additional Detail	2020 Actual	2025	2030	2035	2040	2045
Purchased or Imported Water	Potable (Contract)	7,731	8,705	8,870	8,974	9,255	9,577
Groundwater (not desalinated)	Potable (City)	0	0	0	0	0	0
Recycled Water	Non-potable (City)	1,756[(a)]	2,000	2,540	2,540	2,540	2,540
Total	-	**9,487**	**10,705**	**11,410**	**11,514**	**11,795**	**12,117**

(a) Includes 651 AF used within the City's water service area and 1,115 AF used for agricultural irrigation outside the City's water service area.

WATER SYSTEM RELIABILITY

Chapter 7 of this UWMP describes the long-term-reliability and vulnerability of the City's potable and non-potable water supplies under varying conditions. It considers the City's ability to meet water needs through 2045 under normal conditions, single dry year conditions, and five consecutive dry year periods. In addition, this chapter meets the new requirement to provide a Drought Risk Assessment (DRA) which considers water supply and demand under the assumption that the next five years (2021-2025) will experience a drought that is hydrologically equivalent to the driest five consecutive years on record. The water service reliability assessment through 2045 and the DRA for 2021-2025 combine the details of the water use analysis in Chapter 4 and the water supply analysis in Chapter 6 of this UWMP.

The City's planned and implemented water management tools for increasing the reliability of water supplies out to 2045 are also addressed. Shorter-term reliability responses for scenarios that may require immediate action during a severe dry period, or a catastrophic supply interruption are addressed in Chapter 8 Water Shortage Contingency Plan and Appendix L. Ongoing water use efficiency programs that help ensure water is used wisely by customers during all water supply conditions are discussed in Chapter 9 Demand Management Measures.

A summary of the water service reliability assessment findings is listed below.

- The City does not anticipate legal factors will affect the reliability of its water supplies within the planning horizon of this UWMP.
- The City does not anticipate environmental factors will affect the reliability its water supplies within the planning horizon of this UWMP.
- The City anticipates that climate change and drought conditions could result in a reduction of surface water supply[1]. Although the City does not supply surface water directly, it does receive surface water supply from Sonoma Water. The City's surface water supply from Sonoma Water is subject to reductions during dry years (seasonal and climatic shortages) pursuant to State Water Board's Decision 1610[2]. When the Lake Sonoma (total volume 381,000 AF; water supply pool 245,000 AF) water volume is less than 100,000 AF prior to July 15th, a 30 percent reduction in diversions is required. Such a reduction in Sonoma Water diversions may result in a reduction in deliveries to the City under the Restructured Agreement.
- Shortages are expected (16 percent reduction in Sonoma Water supply) in a single dry year scenario after 2025, increasing to a 19 percent shortage in single dry years by 2045. The Water Shortage Contingency Plan (Appendix L) will be implemented to reduce demand.
- Shortages are not expected in dry five-year periods out to 2045, including the next five years.
- While Chapter 7 indicates supply would exactly meet demand during normal and multiple dry years, in fact more water would be available. Sonoma Water can store 225,000 AF of water in Lake Sonoma and can divert up to 75,000 AFY for water supply purposes under current water rights permits. However, supply volumes are shown to exactly meet demand to indicate that water would be stored in Lake Sonoma to meet future demands.
- In addition, the City's water use efficiency programs have helped ensure water is used wisely by customers during all water supply conditions. These programs have helped the City reduce the per capita demand for potable water by 44 percent (from 192 gallons per capita per day (gpcd) in 1999 down to 102 gpcd in 2020), and have reduced total gross water use by 37 percent (from 12,286 AF in 2001 down to 7,731 AF in 2020). The City's water use efficiency efforts are discussed in more detail in Chapter 9.

[1] Source: Sonoma Water 2020 UWMP.

[2] SWRCB Decision 1610 was adopted in April 1986.

WATER SHORTAGE CONTINGENCY PLAN

Chapter 8 and Appendix L of this UWMP discuss the City's Water Shortage Contingency Plan (WSCP) that will be used when water demands are expected to exceed available supplies. A water shortage may occur due to several reasons, such as drought, climate change, regulatory constraints, natural or human caused disasters, and catastrophic events which may occur at any time. The WSCP is the City's operating manual that allows the City Council, staff, and the public to identify and efficiently implement pre-determined steps to manage a water shortage.

The City anticipates supply reductions in single dry years after 2025. The demand reductions associated with these anticipated shortages could be accomplished through implementation of the first few contingency levels. No shortages are anticipated during multiple dry years through 2045.

To address future water supply shortages during dry years, the City has identified 6 water shortage stages and developed corresponding demand reduction measures to address the severity of the supply restriction (see WSCP). The appropriate stage is determined by City staff and elected officials using the procedures and timeline described in the WSCP.

DEMAND MANAGEMENT MEASURES

Chapter 9 of this UWMP provides an overview of the City's historical and existing water use efficiency programs to promote conservation and reduce demands on water supplies. It also provides information about the status of implementation of Demand Management Measures (DMMs) listed below, including a comprehensive description of the City's historical, current, and projected DMMs. In addition, it discusses implementation of DMMs to achieve future water use targets and State standards for assessing and managing distribution system water loss. The DMMS are integral not only to the City's long-term water supply planning efforts but are also central to the effectiveness of the City's Water Shortage Contingency Plan, which has been summarized in Chapter 8 and provided in detail in Appendix L.

The demand management measures described in Chapter 9 include:

- Water Waste Prevention Ordinance
- Metering
- Conservation Pricing
- Public Education and Outreach
- Programs to Assess and Manage Distribution System Real Loss
- Water Conservation Program Coordination and Staffing Support
- Other Demand Management Measures

2020 UWMP ORGANIZATION

The City's 2020 UWMP is organized as follows:

- Chapter 1 provides background information on the UWMP, how the UWMP is organized, and changes that have occurred since adoption of the 2015 UWMP.
- Chapter 2 provides an overview of UWMP requirements, units of measure, coordination and outreach processes, and public noticing.
- Chapter 3 provides a general description of the City's water system and service area, demographics, and general information on climate change.
- Chapter 4 describes historical, current and projected water demands, future conservation savings, and the City's response to climate change.
- Chapter 5 addresses the requirements of the WC Act, year 2015 and 2020 targets and compliance, and the Regional Alliance.
- Chapter 6 discusses water supplies (Sonoma Water, groundwater, and recycled water) and wastewater treatment system.
- Chapter 7 provides an overview of water supply reliability and potential impacts on various supply sources.
- Chapter 8 provides an overview of the City's Water Shortage Contingency Plan, including conservation stages, prohibitions and enforcement.
- Chapter 9 discusses the City's conservation program which contains demand management measures and implementation.
- Chapter 10 describes the public hearing and adoption process, submittal of the UWMP, and UWMP availability.
- Appendices A through N provide relevant supporting documents including the City's Water Shortage Contingency Plan (Appendix L).

CHAPTER 1
Introduction

The Urban Water Management Planning Act (Act) was originally established by Assembly Bill (AB) 797 on September 21, 1983. Passage of the Act was recognition by state legislators that water is a limited resource and a declaration that efficient water use and conservation would be actively pursued throughout the state. The primary objective of the Act is to direct "urban water suppliers" to develop an UWMP which provides a framework for long-term- water supply planning, and documents how urban water suppliers are carrying out their long-term- resource planning responsibilities to ensure adequate water supplies are available to meet existing and future water demands. A copy of the current version of the Act, as incorporated in Sections 10610 through 10657 of the California Water Code (CWC), is provided in Appendix A of this document.

1.1 IMPORTANCE AND EXTENT OF CITY'S WATER MANAGEMENT PLANNING EFFORTS

The purpose of the UWMP is to provide a planning tool for the City in developing and delivering municipal water supplies to the City's water service area. This UWMP provides the City a water management action plan for guidance as water conditions change and management conditions arise.

Further, changes to the Act since 2015 require updates to the City's previously updated and adopted Water Shortage Contingency Plan (WSCP). The WSCP is part of this UWMP and provides a plan for response to various water supply shortage conditions.

The City has had a long history of providing clean and reliable water to its customers. The City's UWMP is a comprehensive guide for planning for a safe and adequate water supply.

1.2 CHANGES FROM 2015 UWMP

The Act has been modified over the years in response to the State's water shortages, droughts and other factors. A significant amendment was made in 2009, after the 2007 to 2009 drought, and as a result of the Governor's call for a statewide 20 percent reduction in urban water use by the year 2020. This was the Water Conservation Act of 2009, also known as Senate Bill Seven of the Senate's Seventh Extraordinary Session of 2009 (SB X7-7). This act required agencies to establish water use targets for 2015 and 2020 that would result in statewide water savings of 20 percent by 2020. The 2012 to 2016 drought led to further amendments to the California Water Code to improve on water supply planning for long-term- reliability and resilience to drought and climate change.

Summarized below are the major additions and changes to the California Water Code (CWC) since the City's 2015 UWMP was prepared.

- **Five Consecutive Dry Year Water Reliability Assessment** [CWC §10635(a)]. The Legislature modified the dry year water reliability planning from a "multiyear" time period to a "drought lasting five consecutive water years" designation. This statutory change requires the urban water supplier to analyze the reliability of its water supplies to meet its water use over an extended drought period. This requirement is addressed in the water use assessment presented in Chapter 4; the water supply analysis presented in Chapter 6; and the water reliability determinations in Chapter 7 of this plan.

- **Drought Risk Assessment** [CWC §10635(b)]. The California Legislature created a new UWMP requirement for drought planning because of the significant duration of recent California droughts and the predictions about hydrological variability attributable to climate change. The Drought Risk Assessment (DRA) requires the urban water supplier to assess water supply reliability over a five-year period from 2021 to 2025 that examines water supplies, water uses, and the resulting water supply reliability under a reasonable prediction for five consecutive dry years. The DRA is discussed in Chapter 7 based on the water use information in Chapter 4; the water supply analysis is presented in Chapter 6; and the water reliability determinations are discussed in Chapter 7 of this plan.
- **Seismic Risk** [CWC §10632.5]. The Water Code now requires urban water suppliers to specifically address seismic risk to various water system facilities and to have a mitigation plan. Water supply infrastructure planning is correlated with the regional hazard mitigation plan associated with the urban water supplier. The City's seismic risk is discussed in Appendix L of this plan.
- **Energy Use Information** [CWC §10631.2]. The Water Code now requires Suppliers to include readily obtainable information on estimated amounts of energy for their water supply extraction, treatment, distribution, storage, conveyance, and other water uses. The reporting of this information was voluntary in 2015. The City's energy use information is provided in Chapter 6 of this plan.
- **Water Loss Reporting for Five Years** [CWC §10608.34]. The Water Code added the requirement to include the past five years of water loss audit reports as part of this UWMP. The City's water loss reporting is provided in Chapter 4 of this plan.
- **Water Shortage Contingency Plan** [CWC §10632]. In 2018, the Legislature modified the UWMP laws to require a WSCP with specific elements. The WSCP is a document that provides the urban water supplier with an action plan for a drought or catastrophic water supply shortage. Although the new requirements are more prescriptive than previous versions, many of these elements have long been included in WSCPs, other sections of UWMPs, or as part of the urban water supplier's standard procedures and response actions. Many of these actions were implemented by the urban water suppliers during the last drought to successfully meet changing local water supply challenges. The WSCP is used by DWR, the State Water Board, and the Legislature in addressing extreme drought conditions or statewide calamities that impact water supply availability. The City's WSCP is discussed in Chapter 8 of this plan and included as Appendix L.
- **Groundwater Supplies Coordination** [CWC §10631(b)(4)]. In 2014, the Legislature enacted the Sustainable Groundwater Management Act to address groundwater conditions throughout California. Water Code now requires 2020 UWMPs to be consistent with Groundwater Sustainability Plans in areas where those plans have been completed by Groundwater Sustainability Agencies. This requirement is addressed in Chapter 6 of this plan.
- **Lay Description** [CWC §10630.5]. The Legislature included a new statutory requirement for the urban water supplier to include a lay description of the fundamental determinations of the UWMP, especially regarding water service reliability, challenges ahead, and strategies for managing reliability risks. This section of the UWMP could be viewed as a go-to synopsis for new staff, new governing members, customers, and the media, and it can ensure a consistent representation of the Supplier's detailed analysis. This requirement is addressed in the Executive Summary.

- **Water Loss Management** [CWC §10608.34(a) (1)]. The Legislature included a requirement for urban water suppliers to report on their plan to meet the water loss performance standards in their 2020 UWMPs. This requirement is addressed in the Demand Management Measures presented in Chapter 9 of this plan.

1.3 PLAN ORGANIZATION

This 2020 UWMP contains the appropriate sections and tables required per CWC Division 6, Part 2.6 (Urban Water Management Planning Act), included in Appendix A of this 2020 UWMP, and has been prepared based on guidance provided by the California Department of Water Resources (DWR) in their "2020 Urban Water Management Plans Guidebook for Urban Water Suppliers" (DWR Guidebook).

This 2020 UWMP is organized into the following chapters:

- Chapter 1: Introduction
- Chapter 2: Plan Preparation
- Chapter 3: System Description
- Chapter 4: Water Use Characterization
- Chapter 5: SBX7-7 Baselines, Targets, and 2020 Compliance
- Chapter 6: Water Supply Characterization
- Chapter 7: Water Service Reliability and Drought Risk Assessment
- Chapter 8: Water Shortage Contingency Plan
- Chapter 9: Demand Management Measures
- Chapter 10: Plan Adoption, Submittal and Implementation

This 2020 UWMP also contains the following appendices of supplemental information and data related to the City's 2020 UWMP:

- Appendix A: Legislative Requirements
- Appendix B: DWR 2020 Urban Water Management Plan Tables
- Appendix C: DWR 2020 Urban Water Management Plan Checklist
- Appendix D: 2020 Urban Water Management Plan Water Demand Analysis and Water Conservation Measure Update, EKI
- Appendix E: Agency and Public Notices
- Appendix F: Distribution System Water Loss Audits
- Appendix G: Not Used
- Appendix H: SB X7-7 Compliance Form
- Appendix I: Regional Alliance Agreement
- Appendix J: Energy Intensity Calculation Tables
- Appendix K: Sonoma Water Water Supply Reliability

- Appendix L: City of Petaluma Water Shortage Contingency Plan
- Appendix M: Petaluma City Municipal Code Section 15.17: Water Conservation
- Appendix N: 2020 Urban Water Management Plan Adoption Resolution

Furthermore, this 2020 UWMP contains all the tables recommended in the DWR Guidebook, both embedded into the UWMP chapters where appropriate and included in Appendix B.

DWR's Urban Water Management Plan Checklist, as provided in the DWR Guidebook, has been completed by West Yost to demonstrate the plan's compliance with applicable requirements. A copy of the completed checklist is included in Appendix C.

CHAPTER 2
Plan Preparation

This chapter describes the preparation of the City's 2020 UWMP and Water Shortage Contingency Plan (WSCP), including the basis for the preparation of the plan, individual or regional planning, fiscal or calendar year reporting, units of measure, and plan coordination and outreach.

2.1 BASIS FOR PREPARING A PLAN

The Act requires every "urban water supplier" to prepare and adopt an UWMP, to periodically review its UWMP at least once every five years and make any amendments or changes which are indicated by the review. An "urban water supplier" is defined as a supplier, either publicly or privately owned, providing water for municipal purposes either directly or indirectly to more than 3,000 customers or supplying more than 3,000 acre-feet of water annually (AFY).

The City's water system qualifies under the California Health and Safety Code, Section 116275, as a "Public Water System" (PWS) that provides drinking water for human consumption. The City manages PWS #CA4910009, which is regulated by the State Water Resources Control Board, Division of Drinking Water. The City operates a single, retail drinking water system, which receives water from a wholesale supplier and from the City's groundwater wells. The City's public water system does not supply raw or treated drinking water to another agency.

In accordance with the California Water Code, an urban water supplier with 3,000 or more service connections or supplying more than 3,000 acre-feet of water per year is required to prepare an UWMP every five years with a planning horizon spanning at least 20 years. The state recommends, but does not require, a 25-year planning horizon. As shown in Table 2-1, the City provided water to 20,713 customer connections and supplied 7,731 AF of water in 2020. Therefore, the City is an urban water supplier and required to prepare an UWMP. The City's last UWMP, the 2015 UWMP, was adopted by the City Council on May 16, 2016.

Table 2-1. Public Water Systems (DWR Table 2-1 Retail)

Public Water System Number	Public Water System Name	Number of Municipal Connections 2020	Volume of Water Supplied 2020 *
Add additional rows as needed			
4910006	City of Petaluma	20,713	7,731
	TOTAL	20,713	7,731
**** Units of measure (AF, CCF, MG)*** *must remain consistent throughout the UWMP as reported in Table 2-3.*			
NOTES: Volumes are in AF.			

2.2 REGIONAL PLANNING

The California Water Code provides mechanisms for participating in area-wide, regional, watershed, or basin-wide urban water management planning. Water suppliers who receive water from a shared wholesale supplier may to form a regional alliance to comply with the Water Conservation Act (WC Act) of 2008.

A group of water suppliers agreeing among themselves to plan, comply, and report as a region on the requirements of the SB X7-7 is referred to as a "Regional Alliance." Each Regional Alliance develops and demonstrates meeting its own set of 2020 Urban Water Use Targets. A Regional Alliance allows water suppliers to work toward cooperatively developing programs and meeting regional water conservation targets, but not necessarily submitting a Regional Plan. Being a member of a Regional Alliance does not take the place of submitting an UWMP.

The Water Contractors of Sonoma Water have formed a Regional Alliance consisting of the following urban water suppliers: Cities of Santa Rosa, Cotati, Petaluma, Rohnert Park, Sonoma, and the Town of Windsor, and Marin Municipal, North Marin, and Valley of the Moon Water Districts. The City participates with the other Water Contractors in the Regional Alliance for SB X7-7 compliance purposes. Based on an evaluation of 2020 water demand and population data, it has been determined that each of the Water Contractors has individually met their 2020 SB X7-7 targets; hence, the Regional Alliance has also met its collective 2020 regional target. Additional SB X7-7 information can be found in Chapter 5 and Appendix H. Per DWR guidance, each Regional Alliance must develop regional Urban Water Use Targets. Additionally, a regional alliance may either be a part of a Regional UWMP (RUWMP) or may be a group of suppliers that submit a Regional Alliance Report and individual UWMPs. The Regional Alliance's water use targets are discussed in Section 5.7.

The City has prepared an individual UWMP and will not adopt an RUWMP. The City will notify and coordinate with the appropriate regional agencies and constituents, which in this case is Sonoma County, and the Sonoma County Water Agency (Sonoma Water).

2.3 INDIVIDUAL OR REGIONAL PLANNING AND COMPLIANCE

This 2020 UWMP has been prepared on an individual reporting basis covering only the City's service area, see Table 2-2. The City participates in a regional alliance, as discussed above; however, it has elected to prepare and adopt an individual UWMP. As described below in Section 2.5, the City has notified and coordinated planning and compliance with appropriate regional agencies and constituents.

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

Select Only One	Type of Plan		Name of RUWMP or Regional Alliance *if applicable* (select from drop down list)
☑	**Individual UWMP**		
	☐	Water Supplier is also a member of a RUWMP	
	☑	Water Supplier is also a member of a Regional Alliance	North Marin-Sonoma Alliance
☐	**Regional Urban Water Management Plan (RUWMP)**		

2.4 FISCAL OR CALENDAR YEAR AND UNITS OF MEASURE

The City's 2020 UWMP has been prepared on a calendar year basis, with the calendar year starting on January 1 and ending on December 31 of each year. Water use and planning data for the entire calendar year of 2020 has been included.

The water volumes in this 2020 UWMP are reported in units of AF. Although the City often uses reports which use Million Gallons (MG), and billing records which use Hundred Cubic Feet (HCF), these quantities have been converted to Acre-Feet for consistency with other reporting agencies.

The City's reporting methods for this 2020 UWMP are summarized in Table 2-3.

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

Type of Supplier (select one or both)	
☐	Supplier is a wholesaler
☑	Supplier is a retailer
Fiscal or Calendar Year (select one)	
☑	UWMP Tables are in calendar years
☐	UWMP Tables are in fiscal years
If using fiscal years provide month and date that the fiscal year begins (mm/dd)	
Units of measure used in UWMP * (select from drop down)	
Unit	AF
**** Units of measure (AF, CCF, MG)*** *must remain consistent throughout the UWMP as reported in Table 2-3.*	

2.5 COORDINATION AND OUTREACH

The UWMP Act requires the City to coordinate the preparation of its UWMP, which includes its WSCP, with other appropriate agencies and all departments within the City, including other water suppliers that share a common source, water management agencies, and relevant public agencies. The City coordinated the preparation of its 2020 UWMP with Sonoma Water, eight of its neighboring water providers that also utilize Sonoma Water, and the City's Planning and Economic Development Department. These agencies, as well as the public, participated in the coordination and preparation of this 2020 UWMP and are summarized below.

The City also coordinated with the Regional Alliance to develop projected water demands and water conservation efforts to ensure the requirements of SB X7-7 will be met. This coordination effort produced the 2020 Urban Water Management Plan Water Demand Analysis and Water Conservation Measures Update which can be found in Appendix D.

2.5.1 Wholesale and Retail Coordination

The City is a water retailer and receives wholesale water from Sonoma Water. In accordance with CWC Section 10631, the City has informed Sonoma Water of projected water use for that source in five-year increments through 2045, as shown in Table 2-4. Sonoma Water provided information to the City, identifying and quantifying water supplies available for the same period, under normal water year, single dry year, and five dry years hydrological conditions.

Table 2-4. Water Supplier Information Exchange (DWR Table 2-4 Retail)

The retail Supplier has informed the following wholesale supplier(s) of projected water use in accordance with Water Code Section 10631.
Wholesale Water Supplier Name
Add additional rows as needed
Sonoma County Water Agency (Sonoma Water)

2.5.2 Coordination with Other Agencies and the Community

Water suppliers must coordinate the preparation of their UWMP and WSCP with other appropriate agencies in the area, to the extent practicable. The City coordinated the preparation of this UWMP and WSCP with several agencies including the eight neighboring water providers that also utilize water from Sonoma Water, and the City's Planning and Economic Development Department. These and other agencies, as well as the public, participated in the coordination and preparation of this 2020 UWMP.

The City actively encourages community participation in the 2020 UWMP and WSCP update, water management activities and specific water-related projects. The City's public participation program includes both active and passive means of obtaining input from the community, such as mailings, public meetings, and web-based communication. The City's website describes on-going projects and posts announcements of planned rate increases to fund these water projects.

As part of the 2020 UWMP and WSCP update, the City facilitated a public hearing to provide an opportunity for all City water users and the general public to become familiar with the plan and to ask questions about its water supply in addition to the City's continuing plans for providing a reliable, safe, high-quality water supply. Public noticing, pursuant to Section 6066 of the Government Code, was conducted prior to commencement of a public comment period. Public hearing notices are included in Appendix E of this plan. During the public comment period, the Draft UWMP, including the WSCP, was made available on the City's website.

The City also coordinated the preparation of this 2020 UWMP and WSCP with several agencies, including relevant public agencies that utilize the same water supplies. These agencies included the following:

- County of Sonoma
- Sonoma Water
- City of Santa Rosa
- North Marin Water District
- Rohnert Park
- City of Sonoma
- City of Cotati
- Town of Windsor
- Marin Municipal Water District
- Sonoma Valley County Sanitation District
- Valley of the Moon Water District
- Permit Sonoma
- Sonoma County Local Agency Formation Commission (LAFCO)

2.5.3 Notice to Cities and Counties

CWC Section 10621 (b) requires agencies to notify the cities and counties to which they serve water at least 60 days in advance of the public hearing that the plan is being updated and reviewed. In December 2020, a notice of preparation was sent to the cities and counties and other stakeholders, to inform them of the UWMP update process and schedule, and to solicit input for the 2020 UWMP and WSCP. The notifications to cities and counties, the public hearing notifications, and the public hearing and adoption are discussed in Chapter 10 of this report.

CHAPTER 3
System Description

The City of Petaluma's (City) Department of Public Works and Utilities (PW&U) serves water to customers both within the City's boundary and outside that boundary. This chapter describes the City's service area, population, climate, and other demographic elements.

3.1 GENERAL DESCRIPTION

The City is located in Sonoma County, California and is part of the North Bay sub-region of the San Francisco Bay Area.

The City's water service area population is estimated to be 64,251 in 2020. The City's Utilities Department is responsible for providing and maintaining water, sewer collection, storm drainage and flood control services for residents and businesses within the City's water service area.

The City purchases treated water from Sonoma Water and pumps groundwater from local wells for its water supply, as described in further detail in Chapter 6.

The City serves the majority of water to customers within the City boundary. Water is also served to customers outside the boundary for a variety of reasons including previous private water companies being replaced with a municipal water utility service, failed wells, some customers were obtained from Sonoma Water, and other specific reasons. The City's largest customer outside of the boundary is the United States Coast Guard training station located 8 miles west of town. The City also provides recycled water to landscape irrigation customers within the City boundary, as well as to agricultural irrigation customers outside the boundary. These landscape irrigation customers are located along the eastern border of the City, while the agricultural customers are located to the southeast, near the City's water recycling facility.

