PCWA
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2020 Urban Water Management Plan

Adopted Month Day, 2021

PLACER COUNTY WATER AGENCY

2020 Urban Water Management Plan

PUBLIC DRAFT

MAY 18, 2021

Prepared by Water Systems Consulting, Inc.

TABLE OF CONTENTS

Public Draft

Public Draft

Public Draft

LIST OF FIGURES

Public Draft

LIST OF TABLES

Public Draft

Public Draft

ACRONYMS & ABBREVIATIONS

°F	Degrees Fahrenheit
%	Percent
AB	Assembly Bill
AF	Acre Foot
AFY	Acre Feet per Year
ARBS	American River Basin Study
ARPS	American River Pump Station
AWWA	American Water Works Association
Basin	American River Basin
Cal-Am	California American Water Company
CFS	Cubic Feet per Second
CII	Commercial, Industrial, and Institutional
CIMIS	California Irrigation Management Irrigation System
CMMS	Computerized Maintenance Management System
Co.	Company
CSD	Community Service District
CVP	Central Valley Project
CWC	California Water Code
DMM	Demand Management Measure
DRA	Drought Risk Assessment
DWR	California Department of Water Resources
EIR	Environmental Impact Report
EPA	United States Environmental Protection Agency
ETo	Reference Evapotranspiration
GIS	Geographic Information System
GPCD	Gallons per Capita per Day
GSP	Groundwater Sustainability Plan
Lincoln	City of Lincoln
M&I WSP	Municipal and Industrial Water Shortage Policy
MFP	Middle Fork Project
MG	Million Gallons

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MGD	Million Gallons per Day
MWELO	Model Water Efficient Landscape Ordinance
NID	Nevada Irrigation District
PCWA	Placer County Water Agency
PET	Potential evapotranspiration
PG&E	Pacific Gas and Electric Company
PSAs	public service announcements
Roseville	City of Roseville
RWA	Regional Water Authority
SBX7-7	Senate Bill 7 of Special Extended Session 7
SF	Square Feet
SJWD	San Juan Water District
SODU	Statements of Water Diversion and Use
SPMUD	South Placer Municipal Utility District
SSWD	Sacramento Suburban Water District
SVI	Sacramento Valley Index
SWE	Snow water equivalent
TAF	Thousand acre-feet
UIFR	Unimpaired Inflow into Folsom Reservoir
USBR	United States Bureau of Reclamation
UWMP	Urban Water Management Plan
UWMP Act	Urban Water Management Planning Act
WEP	Water Efficiency Program
WFA	Water Forum Agreement
WSCP	Water Shortage Contingency Plan
WPCGMP	Western Placer County Groundwater Management Plan
WPGSA	West Placer Groundwater Sustainability Agency
WRCC	Western Regional Climate Center
WTP	Water Treatment Plant
WWTP	Wastewater Treatment Plant

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1 Introduction

This Chapter provides an introductory level discussion of Placer County Water Agency's 2020 Urban Water Management Plan (UWMP).

IN THIS CHAPTER

- California Water Code
- UWMP Organization

Placer County Water Agency (PCWA) was created in 1957 by a special act of the California Legislature known as the Placer County Water Agency Act. PCWA has a five-member board of directors elected by district voters for four-year terms. The boundaries of PCWA are coterminous with the boundaries of Placer County.

PCWA carries out a broad range of responsibilities including water resource planning and management, wholesale and retail supply of water, and hydroelectric energy production. PCWA has existing surface water appropriative rights as well as contract entitlements of approximately 300,000 acre-feet per year (AFY). PCWA also has access to sustainably managed regional groundwater resources to manage emergency conditions.

PCWA currently delivers approximately 101,600 AFY to treated and untreated retail customers and provides approximately 31,400 AFY of treated and untreated to neighboring water suppliers for resale, serving a total population of over 150,000 people in Placer County directly or indirectly. In addition, PCWA regularly makes surface water available for transfer to other purveyors in the state and to assist fishery protection goals in the lower American River during periods of drought.

PCWA has prepared this UWMP to comply with the Urban Water Management Planning Act (UWMPA) requirements for urban water suppliers. This UWMP addresses PCWA's water management planning efforts to ensure adequate water supply to meet retail and wholesale demands over the next 25 years. The 2020 UWMP specifically assesses the availability of supplies to meet future demands during normal, single-dry, and multiple dry years. Verification that future demands will not exceed supplies and assuring the availability of supplies in dry-year conditions are critical outcomes of this UWMP. This UWMP also provides verification that future demands, represented by existing General Plans within the land use jurisdictions served by PCWA, will not exceed PCWA's available water supplies.

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1.1 The California Water Code

The 2020 UWMP is an update to PWCA's 2015 UWMP and presents new data and analysis as required by the California Department of Water Resources (DWR) and the California Water Code (CWC) since 2015. It is also a comprehensive water planning document that describes PCWA's water supplies, assesses existing and future supply reliability, forecasts future demands, presents demand management progress, and identifies local and regional cooperative efforts to meet projected water use. Lay descriptions are provided at the beginning of each chapter.

1.2 UWMP Organization

This UWMP is organized as follows:

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

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2 Plan Preparation

This Chapter summarizes the Urban Water Management Plan Preparation Requirements for PCWA's 2020 UWMP.

IN THIS CHAPTER

- Plan Preparation
- Coordination and Outreach
- Plan Adoption, Submittal, and Implementation

The UWMPA requires every urban water supplier to prepare an UWMP pursuant to CWC § 10610 et seq. Because PCWA is an urban water supplier, it is preparing its 2020 UWMP consistent with the UWMPA. The plan provides a framework for water planning to minimize the negative effects of potential water shortages and provides useful information to the public about PCWA and its water management programs.

Specifically, the 2020 UWMP describes and evaluates the reliability of PCWA's existing and planned water supplies to meet forecast near-term and long-term customer water demands. The plan assesses the availability and sufficiency of surface, groundwater, and recycled water assets and the vulnerability of these supplies to seasonal, climactic, seismic, and regulatory conditions.

The 2020 UWMP also demonstrates compliance with the target 2020 conservation values as presented in PCWA's 2015 UWMP. This UMWP includes narratives describing water demand management measures (DMMs), PCWA's long-term plan for efficient water use, and estimated future water savings based on water use projections, where available. Consideration of distribution system water loss, climate change, seismic risk, recycled water potential use as a water source is included. The 2020 UWMP also provides a comprehensive water shortage contingency analysis, which details stages of action to be undertaken by PCWA in response to water supply shortages.

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2.1 Plan Preparation

2.1.1 Retail and Wholesale Requirements

The CWC indicates that both urban wholesale and retail water suppliers are to prepare UWMPs. Wholesale and retail suppliers are also to coordinate and provide water use and supply information to each other during preparation of their respective UWMPs. The CWC refers to suppliers that provide retail and wholesale water as "all urban water suppliers" or "all suppliers". This provision denotes consistent application of some components of the UWMPA to both wholesale and retail water providers. There are several instances within the UWMPA, however, where the requirements for wholesale and retail urban water suppliers differ. These include:

- **Past Water Use and Water Loss:** Only retail urban water suppliers are required to report past water use and water loss. Wholesale urban water suppliers can include information if desired.
- **SBX7-7 Baselines and Targets:** Only retail urban water suppliers are required to provide a baseline and urban water use target and identify if the 2020 urban water use target was met.
- **Water Use Reduction:** Wholesale suppliers are to provide "an assessment of their present and proposed future measures, programs, and policies to help achieve the water use reductions."
- **DMMs:** Wholesale suppliers provide documentation for DMMs as required under CWC 10631(e)(1)(B). Retail suppliers provide documentation for each DMM as required under CWC 10631(e)(1)(A).
- **Lower Income Household:** Only retail urban water suppliers are required to address the lower income water supply projections required by CWC 10631.1.

Since PCWA meets the CWC definition of a retail[1] and wholesale[2] urban water supplier, this 2020 UWMP will address both the retail and wholesale requirements of the UWMPA.

2.1.2 Previous Reports

The 2020 UWMP has been prepared using a number of related planning documents and previous reports, including, but not limited to:

- 2015 PCWA UWMP;
- 2013 Placer County General Plan;
- 2006 Integrated Water Resources Plan;
- 2020 Water Shortage Contingency Plan;
- 2020 Placer County Economic and Demographic Profile;
- 2007 Western Placer County Groundwater Management Plan.

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[1] CWC 10608.12(t): "Urban retail water supplier" means a water supplier, either publicly or privately owned, that directly provides potable municipal water to more than 3,000 end users or that supplies more than 3,000 acre-feet of potable water annually at retail for municipal purposes.

[2] CWC 10608.12(w): "Urban wholesale water supplier" means a water supplier, either publicly or privately owned, that provides more than 3,000 acre-feet of water annually at wholesale for potable municipal purposes.

2.2 Coordination and Outreach

The UWMPA requires a water purveyor to coordinate the preparation of its UWMP with other appropriate agencies in and around its service area. This includes other water suppliers that share a common source, water management agencies, and relevant public agencies. PCWA has prepared this UWMP in coordination with water utilities that receive wholesale water from PCWA, as well as other appropriate local government agencies, as listed in **Table 2-1**. All relevant entities and adjacent water suppliers were sent 60-day notices and encouraged to attend the public hearing prior to the adoption of the 2020 UWMP. Copies of the letters and other correspondence are provided in **Appendix A**. PCWA is also a part of local partnerships that enhance water resources and the environment. There partnerships are discussed in further detail in the following section.

Table 2-1. Public and Agency Coordination

AGENCY	COORDINATION REGARDING DEMANDS	SENT COPY OF DRAFT UWMP	SENT 60-DAY NOTICE	NOTICE OF PUBLIC HEARING
WHOLESALE CUSTOMERS FROM FOLSOM LAKE				
City of Roseville	X		X	X
San Juan Water District	X		X	X
Sacramento Suburban Water District	X		X	X
TREATED WATER WHOLESALE CUSTOMERS - URBAN WATER SUPPLIERS				
City of Lincoln	X		X	X
California American Water Company	X		X	X
TREATED WATER WHOLESALE CUSTOMERS - NOT URBAN WATER SUPPLIERS				
Dutch Flat Mutual Water Company (Co.)			X	X
Heather Glen Community Service District (CSD)			X	X
Meadow Vista County Water District			X	X
Willow-Glen Water Co.			X	X
Weimar Water Co.			X	X
Midway Heights County Water District			X	X
Christian Valley Park CSD			X	X
Folsom Lake Mutual Water Co.			X	X
Golden Hills Mutual Water Co.			X	X
Hidden Valley Community Association			X	X
Lakeview Hills Community Association			X	X
LAND USE ENTITIES AND INTERESTED PARTIES				
General Public				X
Placer County			X	X
Sacramento County			X	X
Nevada Irrigation District			X	X
City of Rocklin			X	X
Town of Loomis			X	X
City of Auburn			X	X
City of Colfax			X	X

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2.2.1 Water Forum Agreement

Community leaders, along with water managers from Sacramento, Placer and El Dorado counties negotiated the Water Forum Agreement (WFA). The WFA is a comprehensive package of linked actions that will achieve two coequal objectives: (1) Provide a reliable and safe water supply for the Sacramento region's long-term growth and economic health; and (2) Preserve the fishery, wildlife, recreational, and aesthetic values of the Lower American River. PCWA is a signatory to the WFA. As one of the signatories, PCWA has agreed to specific water management actions under a range of hydrologic events that are linked primarily to the American River Basin and Folsom Reservoir. The water management actions impact the operation of PCWA's Middle Fork Project (MFP) reservoirs as replacement water to benefit the Lower American River. Pursuant to the WFA provisions, PCWA has also developed best management practices that are consistent with the DMMs in the 2020 UWMP.

2.2.2 Regional Water Authority

The Regional Water Authority (RWA) is a joint powers authority that serves and represents the interests of 22 water providers in the greater Sacramento, Placer, El Dorado and Yolo County regions. The Authority's primary mission is to help its members protect and enhance the reliability, availability, affordability, and quality of water resources. RWA has launched significant programs and services on a regional scale, including: (1) A water efficiency program designed to help local purveyors implement best management practices on a regional basis; (2) implementation of the American River Basin Regional Conjunctive Use Program to build and upgrade water facilities throughout the region to better manage surface and groundwater resources; and (3) development of an Integrated Regional Water Management Planning Program to continually identify the regional projects and partnerships that will help the region best meet its future water needs. PCWA is an active member of RWA and holds executive positions on the RWA Board.

2.2.3 Additional Entities

Placer County Water Agency has shared water interests with numerous local and regional water purveyors. The list of these purveyors is incorporated in **Table 2-1**. Specifically, PCWA provides surface water to San Juan Water District (SJWD), the City of Roseville (Roseville), the City of Lincoln (Lincoln), Sacramento Suburban Water District (SSWD), California American Water Company (Cal-Am) and other local purveyors within Placer County. Moreover, PCWA accesses groundwater from the Sacramento North American Groundwater Basin (described in more detail in **Chapter 6**) that also overlaps with numerous water agency boundaries.

2.3 Plan Adoption, Submittal, and Implementation

PCWA plans to submit all required documentation related to the UWMPA soon after adoption and prior to the July 1, 2021 deadline. These documentations include the required DWR UWMP Tables as **Appendix B**, the DWR Checklist as **Appendix C**, the SB X7-7 compliance forms as **Appendix D**, and the AWWA Water Audit worksheet as **Appendix E**. Additional details on Plan Adoption, Submittal and Implementation are included in **Section 10**.

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3 System Description

PCWA provides treated and untreated water to their wholesale and retail customers. PCWA's retail system serves a current population of 108,225. PCWA service area consists mixed land use including residential, commercial and agriculture. This Chapter provides a description of PCWA's treated and untreated water systems that serve wholesale and retail customers in Placer County.

IN THIS CHAPTER

- Service Area
- Classification of Water Use
- Service Zone Descriptions
- Climate and Climate Change
- Population and Demographics
- Land Uses

3.1 General Description

PCWA is a public water agency that provides treated and untreated water directly and indirectly to wholesale and retail customers throughout Placer County. Water in Placer County was primarily used for mining, agricultural and residential purposes beginning in the 1850's. This disaggregated usage lasted through the 1950's. In 1957, the Placer County Water Agency Act was signed by Governor Goodwin Knight, creating the Placer County Water Agency. Shortly after being established, PCWA constructed the Middle Fork American River Hydroelectric Project on the Middle Fork American River and selected tributaries.

PCWA's service area extends from the community of Alta on the east, westward down the Interstate 80 corridor, and bounded by the Sutter County to the west, Sacramento County and El Dorado County to the south and Nevada County to the north. The service area includes retail treated water deliveries to the communities of Alta, Monte Vista, Applegate, Colfax, Auburn, Loomis, Rocklin, and much of the surrounding unincorporated areas within Placer County. PCWA also provides wholesale treated water to the City of Lincoln, Cal-Am for use in their franchise area west of Roseville and south of Baseline Road, and to other relatively small mutual water companies and towns throughout PCWA's service area.

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In addition to treated water service, PCWA provides untreated water through its extensive canal system to individual customers, and untreated water for treatment and resale by other retail water purveyors. Untreated water comprises about 60 percent (%) of PCWA's deliveries.

The service area is a financial and operational amalgamation of four separate systems acquired or developed over time. Each of these underlying systems is designated as a PCWA Zone; numbered 1, 2, 3 and 5[1] . These four zones are described in greater detail in **Section 3.3**.

PCWA also provides untreated water under its North Fork American River water rights into Folsom Lake for delivery to the SJWD, the City of Roseville, and SSWD, each of which are required to prepare their own UWMPs. Thus, PCWA's place of use for its water rights extends outside of the PCWA's district boundaries.

Figure 3-1 illustrates PCWA's service area.