3.2 SERVICE AREA BOUNDARY

Within Petaluma's water service area, the City supplies potable water to residential, industrial, institutional, and commercial customers in its service area. In addition to potable water service, the City provides recycled water for agricultural, golf course, and landscape irrigation. Details regarding the City's water supply sources are included in Chapter 6.

The City's service area covers approximately 14.5 square miles (9,280 acres) and is generally coterminous with the City limits. U.S. Highway 101 runs north and south through the City while California State Route 116 runs east and west. The City of Cotati is located to the north, the City of Sonoma is located to the east, and the City of Novato is located to the south. Figure 3-1 shows the City's water service area boundary.

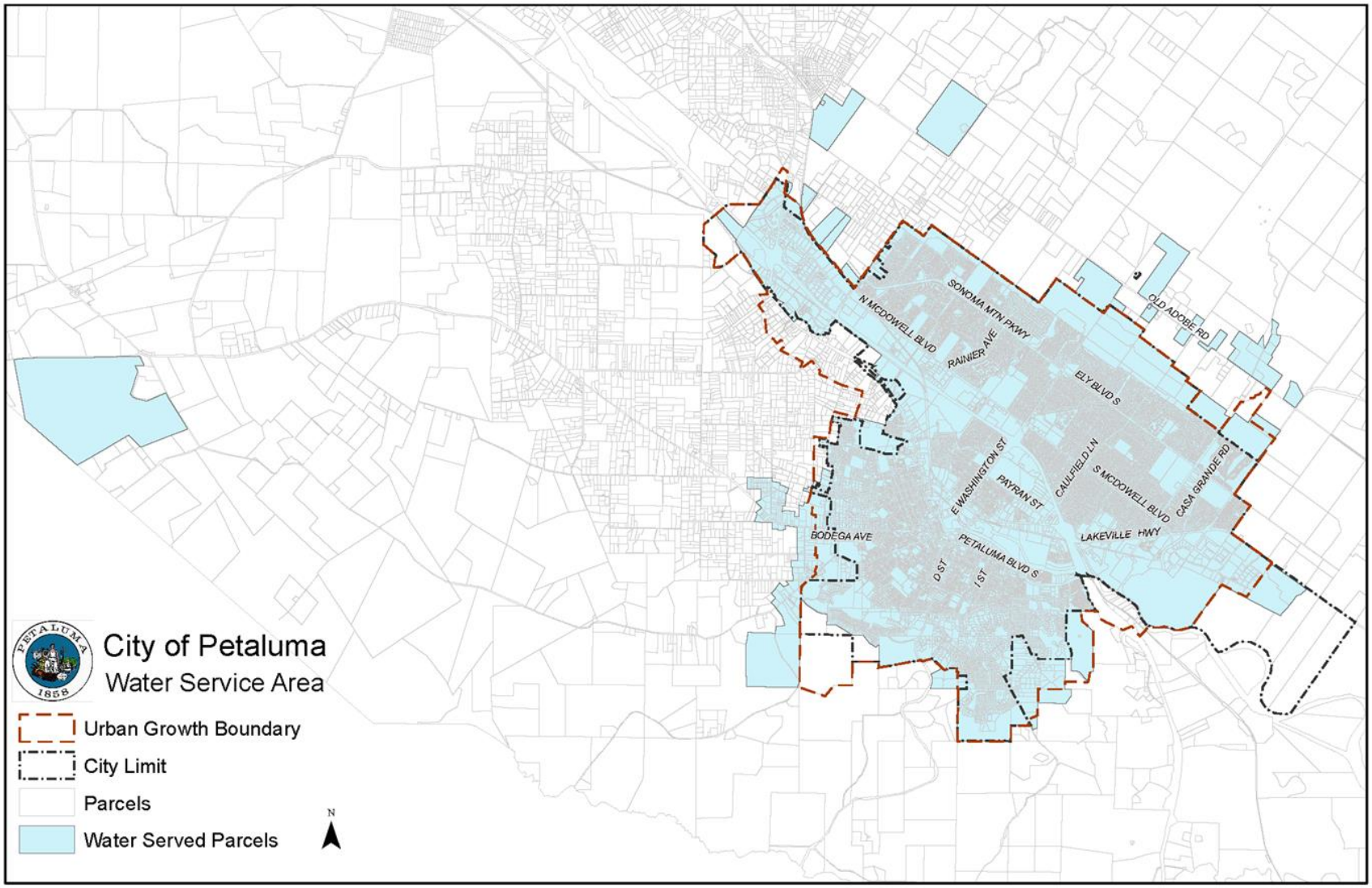

Figure 3-1. WaterService Area

3.3 SERVICE AREA CLIMATE

The service area climate reflects its close proximity to the Pacific Ocean. The area is subject to marine layer-type conditions throughout the year with chilly-foggy mornings which usually clear up by midday. The wet winter season usually begins in October and ends in April with an average low temperature of 45 degrees Fahrenheit (°F). Average annual precipitation is over 26 inches per year. The summer season temperature averages around 60°F. The annual average evapotranspiration rate (ETo) is approximately 40 inches.

3.4 SERVICE AREA POPULATION AND DEMOGRAPHICS

The City's water service area population, employment, and other demographics that may affect water management and planning are described below.

3.4.1 Service Area Population

The City's service population is divided into two elements: customers within the City limits, and customers outside of the City limit. The City serves smaller family units and the Coast Guard training facility outside of the City boundary. Historic population data within the City limit is tracked by the California Department of Finance (DOF). Annual population and average persons per household values are provided by the DOF. The persons per dwelling unit values are used to estimate the population of residential connections outside of the City's boundary. The Coast Guard training facility has a current population of 1,447 which is assumed to stay constant through 2040.

The population projections were based on 2018 ABAG population and employment projections. Population and employment projections are adjusted to include the Coast Guard population and accounts located outside of the City, but within the water service area. Table 3-1 lists the service area population projected out to 2045.

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

Population Served	2020	2025	2030	2035	2040	2045*(opt)*
	64,251	65,894	67,285	68,505	69,980	71,486
NOTES: 2018 ABAG Population Projection for 2020 is 63,168. Actual population for 2020 is 64,251.						

3.4.2 Other Social, Economic, and Demographic Factors

The California Water Code now requires the inclusion of service area socioeconomic information as part of the system description in UWMPs. However, differences in household water use across sociodemographic groups in Petaluma has not been studied. Therefore, the following social, economic, and demographic information is being provided to comply with the new regulation; the information was derived from the U.S. Census Bureau's profile of Petaluma for 2014-2018[3]. And is assumed to sufficiently apply to the City's service area:

- The average number of people per household in the five-year period analyzed was 2.66.
- The median household income in Petaluma was $87,708, while 8.9 percent of all individuals and 10.5 percent of youth under the age of 18 lived in poverty.
- The average unemployment rate was 4.2 percent.
- The owner-occupied housing unit rate was 64.6 percent, with a median home value of $600,900.
- The median gross rent was $1,762 per month.
- The median age was 41.7 years.
- Of persons 25 years or older in Petaluma, 89.4 percent had earned at least a high school diploma or equivalent and 39.8 percent had earned a bachelor's degree or higher.
- Of persons under 65 years of age, 6.3 percent had a disability and 0.2 percent did not have health insurance.
- Almost 94 percent of households had a computer, and 88.8 percent had a broadband internet subscription.
- By race/ethnicity, 68.9 percent of people were White, 1 percent were Black, 0.5 percent were American Indian or Alaska Native, 4.6 percent were Asian, 0.3 percent were Hawaiian Native or Pacific Islander, 4.5 percent were two or more races, and 21.1 percent were Hispanic or Latino.
- Fifteen percent of Petaluma's residents were foreign born, and 23.2 percent of people age five years and older spoke a language other than English at home.

3.5 LAND USES WITHIN SERVICE AREA

From the City's 2025 General Plan, distinct residential neighborhoods illustrate architectural and site design trends of different decades, encompassing more than 150 years of evolution. Downtown and surrounding older neighborhoods, with smaller residential lots and alleys between some blocks, provide a walkable urban core. Heavy commercial, industrial, and warehouse facilities are clustered along the Petaluma River corridor, where access to shipping facilities was important through the mid-1900s. At the same time, major portions of U.S. Highway 101 were completed, encouraging large commercial shopping areas and business/industrial parks to locate along this corridor. East of the highway, where flat,

[3] United States Census Bureau, American Community Survey, 2014-2018 ACS 5-Year Data Profile for Petaluma, California

developable land became readily available starting in the 1950s, residential neighborhoods designed around schools, parks, and creek trails were later established.

Petaluma's existing land use distribution is dominated by residential land uses. Commercial uses developed historically along Petaluma Boulevard and Lakeville Highway, but in recent decades, businesses have located along East Washington Street and McDowell Boulevard. These four corridors, along with Downtown, constitute the City's major commercial areas. Industrial uses were historically concentrated east of Downtown, on sites along the Petaluma River with shipping and rail access. Light industrial activities are also clustered in business parks at the northern and southern edges of Petaluma, adjacent to Highway 101. Open space, such as Shollenberger/Alman and Helen Putnam (a County park), constitute a significant portion of the City's acreage. Thirty percent of this open space, however, is comprised of privately-held and/or operated recreation facilities (i.e., golf courses).

New development under the General Plan seeks to infill existing vacant and under-utilized sites within the urban growth boundary (UGB) that are not environmentally constrained. The western and southern foothills encompass most of the vacant land, with about 350 acres. Due to land constraints posed by topography and public input on defining the community's long-term vision; however, most new development in these areas will remain rural in nature.

Vacant land and development/redevelopment potential also exists along the Petaluma River corridor. Much of the land area north of Payran Street between Petaluma Boulevard and Highway 101 has not yet developed. Should floodplain improvements permanently reduce development constraints, these parcels could provide significant infill and public amenity opportunities within the General Plan timeframe.

Vacant and under-utilized lands also occur along the arterial corridors leading to Downtown and Central Petaluma, such as Petaluma Boulevard and Washington Street. Most of these sites will also be redeveloped or reused for mixed uses. The Central Petaluma area, for which a Specific Plan was adopted in June 2003, contains extensive vacant and under-utilized parcels, particularly along the Petaluma River and Turning Basin, an active rail corridor with transit potential, and adjacent commercial and industrial uses. Vacant lands located in existing industrial and business park areas exist at the northern and southern ends of the City.

Recognizing the limited availability of land within the UGB, the General Plan allows for an increase in residential densities on portions of the remaining supply of vacant and under-utilized lands, as well as redefinition of some lands previously designated for commercial and/or industrial uses to residential or mixed use. New development will complement existing patterns and reinforce connections between neighborhoods and activity centers.

The City is currently updating its 2025 General Plan and hopes to have the updated General Plan and EIR adopted by December 2022.

CHAPTER 4
Water Use Characterization

This chapter describes and quantifies the City's past, current water use and projected water use (through 2045) by water source and customer type. The terms "water use" and "water demand" are used interchangeably and refer to water conveyed by the City's urban water distribution system and used by the City and its customers for any purpose. The Chapter discusses potable and non-potable water sources and outlines usage by sector (including water loss from the distribution system). Additionally, this chapter relates the likely impacts of climate change on water supply and usage, including higher temperatures, more frequent and intense droughts and wildfires, and more variable rainfall and outlines the City's mitigation and adaptation efforts in response to climate change. The chapter covers only the potable water use for the customers. Recycled water current and projected use are covered in Chapter 6.

4.1 DEMAND ANALYSIS METHODOLOGY

This section focuses on the demand analysis and includes realistic prediction of future potable and non-potable (recycled) water use based on the City's past and current use, combined with considerations of anticipated trends in customer water use, population growth, employment predictions, new development, land use planning data, climate change, plumbing code information and new regulations. The demand projections include use for all sectors, including projections for all types of customer water sales as well as authorized unbilled uses (for activities such as firefighting and line flushing) and water losses from the potable water system (real loss from the distribution system and apparent loss due to things such as billing errors). Potable water demands include water use projections for lower income and residential demands.

Each water use sector was examined for a variety of factors, and then the information was aggregated into a comprehensive projection of customer use through 2045. The total projections have been adjusted to account for anticipated "passive" water savings which result from new and existing local ordinances (such as the Model Water Efficient Landscape Ordinance, the National Plumbing Code, California Green Building Standards Code (CALGreen), and State Plumbing Code).

In support of this UWMP, EKI Environment and Water, Inc. (EKI) completed a detailed demand analysis which is summarized in this chapter where applicable. The full analysis by EKI, including a description of the methods used, is provided in Appendix D.

The demand analysis is also used in the assessments of water supplies in Chapter 6 and long-term water system reliability in Chapter 7.

4.2 NON-POTABLE VERSUS POTABLE WATER USE

The City provides both potable water and recycled water to customers within its water service area. The City's potable water use and non-potable water use are served by different water supplies and have separate distribution systems.

Potable water is water that is safe to drink, and which typically has had various levels of treatment and disinfection. The City purchases potable surface water supplies from Sonoma Water and produces its own groundwater as needed.

Recycled water is municipal wastewater that has been treated to a specified quality to enable it to be used again. As discussed in Chapter 6, the City owns and operates the Ellis Creek Water Recycling Facility (ECWRF). The ECWRF provides recycled water that meets Title 22 disinfected tertiary recycled water requirements to the City's landscape irrigation customers. The City does not distribute to its customers other types of non-potable water, such as untreated groundwater, remediated groundwater, or untreated surface water.

Raw water is untreated water that is used in its natural state or with minimal treatment. The City does not deliver raw water to any customers in its service area

4.3 WATER USE BY SECTOR

The water demand provided by the City is broken down into account types or sectors which include Single-Family, Multi-Family, Commercial, Industrial, Institutional/Governmental, and Landscape (Irrigation accounts). Each water system connection has an account type associated with it. Monthly billing records for each account type were totaled using the City's billing software and combined for an annual water demand.

The City uses the following definitions for each sector, as outlined in the DWR Guidebook:

- **Single Family Residential:** A single family dwelling unit. A parcel with a freestanding building containing one dwelling unit that may include a detached secondary dwelling.
- **Multi-Family Residential:** Multiple dwelling units contained within one building or several buildings within one complex.
- **Commercial:** A water user that provides or distributes a product or service (CWC 10608.12(d)).
- **Industrial:** A water user that is primarily a manufacturer or processor of materials as defined by the North American Industry Classification System (NAICS) code sectors 31 to 33, inclusive, or an entity that is a water user primarily engaged in research and development (CWC 10608.12(h)).
- **Institutional (and Governmental):** A water user dedicated to public service. This type of user includes, among other users, higher-education institutions, schools, courts, churches, hospitals, governmental facilities, and nonprofit research institutions. (CWC 10608.12(i)).
- **Landscape:** Water connections supplying water solely for landscape irrigation. Such landscapes may be associated with multi-family, commercial, industrial, or institutional/governmental sites, but are considered a separate water use sector if the connection is solely for landscape irrigation.
- **Distribution System Losses:** Distribution system water losses are the physical water losses from the water distribution system and the supplier's storage facilities, up to the point of customer consumption.
- **Other:** Demand that is not covered in the above demand sectors which include such volume as parcels recently recoded as vacant, metered construction water, or metered water utilized for water main cleaning.

Within its urban system, the City does not provide water to the following three sectors identified and defined as follows in the DWR 2020 Guidebook:

- Sales to other agencies: Water sales made to another agency.
- Saline water intrusion barriers, groundwater recharge, or conjunctive use, or another combination thereof:
  - Saline water intrusion barriers: Injection of water into a freshwater aquifer to prevent the intrusion of saltwater. This may be either a wholesale or retail demand.
  - Groundwater Recharge: The managed and intentional replenishment of natural groundwater supplies using man-made conveyances such as infiltration basins or injection wells. Water used for groundwater banking or storage may also be reported using this sector. If all, or a portion of, the groundwater recharge water is subsequently pumped out of the basin in the same year, that water will be reported by the Supplier as a supply from groundwater. This may be either a wholesale or retail demand.
  - Conjunctive use: A management strategy where surface water is managed in conjunction with an underground aquifer. For purposes of the UMWP, conjunctive use is seen as a management strategy rather than as a water use.

4.3.1 Historical Water Use

In 2015, the City delivered 6,744 acre-feet of potable water to metered accounts. It is noted that 2015 was a unique year for water demands as the State was experiencing a three-year drought. The State of California mandated the City of Petaluma to reduce its water consumption by 16 percent, which the City was able to accomplish by increasing water conservation efforts and applying water use restriction methods. The City's past water consumption for 2016 through 2019 is summarized in Table 4-1.

Table 4-1. Historical Water Demand by Water Use Sector, AF[(a)]

Water Use Sector	2016	2017	2018	2019
Single-Family	3,576	3,962	3,967	3,966
Multi-Family	763	845	836	823
Commercial	955	1,044	1,054	1,005
Industrial	664	636	606	445
Institutional/Governmental	224	234	239	249
Irrigation (Commercial and Institutional)	651	794	805	833
Recycled Water Irrigation[(b)]	1,349	1,245	1,339	1,024
Total	**8,182**	**8,761**	**8,845**	**8,345**

Source: Final Demand Consumption Report

(a) Units are in acre-feet (AF).
(b) Recycled water use includes both urban and agricultural uses.

4.3.2 Current Water Use

The actual water demand by demand sector for 2020 is shown in Table 4-2. There is no existing use for saline barriers, groundwater recharge, conjunctive use, or raw water within the City's water service area.

Table 4-2. Demands for Potable and Non-Potable Water – Actual (DWR Table 4-1 Retail)

Use Type	2020 Actual		
Drop down list May select each use multiple times These are the only Use Types that will be recognized by the WUEdata online submittal tool	Additional Description (as needed)	Level of Treatment When Delivered Drop down list	Volume[2]
Add additional rows as needed			
Single Family		Drinking Water	4,354
Multi-Family		Drinking Water	888
Commercial		Drinking Water	955
Industrial		Drinking Water	403
Institutional/Governmental		Drinking Water	235
Landscape	All dedicated irrigation accounts	Drinking Water	893
Other Potable		Drinking Water	3
		TOTAL	7,731

[1] *Recycled water demands are NOT reported in this table. Recycled water demands are reported in Table 6-4.*
[2] *Units of measure (AF, CCF, MG) must remain consistent throughout the UWMP as reported in Table 2-3.*

NOTES: Volumes are in AF.

4.3.3 Projected Water Use

The projected water demands through the year 2045 were developed as part of the City's 2020 Water Demand Analysis and Water Conservation Measure Update prepared by EKI Environmental & Water Inc. These projected water demands include water savings from conservation programs and plumbing code changes. A summary of the methods used for these projected water demands is shown in Appendix D. The projected water demands are shown in Table 4-3. Potable water demand is projected to increase to 9,577 AF in 2045, an 18 percent increase from 2019. Recycled water demand is projected to increase to 2,540 AF in 2045, a 148 percent increase from 2019 demand. Potable water demand projections are generally consistent with the City's 2015 UWMP demand projections while the recycled water demand projections are higher. Projected demand numbers may not exactly match numbers in other documents due to rounding errors.

Table 4-3. Use for Potable and Non-Potable Water - Projected (DWR Table 4-2 Retail)

Use Type	Additional Description (as needed)	Projected Water Use[2] *Report To the Extent that Records are Available*				
Drop down list May select each use multiple times These are the only Use Types that will be recognized by the WUEdata online submittal tool		2025	2030	2035	2040	2045 (opt)
Add additional rows as needed						
Single Family		4,642	4,740	4,826	4,930	5,036
Multi-Family		523	631	653	679	706
Commercial		1,067	1,102	1,144	1,239	1,341
Industrial		497	497	497	497	497
Institutional/Governmental		384	397	412	446	483
Landscape	Commercial and Institutional Irrigation	1,043	1,078	1,119	1,211	1,312
Groundwater recharge						
Saline water intrusion barrier						
Agricultural irrigation						
Wetlands or wildlife habitat						
Sales/Transfers/Exchanges to other agencies						
Sales/Transfers/Exchanges to other agencies						
Losses	See note a.	749	775	794	826	861
Other Potable						
Other Non-Potable						
Other	Estimated Passive Savings[(b)]	-200	-350	-471	-573	-659
	TOTAL	8,705	8,870	8,974	9,255	9,577

[1] *Recycled water demands are NOT reported in this table. Recycled water demands are reported in Table 6-4.* [2] *Units of measure (AF, CCF, MG) must remain consistent throughout the UWMP as reported in Table 2-3.*

NOTES: Volumes are in AF.
(a) Water losses are based on the average percentage of water loss reported for 2017 through 2019.
(b) Passive water savings are based on the AWE Conservation Tracking Tool.

4.3.4 Total Water Use

Water Loss is discussed in Section 4.4. Recycled water is discussed in Chapter 6. Current and projected total gross water use is shown in Table 4-4.

Table 4-4. Total Water Use (Potable and Non-Potable) (DWR Table 4-3 Retail)

	2020	2025	2030	2035	2040	2045 (opt)
Potable Water, Raw, Other Non-potable *From Tables 4-1R and 4-2 R*	7,731	8,705	8,870	8,974	9,255	9,577
Recycled Water Demand[1] *From Table 6-4*	651	2,000	2,540	2,540	2,540	2,540
Optional Deduction of Recycled Water Put Into Long-Term Storage[2]						
TOTAL WATER USE	8,382	10,705	11,410	11,514	11,795	12,117

[1] Recycled water demand fields will be blank until Table 6-4 is complete

*[2] Long term storage means water placed into groundwater or surface storage that is not removed from storage in the same year. Supplier **may** deduct recycled water placed in long-term storage from their reported demand. This value is manually entered into Table 4-3.*

NOTES: Volumes are in AF.

4.4 DISTRIBUTION SYSTEM WATER LOSSES

New regulations require water suppliers to include potable distribution system water losses for the preceding five years (to the extent records are available) and to project potable water losses in five-year increments for at least 20 years in their 2020 UWMPs. Potable distribution system water losses (also known as "real losses") are the physical water losses from a supplier's potable water distribution system and storage facilities up to the point of delivery to customers. In the City's distribution system, the customer water meter is the point of delivery.

This section discusses the City's past, current (2020) and projected potable distribution system water losses out to 2045. In so doing, this section meets the new requirement to provide an estimation of potable water loss for at least 20 years.

As set forth in California Assembly Bill 1668 and Senate Bill 606, the State is in the process of adopting rules requiring urban retail water suppliers meet volumetric performance standards for real water losses. The State has not yet finalized the City's target, but it appears likely that the target will be closely aligned with the State's draft proposed performance standard for real losses for the City of 16.3 gallons per connection per day. The City's average real loss for 2016-2019 is 16.7 gallons per connection per day. As such, the City anticipates it will achieve and maintain compliance with the State's volumetric performance standard for water loss by 2027 as required. Section 9.2.5 in Chapter 9 provides additional information about the City's programs for assessing and managing real water loss.

The City's potable distribution system water losses for the preceding five years (2015-2019) were calculated annually using the American Water Works Association (AWWA) Water Audit Method as required by the State with the adoption of Senate Bill 555 in 2015. Accordingly, the City submitted to the State an electronic copy of each annual audit of its potable distribution system's water losses for the calendar years 2015 through 2019, using DWR's online submittal tool. The water loss audit for 2015 preceded Senate Bill (SB) 555 requirements to submit to the State as an electronic annual report, but it was submitted to DWR with the City's 2015 UWMP.

The water demands shown in Section 4.3 are considered to be actual water consumption demands by the end users and therefore does not equal the amount of water entering into the City's distribution system. This difference in demands is called "System Losses" and includes use for fire protection, flushing, sewer cleaning, loss from leaks, meter inaccuracies and/or other non-billed uses. The system losses for 2015 to 2019 are shown in Table 4-5.

Table 4-5. Last Five Years of Water Loss Audit Reporting (DWR Table 4-4 Retail)

Reporting Period Start Date (mm/yyyy)	Volume of Water Loss [1,2]
01/2015	591
01/2016	742
01/2017	453
01/2018	828
01/2019	305
[1] Taken from the field "Water Losses" (a combination of apparent losses and real losses) from the AWWA worksheet. *[2] **Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.*	
NOTES: Units are AF	

Detailed water audits for 2015 through 2019 are included in Appendix F.

4.5 ESTIMATING FUTURE WATER SAVINGS

When estimating the projected water demands, water savings from codes, standards, and ordinances were included. These water savings resulted from two categories: the savings from the natural replacement of existing plumbing fixtures with water-efficient models required under current plumbing code standards, and the savings from the installation of water-efficient fixtures and equipment in new buildings and retrofits as required under California Green Building Standards Code. Documentation of the inclusion of future water savings in projections is shown in Table 4-6.

Table 4-6. Inclusion in Water Use Projections (DWR Table 4-5 Retail)

Are Future Water Savings Included in Projections? (Refer to Appendix K of UWMP Guidebook) *Drop down list (y/n)*	Yes
If "Yes" to above, state the section or page number, in the cell to the right, where citations of the codes, ordinances, or otherwise are utilized in demand projections are found.	Chapter 4 (Section 4.3)
Are Lower Income Residential Demands Included In Projections? *Drop down list (y/n)*	Yes

4.6 WATER USE FOR LOWER INCOME HOUSEHOLDS

The demand for lower income households was considered, but not categorized separately, in the projected demands for the City. Inclusion of lower income residential demands in the projections is also indicated in Table 4-6.