3.2 Classification of Water Usage

PCWA is both a retail water purveyor and a wholesale water purveyor that provides treated and untreated water to a diverse customer base. Because of this customer diversity, PCWA classifies its customers into four categories for purposes of assessing existing and future demands:

- **Treated Retail Water**– Potable water that is directly serviced to PCWA's customers for potable water use.
- **Untreated Retail Water** – Untreated water directly serviced to PCWA's customers from PCWA's non-potable surface water system for commercial agriculture and rural residential outdoor use.
- **Treated Wholesale Water** – Potable water treated at PCWA-owned water treatment facilities and sold to other water suppliers who then deliver to customers. (PCWA does not directly serve the end-user).
- **Untreated Wholesale Water** – Untreated water sold to other water suppliers who treat and deliver purchased water to their customers (PCWA does not directly serve the end-user).

These categories are discussed in more depth in **Chapter 4**.

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[1] Previously, PCWA served an area called Zone 4. Zone 4, located in Martis Valley near Truckee, California, is now served by Northstar Community Services District.

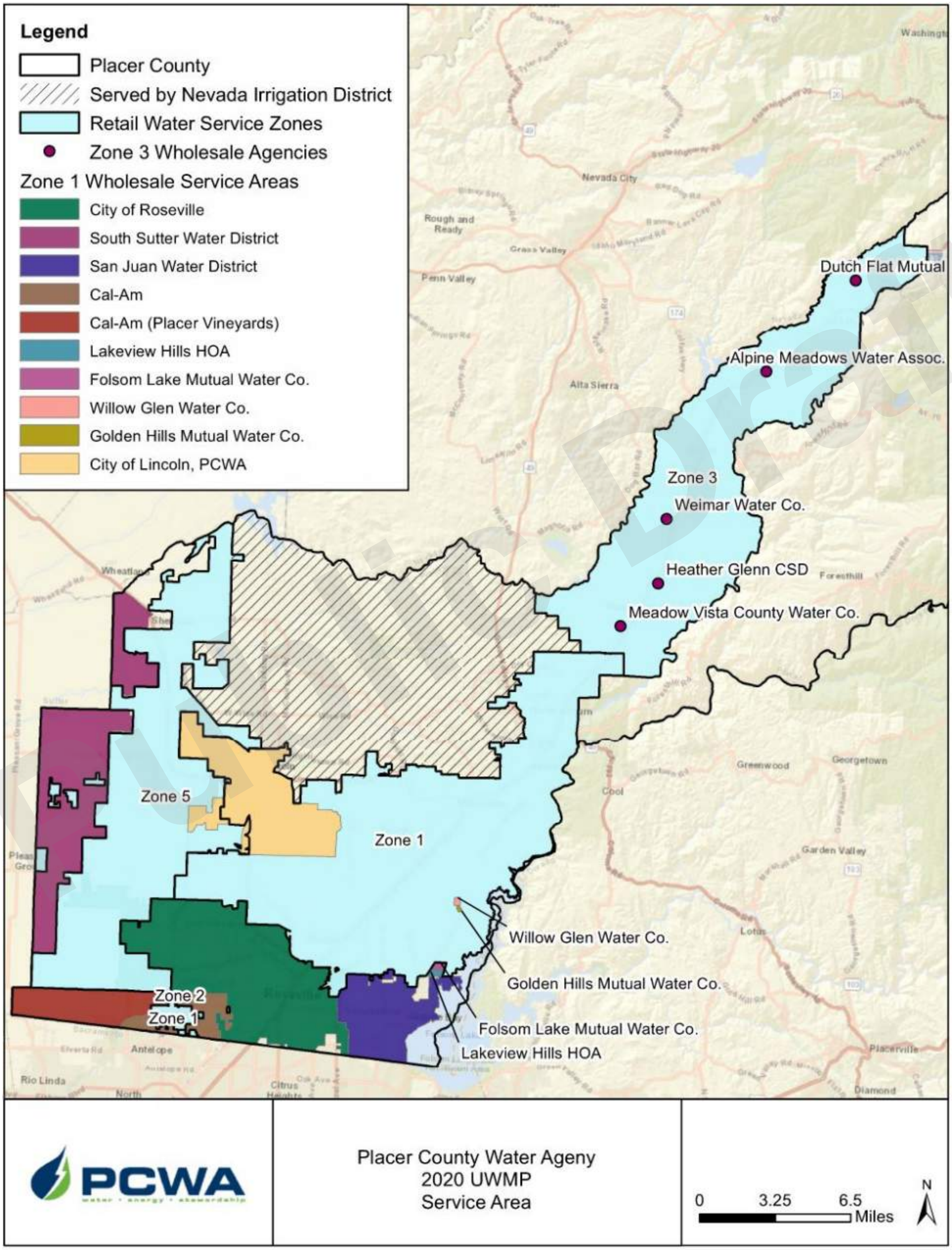

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Figure 3-1. PCWA's Service Area

3.3 Service Zone Descriptions

3.3.1 Zone 1

Zone 1 is the largest of the four zones, extending from the City of Auburn to the City of Lincoln and south to the Sacramento County line. PCWA provides retail service to most of Zone 1 and provides wholesale service to the City of Lincoln, Cal-Am, and small water purveyors. PCWA also provides untreated water service to Christian Valley Park Community Service District which operates its own water treatment plant (WTP).

Water for Zone 1 is delivered by contract from Pacific Gas and Electric Company's (PG&E) Drum-Spaulding hydroelectric system and from PCWA's MFP. PCWA operates four WTPs in Zone 1. The Zone 1 service area has 17 storage tanks with about 60 million gallons (MG) of storage capacity and 496 miles of treated water pipe. A graphical depiction of Zone 1 canals and supply infrastructure can be found in **Figure 3-2.**

Zone 1 is broken into Upper Zone 1 and Lower Zone 1. Upper Zone 1 consists of the City of Auburn and surrounding communities. Due to its location, Upper Zone 1 can only be supplied PG&E contract water. PG&E diverts water from the Bear and Yuba Rivers and delivers that water to PCWA through the Bear River Canal, Wise Canal, and South Canal. PCWA then treats this supply at the Auburn and Bowman WTPs prior to direct deliveries to its customers. PCWA also delivers untreated water to treatment plants in Lower Zone 1. The Auburn and Bowman WTPs have capacities of 8 million gallons per day (MGD) and 7 MGD, respectively. The Upper Zone 1 is comprised of five subareas including Auburn/Bowman, City of Auburn, City of Auburn Airport, Newcastle/Ophir, and unincorporated area in Newcastle.

Lower Zone 1 includes the lower portion of the watershed below Auburn, including the communities of Horseshoe Bar/Penryn, unincorporated area in Loomis Basin, Town of Loomis, Bickford Ranch, Granite Bay, City of Rocklin, Whitney Ranch, Lincoln, Roseville, and Sunset Industrial Area. The primary water supply for Lower Zone 1 is PG&E contract water from the Drum-Spaulding hydroelectric system. PCWA also uses water from MFP pursuant to its own water rights. PCWA pumps MFP water near Auburn into the Auburn Tunnel, which connects to the Auburn Ravine where it can be distributed to Zone 5 irrigation water customers. Currently, water pumped from the American River to the Auburn Tunnel can be released directly into the auburn ravine, supplying water to Zone 5 irrigation customers. Water pumped from the American River can also be pumped out of the Auburn Tunnel using either one or both of the Ophir Pump Stations. Water pumped at the Ophir Pump Station flows directly into the PG&E South Canal, or into a transfer basin that flows to the South Canal. Water from the transfer basin can also be pumped directly to the Foothill WTP, or the future Ophir WTP. The Lower Zone 1 WTPs are the Foothill and Sunset plants which have capacities of 60 MGD and 5 MGD, respectively.

3.3.2 Zone 2

Zone 2 consists of 38 active residential accounts south of the City of Roseville in a community known as Bianchi Estates. PCWA supplied water to Bianchi Estates from two wells until 2003, at which time it was converted to surface water. This development receives treated retail water wheeled through the City of Roseville's system pursuant to an agreement between PCWA and Roseville. As Zone 2 is no longer served by its wells, PCWA considers it part of Zone 1 for this UWMP, as it was for the 2015 UWMP.