4.7 CLIMATE CHANGE CONSIDERATIONS

A Climate Change Vulnerability Assessment was prepared and is included in the City's Local Hazard Mitigation Plan, which is included in the City's Water Supply Contingency Plan (Appendix L of this UWMP). The climate change assessment takes into consideration water demand, water supply, water quality, sea level rise, flooding, ecosystem, habitat vulnerability, and hydropower. The results of the water demand portion of the assessment are the following:

- Industries that require cooling/process water may be subject to increased demand due to average temperature increase. The City does not have any major industries that require cooling water.
- An increase in average temperature is expected to increase outdoor water use. If maximum and minimum monthly water uses vary by more than 25 percent, then the area may be subject to an increase in water demand due to an increase in temperature. The City's difference between maximum and minimum month of water demand was found to be 50 percent, which is greater than the threshold of 25 percent. The City's water conservation efforts such as encouraging residents to remove turf for mulch and the expansion of the City's recycled water system should reduce the water demand for irrigation water during the summer months.
- Agriculture will be sensitive to climate change and may require more water as the climate warms. The agriculture in the area is outside of the system boundary. Many of the agricultural areas are serviced with recycled water, with future expansion planned.
- Areas with more demands may be vulnerable to droughts and may become more dependent on groundwater. The City uses groundwater wells for emergency uses only. The groundwater basin levels have recovered from the 2012-2016 drought. Although Spring 2021 groundwater levels have not recovered from Fall 2020.

CHAPTER 5
SB X7-7 Baselines, Targets, and 2020 Compliance

In November 2009, Senate Bill X7-7 (SB X7-7), the Water Conservation Act of 2009, was signed into law as part of a comprehensive water legislation package. The Water Conservation Act addressed both urban and agricultural water conservation. The legislation set a goal of achieving a 20 percent statewide reduction in urban per capita water use by December 31, 2020 (i.e., "20 by 2020"). To meet the urban water use target requirement, each retail supplier was required to determine its baseline water use, as well as its target water use for the year 2020.

This chapter provides a review of the methodology the City used to calculate its 2020 Urban Water Use Target (target), its baseline, and how the baseline was calculated. The City calculated baselines and targets on an individual reporting basis in accordance with SB X7-7 legislation requirements and Department of Water Resources (DWR) *Methodologies for Calculating Baseline and Compliance Urban Per Capita Water Use* (2016) (DWR *Methodologies*).

In this Chapter, it is also demonstrated that the City has achieved its 2020 target reduction both on an individual basis and as part of a Regional Alliance. Regional Alliance baselines and targets are discussed in Section 5.7. Compliance with the urban water use target requirement is confirmed in the SB X7-7 Compliance Form, which is included as Appendix H in this plan. Water use is measured in gallons per capita per day (GPCD).

A discussion of the City's programs and policies for water conservation is provided in Chapter 9 Demand Management Measures of this plan. Therefore, the remainder of this chapter will only focus on SB X7-7 baselines and targets for the City's retail water service area.

5.1 OVERVIEW AND BACKGROUND

The City's compliance with SB X7-7 was first addressed in the City's 2010 UWMP. The City's baseline per capita water use was determined, and urban water use targets for 2015 and 2020 were established and adopted. Actual water use data and DOF population estimates were used to calculate per capita water use.

SB X7-7 included a provision that an urban water supplier may update its 2020 urban water use target in its 2015 UWMP, and may use a different target method than was used in 2010. Also, the SB X7-7 methodologies developed by DWR in 2011 noted that water suppliers may revise population estimates for baseline years when the 2010 Census information became available.

The 2010 Census data was not finalized until 2012. In its 2015 UWMP, the City updated its population, baselines, and targets to reflect 2010 Census data. The City demonstrated that it successfully achieved its 2015 interim target and confirmed its 2020 target.

In this 2020 UWMP, the City verifies that it achieved its 2020 target per capita water use.

5.2 GENERAL REQUIREMENTS FOR BASELINE AND TARGETS

SB X7-7 required each urban water retailer to determine its baseline daily per capita water use over a 10-year or 15-year baseline period. The 10-year baseline period is defined as a continuous 10-year period ending no earlier than December 31, 2004 and no later than December 31, 2010. SB X7-7 also defined that for those urban water retailers that met at least 10 percent of their 2008 water demand using recycled water, the urban water retailers can extend the baseline GPCD calculation for a maximum of a

continuous 15-year baseline period, ending no earlier than December 31, 2004 and no later than December 31, 2010. In 2008, the City delivered 5.89 percent recycled water; therefore, the City's baseline GPCD was calculated over a 10-year period. In its 2015 UWMP, the 10-year baseline period that the City selected was 1996 through 2005. This is the same 10-year baseline period reported in the City's 2010 UWMP.

SB X7-7 and DWR provided four different methods for calculation of an urban water retailer's 2020 target. Three of these methods are defined in Water Code Section 10608.20(a)(1), and the fourth method was developed by DWR. The 2020 water use target may be calculated using one of the following four methods:

- **Method 1**: 80 percent of the City's base daily per capita water use;
- **Method 2**: Per capita daily water use estimated using the sum of performance standards applied to indoor residential use; landscaped area water use; and commercial, industrial, and institutional uses;
- **Method 3**: 95 percent of the applicable State hydrologic region target as stated in the State's April 30, 2009, draft 20x2020 Water Conservation Plan; or
- **Method 4**: An approach that considers the water conservation potential from: 1) indoor residential savings, 2) metering savings, 3) commercial, industrial and institutional savings, and 4) landscape and water loss savings.

The City selected Method 3 to calculate its 2020 target in its 2015 UWMP.

Daily average water use is divided by the service area population to obtain baseline and target GPCD. In 2015, the City adjusted its baseline and target GPCD to reflect its updated population estimates based on 2010 Census data results. To calculate the City's compliance year GPCD and compare it to the 2020 target, the population is updated to reflect population estimates for 2020. Details of determining the 2020 service area population are provided in Section 5.3.

The City's baselines and targets are summarized in Section 5.5. The City's 2020 compliance water use is provided in Section 5.6.

5.3 SERVICE AREA POPULATION

To correctly calculate its compliance year GPCD, the City must determine the population that it served in 2020. At the time of preparation of this UWMP, the 2020 Census results were unavailable.

The population for the service area was determined using DOF population (61,873), and adding water accounts served outside the City's service area (365 connections x 2.55 person per connection = 931 persons) and the population for the U.S. Coast Guard base, which is estimated to be 1,447 persons and is expected to remain constant. The City's 2020 service area population was 64,251.

5.4 GROSS WATER USE

Annual gross water use, as defined in CWC §10608.12 (h), is the water that enters the City's distribution system over a 12-month period (calendar year) with certain exclusions. The City's annual gross water use for 2020, in accordance with DWR's *Methodologies* document, is 7,360 acre-feet. This number is based

on the City's water production data for 2020, and is different than the water use data in Chapter 4 which is based on finance/billing data.

5.5 BASELINES AND TARGETS SUMMARY

Annual gross water use is divided by annual service area population to calculate the annual per capita water use for each year in the baseline periods. As discussed in Section 5.1, the City updated its population data, adjusted its baseline, and confirmed its 2020 target in its 2015 UWMP. The City chose Target Method 1 to determine the 2020 water use target. A 20 percent reduction of the 10 to 15-year base daily per capita water use (GPCD) of 177 GPCD yields 141 GPCD. Based on the California Water Code, the method adopted by the City must result in a 2020 urban water use target which is no more than 95 percent of the 5-year baseline. The City's baseline and target are summarized in Table 5-1.

Table 5-1. Baselines and Targets Summary (DWR Table 5-1 Retail)

Baseline Period	Start Year *	End Year *	Average Baseline GPCD*	Confirmed 2020 Target*
10-15 year	1995	2004	177	141
5 Year	2003	2007	157	
**All cells in this table should be populated manually from the supplier's SBX7-7 Verification Form and reported in Gallons per Capita per Day (GPCD)*				

5.6 2020 COMPLIANCE DAILY PER CAPITA WATER USE

In Sections 5.3 and 5.4, the City's 2020 population and gross water use are presented, respectively. The City calculated its actual 2020 water use for the 2020 calendar year in accordance with DWR's *Methodologies* document. As shown in Table 5-2, urban per capita water use in 2020 was 102 GPCD, which is well below the confirmed 2020 water use target of 141 GPCD. Therefore, the City has met its 2020 final water use target. The SB X7-7 compliance tables used to document this compliance are included in Appendix H.

Table 5-2. 2020 Compliance (DWR Table 5-2 Retail)

2020 GPCD			2020 Confirmed Target GPCD*	Did Supplier Achieve Targeted Reduction for 2020? Y/N
Actual 2020 GPCD*	2020 TOTAL Adjustments*	Adjusted 2020 GPCD* *(Adjusted if applicable)*		
102		102	141	Yes
**All cells in this table should be populated manually from the supplier's SBX7-7 2020 Compliance Form and reported in Gallons per Capita per Day (GPCD)*				

As detailed in DWR's *Methodologies* document, adjustments are allowed that can be made to an agency's gross water use in 2020 for unusual weather, land use changes, or extraordinary institutional water use.

The City has elected not to make the adjustments allowed by Water Code Section 10608.24 because these exceptions are not needed to demonstrate compliance with SB X7-7 for 2020. Water use in 2020 in the City's service area was significantly reduced as compared to baseline years as a result of increased water conservation efforts by the City and its customers.

5.7 REGIONAL ALLIANCE

The City has chosen to comply with the requirements of SB X7-7 on an individual basis. The City has also elected to participate in a regional alliance as reported in this section.

In 2011, a regional alliance was formed between the cities of Santa Rosa, Rohnert Park, Sonoma, Cotati, and Petaluma, Town of Windsor, and North Marin, Marin Municipal, and Valley of the Moon Water Districts. The Regional Alliance has been formed pursuant to the Department of Water Resources Methodologies for Calculating Baseline and Compliance Urban Per Capita Water Use because the parties receive water from a common water wholesale supplier, Sonoma Water. A Regional Alliance Report is submitted annually, and regional compliance with SB X7-7 for 2020 is provided in this section. The Regional Alliance Agreement is included in the 2020 UWMP as Appendix I.

As part of the Regional Alliance, the City is complying with the requirements of SB X7-7 on a regional basis. If compliance on a regional basis was unsuccessful, then the City would demonstrate compliance on an individual basis as discussed in previous sections.

In the 2015 UWMP, Regional Alliance targets were updated from the 2010 UWMP since revised population data (2010 Census) was made available after the 2010 UWMP was completed. Table 5-3 provides the weighted baseline data which incorporates updated population statistics and baseline gallon per capita metrics for both individual agencies as well as the Regional Alliance.

Table 5-3. SB X7-7 RA1 - Weighted Baseline

Participating Member Agency Name	10-15 year Baseline GPCD*	Average Population During 10-15 Year Baseline Period	(Baseline GPCD) X (Population)	Regional Alliance Weighted Average 10-15 Year Baseline GPCD
City of Cotati	159	6,559	1,043,146	
Marin Municipal Water District	149	178,670	26,690,318	
North Marin Water District	173	54,061	9,370,435	
City of Petaluma	180	52,622	9,491,997	
City of Rohnert Park	161	40,811	6,582,847	
City of Santa Rosa	145	143,109	20,806,963	
City of Sonoma	225	9,679	2,173,212	
Valley of the Moon Water Distict	146	20,969	3,058,648	
Town of Windsor	156	24,572	3,834,809	
Regional Alliance Total	1,495	531,051	83,052,375	**156**

**All participating agencies must submit individual SB X7-7 Tables, as applicable, showing the individual agency's calculations. These tables are: SB X7-7 Tables 0 through 6 , Table 7, any required supporting tables (as stated in SB X7-7 Table 7), and SB X7-7 Table 9, as applicable.These individual agency tables will be submitted with the individual or Regional Urban Water Management Plan.*

The weighted 2020 target for the individual agencies and the Regional Alliance is calculated in Table 5-4.

Table 5-4. SB X7-7 RA1 - Weighted 2020 Target

Participating Member Agency Name	2020 Target GPCD*	2015 Population	(Target) X (Population)	Regional Alliance Weighted Average 2020 Target
City of Cotati	130	7,288	947,440	
Marin Municipal Water District	124	189,000	23,436,000	
North Marin Water District	139	61,381	8,531,959	
City of Petaluma	141	61,798	8,713,518	
City of Rohnert Park	119	41,675	4,959,325	
City of Santa Rosa	126	173,071	21,806,946	
City of Sonoma	180	11,147	2,006,460	
Valley of the Moon Water Disti	124	23,478	2,911,272	
Town of Windsor	130	27,486	3,573,180	
Regional Alliance Total	1,213	596,324	76,886,100	**129**

**All participating agencies must submit individual SB X7-7 Tables, as applicable, showing the individual agency's calculations. These tables are: SB X7-7 Tables 0 through 6 , Table 7, any required supporting tables (as stated in SB X7-7 Table 7), and SB X7-7 Table 9, as applicable.These individual agency tables will be submitted with the individual or Regional Urban Water Management Plan.*

The 2020 actual gallon per capita day metrics for each of the individual agencies as well as the Regional Alliance is calculated in Table 5-5.

Table 5-5. SB X7-7 RA1 - 2020 GPCD (Actual)

Participating Member Agency Name *Add rows as needed*	2020 Actual GPCD[1]	2020 Population	(2020 GPCD) X (2020 Population)	Regional Alliance 2020 GPCD (Actual)
City of Cotati	113	7,533	851,229	
Marin Municipal Water District	128	191,269	24,482,432	
North Marin Water District	119	61,658	7,337,302	
City of Petaluma	107	64,251	6,900,557	
City of Rohnert Park	96	43,069	4,126,872	
City of Santa Rosa	99	173,628	17,189,172	
City of Sonoma	166	11,725	1,946,350	
Valley of the Moon Water Disti	102	23,077	2,353,854	
Town of Windsor	119	28,397	3,379,243	
Regional Alliance Totals	1,049	604,607	68,567,011	**113**

** All participating agencies must submit individual SB X7-7 Tables, as applicable, showing the individual agency's calculations. These tables are: SB X7-7 Tables 0 through 6 , Table 7, any required supporting tables (as stated in SB X7-7 Table 7), and SB X7-7 Table 9, as applicable.These individual agency tables will be submitted with the individual or Regional Urban Water Management Plan.*

As shown in the Regional Alliance Compliance Verification table (Table 5-6), the Regional Alliance has met its 2020 SB X7-7 target.

Table 5-6. SB X7-7 RA1 - Compliance Verification

2020 Actual GPCD	Optional Adjustment for Economic Growth[1]	Adjusted **2020 Actual GPCD**	**2020 Target GPCD** [2]	**Did Alliance Achieve Targeted Reduction for 2020?**
113	-	113	129	YES

[1] Adjustments for economic growth can be applied to either the individual supplier's data or to the aggregate regional alliance data (but not both), depending upon availability of suitable data and methods.

[2] 2020 Target GPCD will be taken from the Regional Alliance's SB X7-7 Verification Form, Weighted Target Table.

CHAPTER 6
Water Supply Characterization

This chapter assesses the City's potable and non-potable water supplies over short-term and long-term planning horizons. It also includes an analysis of the availability of each source out to 2045 under the following hydrologic conditions: normal water year, single dry water year, and a drought lasting five years. It also considers water supplies in a near-term drought (2021-2025) and longer-term issues like climate change and regulatory revisions. The analysis examines each water source separately and then aggregates the information into a comprehensive picture of the City's current and future water supply reliability.

6.1 WATER SUPPLY ANALYSIS OVERVIEW

The City utilizes a portfolio approach to its water supplies. Water sources include surface water, groundwater and recycled water to serve City customers.

In this section, the management of each supply in correlation with other supplies are discussed, along with the measures the City has taken to acquire and develop planned sources of water. Anticipated availability of the City's water supplies under a normal water year is provided in this chapter. The availability of the City's water supplies under a single dry year and a drought year lasting five years, as well as more frequent and severe periods of drought, are discussed in detail in Chapter 7 of this UWMP, along with the basis of those estimates.

6.2 WATER SUPPLY CHARACTERIZATION

The City has historically used surface water, groundwater, and recycled water to supply its various customer demands. The near-term future supply strategy relies on surface water from the Sonoma County Water Agency (Sonoma Water) and recycled water from its own water recycling facility.

6.2.1 Purchased or Imported Water

The City purchases water from Sonoma Water which is supplied by the federal Russian River Project. The key elements to the Russian River system are the Coyote Valley Dam, which creates Lake Mendocino on the East Fork Russian River, and Warm Springs Dam, which creates Lake Sonoma on Dry Creek (a tributary to the Russian River). Sonoma Water manages release at both reservoirs for water supply and to maintain required minimum flows in the Russian River and Dry Creek pursuant to the State Water Resources Control Board (SWRCB) Decision 1610. Flood control releases from these reservoirs are controlled by the United States Army Corps of Engineers (USACE). Flows in the Russian River are augmented by the Pacific Gas and Electric (PG&E) Company's Potter Valley Project, which diverts a portion of the Eel River flows to the East Fork of the Russian River upstream of Lake Mendocino.

Future Potter Valley Diversions from the Eel River into the Russian River via PG&E's Project are regulated by a number of agencies including the Federal Energy Regulatory Commission (FERC) and NOAA-NMFS. In 2004, FERC issued a final decision that reduced the amount of diversion from the Eel River into the Russian River by approximately 15 percent to protect Eel River fisheries.

Water from the Russian River is diverted by Sonoma Water near Forestville and conveyed via its transmission system to its wholesale customers, which includes the City. The City receives the Sonoma Water supply through the Petaluma Aqueduct which has a diameter of 33-inches. This diameter provides a physical limitation of 38 million gallons per day (MGD) at 10 feet per second.

The City, along with the other Sonoma Water contractors, signed the Restructured Agreement for Water Supply in 2006. This agreement provides for the financing, construction, and operation of diversion facilities, transmission lines, storage tanks, booster pumps, conventional wells, and appurtenant facilities. The agreement does not provide for a fixed supply or daily rate. Instead, the agreement states that Sonoma Water is not obligated to provide the City more than 13,400 AFY, or more than 21.8 MGD as an average daily rate during any one month.

Section 3.5 of the Restructured Agreement contains supply shortage provisions, which are further defined in the Water Shortage Allocation Methodology (Shortage Methodology), which was adopted by the Sonoma Water Board in April 2006. Both Section 3.5 of the Restructured Agreement and the Shortage Methodology take into account demand hardening associated with water conservation. This is recognized by the Shortage Methodology, which encourages water conservation. Under the Shortage Methodology, if Sonoma Water's surface water rights and Russian River supply remain limited to 75,000 AFY and the Water Contractors' total demands reach Sonoma Water's 75,000 AFY available supply, then the City's allocation during a shortage would still be 13,400 AFY, the City's full entitlement under the Restructured Agreement[4].

Sonoma Water is authorized to produce and deliver potable water for municipal and industrial purposes; prevent the waste or diminution of water supplies; control and conserve flood and storm waters to reduce potential damage to life and property; provide sanitary sewage services; provide recreational services in connection with flood control and water conservation activities; and levy taxes or fees for improvements necessary to conduct these activities. Sonoma Water operates under the direction of a Board of Directors that consists of the Sonoma County Board of Supervisors. Potential constraints to this supply source are discussed in Chapter 7.

Sonoma Water delivers water on a wholesale basis to customers through its water transmission system. The primary water customers, collectively known as the water contractors, include the cities of Santa Rosa, Cotati, Petaluma, Rohnert Park, and Sonoma; the Town of Windsor; and the water districts of North Marin and Valley of the Moon. The responsibility for supplying water to the water contractors is entrusted to Sonoma Water under the terms of the Restructured Agreement. Sonoma Water also provides water on a wholesale basis to and/or has authorized the exercise of its water rights by additional water purveyors, including but not limited to Marin Municipal Water District, Forestville Water District, and California-American Water, Lawndale Mutual Water, Penngrove, and Kenwood Water companies.

Sonoma Water holds four SWRCB permits which authorize Sonoma Water to store water in Lake Mendocino (122,500 AF) and Lake Sonoma (245,000 AF), and to divert and re-divert 180 cubic feet per second (cfs), approximately 116 MGD, of water from the Russian River and Dry Creek totaling no more than 75,000 AFY.

The permits also establish minimum instream flow requirement for fish and wildlife protection and Russian River recreational considerations. These minimum instream flow requirements vary according to the hydrologic cycle, dry years versus normal water years, as defined by the SWRCB's Decision 1610.

[4] Letter from County of Sonoma's Board of Supervisors, April 2006.

6.2.1.1 Water Supply Projects

Sonoma Water developed the Water Supply and Transmission System Project (WSTSP) in 1998 to increase diversions from the Russian River and increase the transmission system capacity. The WSTSP was expected to increase Sonoma Water Russian River diversions to 101,000 AFY and increase Sonoma Water's water transmission system average-day peak month delivery capacity from 92 to 149 MGD.

Sonoma Water's Board of Directors certified the WSTSP Environmental Impact Report (EIR) in 1998. In 1999, a lawsuit was filed challenging the WSTSP EIR. In 2000, the trial court found the EIR to be adequate. However, on May 16, 2003, the Court of Appeals reversed the trial court's decision, concluding that the EIR was inadequate because it did not contain adequate cumulative impacts and alternatives analyses and its description of the project's environmental setting was deficient. The WSTSP was put on hold by the Sonoma Water Board of Directors. A project entitled the Fish Habitat Flows and Water Rights Project was developed to address the environmental impacts through re-operation of the Russian River project components. This project is described below.

6.2.1.2 Russian River Biological Opinion

On September 24, 2008, the National Marine Fisheries Service (NMFS) issued a 15-year biological opinion for water supply, flood control operations, and channel maintenance conducted by the USACE, Sonoma Water, and Mendocino County Russian River Flood Control and Water Conservation Improvement District in the Russian River watershed. The biological opinion authorizes incidental take of threatened and endangered species, pending an implementation of an alternative to existing management of reservoir releases, river flow, habitat condition and facilities in portions of the mainstream Russian River, Dry Creek, and Russian River estuary. In summary, the biological opinion concluded that the elevated river flows required by Decision 1610 were adversely affecting the fish habitat.

The biological opinion lists alternatives to reduce the affects to fish habitat from the various agency operations. The alternatives addressing the Sonoma Water operations and water supply impacts include:

- Reducing summertime flows in the Russian River and Dry Creek
- Enhancing six miles of habitat in Dry Creek
- Creating a freshwater lagoon in the estuary during summer months
- Monitoring both habitat and fish in Dry Creek, the estuary, and Russian River
- Eliminating impediments to fish spawning or improving habitat in several streams

The biological opinion requires that summertime flows be permanently reduced to replicate river conditions in dry years. Since the biological opinion was released, Sonoma Water has submitted a petition to the SWRCB requesting permanent changes to Decision 1610 minimum flow requirements in line with the biological opinion and is preparing an EIR required by the California Environmental Quality Act (CEQA). Since 2010, Sonoma Water has requested temporary changes to the Decision 1610 minimum flows annually per the biological opinion recommendations.

The Sonoma Water is continually planning and implementing the biological opinion requirements. A project update to the biological opinion was released in January 2016. The project update provides a synopsis of current work being done to fulfill the requirements of the biological opinion. The work currently being done includes:

- Dry Creek Habitat Enhancement Project
- Fish Monitoring
- Mirabel Screen and Fish Ladder Project
- Russian River Estuary Project
- Fish Flow Project
- Interim Flow Changes
- Public Outreach, Reporting & Legislation.

6.2.1.3 Seasonal Hydrologic Constraints on the Russian River Diversion Facilities

The ability of Sonoma Water to divert water from the Russian River can be limited by the rate of recharge to the aquifer through the streambed. To augment this recharge capacity, Sonoma Water has constructed several infiltration ponds that surround the Sonoma Water collector wells. Diversions and infiltration operations are also assisted by an inflatable dam. Sonoma Water's water production capacity is complex and will vary from year to year based on a number of factors. In any given year, Sonoma Water's production needs depend on demands, which are a function of temperature, precipitation, growth, and hydrologic conditions. The hydrologic conditions are in turn a function of groundwater levels and the permeability of the riverbed, which in turn impacts whether or not supply is groundwater or considered underflow from the river. A Sonoma Water analysis of water trends from 1997 to 1999 concluded that stressed hydrologic conditions occurred in the fall/early winter, followed by non-stressed conditions in the winter, and stressed conditions again in the spring, prior to the rubber dam being raised. Stressed hydrologic conditions are determined by monitoring groundwater levels and noting the decline in water levels as the Sonoma Water pumps water to meet demands. Sonoma Water staff is continuing to analyze the seasonal constraint and its potential impact on the ability to provide water to its customers. As non-peak demands continue to rise, Sonoma Water will increasingly rely on using the inflatable dam more continuously throughout the year if conditions allow use.

6.2.1.4 Sonoma Water Water Supply Strategy Action Plan

Sonoma Water has developed multiple Water Supply Strategy Action Plans with the latest in 2018. The action plan addresses strategies and goals to improve supply reliability, implement the Biological Opinion requirements, and other issues. The City is collaboratively working with Sonoma Water and the other contractors to address the regional water supply and demand issues.

6.2.1.5 Sonoma Water Water Supply Reliability

An update to the water supply reliability analysis will be included in Sonoma Water's 2020 UWMP. In the City's past UWMPs, the reliability analysis showed that no impact to the City's water supplies would occur during drought years. Sonoma Water's model results indicate up to 19 percent reduction in wholesale water supply during Single-Dry years by 2045. The impacts of reduction will be discussed in Chapter 7 of this UWMP.