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3.3.3 Zone 3

Zone 3 includes the communities of Applegate, Weimar, Meadow Vista, Colfax, Gold Run, Monte Vista, Dutch Flat, and Alta and in surrounding areas. Water purchased from PG&E under a 1982 contract enters PCWA's Boardman Canal from the Drum-Spaulding system. The Boardman Canal begins near Alta and runs along I-80 to Zone 1. The Boardman Canal serves as the main delivery method for water to users and treatment plants in Zone 3. PCWA's Zone 3 treatment plants include Alta (0.51 MGD), Monte Vista (0.102 MGD), Colfax (1.244 MGD), and Applegate (0.071 MGD). There are about 29 miles of treated water piping and 2.3 MG of treated storage in Zone 3. A graphical depiction of Zone 3 canals and supply infrastructure can be found in **Figure 3-3**.

3.3.4 Zone 5

Zone 5 was established in 2000 to provide irrigation water in a previously un-served area of Placer County that lies generally west of the City of Lincoln. This zone is limited to commercial agriculture customers. The water supply in Zone 5 is delivered through Zone 1 infrastructure and derived from multiple water sources including PG&E's Drum-Spaulding Project and PCWA's MFP. PCWA currently serves water to approximately 3,800 acres in Zone 5. Zone 5 receives no treated water service and is considered part of Zone 1 for the purposes of this UWMP, as it was for the 2015 UWMP.

3.3.5 Western Area

Zone 1, Zone 2, and Zone 5 will be referred to as the "Western Area" in this UWMP, due to geographic overlap and the integration of supplies. The demands in these zones, including the treated wholesale demands, will be grouped under the term "Western Area Water Demands". Zone 3 will continue to be referred to as "Zone 3" in this UWMP.

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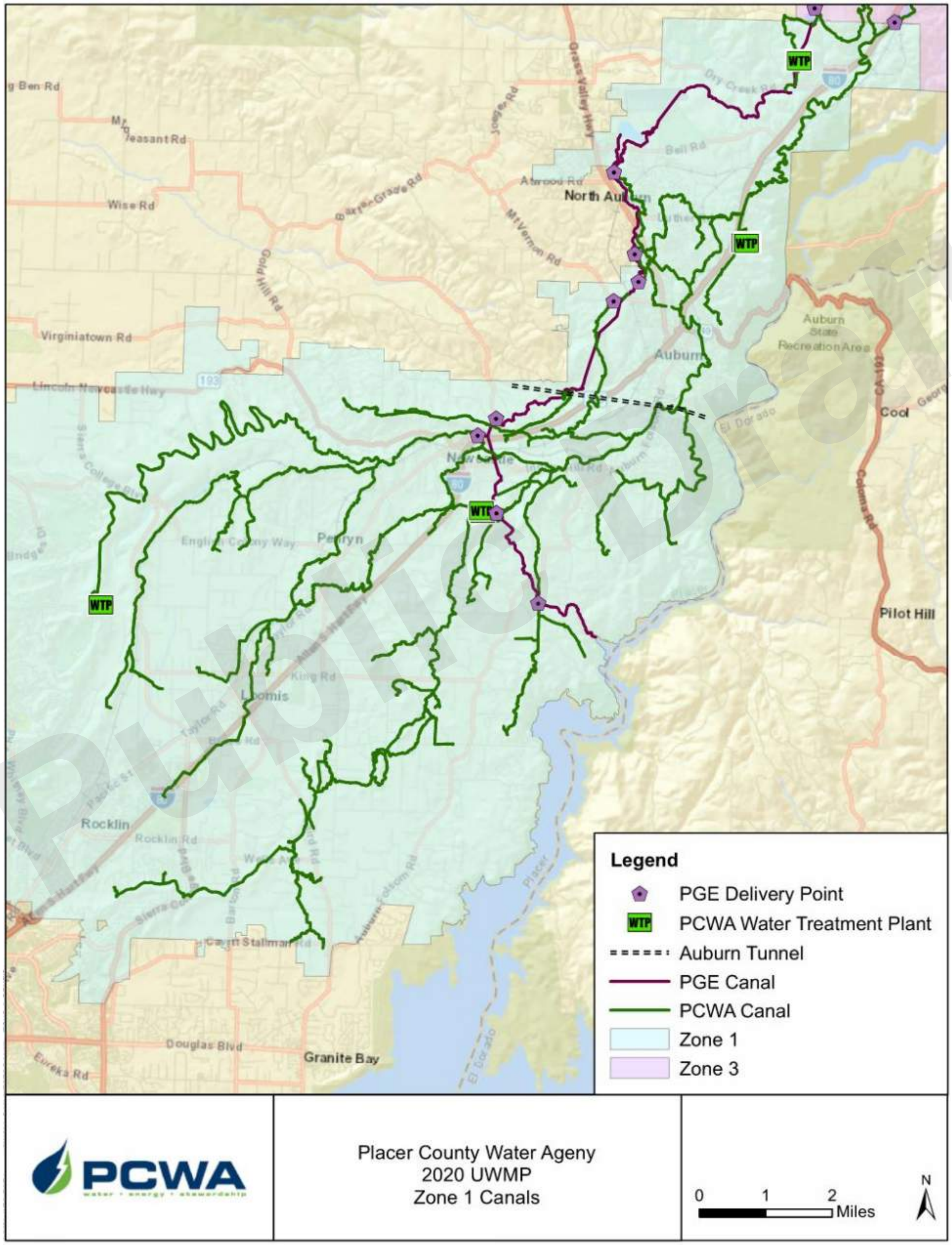

Figure 3-2. Zone 1 Canals

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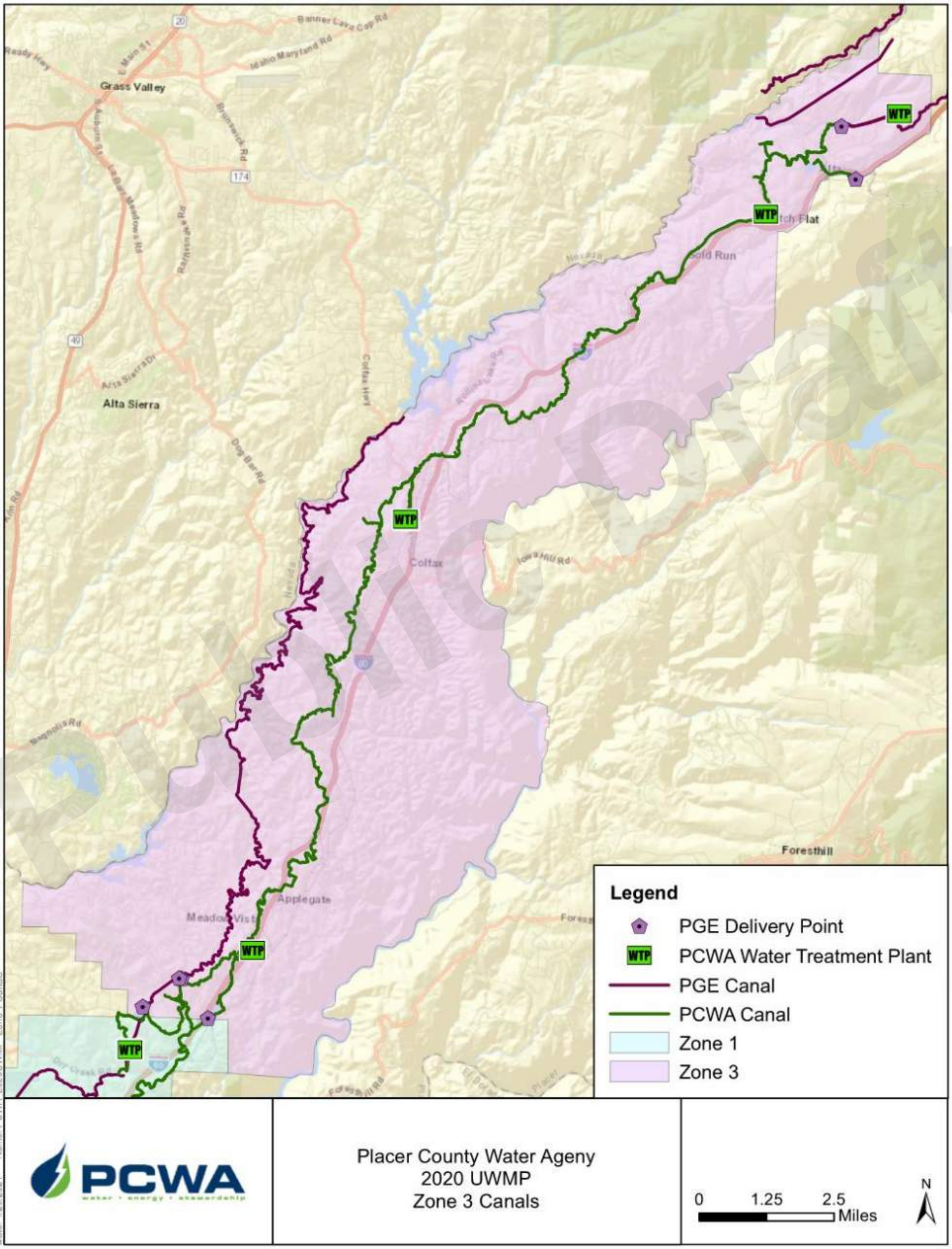

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Figure 3-3. Zone 3 Canals

3.4 Service Area Climate

PCWA’s service area has a large variation in climate due to significant differences in topography, elevation, and related climatological characteristics. This unique variation includes dramatic elevation changes from about 150 feet in the west side of PCWA’s service area and up to about 4,000 feet in the east side of PCWA’s service area. There are significant climate variations even within the 4 designated PWCA service zones, so this UWMP detail’s multiple distinct locations to describe the PCWA service area climate.

The lower portion of Zone 1 (Lower Zone 1), Zone 2 and Zone 5 are in the western portion of Placer County. These zones have weather typical to California’s Central Valley with hot dry summers and cool wet winters. The upper portion of Zone 1 (Upper Zone 1) consists of rolling foothills and associated large landscape development as well as climate variations associated with elevations up to about 1,600 feet. The climate generally includes hot dry summers and cold wet winters – with evening temperatures cooling below areas further west as well as increased precipitation amounts caused by orographic uplift. PCWA’s Zone 3 extends from Zone 1 up to nearly 4,000 feet and is characterized by Sierra forest climate with warm summers, cold wet winters, and occasional snow. Precipitation at these elevations is significant. Spring runoff from the higher elevations, above 4,000 feet, is the backbone of PCWA’s water supply system.

Table 3-1, **Table 3-2**, and **Table 3-3** include the average reference evapotranspiration (ETo), precipitation, and temperature at selected locations in the PCWA service area. Auburn and Roseville represent climate in two distinct areas of the PCWA Zone 1 service area: Upper Zone 1 and Lower Zone 1, respectively. Colfax is representative of the climate in PCWA’s Zone 3 service area.

For purposes of documenting ETo, PCWA will be using Appendix A of the 2015 update to the California Model Water Efficient Landscape Ordinance (MWELO), which contains reference ETo. The tables below include ETo estimates for Roseville, Auburn, and Colfax to reflect variations within PCWA service area. ETo values for Roseville and Auburn have an additional column for data from local California Irrigation Management Information System (CIMIS) stations. While MWELO Appendix A ETo data represents the suggested ETo values, for the purpose of maintaining the most accurate data, CIMIS station data. CIMIS average ETo for Roseville and Auburn are comparable to the MWELO Appendix A ETo. CIMIS average ETo was not available for Colfax.

For purposes of documenting temperature and precipitation, Auburn and Roseville numbers are from CIMIS. There is no CIMIS station for Colfax; therefore, temperature and precipitation numbers for Colfax are from the Western Regional Climate Center (WRCC) data stations. Average snowfall values are included for Colfax in addition to precipitation data since this area receives significant annual snowfall. Temperature values are provided as monthly averages, and average maximum and minimum temperatures in degrees Fahrenheit (°F).

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Table 3-1. Historical Climate for Roseville

MONTH	MWELO APP A ETO (INCHES)[1]	CIMIS AVERAGE ETO (INCHES)[2]	AVERAGE PRECIP. (INCHES)[2]	AVERAGE TEMP. (°F)[2]	AVERAGE MAX TEMP. (°F)[2]	AVERAGE MIN TEMP. (°F)[2]
January	1.1	1.12	3.60	47.66	57.14	39.61
February	1.7	1.78	4.04	50.84	61.57	41.24
March	3.1	3.22	2.84	55.07	66.59	44.09
April	4.7	4.47	1.94	58.87	71.45	46.63
May	6.2	6.29	1.03	65.24	79.63	51.26
June	7.7	7.43	0.16	72.27	88.23	56.99
July	8.5	7.98	0.05	76.50	93.73	60.25
August	7.3	7.07	0.01	75.06	92.27	59.43
September	5.6	5.19	0.11	71.41	87.97	56.94
October	3.7	3.40	1.12	62.85	77.70	49.90
November	1.7	1.64	2.19	53.19	65.07	43.36
December	1.0	1.07	3.80	47.28	57.12	38.92

1. ETo value from MWELO Appendix A 2015 Update for Roseville.
2. ETo, precipitation and temperature values from CIMIS Fair Oaks data (1998-2020).

Table 3-2. Historical Climate for Auburn

MONTH	MWELO APP A ETO (INCHES)[1]	CIMIS AVERAGE ETO (INCHES)[2]	AVERAGE PRECIP. (INCHES)[2]	AVERAGE TEMP. (°F)[2]	AVERAGE MAX TEMP. (°F)[2]	AVERAGE MIN TEMP. (°F)[2]
January	1.2	1.13	4.08	48.79	57.56	40.71
February	1.7	1.83	4.66	50.36	61.30	41.69
March	2.8	3.05	4.56	53.53	64.58	44.18
April	4.4	4.62	2.41	58.04	70.16	46.80
May	6.1	6.23	1.22	64.62	78.28	51.75
June	7.4	7.46	0.32	73.26	88.10	58.91
July	8.3	8.28	0.02	79.08	94.86	64.70
August	7.3	7.57	0.02	77.78	93.34	63.77
September	5.4	5.67	0.24	72.27	87.10	59.73
October	3.4	3.70	1.79	62.63	75.93	51.91
November	1.6	1.76	3.20	53.76	65.16	45.34
December	1.0	1.00	5.57	46.48	56.32	39.05

1. ETo value from MWELO Appendix A 2015 Update for Auburn.
2. ETo, precipitation and temperature values from CIMIS Auburn data (2005-2020).

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Table 3-3. Historical Climate for Colfax

MONTH	MWELO APP A ETO (INCHES)[1]	AVERAGE PRECIP. (INCHES)[2]	AVERAGE SNOWFALL (INCHES)[2]	AVERAGE TEMP. (°F)[2]	AVERAGE MAX TEMP. (°F)[2]	AVERAGE MIN TEMP. (°F)[2]
January	1.1	8.16	6.90	44.20	53.80	34.6
February	1.5	7.60	3.80	46.30	56.20	36.4
March	2.6	6.77	4.00	49.05	59.80	38.3
April	4.0	3.58	0.90	54.00	65.90	42.1
May	5.8	1.85	0.10	60.80	73.60	48
June	7.1	0.59	0.00	68.90	82.80	55
July	7.9	0.09	0.00	76.50	91.10	61.9
August	7.0	0.13	0.00	75.00	89.90	60.1
September	5.3	0.65	0.00	69.80	84.30	55.3
October	3.2	2.45	0.00	60.90	74.20	47.6
November	1.4	5.50	0.50	51.10	62.20	40
December	0.9	7.81	2.80	44.95	54.70	35.2

1. ETo value from MWELO Appendix A 2015 Update for Colfax.

2. ETo, precipitation and temperature values from WRCC data for Colfax (1905-2016).

Public Draft

3.5 Climate Change

In 2020, the American River Basin (Basin) region conducted a climate change study in partnership with local water purveyors and the U.S. Department of the Interior, Bureau of Reclamation. The purpose of the American River Basin Study (ARBS) was to develop data, tools, analyses, identify supply-demand imbalances, and climate change adaptation strategies specific to the Basin. Under the "new normal" of a changing climate, the ARBS aims to improve the resolution of regional climate change data and to develop regionally-specific mitigation and adaptation strategies.