With Sonoma Water's diversions currently limited to 75,000 AFY, Sonoma Water has overcommitted the available supply through the 2006 Restructured Agreement. The Restructured Agreement lists a total of 77,445 AFY to the Water Contractors under Chapter 3.1 Delivery Entitlements of Water Contractors. The Restructured Agreement states Sonoma Water is not obligated to provide the City more than 13,400 AFY and 21.8 MGD average daily rate during any month. Until modified through an updated contract or other means, the City assumes its reliable supply has not changed from the Restructured Agreement.

6.2.2 Groundwater

The Petaluma Valley Groundwater Basin (Basin), designated as Basin Number 2-1 in DWR's Bulletin No. 118 (DWR, 2016), and shown in Figure 6-1 below, is prioritized as a medium priority basin by DWR and is required to comply with the Sustainable Groundwater Management Act (SGMA). The Petaluma Valley Groundwater Sustainability Agency (GSA) was formed in June 2017 to meet SGMA requirements. The Petaluma Valley GSA formed through a Joint Exercise of Powers Agreement entered into by the North Bay Water District, Sonoma County, Sonoma Water, Sonoma Resource Conservation District (RCD), and the City of Petaluma. The Petaluma Valley GSA is preparing a Groundwater Sustainability Plan (GSP) that will be complete by January 31, 2022 as required by SGMA.

The Basin is defined by DWR through its Bulletin 118 (DWR, 2003), and was modified through basin reprioritization in 2018. The Basin, shown in Figure 6-1, is generally bounded on the east by the Sonoma Mountains and on the west by low-lying hills. The approximately 46,000-acre Basin extends from San Pablo Bay northward to a series of low hills bordering the Santa Rosa Plain Subbasin and includes the City of Petaluma and communities of Penngrove and Lakeville. The principal stream draining the Basin is the Petaluma River, which is tidally influenced from near the center of the City of Petaluma downstream to its mouth at San Pablo Bay.

Elevated levels of nitrate have been identified in groundwater in the northwestern portions of the Basin due to past land use practices. Private shallow wells located near the tidal influence portion of the Petaluma River have shown saltwater intrusion, but no instances of saltwater intrusion in the City's wells have been identified.

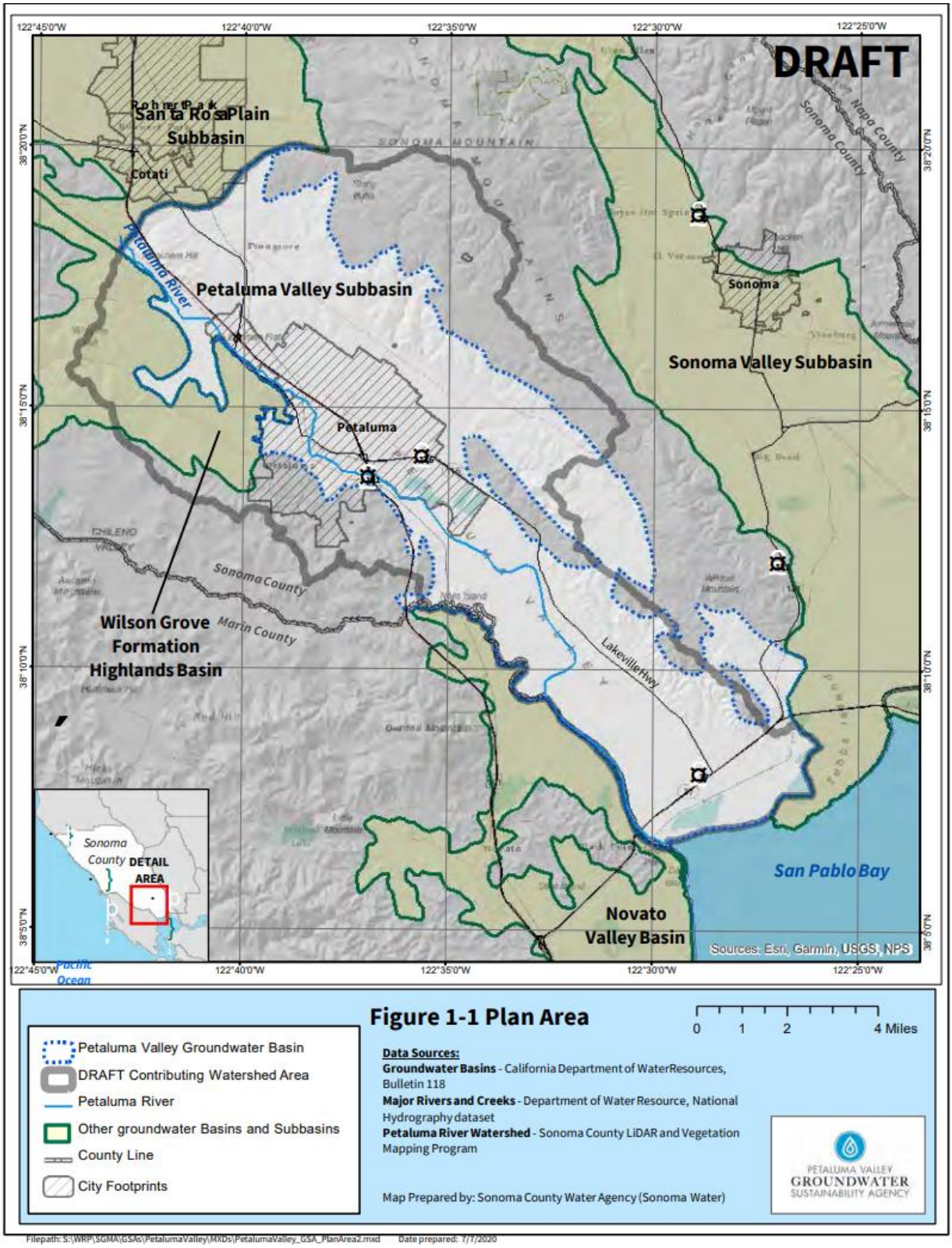

Figure 6-1. Groundwater Basins

The City of Petaluma maintains water supply wells that pump from the Petaluma Valley Basin. The City's active, inactive, and standby wells are monitored for Title 22 requirements, including pH, alkalinity, bicarbonate, calcium, magnesium, potassium, sulfate, barium, copper, iron, zinc, and nitrate. The City does not rely on groundwater as a significant portion of supply due to specific yield and water quality limitations. Since 2000, groundwater is only used for peak water demand needs and emergency purposes. The City has 10 municipal wells for supplemental and emergency purposes only.

6.2.2.1 Groundwater Use

The City is registered with the DWR California Statewide Groundwater Elevation Monitoring (CASGEM) system. Monitoring responsibilities for CASGEM are split between the City, which monitors City wells, and Sonoma RCD, which monitors private wells under contract with the Petaluma Valley GSA. All CASGEM data is reported by the City and includes nine wells. In 2014, Sonoma Water and the City partnered with the U.S. Geological Survey to conduct a groundwater study of the Petaluma Valley. The study analyzed current groundwater levels and water quality. Information provided in the study will serve as a foundation for the Petaluma Valley GSP.

The City has decreased groundwater use over the past five years and has only used groundwater for short-term scenarios. In 2016, the City supplied approximately four percent of its annual demand using groundwater to augment surface water supply due to drought conditions. In 2017, about one percent of the City's annual water demand was supplied by groundwater for emergency purposes, and between 2018-2020, 0 to <1 percent of annual supply was from groundwater due to water distribution system repair. The City intends to only use groundwater in the future for emergency backup supply, to meet peak demands, or for other short-term scenarios. The City continues to maintain and sample wells for Title 22 requirements, and wells are exercised and maintained for use during an emergency. Groundwater use from 2016-2020 is summarized in Table 6-1.

Table 6-1. Groundwater Volume Pumped (DWR Table 6-1 Retail)

☐	Supplier does not pump groundwater. The supplier will not complete the table below.					
☐	All or part of the groundwater described below is desalinated.					
Groundwater Type ***Drop Down List*** *May use each category multiple times*	Location or Basin Name	2016*	2017*	2018*	2019*	2020*
Add additional rows as needed						
Alluvial Basin	Petaluma Valley	382	67	0	6	37
	TOTAL	382	67	0	6	37
**** Units of measure (AF, CCF, MG)*** *must remain consistent throughout the UWMP as reported in Table 2-3.*						
NOTES: Volumes are in AF.						

In the future, the City may pump groundwater to make up for shortages in the purchased water supply from Sonoma Water.

6.2.3 Surface Water

The City does not have any self-supplied surface water.

6.2.4 Stormwater

The City does not currently divert stormwater for beneficial use.

6.2.5 Wastewater and Recycled Water

The City owns and operates its own wastewater collection and treatment system. The Ellis Creek Water Recycling Facility (ECWRF) provides 24-hour collection, treatment, disposal and reuse of domestic, commercial and industrial wastewater generated by the City and a service area within the unincorporated County community of Penngrove.

6.2.5.1 System Description

The City operates and maintains approximately 193 miles of gravity sewer mains and 4 miles of sewer force mains. Sewer pipes range from 4- to 54- inches in diameter and wastewater is pumped throughout the system by 9 lift stations. The City has 2 major sewer watersheds and 18 sewer sub-basins. Wastewater is pumped from the Primary Influent Pump Station at Hopper Street 2.5 miles to the City's ECWRF located adjacent to Lakeville Highway.

The ECWRF opened in July 2009 and provides advanced secondary treatment, anaerobic digestion, and tertiary treatment of wastewater. The treatment facility has an average dry weather capacity of 6.7 MGD, wet weather design capacity of 36 MGD, and treats domestic, commercial, and industrial wastewater generated in the City and in unincorporated Penngrove. The facility treats on average 4.6 million gallons of wastewater each day and 1,900 million gallons annually.

The City provides complete tertiary treatment with flocculation, filtration, and ultraviolet light disinfection. The City is permitted to discharge secondary-treated wastewater to the Petaluma River from October 21 to April 30. Tertiary-treated recycled water, distributed through a system of pump stations and pipelines, provides irrigation for agriculture, golf courses, school yards, parks and other landscaped areas. At the treatment facility, recycled water is used for landscape irrigation, toilet flushing, fire protection, and process water. Urban use of recycled water saves potable water and supplements the City's water supply. Agricultural use of recycled water allows the maintenance and expansion of local farming, including dairies and vineyards.

The City has expanded use of tertiary recycled water to irrigate City parks, schools and fields that are currently irrigated with potable water, and has expanded service to additional agricultural properties.

Wastewater collected within the potable water service area in 2020 is shown in Table 6-2.

Table 6-2. Wastewater Collected Within Service Area in 2020 (DWR Table 6-2 Retail)

☐	There is no wastewater collection system. The supplier will not complete the table below.
	Percentage of 2020 service area covered by wastewater collection system *(optional)*
	Percentage of 2020 service area population covered by wastewater collection system *(optional)*

Wastewater Collection			Recipient of Collected Wastewater			
Name of Wastewater Collection Agency	Wastewater Volume Metered or Estimated? *Drop Down List*	Volume of Wastewater Collected from UWMP Service Area 2020 *	Name of Wastewater Treatment Agency Receiving Collected Wastewater	Treatment Plant Name	Is WWTP Located Within UWMP Area? *Drop Down List*	Is WWTP Operation Contracted to a Third Party? *(optional)* *Drop Down List*
City of Petaluma	Metered	5059	City of Petaluma	ECWRF	Yes	No
Total Wastewater Collected from Service Area in 2020:		5,059				

**** Units of measure (AF, CCF, MG)*** *must remain consistent throughout the UWMP as reported in Table 2-3* **.**

NOTES: Volumes are in AF.

6.2.5.2 Current Wastewater and Recycled Water Use

Between October 21 to April 30, secondary-treated wastewater is discharged to the Petaluma River. Between May 1 and October 20, ECWRF is restricted from discharging to the Petaluma River and wastewater received during this part of the year is either treated to tertiary standards and distributed to recycled water customers and reused onsite, or secondary-treated wastewater is stored in the ECWRF oxidation pond system. The available capacity of the oxidation ponds is approximately 250 million gallons or 770 AF. About 18 percent of tertiary-treated recycled water is reused year-round at ECWRF for process water and on-site landscape irrigation. The majority of recycled water produced by the ECWRF is delivered to agricultural customers outside the City water service area and is not considered potable offset to City water supply. Between 2016-2020, the City supplied about 20 percent to 30 percent of its recycled water to golf courses that historically used pumped groundwater as their source for irrigation. The remaining recycled water is delivered to customers consisting of parks and schools. This recycled water use is considered urban potable offset as these customers were once connected to the service area distribution system of potable water. A summary of the amount of wastewater treated and recycled water use is shown in Table 6-3.

Table 6-3. Wastewater Treatment and Discharge Within Service Area in 2020 (DWR Table 6-3 Retail)

☐	**No wastewater is treated or disposed of within the UWMP service area.** The supplier will not complete the table below.										
Wastewater Treatment Plant Name	Discharge Location Name or Identifier	Discharge Location Description	Wastewater Discharge ID Number *(optional)* [2]	Method of Disposal *Drop down list*	Does This Plant Treat Wastewater Generated Outside the Service Area? *Drop down list*	Treatment Level *Drop down list*	2020 volumes [1]				
							Wastewater Treated	Discharged Treated Wastewater	Recycled Within Service Area	Recycled Outside of Service Area	Instream Flow Permit Requirement
ECWRF	E-001S	Petaluma River		River or creek outfall	Yes	Tertiary	5,059	2,314	651	1,115	
						Total	5,059	2,314	651	1,115	0

[1] **Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.
[2] If the **Wastewater Discharge ID Number** is not available to the UWMP preparer, access the SWRCB CIWQS regulated facility website at https://ciwqs.waterboards.ca.gov/ciwqs/readOnly/CiwqsReportServlet?inCommand=reset&reportName=RegulatedFacility

NOTES: Volumes are in AF.

6.2.5.3 Recycled Water System Description

Tertiary treated water allows for unrestricted reuse in all recycled water applications. Currently the City uses recycled water for agricultural, golf course, and landscape irrigation. The City uses tertiary recycled water onsite at ECWRF for flushing toilets, process water, and landscape irrigation. The City is planning an expansion of the urban recycled water system to deliver recycled water to more parks and schools throughout the service area. The City is also planning an expansion to deliver recycled water to more agricultural customers outside of the City's service area. The projected recycled water direct beneficial uses within the service are is shown in Table 6-4.

Table 6-4. Recycled Water Direct Beneficial Uses Within Service Area (DWR Table 6-4 Retail)

☐	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.										
Name of Supplier Producing (Treating) the Recycled Water:	City of Petaluma										
Name of Supplier Operating the Recycled Water Distribution System:	City of Petaluma										
Supplemental Water Added in 2020 (volume) *Include units*											
Source of 2020 Supplemental Water											
Beneficial Use Type *Insert additional rows if needed.*	**Potential** Beneficial Uses of Recycled Water (Describe)	Amount of **Potential** Uses of Recycled Water (Quantity) *Include volume units* [1]	General Description of 2020 Uses	Level of Treatment *Drop down list*	2020 [1]	2025 [1]	2030 [1]	2035 [1]	2040 [1]	2045 [1] (opt)	
Agricultural irrigation			Ag and Urban Irrigation Projections		0	2,000	2,540	2,540	2,540	2,540	
Landscape irrigation (exc golf courses)					228						
Golf course irrigation					413						
Commercial use											
Industrial use											
Geothermal and other energy production											
Seawater intrusion barrier											
Recreational impoundment											
Wetlands or wildlife habitat											
Groundwater recharge (IPR)											
Reservoir water augmentation (IPR)											
Direct potable reuse											
Other (Hauled Recycled Water)			Hauled RW		10						
				Total:	651	2,000	2,540	2,540	2,540	2,540	
				2020 Internal Reuse	422						

[1] ***Units of measure (AF, CCF, MG)*** *must remain consistent throughout the UWMP as reported in Table 2-3.*

NOTES:Volumes are in AF. 2020 Ag recycled water use outside of service area was 1,115 AF.

The agricultural irrigation was not included due to it being outside of the City's potable water service area. The golf course irrigation is included, although it should be noted that this recycled use is not considered potable offset. The golf course irrigation has historically been supplied by groundwater pumping and was not served by the City's potable water distribution system.

A projection for 2020 recycled water use was included in the 2015 UWMP. A comparison showing the projected 2020 use and actual use is shown in Table 6-5.

Table 6-5. 2015 UWMP Recycled Water Use Projection Compared to 2020 Actual (DWR Table 6-5 Retail)

☐	Recycled water was not used in 2015 nor projected for use in 2020. The supplier will not complete the table below. If recycled water was not used in 2020, and was not predicted to be in 2015, then check the box and do not complete the table.

Beneficial Use Type	2015 Projection for 2020 [1]	2020 Actual Use [1]
Insert additional rows as needed.		
Agricultural irrigation		
Landscape irrigation (exc golf courses)	371	228
Golf course irrigation	765	413
Commercial use	2	
Industrial use		
Geothermal and other energy production		
Seawater intrusion barrier		
Recreational impoundment		
Wetlands or wildlife habitat		
Groundwater recharge (IPR)		
Reservoir water augmentation (IPR)		
Direct potable reuse		
Other (Hauled Recycled Water)		10
Total	1,138	651

[1] **Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.

NOTE: Volumes are in AF. Ag recycled water use outside water service area was 1,115 AF in 2020. 2020 Landscape irrigation did not meet 2015 projected demands because the City's urban expansion program is dependent on funding. The City is in the process of planning an urban pipeline that will add a few park and school recycled water connections. 2020 Golf Course irrigation did not meet 2015 projected demands because one of the two golf courses taking recycled water closed, and only took 123 AF of water in 2020.

The 2015 UWMP projected 2020 use of recycled water for golf course and landscape irrigation. 2020 Actual Use for landscape irrigation was 228 AF. Landscape irrigation did not meet the 2015 projected demands for 2020 because the City completed an urban recycled water expansion project in May 2018 that did not finish connecting planned urban users until mid-2020. 2020 Actual Use for golf course irrigation was 413 AF. Golf course irrigation did not meet 2015 projected demands for 2020 because one of the two golf courses in agreement with the City to take recycled water closed, and only took 123 AF of water in 2020. Golf course irrigation is not considered potable offset, because the golf course irrigation was historically supplied by groundwater pumping and not served by the City's potable water distribution

system. Although the 2015 UWMP projections for 2020 did not include agricultural irrigation, recycled water used outside the City's potable water service area for agricultural irrigation was 1,115 AF in 2020.

6.2.5.4 Methods to Expand Future Recycled Water Use

The City is a member of North Bay Water Reuse Authority (NBWRA), a regional water recycling and management initiative which covers areas north of the San Francisco Bay. The North Bay Water Reuse Program (NBWRP) is comprised of member agency recycled water projects, including City of Petaluma projects. Through NBWRA, the City continuously pursues funding opportunities for its projects included in NBWRP Phase 2.

The planned expansion of the recycled water system is separated into three parts. The Tertiary Upgrades Project is currently under design, and recently received $3.6 million in DWR IRWM grant funding through NBWRP Phase 2.

- Tertiary Treatment Expansion – This project will increase ECWRF tertiary treatment capacity by 2.12 MGD, providing a yield of 712 AFY. Existing capacity is 4.68 MGD for Title 22 disinfected tertiary. This project will allow the City to meeting increasing urban and agricultural irrigation demands.
- Urban Pipeline Expansion – Expand urban distribution pipeline to provide 173 AFY of potable water offset for irrigation.
- Ag Pipeline Expansion – Expand agricultural distribution pipeline to provide 1,343 AFY of recycled water for irrigation.

The proposed methods to increase recycled water use are listed in Table 6-6.

Table 6-6. Methods to Expand Future Recycled Water Use (DWR Table 6-6 Retail)

☐	Supplier does not plan to expand recycled water use in the future. Supplier will not complete the table below but will provide narrative explanation.		
	Provide page location of narrative in UWMP		
Name of Action	Description	Planned Implementation Year	Expected Increase in Recycled Water Use *
Add additional rows as needed			
Tertiary Treatment Expansion	Increase the tertiary treatment capacity of the ECWRF from 4.68 MGD to 6.8 MGD, producing a yield of 712 AFY to meet peak demands.	2023-2024	712
Urban Expansion Pipeline	Expand urban distribution pipleine to provide 173 AFY of potable water offset for irrigation.	2025+	173
Ag Expansion Pipeline	Expand Ag distribution pipeline to provide 1,343 AFY of recycled water for irrigation.	2025+	1,343
		Total	2,228
***Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.*			
NOTES: Volumes are in AF. Expected increase in recycled water use of 712 AF for the tertiary treatment expansion is to meet peak demands of existing Urban and Ag customers. Expected increase in recycled water use at full buildout of Urban and Ag expansion pipelines, which have no planned implementation year at this time.			

Figure 6-2 shows the planned expansion of the City's recycled water system.

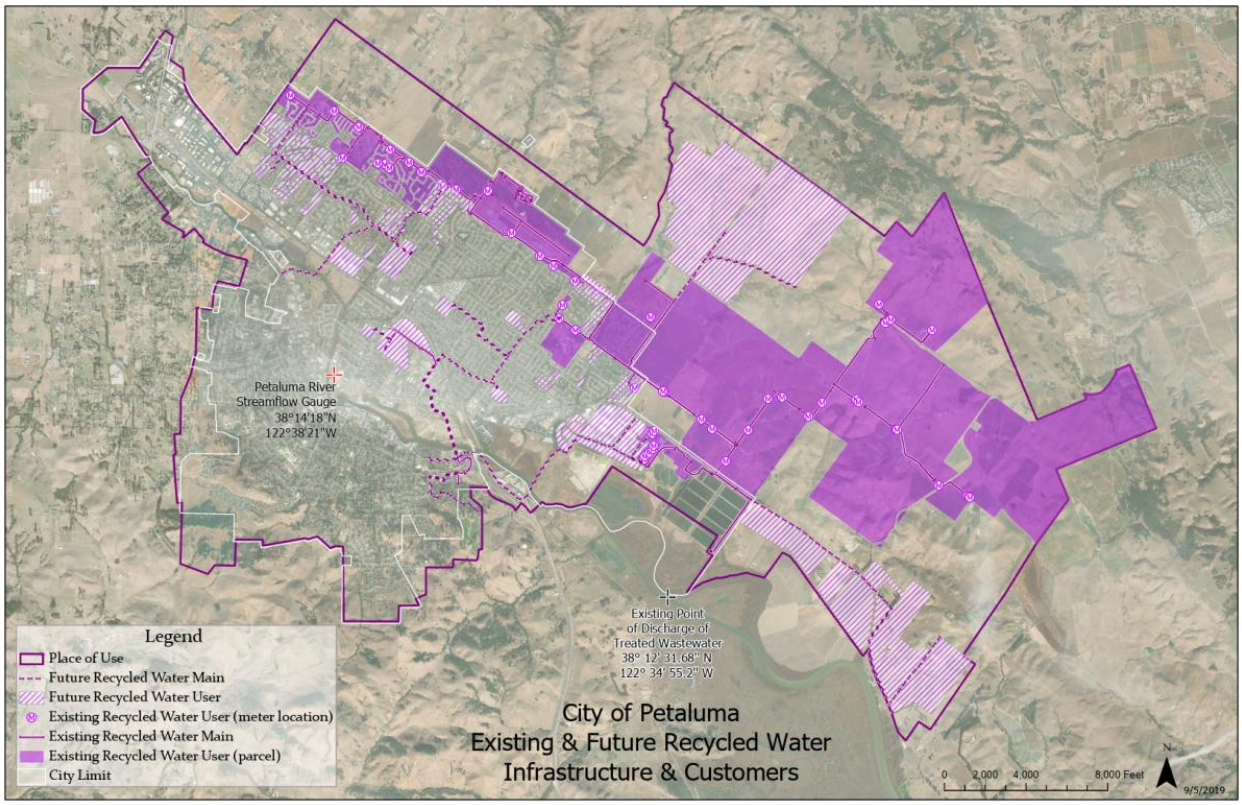

Figure 6-2. Recycled Water System Expansion

6.2.6 Desalinated Water

The City of Petaluma has not identified current desalination opportunities; however, the City is the reporting agency for the California Statewide Groundwater Elevation Monitoring (CASGEM) program for the groundwater basin. The reporting area covers wells near the San Pablo Bay and surface water bodies that are likely under tidal influence. This City continues to monitor groundwater elevations of five municipal wells. The City coordinates seasonal elevation monitoring with Sonoma Resource Conservation District, who monitors private groundwater wells in the Petaluma Valley groundwater basin for the Petaluma Valley GSA.

6.2.7 Water Exchanges and Transfers

The City of Petaluma has not identified opportunities for water exchanges or transfers.

6.2.8 Future Water Projects

The City is currently in the process of evaluating the groundwater well system for expansion. Municipal wells are intended to be used for emergency purposes, peaking usage, and other short-term scenarios and are not intended for use as a reliable annual supply. Conjunctive use of the wells in 2020 accounted for only 37 AF of supply. The City has no expected future water supply projects or programs that would provide a quantifiable increase in water supply, as summarized in Table 6-7.