The ARBS's study area is bounded by the Sierra Nevada mountain range to the east, the Feather and Sacramento rivers to the west, the Bear River to the north, and the Cosumnes River to the south (**Figure 3-4**). In addition to the American River Watershed, the study area encompasses the North and South American Groundwater Subbasins, and Non-Federal Partners' service areas outside of the American River Watershed.

The following sections summarizes climate change findings from the ARBS[2] .

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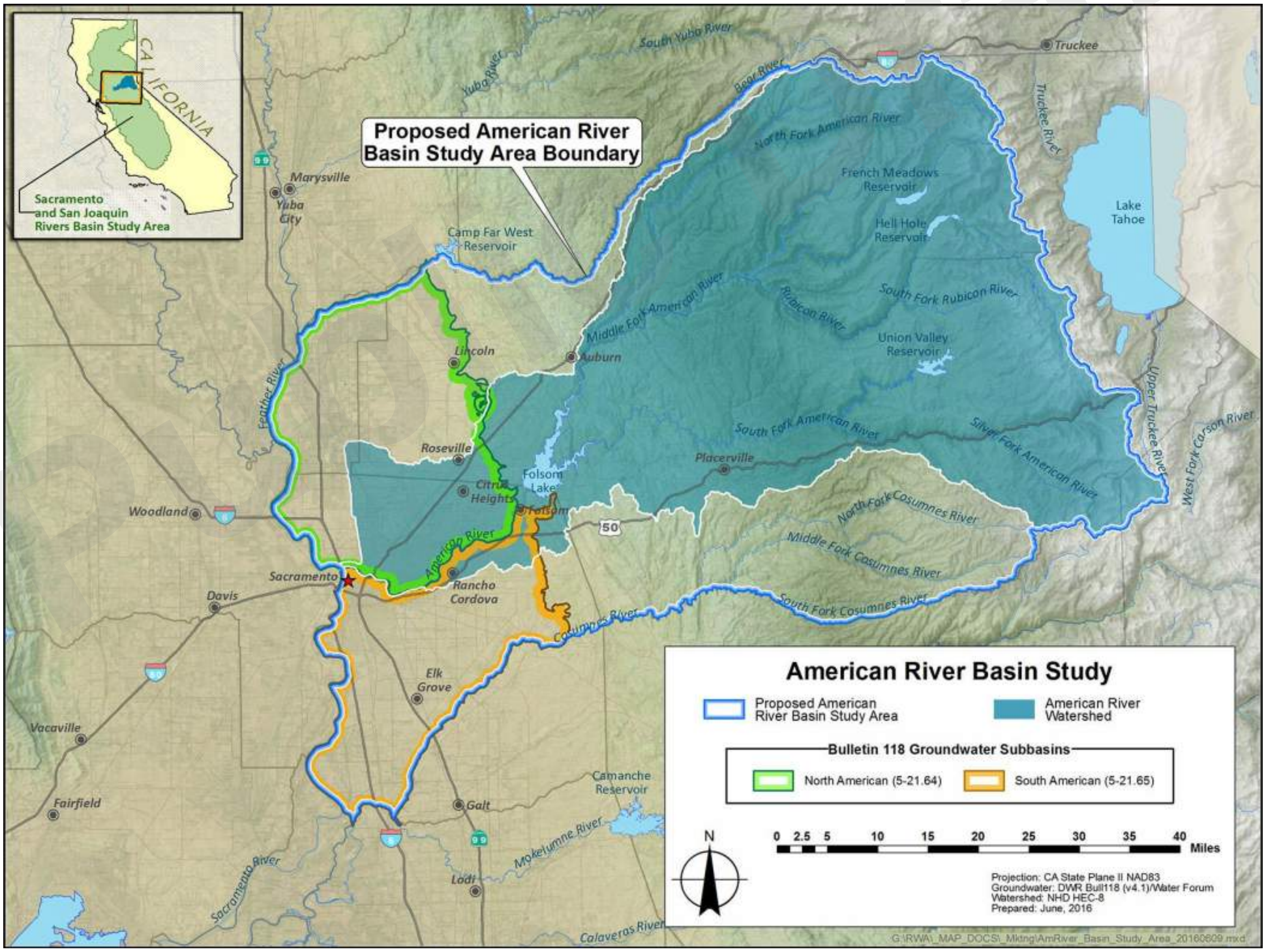

Figure 3-4. American River Basin Study Area

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[2] More detail and approved study can be found at www.pcwa.net/planning/arbs.

3.5.1 Projected Future Conditions

Analysis of projected future climate conditions in the Basin and development of climate scenarios for the ARBS were based on an ensemble of bias-corrected and spatially downscaled climate projections[3]. This ensemble has been used by the CWC and DWR as the primary source of climate projection information in several recent studies, including the Water Storage Investment Program and California's Fourth Climate Change Assessment (Pierce et.al., 2018). Projected future climate conditions were evaluated and characterized based on the ensemble of downscaled climate projections.

Hydrology scenarios were used to develop streamflow inputs to the CalSim 3.0 model, which was then used to evaluate changes in water supplies, demands, and management throughout the Central Valley Project (CVP) and State Water Project, including the study area. Demands for each water purveyor largely relied upon water purveyors' information provided in Regional Drought Contingency Plan/Regional Water Reliability Plan (Regional Water Authority, 2017) and 2015 UWMPs.

3.5.1.1 Temperature

Surface air temperatures are projected to increase steadily, with average summer temperatures increasing by approximately 7.2 degrees °F by the end of the 21st century (**Figure 3-5**), and winter temperatures increasing by 4.9°F. Projections of daily maximum and minimum temperatures suggest similar warming trends during all seasons, with maximum temperatures projected to increase as much as 7.3°F during the summer months. Projected change in temperature for the study area between historical (1980-2009) and end of century (2070-2099) is presented in **Table 3-4**.

3.5.1.2 Precipitation

Annual precipitation projections show no significant trend in the median of change over the 21st century. Many of the available global climate model projections show change in precipitation, but there is no consistency in the magnitude and direction of projected change between models. Approximately half of the projections indicate a minor increase in annual precipitation and half indicate a minor decrease, highlighting the large uncertainty in future precipitation over this region. Although lacking clear trend in projected annual precipitation, by the end of the 21st century the average fall and spring precipitation is expected to decrease, with winter and summer precipitation increasing. Increasing variability is also projected in winter and fall precipitation. Projected change in precipitation for the study area between historical and end of century is presented in **Table 3-4**.

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[3] Climate projections were developed using Global Climate Models from the Coupled Model Intercomparison Project Phase 5 and downscaled using Localized Constructed Analogs method projected and coupled with two future emission scenarios (RCP 4.5 and RCP 8.5) available from Dr. David Pierce at the Scripps Institution of Oceanography.

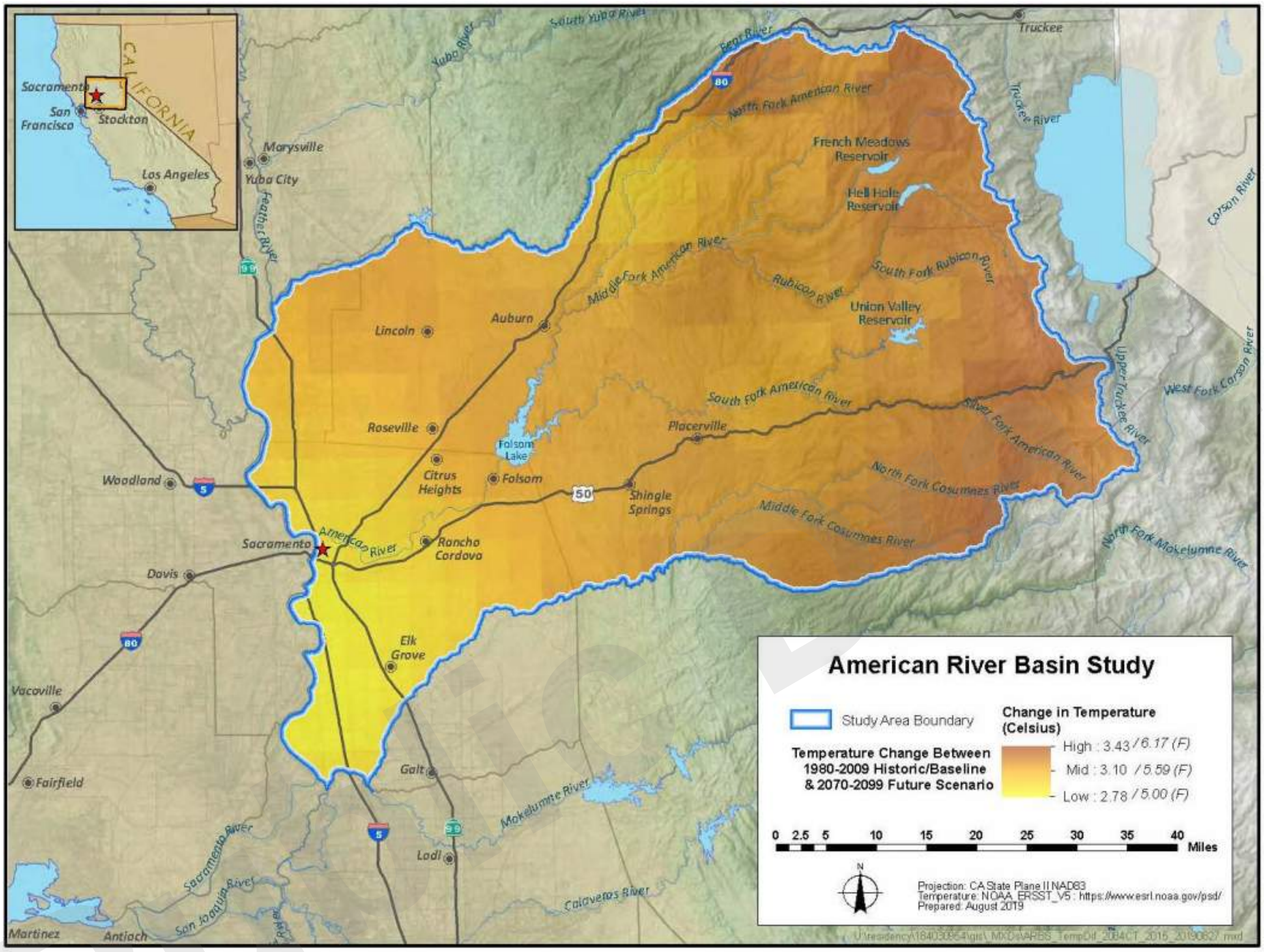

Figure 3-5. Projected Changes in July Temperature between Historical and End of Century Under Central Tendency Climate Change

Table 3-4. Projected Change in Precipitation and Temperature Over the ARBS's Study Area Between Historical and End of Century

	PERCENT CHANGE IN BASIN-AVERAGED ANNUAL MEAN PRECIPITATION (%)	CHANGE IN BASIN-AVERAGED ANNUAL MEAN DAILY AIR TEMPERATURE (°F)	CHANGE IN ANNUAL MEAN OF DAILY MAXIMUM AIR TEMPERATURE (°F)	CHANGE IN ANNUAL MEAN OF DAILY MINIMUM AIR TEMPERATURE (°F)
Fall	-6.0	5.8	6.1	5.5
Winter	4.7	4.9	5.0	4.8
Spring	-11.9	5.8	6.3	5.1
Summer	10.4	7.2	7.3	7.0

3.5.1.3 Snowpack

Snow water equivalent (SWE) is a key indicator of water supplies in this region, where runoff is largely influenced by snowmelt. The increasing variability in precipitation combined with increases in surface air temperatures are key drivers in projections of a reduction in annual average SWE. Average SWE is forecasted to decrease by 50-85% across all climate scenarios and future time periods. In addition, areas that accumulate snow above Folsom Reservoir are also projected to have up to a 12-inch decrease in maximum snowpack by end of the century.

3.5.1.4 Evapotranspiration

Potential evapotranspiration (PET) serves as a key indicator of landscape water demands, including consumptive use by evaporation and transpiration from bare soil, water surfaces, native vegetation, and crops. Average annual PET is expected to increase 1.2 to 6.2 inches across all climate scenarios and future time periods. PET is strongly correlated with air temperature and thus expected to increase more under the hot scenarios (Hot-Dry, Hot-Wet) than under the warm scenarios (Warm-Dry, Warm-Wet).

3.5.1.5 Runoff

Watershed runoff is a direct indicator of local water supply available, as well as to statewide CVP-SWP system. Climate change projections indicate a pronounced shift in the distribution of runoff from May and June to earlier in the season (December to March), implying a transition in precipitation from snow to rainfall and/or earlier snowmelt and increasing the amount of runoff during the winter months. Peak runoff is expected to shift by more than a month earlier by mid to late century (**Figure 3-6**). Spring runoff will decrease due to reduced winter snowpack. Similar to the precipitation scenarios, there is large uncertainty in projected runoff where the ‘wet’ scenarios suggest an increase in annual runoff and the ‘dry’ scenarios suggest a decrease in annual runoff. The projected changes in basin wide runoff range from an increase of 486 thousand acre-feet (TAF) under the warm-wet scenario to a decrease of 203 TAF under the hot-dry scenario by the end of the century.

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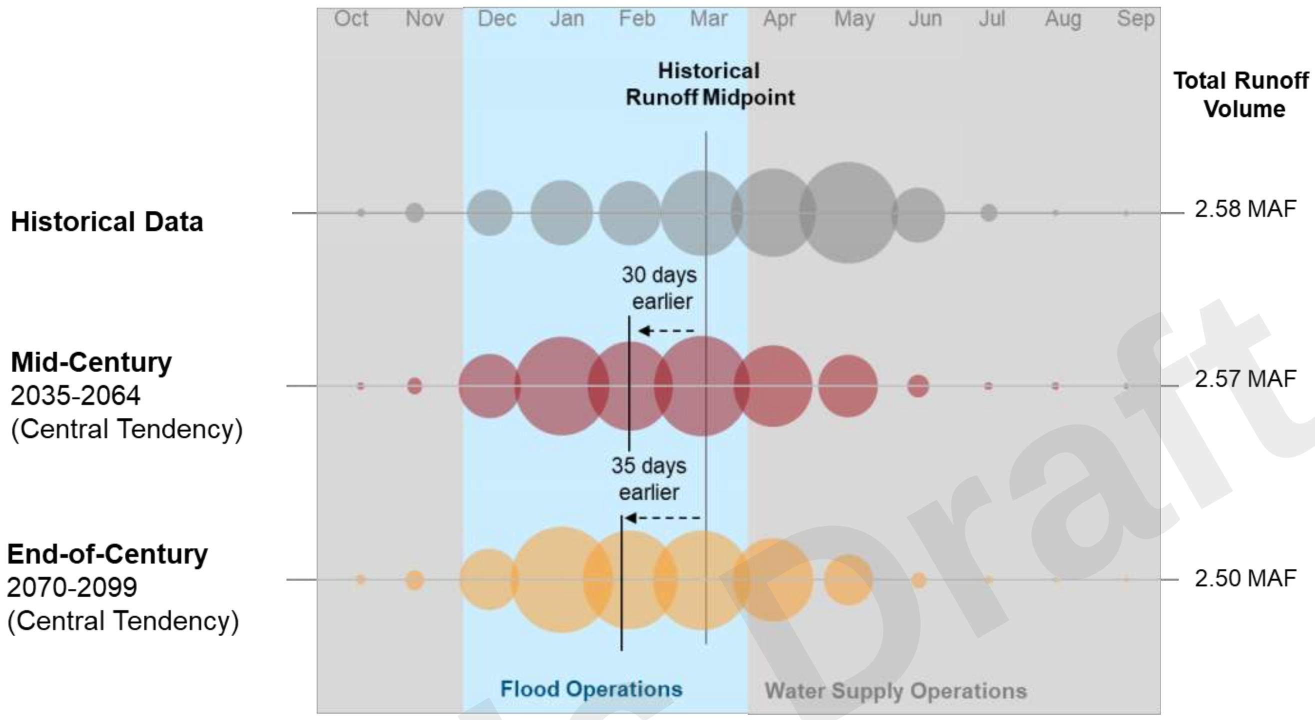