Table 6-7. Expected Future Water Supply Projects or Programs (DWR Table 6-7 Retail)

Submittal Table 6-7 Retail: Expected Future Water Supply Projects or Programs						
☑	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 suppliers?		Description (if needed)	Planned Implementation Year	Planned for Use in Year Type *Drop Down List*	Expected Increase in Water Supply to Supplier* *This may be a range*
	Drop Down List (y/n)	*If Yes, Supplier Name*				
Add additional rows as needed						
***Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.*						
NOTES: Volumes are in AF.						

6.2.9 Summary of Existing and Planned Sources of Water

The supply for the City consists of three components: 1) Purchased water from Sonoma Water, 2) pumped groundwater from the City-owned wells, and 3) recycled water produced by the ECWRF. The City and Sonoma Water have an agreement in that Sonoma Water will not supply the City with more than 13,400 AFY. This 13,400 AFY is greater than the projected demand discussed in Chapter 4. The actual 2020 water supply and total right/safe yield are shown in Table 6-8.

Table 6-8. Water Supplies – Actual (DWR Table 6-8)

Water Supply		2020		
Drop down list May use each category multiple times.These are the only water supply categories that will be recognized by the WUEdata online submittal tool	Additional Detail on Water Supply	Actual Volume*	Water Quality Drop Down List	Total Right or Safe Yield* (optional)
Add additional rows as needed				
Purchased or Imported Water	Sonoma Water	7,323	Drinking Water	13,400
Groundwater (not desalinated)	Municipal Wells	37	Drinking Water	
Recycled Water	ECWRF	1,820	Recycled Water	
	Total	9,180		13,400
***Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.*				
NOTES: Volumes are in AF. Actual volume purchased from Sonoma Water is for 12/26/2019-12/23/2020. Recycled Water volume of 1,820 includes Ag Use of 1,115 AF (outside of service area) and 705 AF Urban Use (inside servcie area). Recycled Water volume does not include onsite reuse at ECWRF.				

The projected water supplies are shown in Table 6-9. As described in the groundwater section, the City projects zero groundwater use in the future, for the purposes of this UWMP, until a better understanding of long-term yield, water quality, and treatment requirements is available. Projected recycled water supply includes projected use for agricultural, golf course, and landscape irrigation. Landscape irrigation is the only projected use that can be considered as potable offset within the City's potable water service boundary.

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

Submittal Table 6-9 Retail: Water Supplies — Projected											
Water Supply		Projected Water Supply * Report To the Extent Practicable									
Drop down list May use each category multiple times. These are the only water supply categories that will be recognized by the WUEdata online submittal tool	Additional Detail on Water Supply	2025		2030		2035		2040		2045 (opt)	
		Reasonably Available Volume	Total Right or Safe Yield (optional)	Reasonably Available Volume	Total Right or Safe Yield (optional)	Reasonably Available Volume	Total Right or Safe Yield (optional)	Reasonably Available Volume	Total Right or Safe Yield (optional)	Reasonably Available Volume	Total Right or Safe Yield (optional)
Add additional rows as needed											
Purchased or Imported Water		8,705	13,400	8,870	13,400	8,974	13,400	9,255	13,400	9,577	13,400
Groundwater (not desalinated)											
Recycled Water		2,000		2,540		2,540		2,540		2,540	
Total		10,705	13,400	11,410	13,400	11,514	13,400	11,795	13,400	12,117	13,400
*Units of measure (AF, CCF, MG) must remain consistent throughout the UWMP as reported in Table 2-3.											
NOTES: Volumes are in AF. The City of Petaluma plans to use groundwater to meet peak demands or for emergency purposes only. The range for groundwater supply in Petaluma Valley GSA's Groundwater Sustainability Plan projections for municipal groundwater projections is 0-300 AF (2025), and 300-600 AF (2030-2045+). Recycled Water projected supply is equal to projected recycled water demand. Projected Recycled Water Supply includes demand for both Urban and Ag Use.											

6.3 CLIMATE CHANGE IMPACTS TO SUPPLY

The City's water supply is not vulnerable to the following climate change impacts listed in the Climate Change Handbook for Regional Water Planning:

- No portion of the City's water supply comes from snowmelt
- No portion of the City's water supply comes from the Delta, is imported from the Colorado River, or is imported from other climate sensitive- areas
- No portion of the City's water supply comes from coastal aquifers, and salt intrusion has not been a problem in the past
- Sonoma Water's water supply does not have difficulty in storing carry-over water from year to year; the current storage volume can meet several years' water demand
- The City has not experienced a drought that has caused it to not meet local water demands
- The region does not have invasive species management issues at the water supply facilities

The impacts to supply due to climate change for the City's water supplies are as follows:

- Purchased Water: The City purchases water from Sonoma Water. Sonoma Water has investigated whether existing downscaled climate models can be used or modified to provide reliable estimates of the effects of increased concentrations of carbon dioxide and other greenhouse gases on temperatures and precipitation patterns within Sonoma Water's service area and within the watersheds from which Sonoma Water obtains its water supply during the 25-year planning horizon. As of this time, no detailed analysis exists of potential climate change impacts that takes into consideration the influence of marine layers, whose effects on the region are difficult to model. Given the uncertainties between various downscaled models, Sonoma Water evaluates ensembles of downscaled models for general water supply planning purposes. However, there is not one model that can be selected with any confidence to be analyzed for the required format of this Plan. For these reasons, this Plan assumes that the climatic patterns and associated hydrology experienced over the past 108 years of record (1910 – 2017) provide a reasonable basis for the 25-year planning horizon that would impact the water supply and water demand analysis set forth in the Plan.

  Sonoma Water has been funding a series of ongoing USGS studies to evaluate the potential effects of climate change on Sonoma Water's water supply. The results of the USGS studies may allow Sonoma Water to evaluate climate change impacts in future years on the water demands of the City, as well as other water contractors, and in turn provide the basis for future Urban Water Management Plans. For additional information, see Sonoma Water's 2020 UWMP.
- Groundwater: Climate change can greatly affect the availability and yield from groundwater aquifers. The City does not use its groundwater supplies for a reliable annual supply, but rather a supply for emergency purposes and conjunctive use to keep the wells in State conformance and to exercise the system. The City is currently coordinating with the Petaluma Valley GSA's developing of its GSP which will include climate change effects on groundwater and surface water supplies.
- Recycled Water: Climate change can impact the supply for recycled water in that a reduced amount of wastewater produced will reduce the amount of recycled water produced. The existing and proposed recycled water demand from urban offset users within the service area is much less than the capacity of the ECWRF. It is expected that the impacts due to climate change on the recycled water supply will be minimal.

6.4 ENERGY INTENSITY

In accordance with CWC §10631.2(a), the energy intensity to provide water service to the City's customers over a one-year period is presented in this section to the extent that the information is available. The amount of energy to divert, pump, treat, and distribute the City's water supply within the system that it owns and operates is included. The energy intensity calculation tables are included in Appendix J.

Water energy intensity is the total amount of energy, calculated on a whole system basis, used to deliver water to the City's retail and wholesale customers for use. Energy intensity is the total amount of energy in kilowatt hour (kWh) expended on a per acre-foot basis to take water from the City's source to its point of delivery. Understanding the whole system energy intensity would allow the City to make informed strategies in managing its water supplies and operating its system as follows:

- Identifying energy saving opportunities as energy consumption is often a large portion of the cost of delivering water
- Calculating energy savings and greenhouse gas (GHG) emissions reductions associated with water conservation programs
- Potential opportunities for receiving energy efficiency funding for water conservation programs
- Informing climate change mitigation strategies
- Benchmarking of energy use at each water acquisition and delivery step and the ability to compare energy use among similar agencies

In Table 6-10 below, the energy intensity of the City's water service is calculated for 2019 as it provides a typical year's energy use. The COVID-19 pandemic in 2020 may have altered the City's customers' water use as shelter-in-place and restrictions on businesses went into effect. The total energy intensity for the City's water service is 47.1 kWh/AF.

Table 6-10. Recommended Energy Reporting – Total Utility Approach (DWR Table O-1B)

Enter Start Date for Reporting Period	1/1/2019	**Urban Water Supplier Operational Control**		
End Date	12/31/2019			
☐ Is upstream embedded in the values reported?		**Sum of All Water Management Processes**	**Non-Consequential Hydropower**	
Water Volume Units Used	*AF*	Total Utility	Hydropower	Net Utility
Volume of Water Entering Process (volume unit)		*7232*	*0*	*7648*
Energy Consumed (kWh)		*340836*	*0*	*340836*
Energy Intensity (kWh/volume)		*47.1*	*0.0*	*44.6*

As discussed in Section 6.4, the City operates a wastewater collection system to collect wastewater within the City's water service area, a regional wastewater treatment system, and a recycled water system. The energy intensity associated with these systems for 2019 is provided in Table 6-11. The total energy intensity for the City's wastewater and treatment services is 1,254 kWh/AF. The total energy intensity for the City's recycled water services is 1,312.8 kWh/AF.

Table 6-11. Recommended Energy Reporting - Wastewater & Recycled Water (DWR Table O-2)

Enter Start Date for Reporting Period 1/1/2019 End Date 12/31/2019		Urban Water Supplier Operational Control			
		Water Management Process			
☐ Is upstream embedded in the values reported?		Collection / Conveyance	Treatment	Discharge / Distribution	Total
Volume of Water Units Used	AF				
Volume of Wastewater Entering Process (volume units selected above)		*0*	*0*	*0*	*6621*
Wastewater Energy Consumed (kWh)		*0*	*0*	*0*	*8302456.8*
Wastewater Energy Intensity (kWh/volume)		*0.0*	*0.0*	*0.0*	*1254.0*
Volume of Recycled Water Entering Process (volume units selected above)		*0*	*0*	*0*	*1581*
Recycled Water Energy Consumed (kWh)		*0*	*0*	*0*	*2075614.2*
Recycled Water Energy Intensity (kWh/volume)		*0.0*	*0.0*	*0.0*	*1312.8*

CHAPTER 7
Water Service Reliability and Drought Risk Assessment

This chapter describes the long-term reliability and vulnerability of the City's potable and non-potable water supplies under varying conditions. It considers the City's ability to meet water needs through 2045 under normal conditions, single dry year conditions, and five consecutive dry year periods. In addition, this chapter meets the new requirement to provide a DRA which considers water supply and demand under the assumption that the next five years (2021-2025) will experience a drought that is hydrologically equivalent to the driest five consecutive years on record. The water service reliability assessment through 2045 and the DRA for 2021-2025 combine the details of the water use analysis in Chapter 4 and the water supply analysis in Chapter 6 of this UWMP.

The City's planned and implemented water management tools for increasing the reliability of water supplies out to 2045 are also addressed. Shorter term reliability responses for scenarios that may require immediate action during a severe dry period, or a catastrophic supply interruption are addressed in Chapter 8 Water Shortage Contingency Plan and Appendix L. Ongoing water use efficiency programs that help ensure water is used wisely by customers during all water supply conditions are discussed in Chapter 9 Demand Management Measures.

7.1 WATER SERVICE RELIABILITY ASSESSMENT

The City has historically used imported surface water, groundwater, and recycled water to supply its various customer demands. The near-term future supply strategy relies on surface water imported from Sonoma Water and recycled water from its own water recycling facility. This chapter presents the long-term reliability of the City's water supplies.

7.1.1 Constraints on Water Sources

There are several potential factors that could result in a reduction or inconsistent reliability of the City's water supplies. These factors include legal, environmental, water quality, and climatic impacts. Potential factors of the Sonoma Water surface water supply are discussed in Chapter 6 of this UWMP. Sonoma Water Supply Reliability is detailed in Appendix K.

Groundwater sources may be impacted by water quality issues of reduced yield due to drought. The City has experienced some water quality issues in the past with its groundwater. However, as the City is not projecting using groundwater as a normal supply, there are no impacts to the supply quantity.

There are no projected impacts to the City's recycled water supply, though future regulations or other issues may impact reliability.

7.1.1.1 Sonoma Water Supply Constraints

An overview of the conditions that could affect Sonoma Water's water supply is provided below. Additional information about the reliability of Sonoma Water supply can be found in Sonoma Water's 2020 UWMP.

Various conditions may influence the water supply available to Sonoma Water. This section of the plan describes the water rights held by Sonoma Water and the City's entitlement to Sonoma Water's water supply. This section also describes the various physical and legal conditions that may influence the water supply availability, including the Biological Opinion and future operation of the Potter Valley Project. Finally, this section describes the process by which Sonoma Water determined how much water may be

delivered through the 2045 planning period under normal, single dry, and five consecutive dry years hydrologic conditions.

7.1.1.1.1 Sonoma Water - Water Rights

Four State Water Resources Control Board (State Water Board) permits[5] currently authorize Sonoma Water to store water in Lake Mendocino (up to 122,500 AF) and Lake Sonoma (up to 245,000 AF) and to divert and redivert 180 cubic feet per second (cfs) of water from the Russian River, up to 75,000 AFY.

The permits also establish minimum instream flow requirements for fish and wildlife protection and Russian River recreational considerations. These minimum instream flow requirements vary according to the hydrologic cycle (i.e., dry water years versus normal water years) defined by the State Water Board's Decision 1610. Sonoma Water meets the various instream flow requirements set by Decision 1610 by making releases from Coyote Valley Dam and Warm Springs Dam. Sonoma Water has applied to the State Water Board to increase Sonoma Water's Russian River re-diversion right from 75,000 AFY to 101,000 AFY. In addition, as required by the Biological Opinion, Sonoma Water has applied to the State Water Board to make changes to the minimum instream flow requirements of Decision 1610. The Biological Opinion requirements are discussed below.

Sonoma Water also has three deep groundwater water wells that provide water supply. They are located near the Laguna de Santa Rosa and feed directly into Sonoma Water's Russian River-Cotati Intertie Pipeline. Sonoma Water estimates the future production capacity of these wells at 2,300 AFY.

7.1.1.1.2 Restructured Agreement

The Restructured Agreement was executed in 2006, and generally provides for the finance, construction, and operation of existing and new diversion facilities, transmission lines, storage tanks, booster pumps, conventional wells, and appurtenant facilities. The Restructured Agreement currently provides the contractual relationship between Sonoma Water and the City and includes specific rates of delivery and maximum amounts of water that Sonoma Water is obligated to supply to the City. The Restructured Agreement defines the City's entitlement as 13,400 AFY and an average of 21.8 mgd during any month.

Though the City's existing supply from Sonoma Water is relatively reliable, the Restructured Agreement contains provisions in Section 3.5 which may be implemented in the event of a supply shortage. The shortage provisions are further defined in the Water Shortage Allocation Methodology (Shortage Methodology), which was adopted by the Sonoma Water Board in April 2006.[6] The Restructured Agreement Section 3.5 provisions and the Shortage Methodology are designed to take the demand hardening associated with water conservation into account. The City has implemented an aggressive water conservation program over the past 25 years and has one of the lowest per capita water uses among all Sonoma Water customers. This is recognized by the Shortage Methodology, which encourages water conservation. Under the Shortage Methodology, if Sonoma Water surface water rights and Russian River supply remain limited to 75,000 AFY and the Water Contractors' total demands reach Sonoma Water's

[5] State Water Board Permit Numbers 12947A, 12949, 12950, and 16596.

[6] John O. Nelson Report, April 2006.

75,000 AFY available supply, then the City's allocation would still be 13,400 AFY, the City's full entitlement under the Restructured Agreement.[7]

7.1.1.1.3 Threatened and Endangered Species

On October 31, 1996, the National Marine Fisheries Service (NMFS) published a final notice of determination listing Coho salmon as threatened under the federal Endangered Species Act (ESA) within the Central California Coast Evolutionarily Significant Unit (ESU), which includes the Russian River. On August 18, 1997, NMFS published a final notice of determination listing steelhead as threatened under the ESA within the Central California Coast ESU, also including the Russian River. On September 16, 1999, NMFS listed the California Coast ESU of Chinook salmon as threatened.

In accordance with Section 7(a)(2) of the ESA, federal agencies must consult with the United States Fish and Wildlife Service and/or NMFS (depending on the species) to "ensure that any action authorized, funded, or carried out by such agency is not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of designated critical habitat…." (50 CFR §402). The operation of Warm Springs and Coyote Valley dams and Sonoma Water's rubber dam and fish screens all fall within the provisions of Section 7 of the ESA. In December 1997, the USACE, as the federal sponsor of the above two flood control and water supply projects, and Sonoma Water, as the local sponsor, entered into a Memorandum of Understanding with NMFS to begin the Section 7 consultation process. As part of the Section 7 consultation, a Biological Assessment was prepared to study the impact of current and potential future operations of facilities on the listed species in the Russian River. The final Biological Assessment was completed in September 2004.

As part of the Section 7 consultation process, the NMFS formed Biological Review Teams to conduct a status review of the three listed fish species by assembling the best available information on the condition of the fish species and quantifying risks faced by each ESU. Using the results of the status review, NMFS reevaluated the listing of the three fish species. On June 28, 2005, NMFS issued a final rule listing the status of Coho salmon as endangered and maintaining the threatened status of California Coast Chinook salmon and steelhead. On January 5, 2006, NMFS issued a final determination listing the steelhead as threatened.[8]

On September 24, 2008, NMFS issued the Biological Opinion. The Biological Opinion analyzed the impacts of the current operation of the Warm Springs and Coyote Valley Dams as well as other facilities operated by the USACE, Sonoma Water, and the Russian River Flood Control and Water Conservation Improvement District in the Russian River Watershed for the next fifteen years. The Biological Opinion determined that the continued operation of some aspects of the flood control and water supply operations will have substantial adverse effects on both the Coho salmon and steelhead but are not likely to impact the survival and recovery of the Chinook salmon in the Russian River. The three areas of most concern are the high

[7] Letter from Sonoma County Board of Supervisors, April 2006.

[8] National Marine Fisheries Service, Southwest Region, Biological Opinion for Water Supply, Flood Control Operations, and Channel Maintenance conducted by the U.S. Army Corps of Engineers, Sonoma Water, and the Mendocino County Russian River Flood Control and Water Conservation Improvement District in the Russian River watershed, September 24, 2008.

summertime flows in the Russian River and Dry Creek, the high velocity of water in Dry Creek in the summer, and the current practice of breaching the sandbar at the estuary during the summer months.[9]

NMFS collaborated with the USACE and Sonoma Water to develop a Reasonable and Prudent Alternative, including eight Reasonable and Prudent Measures (RPMs), to implement over a 15-year timeframe to avoid jeopardy to the Coho salmon and steelhead. The RPMs include the following: interim and permanent changes to the summertime flows in the Russian River and Dry Creek; changing the management of the Jenner estuary; restoring fish habitat along Dry Creek; conducting a feasibility study of constructing a pipeline to deliver water from Lake Sonoma to the mainstem of the Russian River; strengthening and expansion of the existing Coho Broodstock program; installation of a new back-up water supply pipeline to the Warm Springs Hatchery and construction of additional rearing facilities for the Coho Broodstock program; and monitoring of habitat and fish in the Russian River, Dry Creek, and the Jenner estuary.

Fish habitat restoration work and monitoring have been steadily implemented, under review by NMFS. On October 4, 2018, NMFS reported in a letter to USACE that implementation of Dry Creek habitat restoration work has been "tremendously successful to date" and has allowed "critical water supply and dam safety operations to continue unconstrained while also producing demonstrable benefits to the three ESA-listed salmonid species that inhabit the watershed." [10]

The Biological Opinion also provides an Incidental Take Statement for the taking of the Coho, steelhead and Chinook that may occur due to the implementation of the continued operations of the flood control and water supply operations and the associated RPMs.

The Biological Opinion requires the following temporary and permanent changes to the minimum instream flows in the Russian River and Dry Creek:

During Normal Years:

- Reduce the minimum flow requirement for the Russian River from the East Fork to Dry Creek from 185 cfs to 125 cfs between June 1 and August 31; and from 150 cfs to 125 cfs between September 1 and October 31.
- Reduce the minimum flow requirement for the Russian River between the mouth of Dry Creek and the mouth of the Russian River from 125 cfs to 70 cfs.
- Reduce the minimum flow requirement for Dry Creek from Warm Springs Dam to the Russian River from 80 cfs to 40 cfs from May 1 to October 31.

During Dry Years:

- Reduce the minimum flow requirement for the Russian River between the mouth of Dry Creek and the mouth of the Russian River from 85 cfs to 70 cfs.

[9] Sonoma Water, Russian River Instream Flow and Restoration, The Biological Opinion: Frequently Asked Questions, October 2008.

[10] Letter from Sam Rauch, Deputy Assistant Administrator for Regulatory Program, National Marine Fisheries Service, to Lt. General Todd Semonite, Chief of Engineers, and James Dalton, Director of Civil Works, United States Army Corps of Engineers, October 4, 2018.

In September 2009, Sonoma Water filed a petition with the State Water Board to permanently change the minimum instream flow requirements as outlined by the Biological Opinion. The petition is currently pending at the State Water Board and will not be acted on until Sonoma Water has completed compliance with CEQA. Until the petition is acted upon by the State Water Board, Sonoma Water will have to annually file a Temporary Urgency Change petition with the State Water Board to reduce the minimum instream flows during the months of May through October as required by the Biological Opinion.

The reduced flows required by the RPMs would provide enough water for Sonoma Water to meet existing water demands. The RPMs allow for restoration of fish habitat in Dry Creek to continue flows of 130 to 175 cfs to meet the water demands of Sonoma Water.[11] However, the Biological Opinion clarified that, if the restoration work was not sufficiently effective, Sonoma Water would have to explore other alternatives, including a bypass pipeline. Sonoma Water released a draft feasibility study of a bypass pipeline in April 2011 and a final study report on September 15, 2011.

As described in Sonoma Water's 2020 UWMP, Sonoma Water assumes that the Biological Opinion will remain in effect and that actions required by (and be subject to the restrictions set forth in) the Biological Opinion will be completed. Sonoma Water also assumes that it will engage in a new Section 7 consultation with NMFS and USACE and that a new Biological Opinion will be issued in the future. The Biological Opinion is only in effect until 2023. Although it is likely that any future consultation and new Biological Opinion will have provisions that differ from the existing Biological Opinion, it is impossible for Sonoma Water to guess what new provisions might be added in future consultations. Moreover, given the long history of coordination and cooperation between Sonoma Water, USACE, NMFS, and California Department of Fish and Wildlife (CDFW), Sonoma Water reasonably assumes that any changes to the Biological Opinion will not affect their ability to deliver the quantities of water from its transmission system projected in this Plan. [12] This UWMP similarly assumes that the requirements, terms and conditions in the existing Biological Opinion will continue to be applicable through 2045 such that supply availability is similar to current conditions.

In August of 2016, Sonoma Water released the Fish Habitat Flows and Water Rights Project (Fish Flow Project) Draft Environmental Impact Report (DEIR) for public review. The Fish Flow Project objectives include managing Lake Mendocino and Lake Sonoma water supply releases to provide instream flows that improve habitat for threatened and endangered fish species and updating Sonoma Water's existing water rights to reflect current conditions. The Fish Flow Project would change Sonoma Water's water right permits related to flows and diversions from the Russian River and Dry Creek. The new minimum instream flow requirements proposed by the Fish Flow Project were developed to meet the requirements of the Biological Opinion to improve habitat for threatened and endangered salmonid species. The Fish Flow Project does not propose to increase or otherwise change the quantities of surface water that Sonoma Water diverts under its water right permits, to obtain any new authorizations for new rights, or to construct new facilities.[13] In response to release of the Draft EIR, Sonoma Water received numerous comment letters from the public and resource agencies. Sonoma Water plans to recirculate the Draft EIR in 2021.

[11] Sonoma Water, October 2008.

[12] Sonoma Water, 2015 Urban Water Management Plan, June 2016.

[13] Sonoma Water, Fish Habitat Flows and Water Rights Project Draft Environmental Impact Report, August 2016.

7.1.1.1.4 Future Operation of the Potter Valley Project

Diversions from the Eel River into the Russian River via PG&E's Potter Valley Project (PVP) are regulated by several agencies including the FERC and NMFS. The Eel River water is diverted through an inter-watershed- tunnel to PG&E's hydroelectric facility in Potter Valley. Thereafter, the water flows down the east fork of the Russian River, is stored in Lake Mendocino, and is released to augment summer flows and maintain minimum instream flow requirements in the Russian River.

From 1908 to 1999, an estimated 160,000 AFY was diverted from the Eel River to the Russian River as a result of the operation of the PG&E PVP. A new license issued by the FERC to PG&E for the PVP in 1983 required PG&E, in cooperation with the California Department of Fish and Game (now the CDFW), to carry out a 10-year fish monitoring study in cooperation with NMFS. After completion of the study, a proposed flow schedule reducing Eel River diversions to the Russian River by approximately 15 percent (in an effort to improve Eel River fisheries) was submitted to FERC. PG&E had been voluntarily implementing the recommended flow schedule since the summer of 1999. An Environmental Impact Statement (EIS) that presented the impacts of two proposed flow schedules was released in 1999. Since that time, other proposals have been submitted for FERC's consideration.

In April 1999, as an alternative to the PG&E/FERC proposal, the Department of Interior and NMFS jointly submitted a flow proposal which would result in lower PVP imports to the Russian River. In May 2000 FERC issued its final EIS recommending the PG&E flow proposal with Potter Valley Irrigation District modifications. In June 2004, FERC issued its final order on the flow regime based upon a Biological Opinion for the PVP issued by NMFS. The FERC order supported an approximately 15 percent reduction in summer flows and was close to the voluntary flow schedule that had been in place since the summer of 1999.

In August 2006, NMFS and CDFW filed concerns with FERC regarding PG&E's implementation of the flow regime. On October 16, 2006, PG&E sent a letter to FERC acknowledging three errors in the implementation of the flow regime and associated flow requirements of the Biological Opinion Reasonable and Prudent Alternative. In response, PG&E has adjusted implementation of the flow regime, leading to an approximately 33 percent reduction in summer flows through the PVP to the Russian River.[14]

PG&E's license to operate the PVP expires on April 14, 2022. The Sonoma Water 2015 UWMP assumes that PG&E's existing FERC license for the PVP will not be modified, and that a new license will be issued in 2022 or thereafter that will not appreciably change the amount of water discharged from the PVP into the Russian River system. On April 6, 2017, PG&E filed a Notice of Intent (NOI) to relicense the project and a pre-application document (PAD) and initiated the pre-filing steps of the Integrated Licensing Process.

At the request of several interested entities, a PVP Ad Hoc Committee was convened by U.S. Representative Jared Huffman to enable dialogue on the terms of a potential new license. The Ad Hoc Committee is comprised of over 25 federal and state resource agencies, local counties, tribes, and environmental organizations. Participating stakeholders have committed to reaching a "Two-Basin Solution" with co-equal goals of improving fish passage and habitat on the Eel River and minimizing adverse impacts to water supply reliability, fisheries, water quality, and recreation in the Russian River and Eel River basins.

[14] PG&E Letter to FERC, October 16, 2006.

On January 25, 2019, PG&E filed a notice of withdrawal of its NOI and PAD, indicating it was discontinuing efforts to relicense the project. On March 1, 2019, FERC issued a Notice Soliciting Applications for any party interested in filing a license application for a new license, stating any party interested in seeking a new license needed to file an NOI and PAD by July 1, 2019. In May 2019, four parties signed a Planning Agreement to undertake a Feasibility Study of a potential licensing proposal for the PVP. Signatories included California Trout, Inc., the County of Humboldt, Mendocino County Inland Water and Power Commission, and Sonoma Water. By signing the Planning Agreement, these entities committed to reaching a "Two-Basin Solution" with co-equal goals of improving fish passage and habitat on the Eel River and minimizing adverse impacts to water supply reliability, fisheries, water quality, and recreation in the Russian River and Eel River basins.

As outlined in the Draft Environmental Impact Report for the Fish Habitat Flows and Water Rights Project, "the historical importance of flows from the Pottery Valley Project on Lake Mendocino water supplies is demonstrated by the fact that the State Water Board's Decision 1610 […] established a hydrologic index for the Russian River and Dry Creek minimum instream flow requirements […] that is based on cumulative inflows into Lake Pillsbury." [15] Should relicensing fail, water supplies downstream of Lake Mendocino could be impacted. To address this question, the Water Supply Working Group, a subgroup of the Huffman Ad Hoc Committee, published modeling results in May 2019 that simulate the impact of full PVP decommissioning on Eel River and Current Operations on Russian River (Scenario 1). Results indicate that, if there are no longer any diversions from the Eel River to the Russian River, inflows to Lake Mendocino and storage in Lake Mendocino would be consistently lower than current baseline operations.[16] The study found that flows downstream of Lake Mendocino would be "slightly lower than baseline operations in January and February (<10 cfs), nearly the same in March, April, and May, and again lower (approximately 40 cfs to 50 cfs) for the balance of the year (June-December). During drier water years (75 percent exceedance and higher), flows in the Russian River could decrease below 10 cfs in late summer through October". The report concluded that this outcome does not meet the Two Basin Solution goals, one of which is minimizing or avoiding adverse impacts to water supply reliability.[17]

On June 28, 2019, parties to the Planning Agreement jointly filed with FERC an NOI to file an application for new license for the PVP. In the NOI they propose to continue the relicensing process initiated by PG&E and indicate they submitted the NOI as proxies for a new regional entity (as yet to be formed) that would ultimately be the license applicant for the project. The NOI states the Planning Agreement parties will work together to complete a feasibility study by April 2020, consult on the need for additional studies, and file a final license application with FERC by April 14, 2022.

Since the filing of the NOI, the Round Valley Indian Tribes have signed the Planning Agreement. The parties to the Planning Agreement have also submitted additional reports and filings with FERC to stay on track for the relicensing requirements through 2020. In 2021, the Parties plan to carry out required studies outlined by FERC's study plan determination and will update FERC and stakeholders on the results of completed studies and status of any studies that remain outstanding, as well as to propose any study modifications. They also plan to submit a draft licensing proposal for FERC and stakeholder comment,

[15] Sonoma Water, 2015 UWMP.

[16] Huffman Ad-Hoc Committee, Pottery Valley Project Water Supply Working Group, Results of Initial Water Supply Modeling for Potter Valley Project and Russian River Alternatives, May 2019.

[17] Ibid.

including any proposed reconfiguration of the project and fisheries and other environmental protection measures in November 2021 and submit the final license application in April 2022.[18]

There is still uncertainty around if or how the PVP will operate in the future. However, given the fact that a concerted multi-agency and State supported effort is underway to achieve a successful two-basin solution for the PVP, there is some confidence that the associated water supply issues will be adequately addressed. If relicensing should fail, decommissioning the PVP will likely take upwards of 20 years or longer. As such, it is unlikely that PVP proceedings will have an impact during the term of this UWMP.[19] While decommissioning the PVP could potentially eventually impact the City's water supply, there are many other options being considered that would help offset this outcome, including modeling scenarios run by the Water Supply Modeling Subgroup, a subcommittee of the Huffman Ad Hoc Committee. Results for the modeling scenarios can be found in a report prepared by the Huffman Ad Hoc Committee entitled Results of Initial Water Supply Modeling for Potter Valley Project and Russian River Alternatives Report.[20] Because of the significant uncertainty regarding the schedule and final disposition of the PVP, Sonoma Water is assuming the PVP will operate under annual licenses after April 2022 for the 25-year planning horizon of the 2020 Plan. In order to base the water supply analysis in this Plan on an alternate assumption, Sonoma Water would have to select a specific schedule and outcome from a universe of potentially available options. Consequently, Sonoma Water's reliance on existing conditions instead of a speculative future alternative is reasonable and appropriate. Sonoma Water will re-evaluate the assumptions for PVP in five years during preparation of its 2025 Plan when new information will likely be available.

7.1.1.1.5 Water Reliability Modeling For 2020 UWMP

Sonoma Water modeled the reliability of its water supply system for the Water Contractors' use in preparing individual 2020 UWMPs. For both the average (2002) and five consecutive dry year period (1987-1991) scenarios, the modeling results indicated that there would be adequate water supply to meet 100 percent of the projected demands for Sonoma Water, including demands from the City of Petaluma.

Sonoma Water modeled the impact of the single dry year scenario for 1977 and projected the results for the Upper Russian River and Lower Russian River systems as follows:

- **Lake Mendocino**: For the single dry year scenario, the modeling results indicated significant impacts to Lake Mendocino. Sonoma Water would need to request reductions in minimum instream flow requirements, coupled with significant demand reductions by water users that divert water from the Upper Russian River, to prevent Lake Mendocino from dropping below 5,000 AF. However, the City is not an Upper Russian River water user; therefore, these results do not directly affect water supply reliability for the City.

[18] FERC Relicensing Schedule, as shown on the Two Basin Solution Partnership website, accessed on January 29, 2021. https://www.twobasinsolution.org/schedule/

[19] Woodard & Curran, January 22, 2020.

[20] Huffman Ad-Hoc Committee, May 2019.

- **Lake Sonoma**: For the single dry year scenario, modeling results for 2025-2045 indicate that Lake Sonoma (Sonoma Water's main water supply) would drop below 100,000 AF before July 15 starting in 2030. Per Decision 1610, described above, this water level on July 15 requires a mandatory 30 percent reduction in Russian River diversions. The resulting difference between demand and supply would range from 16 percent in 2030 to nearly 19 percent in 2045 for all of Sonoma Water's Water Contractors combined. If this water supply condition were to occur, water would be allocated among the Water Contractors in conformance with the adopted Shortage Methodology in accordance with Section 3.5 of the Restructured Agreement, as described above. Because the Shortage Methodology requires real time current and projected water demand information from all the Water Contractors, the City used the average percent in supply reduction in this UWMP to project water supply availability during a single dry year.

7.1.1.2 Groundwater Supply Constraints

Groundwater sources may be impacted by water quality issues or reduced yield due to drought. The City has experienced some water quality issues in the past discussed with its groundwater. However, as the City is not projecting using groundwater supply as a normal supply, there are no projected impacts to the supply quantity.

The City is also working with the local GSA to develop a GSP, as described in Chapter 6. The findings of this plan may alter groundwater use assumptions in future UWMPs.

7.1.1.3 Recycled Water Supply Constraints

There are no projected impacts to the City's recycled water supply, though future regulations or other issues may impact reliability. The City is actively working to procure funding for expansion of the recycled water system to continue to offset potable water demands in the water service area.

7.1.2 Year Type Characterization

This section discusses the City's potable and non-potable water supplies available during normal conditions, single dry year conditions, and five consecutive dry year periods.

To identify the years to use for characterizing a normal year, a single dry year, and the five consecutive dry year drought conditions, the City used the following water year definitions from the DWR 2020 Guidebook.[21]

- **Normal Year**. This condition represents the water supplies a Supplier considers available during normal conditions. This could be a single year or averaged range of years that most closely represents the average water supply available to the Supplier. In the Guidebook, DWR uses the terms average and normal interchangeably when addressing the water year type.
- **Single Dry Year**. The single dry year is the year that represents the lowest water supply available to the Supplier.

[21] State of California Department of Water Resources. Final March 2021. *Urban Water Management Plan Guidebook 2020*.

- **Five Consecutive Dry Year Drought**. Per Water Code, the five consecutive dry year period for the Drought Risk Assessment for 2021-2025 would be the driest five-year historical sequence for the Supplier (Water Code Section 10612). The State encourages Suppliers to use the same five-year sequence for their water service reliability assessment. However, Suppliers may choose to use a different five consecutive year dry period such as the lowest average water supply available to the Supplier for five years in a row. Suppliers are encouraged to characterize the five consecutive year drought in a manner that is best suited for understanding and managing their water service reliability.

An analysis on the reliability of the City's main supply (Sonoma Water imported surface water), was performed. The analysis includes the historic reliability of the water supply, and any vulnerability to seasonal or climactic shortage. The historic climatic shortage was analyzed based on average year, single dry-year which represents the lowest water supply to the City, and multiple dry years which is a period that represents the lowest average water supply availability for a consecutive multiple dry year periods (five years or more). The years selected for analysis for the average year, single-dry year, and five consecutive dry years are 2002, 1977, and 1987-1991, respectively.

The Sonoma Water supply is subject to reductions in Decision 1610 based on Lake Sonoma volume. Lake Sonoma has a total volume of 381,000 AF and a supply pool of up to 212,000 AF. When the total volume is less than 100,000 AF, the Sonoma Water diversion is subject to a 30 percent reduction. Using the water type years as listed above and in Table 7-1, the Sonoma Water supply is expected to have an impact only in the single-dry year scenario. With up to three years of supply stored in Lake Sonoma, the system is relatively resistant to impacts from the average year and to five years of dry hydrology.

This analysis showed that during a single-dry year scenario, the levels in Lake Sonoma drop below 100,000 AF before July 15. Based on terms in the Sonoma Water's water rights, Sonoma Water is required to reduce their diversions from the Russian River by 30 percent. This reduction in diversions directly impacts the City's supply of water. The 30 percent reduction is based on Sonoma Water average monthly deliveries during the same month of the previous three years. To satisfy the City's demand with the reduced supply, the City will need to increase the production of local water supplies and increase water conservation efforts. Enactment of the City's water shortage contingency plan will most likely be required depending on the amount of reduction in consumption required and the amount of water that can be supplied by the City's groundwater sources.

Table 7-1. Basis of Water Year Data (Reliability Assessment) (DWR Table 7-1 Retail)

Year Type	Base Year If not using a calendar year, type in the last year of the fiscal, water year, or range of years, for example, water year 2019-2020, use 2020	Available Supplies if Year Type Repeats	
		☐	Quantification of available supplies is not compatible with this table and is provided elsewhere in the UWMP. Location _____
		☐	Quantification of available supplies is provided in this table as either volume only, percent only, or both.
		Volume Available *	% of Average Supply
Average Year	2002	13,400	100%
Single-Dry Year	1977	13,400	100%
Consecutive Dry Years 1st Year	1987	13,400	100%
Consecutive Dry Years 2nd Year	1988	13,400	100%
Consecutive Dry Years 3rd Year	1989	13,400	100%
Consecutive Dry Years 4th Year	1990	13,400	100%
Consecutive Dry Years 5th Year	1991	13,400	100%

Supplier may use multiple versions of Table 7-1 if different water sources have different base years and the supplier chooses to report the base years for each water source separately. If a Supplier uses multiple versions of Table 7-1, in the "Note" section of each table, state that multiple versions of Table 7-1 are being used and identify the particular water source that is being reported in each table.

***Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.*

NOTES: Volumes are in AF. 13,400 AF is Petaluma's annual supply allocation from Sonoma Water.

7.1.3 Water Service Reliability

This section provides an analysis of the reliability of the City's water service to its customers over the planning horizon out to 2045. This assessment compares projected water demands to total water supply sources for a normal water year, a single dry water year, and a dry period lasting five consecutive water years. The water supply service reliability analysis extends through 2045 in five-year increments and is based on the information provided in Chapters 4 and 6.

In summary, the water service reliability assessment through 2045 found the following:

- Normal Water Years: The City projects having adequate water supplies in normal years to meet demands through 2045.
- Single Dry Water Years: The City projects experiencing a shortfall in contract water supply from Sonoma Water by 2030 in a single dry year that is hydrologically equivalent to the driest water year on record (1977). However, the City does not anticipate a shortfall in groundwater supply or recycled water supply. To mitigate the shortfall in contract water supply, the City may decide to temporarily reduce its demands and supply groundwater to ensure demand does not exceed supply should such a shortage occur during a single dry year.

- Five Consecutive Dry Year Periods: The City projects having adequate water supplies for five consecutive dry years that are hydrologically equivalent to the five driest consecutive years on record (1987-1991) to meet demands through 2045.

7.1.3.1 Water Service Reliability – Normal Year

The normal year supply and demand comparison is shown in Table 7-2.

Table 7-2. Normal Year Supply and Demand Comparison (DWR Table 7-2 Retail)

	2025	2030	2035	2040	2045 *(Opt)*
Supply totals *(autofill from Table 6-9)*	10,705	11,410	11,514	11,795	12,117
Demand totals *(autofill from Table 4-3)*	10,705	11,410	11,514	11,795	12,117
Difference	0	0	0	0	0
NOTES: Volumes are in AF.					

7.1.3.2 Water Service Reliability – Single Dry Year

The single-dry year supply and demand scenario is presented in Table 7-3.

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

	2025	2030	2035	2040	2045 (Opt)
Supply totals*	11,005	10,298	10,313	10,463	10,632
Demand totals*	10,705	11,410	11,514	11,795	12,117
Difference	300	(1,112)	(1,201)	(1,332)	(1,485)
***Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.*					
NOTES: Volumes are in AF. Supply totals include projected demand with forecasasted reduction from Sonoma Water for each year, local groundwater supply, and recycled water supply. Demand totals are based on normal demand and include projected potable demand and recycled water demand from EKI Environment & Water, Inc. 2020 Water Demand Analysis and Water Conservation Measure Update for City of Petaluma.					

7.1.3.3 Water Service Reliability – Five Consecutive Dry Years

The multiple-dry year supply and demand scenario is presented in Table 7-4.

Table 7-4. Multiple Dry Years Supply and Demand Comparison (DWR Table 7-4 Retail)

		2025*	2030*	2035*	2040*	2045* (Opt)
First year	Supply totals	10,705	11,410	11,514	11,795	12,117
	Demand totals	10,705	11,410	11,514	11,795	12,117
	Difference	0	0	0	0	0
Second year	Supply totals	10,705	11,410	11,514	11,795	12,117
	Demand totals	10,705	11,410	11,514	11,795	12,117
	Difference	0	0	0	0	0
Third year	Supply totals	10,705	11,410	11,514	11,795	12,117
	Demand totals	10,705	11,410	11,514	11,795	12,117
	Difference	0	0	0	0	0
Fourth year	Supply totals	10,705	11,410	11,514	11,795	12,117
	Demand totals	10,705	11,410	11,514	11,795	12,117
	Difference	0	0	0	0	0
Fifth year	Supply totals	10,705	11,410	11,514	11,795	12,117
	Demand totals	10,705	11,410	11,514	11,795	12,117
	Difference	0	0	0	0	0
Sixth year *(optional)*	Supply totals	10,705	11,410	11,514	11,795	12,117
	Demand totals	10,705	11,410	11,514	11,795	12,117
	Difference	0	0	0	0	0

***Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.*

NOTES: Volumes are in AF. Based on projected demands. Supply does not include groundwater because there is no projected deficit between supply and demand. Groundwater is only used as emergency backup supply.

7.1.4 Efforts to Minimize Imported Water

The Sonoma Water/Russian River water system is not connected to other water systems. Therefore, all local resources are maximized, and it is not possible to import water from other regions.

7.2 DROUGHT RISK ASSESSMENT

The DRA is new requirement for UWMPs. The DRA is an evaluation of local water supply availability, assuming the next five years (2021-2025) are hydrologically equivalent to the driest five consecutive years on record. As required by the new regulation, this section provides a description of the data and methods used for the DRA, the basis for determining supply shortage conditions, a determination of the reliability of each water supply source, and a comparison of the total water supplies and uses, assuming the next five years are hydrologically equivalent to the driest five consecutive years on record.

7.2.1 Data, Methods, and Basis for Water Shortage Condition

The City analyzed data and considered trends to assess whether supply shortage conditions are anticipated in one or more years during the upcoming five-year period (2021-2025), assuming this upcoming five years are hydrologically equivalent to the driest five-year period on record. To conduct this assessment, the City relied on the following data sources to develop this DRA:

- Driest five-year period on record for the region, based on historical hydrological information (Source: Sonoma Water 2020 UWMP)
- Historic and current water supplies by source
- Historic and current water use, including all uses and water losses
- Projected water supply availability for 2021 through 2025 (Source: Sonoma Water 2020 UWMP)
- Projected water use for 2021-2025 (Sources: EKI report (Appendix D) and Chapter 4 of this UWMP)

The City used the following methods in its analysis.

Driest Five-Year Period: To identify the driest five-year period on record, the City relied on the analysis completed by Sonoma Water. Sonoma Water analyzed hydrologic records for the region and determined that the driest five-year period on record as 19871991.

Water Use: To estimate water use for 2021-2025, the City used historic and projected water use data. Water use was estimated at "unconstrained" levels. Unconstrained refers to anticipated water use under normal water year conditions when the City is not experiencing a water shortage. To estimate unconstrained demand for 2021-2025, the City considered historic water use and the projected demand for 2025, which takes into account estimated population and employment growth, likely new development, rebounding demand after the 2014-2016 drought, passive water savings from plumbing

codes, and climate change impacts.[22] The anticipated increase in use from 2019 actual use to 2025 projected demand was prorated to estimate the demands for 2021, 2022, 2023, and 2024.

Table 7-5 shows the estimated unconstrained water demand for 2021-2025.

Table 7-5. Estimated Potable Water Use for 2021-2025, AFY

2021 Estimate[(a)]	2022 Estimate[(a)]	2023 Estimate[(a)]	2024 Estimate[(a)]	2025 Projected[(b)]
7,926	8,121	8,315	8,510	8,705

(a) Estimated water demand for 2021-2024 was based on apportioning the difference between actual 2020 use and projected 2025 demands from Table 4-6 in Appendix D (EKI report).
(b) Projected water use from Table 4-6 in Appendix D (EKI report).

Water Supplies: To estimate water supplies for 2021-2025, the City considered each water supply separately.

Contract Water: The City relied Sonoma Water for its analysis of contract water supplies. Sonoma Water assessed the availability its water supply for 2021-2025 under hydrologic conditions equivalent to the driest five-year period on record (1987-1991). Based on that analysis, Sonoma Water anticipates contract water supply would be less than normal but would not result in a water shortage condition if the 2021-2025 hydrologically is equivalent to the driest five-year period on record.

Groundwater: The City assessed groundwater availability for 2021-2025 under conditions equivalent to the driest five-year period on record. The City does not rely on groundwater as a source of water supply in normal years, and plans to use groundwater as a supply source for emergency purposes only. The City projects groundwater supply will not be impacted if 2021-2025 is hydrologically equivalent to the driest five-year period.

Recycled Water: As discussed in Chapter 6, the City assessed recycled water availability for 2021-2025 under conditions equivalent to the driest five-year period on record. The City considered the fact that urban customers consume about 13 percent of the total recycled water produced and that urban recycled water customers are given high priority for deliveries and that urban recycled water supply has not been impacted by drought conditions. Therefore, the City projects recycled water supply will not be impacted if 2021-2025 is hydrologically equivalent to the driest five-year period.

7.2.2 DRA Water Source Reliability

As discussed above in Section 7.2.1, the City assessed available water supplies for 2021-2025, assuming the hydrology will be equivalent to the driest five-year period on record and determined the following:

- Sonoma Water anticipates contract water supply would be less than normal but would not result in a water shortage condition
- Groundwater supply will not be impacted
- Recycled supply will not be impacted

[22] EKI report (Appendix D).

7.2.3 Total Water Supply and Use Comparison

This section provides an analysis of the reliability of the City's water service to its customers should the next five years (2021-2025) be hydrologically equivalent to the driest five-year period on record for the region (1987-1991). This assessment compares estimated water demands to total water supply sources.

The City anticipates having adequate supplies to meet estimated unconstrained demand if 2021-2025 is hydrologically equivalent to the driest five-year period on record. Table 7-6 provides a comparison of estimated water supplies and unconstrained demands for 2021-2025 under drought conditions.

Table 7-6. Five-Year Drought Risk Assessment Tables to address Water Code Section 10635(b) (DWR Table 7-5)

2021	Total
Total Water Use	9,927
Total Supplies	9,927
Surplus/Shortfall w/o WSCP Action	0
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	
WSCP - use reduction savings benefit	
Revised Surplus/(shortfall)	0
Resulting % Use Reduction from WSCP action	0%

2022	Total
Total Water Use	10,121
Total Supplies	10,121
Surplus/Shortfall w/o WSCP Action	0
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	
WSCP - use reduction savings benefit	
Revised Surplus/(shortfall)	0
Resulting % Use Reduction from WSCP action	0%

2023	Total
Total Water Use	10,316
Total Supplies	10,316
Surplus/Shortfall w/o WSCP Action	0
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	
WSCP - use reduction savings benefit	
Revised Surplus/(shortfall)	0
Resulting % Use Reduction from WSCP action	0%

2024	Total
Total Water Use	10,510
Total Supplies	10,510
Surplus/Shortfall w/o WSCP Action	0
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	
WSCP - use reduction savings benefit	
Revised Surplus/(shortfall)	0
Resulting % Use Reduction from WSCP action	0%

2025	Total
Total Water Use	10,705
Total Supplies	10,705
Surplus/Shortfall w/o WSCP Action	0
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	
WSCP - use reduction savings benefit	
Revised Surplus/(shortfall)	0
Resulting % Use Reduction from WSCP action	0%
NOTE: Units are in AF. Water Use includes total from Water Use Worksheet in Table 4-2, plus 2000 AFY Recycled Water Demand. Incremental growth for each year between the 5 year projections.	

CHAPTER 8
Water Shortage Contingency Plan

A water shortage may occur due to a number of reasons, such as population growth, climate change, drought, and catastrophic events. Drought, regulatory action constraints, and natural and manmade disasters may occur at any time. A water shortage means that the water supply available is insufficient to meet the normally expected customer water use at a given point in time. A Water Shortage Contingency Plan (WSCP) presents how an urban water supplier plans to act in response to an actual water shortage condition. This chapter presents the City's WSCP, which describes the City's strategic plan in preparation for and response to water shortages, including the water shortage stages and associated actions that will be implemented in the event of a water supply shortage. As part of the WSCP, the City's legal authorities, communication protocols, compliance and enforcement, and monitoring and reporting are included.

In 2018, the California State Legislature (Legislature) enacted two policy bills, (SB 606 (Hertzberg) and AB 1668 (Friedman)) (2018 Water Conservation Legislation), to establish a new foundation for long-term improvements in water conservation and drought planning to adapt to climate change and the resulting longer and more intense droughts in California. The 2018 Water Conservation Legislation set new requirements for water shortage contingency planning.

This chapter updates the City's WSCP so that is it consistent with the 2018 Water Conservation Legislation requirements. This WSCP provides a guide for the City to use to proactively prevent catastrophic service disruptions. The City intends for this WSCP to be dynamic, so that it may assess response action effectiveness and adapt to the emergencies and catastrophic events. Refinement procedures to this WSCP are provided to allow the City to modify this WSCP outside of the UWMP process. The City's WSCP is included as Appendix L to this UWMP.

8.1 WATER SUPPLY RELIABILITY ANALYSIS

Chapter 6 and 7 of the City's 2020 UWMP present the City's water supply sources and reliability, respectively. Findings show that during normal water years, the City anticipates its full annual entitlement for from Sonoma Water to be 13,400 AFY per the Restructured Agreement, consistent with Sonoma Water's 2020 UWMP projections through 2045. During normal water years, the City does not plan to use groundwater as a source of water supply. Recycled water during normal water years is anticipated at 2,000 AFY in 2025, and 2,540 AFY in 2030-2045 based on EKI Water Demand and Conservation Report projections. The City anticipates having adequate water supply in normal years to meet demands through 2045.

During single dry water years, the City anticipates a supply reduction from Sonoma Water for each year beginning in 2030, as described in Sonoma Water's 2020 UWMP. The City does not plan to use groundwater for water supply during a normal water year, but projects 300 AFY of groundwater supply during the single-dry year to account for a deficit in water supply due to projected reduction from Sonoma Water. Recycled water during single dry water years is anticipated at 2,000 AFY in 2025, and 2,540 AFY in 2030-2045 based on EKI Water Demand and Conservation Report projections. The City anticipates receiving the following percentages of a normal year supply from Sonoma Water during a single dry year scenario through 2045: 2025 (100%), 2030 (90.3%), 2035 (89.6%), 2040 (88.7%), and 2045 (87.7%). In the event of a single dry year when there is a deficit in water supply, the City will enact the 2020 WSCP based on supply shortage to reduce customer demand. Appropriate water shortage response actions would be taken to ensure demand does not exceed supply during a water shortage scenario.

During five consecutive dry year periods, the City anticipates water supply from Sonoma Water that is less than a normal year supply, as described in Sonoma Water's 2020 UWMP. Sonoma Water uses the driest five-year period on record from 1987-1991 for the five-year period model. While Sonoma Water projects having less water during a five-year dry period than in a normal year, their model does not anticipate water shortages during these multiple dry year periods through 2045. During multiple dry year periods when no reduction in water supply is anticipated by Sonoma Water, the City does not plan to use groundwater as a source of water supply. Recycled water during multiple water years is anticipated at 2,000 AFY in 2025, and 2,540 AFY in 2030-2045 based on EKI Water Demand and Conservation Report projections. The City anticipates having adequate water supply during five consecutive dry year periods to meet demands through 2045.

The evaluation associated with this WSCP was developed in the context of the City's water supply sources and reliability.

8.2 ANNUAL WATER SUPPLY AND DEMAND ASSESSMENT PROCEDURES

This section presents the procedures that will be used by the City to conduct an Annual Water Supply and Demand Assessment (Annual Assessment). The Annual Assessment is required to be submitted annually to the DWR beginning on July 1, 2022. The Annual Assessment forecasts near-term water supply conditions (12 months) to ensure shortage response action are triggered in a timely manner. The Annual Assessment will provide a description and quantification of each source of the City's water supply compared to water demands for the current year and on subsequent dry year. The decision-making process and data and methodologies are described in this section. These procedures may be modified overtime.

Decision-Making Process. This section presents the decision-making process and timeline that the City will use each year to determine its water supply reliability. The assessment will be conducted annually and completed by July 1 of each year.

Develop Annual Assessment. Sonoma Water staff will provide a draft of their Annual Assessment of water supply conditions, considering demand projections for Sonoma Water contractors, by April. City staff will work with Sonoma Water and its contractors to provide City demand projections and review Sonoma Water's draft Annual Assessment, which is to be released as final in June. City staff will complete the Annual Assessment in accordance with the methodology described in Section 2 of the 2020 WSCP for the current year and one subsequent dry year. City staff will present a draft of the Annual Assessment to the Director of Public Works & Utilities (Director) for review and approval by June, or an earlier date determined by the release date of Sonoma Water's final Annual Assessment. If the Annual Assessment determines that projected supply will not meet projected demand, the Director may decide to present the Annual Assessment to the City Council, and request input on the findings and staff recommendations for specific shortage response actions resulting from the assessment.

Submit Annual Assessment to DWR. The City will submit the Annual Assessment to DWR by July 1 of each year.

Data and Methodologies. Data and methodologies present the data inputs and assessment methodology that will be used to evaluate the City's water supply. The evaluation criteria, water supply, unconstrained demand, water supply, planned water use, and infrastructure considerations are described.

Evaluation Criteria. Evaluation criteria are determined by forecasted demand and Sonoma Water's supply conditions and factors that may impact the City's groundwater and recycled water supply. The criteria include the key data inputs and the constraints imposed on water supply and demand. Key data inputs used by the City to forecast water supply and demand for the remainder of the current year and a subsequent dry year include the items described below.

- **Unconstrained customer demand.** Current and subsequent year unconstrained demand considering growth, weather, prior-year conditions, anticipated new demands, policy, and other influencing factors.
- **Sonoma Water Supply.** Sonoma Water's Russian River system is controlled and influenced by a variety of agreements and decisions. There are several constraints, requirements, and restrictions on water supply that will be considered as part of Sonoma Water's Annual Assessment.
- **Groundwater Supply.** Planned groundwater supply and quantity will be described and consistent with supply projections in the UWMP, and will consider growth, weather, prior-year conditions, water quality, infrastructure, coordination with the Petaluma Valley GSA, and other influencing factors.
- **Recycled Water Supply.** Planned recycled water supply and quantity will be described and consistent with supply projections in the UWMP, and will consider growth, weather, prior-year conditions, anticipated new demand, infrastructure, and other influencing factors.

Water Supply. Water supply sources will be described, and estimates made of the availability of supply sources, in the Annual Assessment. Water supply source and quantity will be consistent with the supply projections in the UWMP and based on Sonoma Water's Annual Assessment results for the City of Petaluma. The City may adjust water supply projections to account for weather, prior year conditions, Sonoma Water supply availability, water quality, infrastructure, or other influencing factors.

Unconstrained Customer Demand. Unconstrained customer demand refers to anticipated customer water needs for the year, prior to any water shortage response actions that might be necessary to ensure demand does not exceed supply. Unconstrained customer demand projections will be consistent with the demand projections in Chapter 4 of the City's UWMP. The City may adjust water demand projections to account for weather, prior-year conditions, Sonoma Water supply availability, infrastructure, or other influencing factors.

Planned Water Use for Current Year Considering Dry Subsequent Year. The Annual Assessment will provide an evaluation of the amount of anticipated water supply for the current year as well as how supply will be used, while anticipating that the following year will be dry. The assessment of planned water use will be based on evaluating the key data inputs to determine availability and reliability of each water supply source.

Infrastructure Considerations. The Annual Assessment will include an evaluation of how infrastructure capabilities and constraints may affect the City's ability to deliver supply to meet expected customer water use needs in the coming year. Evaluation will include anticipated capital projects that may influence capabilities, such as repairs or new projects.

Other Factors. The City will describe any specific locally applicable factors that can influence or disrupt supply, along with other unique local considerations that are considered as part of the Annual Assessment.

8.3 SIX STANDARD WATER SHORTAGE STAGES

To provide a consistent regional and statewide approach to conveying the relative severity of water supply shortage conditions, the 2018 Water Conservation Legislation mandates that water suppliers plan for six standard water shortage levels that correspond to progressive ranges of up to 10, 20, 30, 40, 50 percent, and greater than 50 percent shortages from the normal reliability condition. Each shortage condition should correspond to additional actions water suppliers would implement to meet the severity of the impending shortage.

In Table 8-1, the City's water shortage stages and corresponding water shortage levels conditions are identified. The City's water shortage levels apply to both foreseeable and unforeseeable water supply shortage conditions. Water shortage is the gap between available supply and planned demands.

Table 8-1. Water Shortage Contingency Plan Levels (DWR Table 8-1)

Shortage Level	Percent Shortage Range	Shortage Response Actions (*Narrative description*)
1	Up to 10%	Voluntary - up to 10% reduction in citywide water use.
2	Up to 20%	Mandatory - up to 20% reduciton in citywide water use, including customer demand reduction plan.
3	Up to 30%	Mandatory - up to 30% reduciton in citywide water use, including customer demand reduction plan.
4	Up to 40%	Mandatory - up to 40 % reduction in citywie water use, including customer demand reduction plan.
5	Up to 50%	Mandatory - up to 50 % reduction in citywie water use, including customer demand reduction plan.
6	>50%	Mandatory - more than 50 % reduction in citywie water use, including customer demand reduction plan.

8.4 SHORTAGE RESPONSE ACTIONS

CWC §10632 (a)(4) requires shortage response actions that align with the defined shortage levels. The City's shortage response actions consist of a combination of supply augmentation, demand reduction, and operational changes. The City's suites of response actions are dependent on the event that precipitates a water shortage level, the time of the year the event occurs, the water supply sources available, and the condition of its water system infrastructure. Depending on the foreseeable or unforeseeable events that led to the water shortage condition, the City may implement one or a combination of any of the shortage response actions described in this section to ensure that critical public health and safety are maintained.

The shortage responses are discussed below may be considered as tools that allow the City to respond to water shortage conditions. Because the City may continuously monitor and adjust its response actions to reasonably equate demands with available supply, the extent to which the gap between water supplies and water demand will be reduced by implementation of each action is difficult to quantify and is provided as an estimate. Certain response actions, such as public outreach and enforcement, support the effectiveness of other response actions and do not have a quantifiable effect on their own.

8.4.1 Demand Reduction

During water shortage conditions, the City plans to close the gap between water supply and water demand by implementing demand reduction action categories shown in Table 8-2. The shortage level for which each demand reduction action will commence implementation is also provided, along with the estimate of extent that the action will reduce the shortage gap. The table also indicates if the City plans to use compliance actions such as penalties, charges, or other enforcement actions for each demand reduction action.

Table 8-2. Demand Reduction Actions (DWR Table 8-2)

Shortage Level	Demand Reduction Actions ***Drop down list*** *These are the only categories that will be accepted by the WUEdata online submittal tool. Select those that apply.*	How much is this going to reduce the shortage gap? *Include units used (volume type or percentage)*	Additional Explanation or Reference *(optional)*	Penalty, Charge, or Other Enforcement? ***For Retail Suppliers Only*** *Drop Down List*
Add additional rows as needed				
1	Expand Public Information Campaign	15% to 20%		No
1	Increase Frequency of Meter Reading	0.50%	Always offered, anticipated increase in calls for high-usage.	No
1	Offer Water Use Surveys	< 0.5%	Always offered, anticipate increase in participation.	No
1	Provide Rebates on Plumbing Fixtures and Devices	< 0.5%	Always offered, anticipated increase in participation.	No
1	Provide Rebates for Turf Replacement	< 0.5%	Always offered, anticipated increase in participation.	No
1	Increase Water Waste Patrols	< 0.5%	Enforcement of all water waste prohibitions in ordinance.	Yes
1	Landscape - Other landscape restriction or prohibition	< 0.5%	Landscape irrigation is limited to the hours of 8pm to 6am.	No
1	Landscape - Restrict or prohibit runoff from landscape irrigation	< 0.5%	Always enforced by water waste ordinance.	Yes
1	Other - Customers must repair leaks, breaks, and malfunctions in a timely manner	< 0.5%	Always enforced by water waste ordinance.	Yes
1	Other - Require automatic shut of hoses	< 0.5%	Always enforced by water waste ordinance.	Yes
1	Other - Prohibit use of potable water for washing hard surfaces	< 0.5%		Yes

Table 8-2. Demand Reduction Actions (DWR Table 8-2)

Shortage Level	Demand Reduction Actions ***Drop down list*** *These are the only categories that will be accepted by the WUEdata online submittal tool. Select those that apply.*	How much is this going to reduce the shortage gap? *Include units used (volume type or percentage)*	Additional Explanation or Reference *(optional)*	Penalty, Charge, or Other Enforcement? ***For Retail Suppliers Only*** *Drop Down List*
Add additional rows as needed				
2	Expand Public Information Campaign	15% to 20%		No
2	Other	Up to 5%	All demand reduction actions in Stage 1 apply in stage 2	Yes
2	CII - Restaurants may only serve water upon request	< 0.5%		Yes
2	Other	0-2%	Implement Customer Demand Reduction Plan, as needed	Yes
2	Other - Prohibit vehicle washing except at facilities using recycled or recirculating water	< 0.5%		Yes
2	CII - Lodging establishment must offer opt out of linen service	< 0.5%		Yes
3	Other - Prohibit use of potable water for construction and dust control	< 0.5%	Recycled water must be used for dust control when available.	Yes
2	Other	< 0.5%	No new potable water hauler accounts authorized.	No
2	Landscape - Limit landscape irrigation to specific times	0-2%	Specific days and times determined by Director.	Yes
3	Expand Public Information Campaign	15% to 20%		
3	Other	Up to 11.5%	All demand actions in Stages 1 and 2 apply.	Yes
3	Water Features - Restrict water use for decorative water features, such as fountains	< 0.5%		Yes
3	Pools and Spas - Require covers for pools and spas	< 0.5%	Always enforced by water waste ordinance.	Yes
3	Other water feature or swimming pool restriction	< 0.5%	Filling new pools and spas prohibited.	Yes
3	Decrease Line Flushing	< 0.5%	Determined by Director	Yes
3	Landscape - Prohibit certain types of landscape irrigation	0-5%	No landscape irrigation with potable water allowed at parks, golf courses, landscape assessment districts, schools, medians, and frontages. School and park irrigation restricted to playing fields and mature trees only. Golf course irrigation restricted to putting greens only.	Yes
3	Other	0-2%	Implement Customer Demand Reduction Plan or increase implementation	Yes
3	Moratorium or Net Zero Demand Increase on New Connections	0-4%	City may implement a water demand offset policy for new development.	Yes

Table 8-2. Demand Reduction Actions (DWR Table 8-2)

Shortage Level	Demand Reduction Actions ***Drop down list*** *These are the only categories that will be accepted by the WUEdata online submittal tool. Select those that apply.*	How much is this going to reduce the shortage gap? *Include units used (volume type or percentage)*	Additional Explanation or Reference *(optional)*	Penalty, Charge, or Other Enforcement? ***For Retail Suppliers Only*** *Drop Down List*
Add additional rows as needed				
4	Expand Public Information Campaign	15%-20%		
4	Other	Up to 24.5%	All demand actions in Stages 1, 2, and 3 apply.	Yes
4	Other water feature or swimming pool restriction	< 0.5%	Filling or topping off existing pools and spas prohibited, except for public facilities.	Yes
4	Landscape - Other landscape restriction or prohibition	0-1%	Moratorium on installation of new landscapes or replanting of existing landscapes that require water.	Yes
4	Other	< 0.5%	City may restrict street sweepers to recycled water for street cleaning.	Yes
5	Expand Public Information Campaign	15%-20%		
5	Other	Up to 26.5%	All demand actions in Stages 1, 2, 3, and 4 apply.	Yes
5	Landscape - Prohibit certain types of landscape irrigation	0-10%	No landscape irrigation except for food gardens and mature trees. Public irrigation uses only allowed for playing fields and mature trees or shrubs. Director may eliminate all public irrigation depending on shortage condition.	Yes
6	Expand Public Information Campaign	15%-20%		
6	Other	Up to 36.5%	All demand actions in Stages 1, 2, 3, 4 and 5 apply.	Yes
6	Landscape - Prohibit all landscape irrigation	0-20%	No landscape irrigation except for food gardens and mature trees. Public irrigation uses only allowed for playing fields and mature trees or shrubs. Director may eliminate all public irrigation depending on shortage condition.	Yes
NOTES:				

8.4.2 Additional Mandatory Restrictions

In addition to the demand reduction response actions discussed in Table 8-2, the City may implement additional mandatory water restrictions as described in the City's 2020 WSCP.

8.4.3 Supply Augmentation

Should the City's water supply portfolio be insufficient to meet the reduced demands of its customers, the City may augment its water supply and take other actions as summarized in Table 8-3. The shortage level for which each action will commence implementation is provided, along with the estimated extent that the action will reduce the shortage gap. Details regarding operational changes in response to water shortage are provided in Section 8.4.4.

Table 8-3. Supply Augmentation and Other Actions (DWR Table 8-3)

Shortage Level	Supply Augmentation Methods and Other Actions by Water Supplier ***Drop down list*** *These are the only categories that will be accepted by the WUEdata online submittal tool*	How much is this going to reduce the shortage gap? *Include units used (volume type or percentage)*	Additional Explanation or Reference *(optional)*
Add additional rows as needed			
All	New Recycled Water	Up to 2%	Recycled water can reduce shortage gap by up to 2%, when demand reduction actions are in place to minimize citywide water use.
All	Stored Emergency Supply	Up to 100%	Stored water supply can reduce shortage gap by up to 100% for a period of time, when demand reduction actions are in place to minimize citywide water use.
All	Other Actions (describe)	Up to 100%	Local groundwater supply can reduce shortage gap by up to 100% for a period of time, when demand reduction actions are in place to minimize citywide water use.
NOTES: Supply augmentation methods may be used at any water shortage level, as determined by the City, but most likely will be used in the more severe water shortage stages 3-6.			

8.4.4 Operational Changes

City will implement various operational changes to address water shortage on a short-term basis. Operational changes may be related to supply augmentation or demand reduction response actions, depending on the water shortage stage. In the event the City's water supply from Sonoma Water is significantly and suddenly reduced, the City may activate its production, standby, or emergency wells to augment water supply. Under normal water conditions, the City does not use groundwater as a water supply source. Demand reduction measures will be implemented at each stage of a water shortage. The City's WSCP (Appendix L) provides a complete summary of demand reduction actions the City will implement at each stage of its WSCP shortage, including:

- Public Information Campaign
- Programs to help customers reduce water
- Water use restrictions and prohibitions

- Water Waste Patrols
- Operational changes
- Customer Demand Reduction Plan

8.4.5 Emergency Response Plan

In addition to responding to drought conditions, the City's WSCP can be used to respond to emergency conditions that interrupt water supply to the City. Water supply may be interrupted in the future due to water supply contamination, major transmission pipeline break, regional power failures, or a natural disaster such as an earthquake. In the event of an emergency, the City will respond as outlined below.

Supply Interruption. In the event that the Sonoma Water's Russian River supply becomes contaminated (i.e., due to a chemical spill or other environmental incident) or is unavailable due to natural disaster, it may be possible that no water would be available from Sonoma Water for a period of time. In such a case, the City would need to rely on water from system storage facilities and emergency wells. The City will first determine existing storage supply, secure the Kastania Storage Tanks, evaluate the potential length of supply shut down, and then determine which water storage stage to declare. Once a water shortage stage is selected, the City will implement the appropriate measures as defined in the stage description.

Power Failure. If an area-wide electrical power failure were to occur within the City's water service area, many of the City's pumping facilities could potentially be impacted. Uninterruptible power supplies are used at the Public Works and Utilities Building and at each of the field sites to power the Supervisory Control and Data Acquisition (SCADA) system. The batteries can provide approximately eight hours of power, which should be sufficient time to return power or connect to a standby generator. Three portable generators are available and have been used in the past to support power outage response. Sonoma Water's facilities may also be vulnerable to power outages; most of the Sonoma Water facilities which serve the City have backup power provisions.

8.4.6 Seismic Risk Assessment and Mitigation Plan

The California Water Code requires that WSCPs include a seismic risk assessment and mitigation plan to assess water system vulnerabilities and mitigate those vulnerabilities. A Local Hazard Mitigation Plan (LHMP) may be incorporated into WSCPs to address this requirement if it addresses seismic risk.

The City's 2020 LHMP was adopted by City Council on November 2, 2020 by Resolution No. 2020-160 N.C.S. The 2020 LHMP was submitted to the Federal Emergency Management Agency (FEMA), which found the plan to be in conformance with 44 CFR 201.6. The 2020 LHMP is included with the WSCP in Appendix L.

As described in the 2020 LHMP, the City is situated within an area of high potential seismic activity (the San Francisco Bay Region), and so the fault systems within and around the City have the potential to produce earthquakes that could impact the City significantly (e.g., the San Andreas Fault System which is currently active). A high-magnitude earthquake on one of the faults could cause moderate to high ground shaking in the City. Worst-case shaking scenario that the City will experience strong ground shaking, which has the potential to be damaging.

According to the United States Geological Survey (USGS) Earthquake Hazards Program data for liquefaction susceptibility, there are several areas of liquefaction susceptibility in the City. Most of the City is in the moderate liquefaction susceptibility zone, while parts in the center and close to Highway 101 (near Washington Street and Western Avenue) are within more severe liquefaction susceptibility zones. Most of the highly susceptible categories follow the Petaluma River's general location as it flows from the northwest of the City, through the center and downtown area, then out through the center east.

Water system infrastructure, including pump stations, storage tanks, and pipelines, can be damaged during a strong earthquake. The City's facilities have been constructed in accordance with the applicable building codes to minimize potential damage during an earthquake. Major reconstruction of existing facilities must also be designed to meet the provisions of the Uniform Building Code for Seismic Zone four. However, it is expected that some facilities may be damaged as the result of a strong earthquake. The City has multiple storage facilities and looped distribution pipelines, to allow potentially damaged portions of the City's system to be quickly isolated and repaired.

8.4.7 Shortage Response Action Effectiveness

Refer to Table 8-2 for a summary of water demand reduction actions and associated estimated water reduction by action for each stage.

8.5 COMMUNICATION PROTOCOLS

When a water shortage level is triggered by the Annual Assessment, or for any other reason, and a declaration of a water shortage emergency is made, the City will initiate a public information campaign. The City may trigger any of these communication protocols at any water shortage stage. The City will seek to coordinate outreach with Sonoma Water and the Sonoma-Marin Saving Water Partnership to ensure consistent messaging within the region. Public outreach during a water shortage will seek to inform the City's residents, businesses, and water customers of current water shortage level, demand reduction targets and associated prohibitions and demand reduction actions and provide information about City's water conservation program. Print and digital information will be made available in English and Spanish.

The Public Information Campaign may include:

- Preparation and dissemination of outreach brochures, bill inserts and direct customer mailers.
- Contact the Two Rock USCG Training Center to discuss water shortage and targeted demand reduction.
- Dissemination of outreach to specific customer types.
- Informational booths at local events.
- Coordinated outreach in local newspaper, City newsletter, social media, and media releases.
- Update City's website to include current water shortage information.
- Conduct targeted outreach to the highest water users by direct mailings and letters.
- Conduct outreach to potable water haulers to communicate demand reduction actions associated with hauled water.

- Conduct targeted outreach to specific groups, such as property managers, landscape professionals, pool and spa companies, high use water customers, etc.
- Presentations and outreach to local groups, business, and schools.
- Presentations and workshops to City Council.

The public information campaign will be intensified as necessary, with each progressive water shortage stage, to communicate mandatory requirements and increased demand reduction actions.

8.6 COMPLIANCE AND ENFORCEMENT

Water shortage warnings, violations, and fees can be applied to customers who are in violation of the 2020 WSCP stage demand reduction actions, the City's Water Conservation Regulations defined in Petaluma Municipal Code (PMC) Chapter 15.17, or not meeting the requirements of their assigned Reduction Plan. The City will issue warnings, violations, and fines as necessary according to the following process:

4. Personal contact with the customer at the address of the water service in violation. Education and technical support provided.
5. If personal contact is unsuccessful, written notice of the violation, including date that violation must be corrected, may be left on the premises, with a copy of the notice sent by certified mail to the customer. Customer is given 72 hours or less as appropriate to mitigate violation.
6. As adopted by the City Council pursuant to PMC Section 1.16.030, current fines, as stated in Resolution No. 2008-212 N.C.S., are as follows. The most current fines apply as adopted by City Council:
   - First Violation: Fine of $100
   - Second Violation: Fine of $500
   - Third violation: Fine of $1,000
7. Pursuant to PMC Chapter 15.17.100 Enforcement and fees, in addition to issuing a notice of violation, if appropriate, City may install a pressure reducing device in a service connection or disconnect service until verification of correction is made.
8. Customer will be charged $250 for installation of a pressure reducing device, and $250 for the removal of device. Device will not be removed until customer has paid all fines and outstanding account balances, and customer may be assigned a water budget.
9. Customer will be charged $60 for service disconnection and $60 for re-connection. Service will not be re-connected until customer has paid all fines and outstanding account balances, and customer may be assigned a water budget.

8.7 LEGAL AUTHORITIES

The City of Petaluma City Council, by resolution, shall declare a water shortage emergency and adopt the 2020 WSCP. A draft of the Water Shortage Emergency Resolution is provided in the WSCP (Appendix L). In the event of a water shortage emergency when immediate action must be taken prior to the ability of the City Council to declare a water shortage emergency, the City Manager, or designee, is authorized to implement the WSCP based on the reduction in water supply.

The City provides water service to the Two Rock United States Coast Guard Training Center (Training Center). The City shall coordinate with the Training Center, to which it provides water supply services for the possible proclamation of a local emergency.

8.8 FINANCIAL CONSEQUENCES OF WSCP

The City's tiered water rate structure is designed to encourage water conservation. The City's rate structure includes a fixed monthly service charge and a consumption charge. The fixed monthly charge is based on meter size. Consumption charges for commercial, industrial, and multi-family residential customers are based on a single rate, while single-family residential consumption charges are based on four tiers that increase in rate by volume.

The declaration of a water shortage emergency and adoption of the WSCP with voluntary and mandatory demand reduction targets has the potential to reduce revenue to the water and wastewater utilities through reduced water sales and increased expenses as the City responds to the actions described in the WSCP. The City does not have a water shortage rate structure to help cover water and wastewater utility costs.

In the upcoming 2022 utility rate study, the City will include an analysis of impacts of a prolonged drought on the water and wastewater utilities, develop options to meet short-term and long-term water shortage revenue reductions, and a water shortage rate structure may be established to consider for use in the event of a prolonged drought.

Depending on the water shortage level and duration of a water shortage emergency, mitigation actions may be taken to reduce financial impacts:

- Implementation of future water shortage rate structure
- Using financial reserves
- Reducing current and/or future operation and maintenance expenses
- Deferring capital improvement projects

8.9 MONITORING AND REPORTING

Monitoring and reporting water use is fundamental to water supply planning and management. Monitoring is also essential to ensure that the demand reduction actions are achieving the intended water use reduction, or if improvements or new action need to be considered. Monitoring for customer compliance tracking is also useful for enforcement of the Reduction Plan.

The City's water system is fully metered, from its water supply sources to individual customer meters. During all water supply conditions, the City collects, tracks, and analyses water use data and submits a monthly urban water supplier monitoring report the State Water Board. The City will prepare and submit monthly water shortage monitoring and reporting as required by the State Water Board.

During a water shortage emergency, a demand reduction target will be determined with a baseline year by which to achieve the tarted reduction. All water shortage stages are implemented as citywide targets, and do not target individual customers, unless a customer is assigned a Reduction Plan as a City action beginning in Stage 2 of the WSCP. Citywide water demand will be tracked monthly and compared to the baseline year for compliance. Beginning in Stage 2, if a customer is assigned a Reduction Plan, the City will track customer water use monthly and compare the customer demand reduction target to the baseline year. Reduction Plan reduction target and baseline year are determined by the reduction target and baseline year implemented by the WSCP, or another reduction target and baseline as determined by the City and described in the Reduction Plan.

8.9.1 WSCP Refinement Procedures

This WSCP is an adaptive management plan. It is subject to refinements as needed to ensure that the City's shortage response actions are effective and produce the desired results. Based on monitoring described in Section 8.9 and the need for compliance and enforcement actions described in Section 8.6, the City may adjust its response actions. If it is determined that the WSCP needs revision to ensure shortage response actions are effective, the City will revise the WSCP following the procedures described in the WSCP (Appendix L).

8.9.2 Systematic Monitoring

The City will monitor meters at its water source to evaluate the overall effectiveness of its response actions in meeting the declared water shortage stage. Should overall demands not meet or exceed the goals of the declared water shortage stage, the intensity of public outreach for water conservation and the extent of enforcement of water use restrictions may be increased. Conversely, should overall demands continue to be substantially less than the goals of the declared water shortage stage, the intensity of public outreach for water conservation and the extent of enforcement of water use restrictions may be decreased.

8.9.3 Feedback from Staff and Customers

Feedback from staff and public is important in refining or incorporating new actions. The City seeks input from staff who interface with customers to gauge the effectiveness of its response actions and for response action ideas.

Customer water meter data may be evaluated for each customer sector or each individual customer. The City tracks water use violations and may evaluate their frequency to determine restrictions that customers may not be able to meet. This evaluation may also show water demand reduction actions that customers may effectively implement.

The City seeks input from its customers and the general public through its website, through public hearings for water shortage determination, and through regularly scheduled City Council meetings.

8.10 SPECIAL WATER FEATURE DISTINCTION

The City distinguishes special water features, such as decorative fountains and ponds, differently from pools and spas. Special water features are regulated separately.

8.11 PLAN ADOPTION, SUBMITTAL, AND AVAILABILITY

This WSCP is adopted concurrently with the City's 2020 UWMP, by separate resolution. Prior to adoption, a duly noticed public hearing was conducted. A hard copy of this WSCP will be submitted to DWR within 30 days of adoption, along with an electronic copy.

No later than 30 days after submittal to DWR, copies of this WSCP will be available at the City's offices. A copy will also be provided to Sonoma County. An electronic copy of this 2020 UWMP will also be available for public review and download on the City's website.

CHAPTER 9
Demand Management Measures

The City maintains an active water conservation program. Extensive analysis of the City's water conservation program and demand management measures (DMMs) was conducted in 2020. The 2020 analysis was done in conjunction with partners of Sonoma-Marin Saving Water Partnership (SMSWP) and resulted in the modification of several programs in the City's 2008 Water Conservation Plan. These efforts led to the current conservation and demand management program as presented in this section.

9.1 DEMAND MANAGEMENT MEASURES FOR WHOLESALE SUPPLIERS

The City is not a wholesale water provider and the DMMs in this section are not applicable.

9.2 DEMAND MANAGEMENT MEASURES FOR RETAIL SUPPLIERS

This section lists each required DMM for retail agencies as well as the additional programs implemented by the City.

9.2.1 Water Waste Prevention Ordinances

The City adopted Water Conservation Regulations Ordinance No. 2316 in February 2009 as part of the PMC. The Water Conservation Regulations Ordinance was updated in June 2016 (Ordinance No. 2579) to include additional water waste regulations defined in Executive Orders B-37-16 and B-40-17 such as watering within 48 hours of measurable rainfall. The ordinance prohibits such practices as non-recirculating fountains, deliberate waste of water, single-pass evaporative cooling towers, or other non-essential uses of water as defined in the PMC Chapter 15.17. The ordinance gives the City the authority to disconnect service if water waste is not corrected. The City's water waste prohibition can be found in Section 15.17.70 of the Water Conservation Regulations (Appendix M).

9.2.2 Metering

All customers are meters and charged using volumetric rates. In 2016, the City finished implementing the Automatic Meter Reading (AMR) program which helps to address the customer meter inaccuracy.

9.2.3 Conservation Pricing

The City has always been metered and charged on volumetric rates. Expense and revenue requirements are evaluated regularly, and rates are adjusted to match requirements for cost recovery. The City's current water rate structure contains a monthly service charge and tiered volumetric charge. There are four tiers for the residential customers and one tier for all other customers. The wastewater rate also has two components, a service charge and a volumetric charge based on the customer's average winter water usage.

9.2.4 Public Education and Outreach

The City's Public Information & School Education programs cover this demand management measure. The City has maintained a public outreach program since 2002 and currently provides an annual budget of approximately $395,000 to implement the water conservation program and demand management messages for each program. The City uses various forms of media to reach its customers, including print and digital advertisements, radio, web site, PSAs, bill inserts, informational booths, demonstration gardens, movie theater ads, social media, and others. Informational booths are set up at local public

events including the annual Sonoma-Marin Fair and at seasonal farmers markets. The City maintains several water conservation demonstration gardens throughout the City, located at the City Hall, Ellis Creek Water Recycling Facility, Tahola Lane, the Cavanaugh Recreation Center, and the Public Library to name a few. Customer bills contain comparison of water usage to the previous year usage to help the customer understand their water usage.

The City is in an agreement with the non-profit organization Daily Acts to provide public outreach and school education for the water conservation program.

The City is also a partner of a regional Public Information & School Education program through SMSWP. Petaluma contributes $171,500 annually to the SMSWP Regional programs which include: Regional multi-media public outreach campaign, SMSWP website, Water Education materials available for local schools, QWEL Training in English and Spanish, Master Gardener's Garden Sense Program, Annual Eco-Friendly Garden Tour, Russian River/Bay Friendly Landscaping, Water Smart Plant labels in local nurseries, representation at Sonoma County Fair, Green Car Wash Certification, and more. The SMSWP Water Education program provides curriculum materials, classroom instruction, water education field trips and study programs, assemblies and workshops, ESL water-focused lessons, and water education teacher trainings for grades K-12.

The City tracks outreach efforts and estimates the number of customers reached through each outreach effort. The City compares its individual program participation to its annual goals to estimate effectiveness of its public information program. The program is modified through new messaging or using different media to reach the program implementation goals.

9.2.5 Programs to Assess and Manage Distribution System Real Loss

The City's Public Works and Utilities Department conducts the efforts for this demand management measure. Since 2016, all meters are on AMR and all meter areas area assigned by customer class. Staff monitor production and sales records on a monthly basis to identify unaccounted for water. Annual reports are produced to include water production, sales by customer class, and quantity of non-revenue water in order to identify unaccounted for water compared to past years and to identify potential issues. The City conducts a water audit annually based on AWWA Methodology, see Appendix F for the City's 2015-2019 water loss audits.

9.2.6 Water Conservation Program Coordination and Staffing Support

The City has maintained a full-time conservation coordinator since 2006 when the position was created. The City also budgets for one full-time equivalent (FTE) to help implement the conservation program. The coordinator's duties include management and implementation of the programs, budgeting and cost tracking, conducting site visits or other audits, representing the program at public information events, customer demand tacking, and others. Additional staff is utilized to assist in site visits and audits, budgeting and planning, water demand analysis, public information events and campaigns, or other program implementation needs.

9.2.7 Other Demand Management Measures

The following are programs offered by the City of Petaluma:

Water-Wise HouseCall Program

A Water-Wise HouseCall (WWHC) is a personalized program to help water/sewer customers use water more efficiently both inside and outside the home. A water efficiency professional assesses the customers current water usage by performing various tasks such as:

- Visually inspect faucets, shower heads, toilets, and other water using apparatus for leaks;
- Provide free low-flow aerators and shower heads, if needed;
- Share details about how to qualify for high-efficiency toilets (HET) and high-efficiency clothes washer (HECW) rebates; and
- Outline the most practical ways to maximize water savings.

Outdoor assessments include:

- Test irrigation systems and look for leaks and broken sprinkler heads;
- Identify areas of the systems that may need maintenance or upgrades;
- Discuss how soil types can affect watering needs;
- Provide efficient irrigation schedule for programmers and program if needed; and
- Teach the customer how to read their water meter and monitor their water usage.

All HouseCalls are free to water/sewer customers and typically take 30 minutes.

High-Efficiency Toilet Rebate Program

The City offers two types of rebates in this program, a residential rebate for HETs and commercial rebates for HETs and high-efficiency urinals (HEUs). To qualify for a residential or commercial HET/HEU rebate a customer must call and schedule a free Water-Wise HouseCall. A pre-approval must be obtained before replacing the older existing toilet/urinal. The existing toilet/urinal must be inspected by a City employee to determine eligibility for the rebates (toilets must flush 1.28 gallons per flush (gpf) or more and urinals must flush one gpf or more). If qualified, an application form is provided during the appointment as well as instructions on how to obtain the rebate and where to recycle the older fixtures. Customer must submit the rebate application with original receipts of the new HET(s)/HEU(s) purchased and proof of receipt of recycling the older toilet(s) or urinal(s). Residential rebates are up to $150 per HET and the commercial toilet/urinal rebates are up to $260.

Mulch Madness Program

To qualify for the Mulch Madness Program, a single family residential, multi-family residential, or commercial water customer must first sign up for a Water-Wise HouseCall. A trained Environmental Services Technician evaluates the turf area and determines if it qualifies for the program. To qualify for the program residential and commercial accounts must be actively maintaining a minimum of 500 square feet of high water-use turf landscape. Lawns that are dead, have already been removed, and areas of non-turf (weed or dirt patches) are not eligible for the program. The site must have in-ground irrigation and be regularly irrigated and maintained at the time of pre-inspection. Upon being qualified by a

Technician, customers are provided contact information for the vendors who supply the products to help complete their sheet mulching project. This program includes free delivery of mulch, compost, and a double layer of cardboard, and a drip irrigation conversion kit to pick up. (Kits only available to single family residential accounts).

High-Efficiency Clothes Washer Rebate

The City offers a $75 rebate to residential water and/or sewer service customers who purchase and install a new, qualifying high-efficiency clothes washer. To participate the customer must replace a top-loading clothes washer with a qualifying front-loading clothes washer to receive a rebate. Only Energy Star "Most Efficient" models qualify for the rebate. (Note: The rebate used to be $125, but was decreased to $75 in July 2018.)

High-Efficiency Faucet Aerator/Showerhead Giveaway

This program distributes low-flow showerheads, faucet aerators and hose-end shut-off nozzles to Commercial, Industrial, Institutional (CII) and residential water/sewer customers. Supplies are made available at several City office locations, are given away at local community events, and offered during audits.

Water Conserving Landscape and Irrigation Codes

The City adopted Water Conservation Regulations Ordinance No. 2562 in 2016 as part of the City's Municipal Code. This Ordinance replaced the City's landscape water use efficiency standards with updated standards to comply with State Model Water Efficient Landscape Ordinance. The City's updated Ordinance increases water efficiency standards for new and renovated landscapes through more efficient irrigation systems and limiting high water use plants including turf. The City's landscape water use efficiency standards can be found in Section 15.17.050 of the Water Conservation Regulations (Appendix M).

The following is a regional program offered by the Sonoma-Marin Saving Water Partnership:

Restaurant Rebate Program

The City, in coordination with the SMSWP, offered a Restaurant Rebate Program. To participate in the program, restaurants needed to contact the City to confirm eligibility. The restaurant selected the equipment from an approved list of appliances, then would purchase and install the rebate eligible equipment. The participating restaurant had to complete and sign an application form and attach a copy of paid invoice(s) for the eligible equipment, complete and sign IRS Form W-(9). and submit all documents by mail to the SMSWP. Items eligible for rebate were dishwashers, steam cookers, ice machines, pre-rinse spray valves with a flow rate of 1.15 gpm or less, and lavatory faucets with a maximum flow rate of 0.5 gpm.

9.3 IMPLEMENTATION OVER THE PAST FIVE YEARS

This section provides a brief description and quantification of the demand management measures listed in Section 9.2 that the City implemented over the past five years.

9.3.1 Water Waste Prevention Ordinances

The City adopted Water Conservation Regulations Ordinance No. 2316 in February 2009 as part of the City's Municipal Code. The Water Conservation Regulations Ordinance was updated in June 2016 (Ordinance No. 2579) to include additional water waste regulations defined in Executive Orders B-37-16 and B-40-17 such as watering within 48 hours of measurable rainfall. The ordinance prohibits such practices as non-recirculating fountains, deliberate waste of water, single-pass evaporative cooling towers, or other non-essential uses of water as defined in the PMC Chapter 15.17 (Appendix M).

9.3.2 Metering

All customers have been metered using AMR over the past 5 years.

9.3.3 Conservation Pricing

The City has always been metered and charged on volumetric rates. Expense and revenue requirements are evaluated regularly, and rates are adjusted to match requirements for cost recovery. The City's current water rate structure contains a monthly service charge and tiered volumetric charge. There are four tiers for the residential customers and one tier for all other customers.

9.3.4 Public Education and Outreach

The City has maintained a public outreach program since 2002 and currently provides an annual budget of approximately $395,000 to develop the conservation program and demand management messages for each program. The City uses various forms of media to reach its customers, including print and digital advertisements, radio, web site, PSA's, bill inserts, informational booths, demonstration gardens, movie theater ads, social media, and others. Informational booths are set up at local public events including the annual Sonoma-Marin Fair and at seasonal farmers markets. The City maintains several water conservation demonstration gardens throughout the City. Customer bills contain comparison of water usage to the previous year usage to help the customer understand their water usage.

The City is in an agreement with the non-profit organization Daily Acts to provide public outreach and school education for the water conservation program.

The City is also a partner of a regional Public Information & School Education program through SMSWP. Petaluma contributes $171,500 annually to the SMSWP Regional programs which include: Regional multi-media public outreach campaign, SMSWP website, Water Education materials available for local schools, QWEL Training in English and Spanish, Master Gardener's Garden Sense Program, Annual Eco-Friendly Garden Tour, Russian River/Bay Friendly Landscaping, Water Smart Plant labels in local nurseries, representation at Sonoma County Fair, Green Car Wash Certification, and more. The SMSWP Water Education program provides curriculum materials, classroom instruction, water education field trips and study programs, assemblies and workshops, ESL water-focused lessons, and water education teacher trainings for grades K-12.

The City tracks outreach efforts and estimates the number of customers reached through each outreach effort. The City compares its individual program participation to its annual goals to estimate effectiveness of its public information program. The program is modified through new messaging or using different media to reach the program implementation goals.

9.3.5 Programs to Assess and Manage Distribution System Real Loss

The City has been monitoring unaccounted for water loss for the past 25 years. Staff monitor production and sales records on a monthly basis to identify unaccounted for water. Since 2015, the City has performing an annual water loss annual report using AWWA software. Annual reports are produced to include water production, sales by customer class, and quantity of non-revenue water in order to identify unaccounted for water compared to past years and to identify potential issues. Petaluma's average reported loss based on 2017-2019 water loss audit reports is 23.7 gallons per connection per day. Petaluma has a State target of 13.4 gallons per connection per day by 2027.

9.3.6 Water Conservation Program Coordination and Staffing Support

The City has maintained a full-time conservation coordinator since 2006 when the position was created. The City also budgets for one full-time equivalent (FTE) to help implement the conservation program. Additional staff is utilized to assist in site visits and audits, budgeting and planning, water demand analysis, public information events and campaigns, or other program implementation needs.

9.4 IMPLEMENTATION TO ACHIEVE WATER USE TARGETS

The list below describes the demand management measures the City may implement in order to achieve its future water use targets. The demand management measure effectiveness will be measured by program and customer data that is used to evaluate the impacts of the measures on demand over time.

1. Water Waste Prevention Ordinances
2. Metering
3. Conservation Pricing
4. Public Education and Outreach
    - SMWSP – Regional Program
    - City Program
5. Programs to Assess and Manage Distribution System Real Loss
6. Water Conservation Program Coordination and Staffing Support
7. Water-Wise HouseCall Program
8. High-Efficiency Toilet Rebate Program
9. Mulch Madness Program
10. High-Efficiency Clothes Washer Rebate Program – CII, Single-Family Residential (SFR), Multi-Family Residential (MFR)
11. High-Efficiency Faucet Aerator/Showerhead Giveaway – CII, SFR, MFR
12. Water Conserving Landscape and Irrigation Codes
13. Drip Irrigation Incentive – CII, SFR, MFR
14. Incentive Irrigation Equipment Upgrades – Large Landscapes, SFR
15. Incentive Submetering for Existing Customers – CII, MFR
16. Indoor Fixture Program for Hotels, Motels, and Schools

17. Restaurant Spray Nozzle Rebate
18. Thermostatic Shut-Off Valve Showerheads/Tub Spouts Rebates
19. Ultra-High-Efficiency Toilet (UHET) <1.0 gpf Rebate – CII
20. Water Savings Incentive Program for CII

9.5 WATER USE OBJECTIVES (FUTURE REQUIREMENTS)

In 2018, the State Legislature enacted two policy bills, (SB 606 (Hertzberg) and AB 1668 (Friedman)), to establish long-term water conservation and drought planning to adapt to climate change and the associated longer and more intense droughts in California. These two policy bills build on SB X7-7 and sets authorities and requirements for urban water use efficiency. The legislation sets standards for indoor residential use and requires the State Water Board, in coordination with DWR, to adopt efficiency standards for outdoor residential use, water losses, and CII outdoor landscape areas with dedicated irrigation meters. At the time of preparation of this UWMP, DWR and the State Water Board are in the process of finalizing water loss standards and are in the process of developing new standards for indoor and outdoor residential water use. These standards will require urban water retailers to develop agency-wide water use objectives, provide annual reports and update their UWMP.

The State Legislature established indoor residential water use standards as 55 GPCD until January 2025, 52.5 GPCD from 2025 to 2029, and 50 GPCD in January 2030, or a greater standard recommended by DWR and the State Water Board. By June 30, 2022, the State Water Board is anticipated to adopt an outdoor residential use standard, a standard for CII outdoor landscape area with dedicated irrigation meters, and performance measures for CII water uses. At that time, the State Water Board will adopt guidelines and methodologies for calculating the water use objectives. In accordance with CWC §10609.20(c), the water use objective for urban water retailers will be based on the estimated efficient indoor and outdoor residential water use, efficient outdoor irrigation of CII landscaped areas, estimated water losses, and estimated water use for variances approved by the State Water Board aggregated across the population in its water service area.

By November 1, 2023, and November 1 of every year thereafter, the City will calculate its urban water use objective and actual water use and provide an annual report to the State. By January 1, 2024, the City will prepare an UWMP supplemental incorporating DMMs and other water efficiency standards that it plans to implement to achieve its water use objective by January 1, 2027.

CHAPTER 10
Plan Adoption, Submittal, and Implementation

This chapter provides information regarding the notification, public hearing, adoption, and submittal of the City's 2020 UWMP. It also includes discussion on plan implementation and the process of amending the UWMP and the WSCP.

10.1 INCLUSION OF ALL 2020 DATA

Because 2020 is the final compliance year for SB X7-7, this 2020 UWMP contains data through the end of 2020. If a water supplier bases its accounting on a fiscal year (July through June) the data must be through the end of the 2020 fiscal year (June 2020). If the water supplier bases its accounting on a calendar year, the data must be through the end of the 2020 calendar year (December 2020).

As indicated in Chapter 2 of this plan, the City uses a calendar year for water supply and demand accounting, and therefore this 2020 UWMP includes data through December 2020.

10.2 NOTICE OF PUBLIC HEARING

In accordance with the UWMP Act, the City provided an opportunity for the public to provide input on this 2020 UWMP. Water suppliers must hold a public hearing prior to adopting the plan. The public hearing provides an opportunity for the public to provide input to the plan before it's adopted. There are two audiences to be notified for the public hearing: cities and counties, and the public.

10.2.1 Notices to Cities and Counties

There are two required notices to cities and counties. A 60-day notification must be sent to cities and counties that states the supplier is reviewing the UWMP and considering amendments to the Plan. A notice of public hearing must also be sent which states the time and place of the public hearing. The notice must also include the location of where the 2020 UWMP can be viewed, the UWMP revision schedule, and contact information of the UWMP preparer. The public hearing must also be noticed in a local newspaper, per Government Code 6066.

Per California Water Code Section 10621, notice regarding the plan preparation was sent to Sonoma County more than 60 days prior to the public hearing date as noted in Table 10-1. A similar 60-day notice was also sent to neighboring cities. The 60-day Notification, Notice of Public Hearing sent to cities and counties, and notice placed in a local newspaper can be found in Appendix E.

The City coordinated the preparation of its UWMP internally, with Sonoma Water, and with the agencies participating in the Regional Alliance for SB X7-7 compliance. The notices of preparation are included in Appendix E. Upon substantial completion of this 2020 UWMP, the City provided the same agencies, including internally within the City and Sonoma County, with the notice of public hearing (Appendix E).

Table 10-1. Notification to Cities and Counties (DWR Table 10-1 Retail)

City Name	60 Day Notice	Notice of Public Hearing
Add additional rows as needed		
City of Petaluma	Yes	Yes
County Name *Drop Down List*	60 Day Notice	Notice of Public Hearing
Add additional rows as needed		
Sonoma County	Yes	Yes

10.2.2 Notice to the Public

The City issued a notice of public hearing to the public and provided a public review period following the notice, and prior to adoption, to allow ample time for public comments to be prepared and received.

A notice of public hearing was issued in accordance with Government Code Section 6066 and was published twice in the Petaluma Argus Courier newspaper to notify all customers and local governments of the public hearing. In addition, the notice was posted on the City's website, www.cityofpetaluma.org/water-supply. A copy of the published Notice of Public Hearing is included in Appendix E.

10.3 PUBLIC HEARING AND ADOPTION

The City encouraged community participation in the development of this 2020 UWMP, including its WSCP, using public notices and web-based communication. The notice included time and place of hearing, as well as the location where the plan is available for public inspection.

A public hearing to discuss the Draft UWMP and WSCP was held on May 17, 2021, in conjunction with the City Council meeting.

The public hearings provide an opportunity for City water users and the general public to become familiar with the 2020 UWMP and ask questions about the City's water supply, its continuing plans for providing a reliable, safe, high-quality water supply, and plans to mitigate various potential water shortage conditions. Copies of the draft UWMP were made available for public inspection at the City's offices, at local public libraries, and on the City website.

The UWMP was adopted by the City Council on June 7, 2021. A copy of the adopted resolution is provided in Appendix N.

10.4 PLAN SUBMITTAL

A hard copy of this 2020 UWMP will be submitted to DWR within 30 days of adoption and an electronic copy will be provided July 1, 2021. The adopted 2020 UWMP will be submitted electronically to DWR using the Water Use Efficiency (WUE) data submittal tool. A CD or hardcopy of the adopted 2020 UWMP will also be submitted to the California State Library.

No later than 30 days after adoption, a copy of the adopted 2020 UWMP, including the Water Shortage Contingency Plan, will be provided to the cities and counties to which the City provides water.

10.5 PUBLIC AVAILABILITY

No later than 30 days after submittal to DWR, copies of this Plan, including the adopted Water Shortage Contingency Plan, will be available at the California State Library and at the City's Public Works and Utilities department during normal business hours located at 202 North McDowell Boulevard, Petaluma, CA 94954. An electronic copy of this 2020 UWMP will also be available for review and download on the City's website.

10.6 AMENDING AN ADOPTED UWMP OR WATER SHORTAGE CONTINGENCY PLAN

The City may amend its 2020 UWMP and Water Shortage Contingency Plan jointly or separately. If the City amends one or both documents, the City will follow the notification, public hearing, adoption, and submittal process described in Sections 10.2 through 10.4 above. In addition to submitting amendments to DWR through the WUE data Portal, copies of amendments or changes to the plans will be submitted to the California State Library, and any city or county within which the supplier provides water supplies within 30 days after adoption.