Figure 3-6. Distribution of Average Monthly Runoff for Historical Record (1922-2015) and Future Projections Under Central Tendency Climate Scenario

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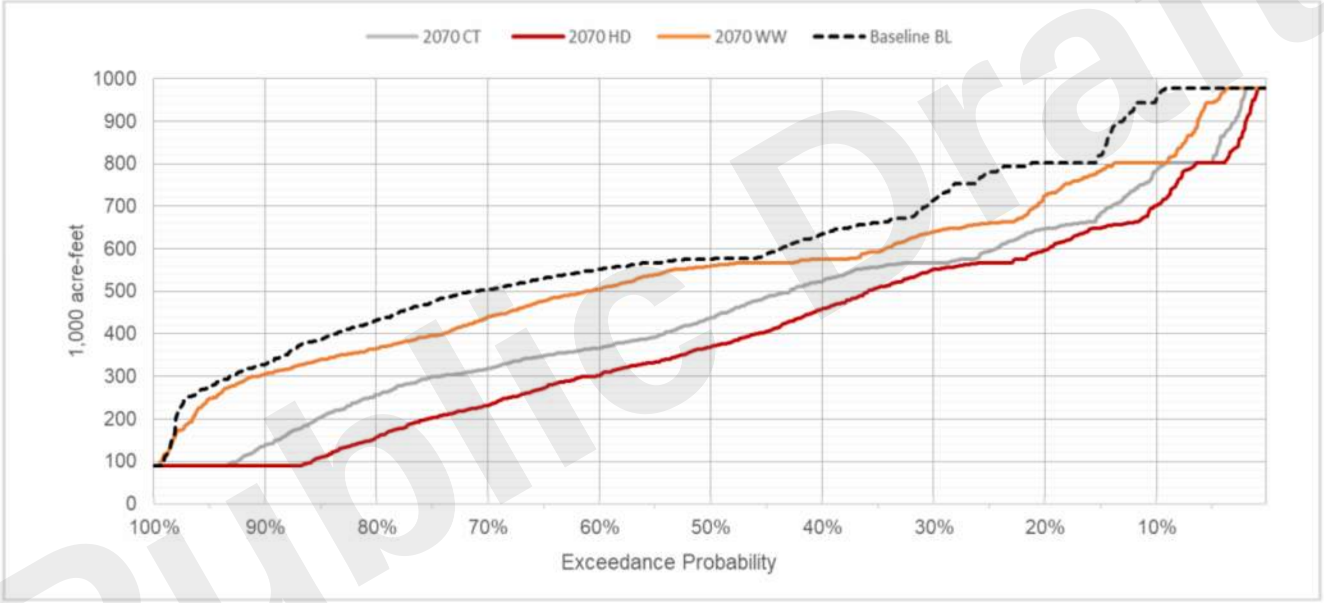
Table 3-5 presents the change in annual climatic and hydrologic indicators between historical baseline observations (1915 to 2015) and projected future conditions for the ARBS's study area.

Table 3-5. Change in Hydrologic Indicators Between Historical Observations and Projected Future Hydrology

TIME PERIOD	CLIMATE SCENARIO	PRECIP (IN)	T AVG (°F)	T MAX (°F)	T MIN (°F)	PET (IN)	SWE AVG (IN)	SWE MAX (IN)	RUNOFF (TAF)
1915 - 2015	Historical Observations	38.2	54.8	67.8	35.6	42.8	1.5	5.7	1,458
2040 - 2069	Warm-Wet	1.9	4	6.2	1.6	1.6	-0.7	-2.3	701
	Central Tendency	0.1	5	8.1	2.1	2.7	-0.9	-2.8	-2
	Hot-Dry	-2.8	6.2	10.4	2.7	3.7	-1.1	-3.4	-206
2055 - 2084	Warm-Wet	3.8	4.7	7.4	2	2	-0.8	-2.5	199
	Central Tendency	-1.1	6.3	11.1	2.6	4.1	-1.08	-3.5	-93
	Hot-Dry	-3.4	7.9	13.3	3.7	5	-1.2	-3.8	-185
2070 - 2099	Warm-Wet	7	5.4	8.3	2.5	1.8	-0.9	-2.9	486
	Central Tendency	-0.6	6.5	11	2.8	3.9	-1	-3.3	-54
	Hot-Dry	-4.6	8.9	15.7	4.1	6.2	-1.3	-4.3	-203

3.5.2 Water Supply Reliability

Changing climate conditions in the Sierra Nevada Mountains threaten the volume of water stored snowpack and the timing of runoff entering Folsom Reservoir. Consequently, they can also affect the critical role of Folsom Reservoir in the CVP Operations. Reliance on Folsom Reservoir is expected to increase commensurate with the impact of sea level rise on salinity in the Delta. Modeling of these factors has illustrated that, without operational adjustments, Folsom Reservoir is projected to have lower end of conservation season (end of September) storage levels and approach “dead pool” more often under most future climate scenarios, as shown in **Figure 3-7**. Similarly, increased early season runoff would increase flood risks along the Lower American River, leaving less water in the upper watershed available during water supply operations.



Key:
Baseline BL = Historic Conditions, 2070 CT = Central Tendency 2070 Climate Scenario, HD = Hot-Dry 2070 Climate Scenario, WW = Warm-Wet 2070 Climate Scenario

Figure 3-7. Exceedance Plot of Folsom Reservoir Storage (end of September) Under Future Climate Change

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Under the 2070 level of development, the ARBS projects a supply-demand imbalance of 63 to 78 TAF/year in the Upper Basin (or Foothills Area) without further conservation or management actions. In the Lower Basin, groundwater extraction is expected to increase by 62 to 155 TAF/year to offset the projected imbalance, which would affect groundwater sustainability.

Based on the water supply and demand imbalance results, the region's water supply reliability has vulnerabilities. The ARBS assessed several adaptation portfolios for addressing the range of vulnerabilities and future supply-demand imbalances for the Study Area for regional benefits. Portfolios analyzed were:

1. Foundational Institutions
2. No Assurances for Long-term CVP Water Contract
3. Alder Creek Storage and Conservation Project
4. Sacramento River Diversion Project
5. Federally Recognized Groundwater Bank (North and South Basin)
6. Folsom Dam Raise with Groundwater Banking (South Basin)
7. Modified Flow Management Standard

The seven formulated adaptation portfolios were quantitatively evaluated using CalSim 3 to alleviate supply-demand imbalances and benefits to the region. ARBS's intent was not focused on individual water-supplier's portfolio, but rather how the region could plan to increase regional reliability. The precise composition, scale, operations, partnerships, funding, and governance to advance these project concepts will require further evaluations and coordination among American River Basin interests, including the United States Bureau of Reclamation (USBR), DWR, and State Water Resources Control Board.

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3.6 Service Area Population and Demographics

3.6.1 Service Area Population

The population served by PCWA represents a highly varied mix of users and user classes. This is due to the size of the treated retail service area, which includes a broad mix of residential population densities, as well as commercial, public, and industrial water use customers. The current treated water retail service area population was estimated using DWR's Persons-per-Connection method. Using population values from the 2000 and 2010 census and number of connections, PCWA determined an occupancy rate for those respective years. These occupancy rates were then interpolated for 2005 and extrapolated for 2015 and 2020. These occupancy rates were applied to the number of service connections to determine population. Since the 2020 census has not been completed, this method was used through 2020.

Due to the size of the treated retail service area, it is difficult to determine when and where growth can occur. However, PCWA anticipates growth in the treated retail service area will be similar to the growth over the past 20 years. Therefore, an annual growth of 2.9% was used to determine projected population through 2040.

Historical and projected population is presented in **Table 3-6**.

Table 3-6. Historical, Current, and Projected Population

YEAR	POPULATION
1995	54,744
2000	67,321
2005	85,942
2010	91,648
2015	98,128
2020	108,225
2025 (est.)	124,892
2030 (est.)	144,125
2035 (est.)	166,320
2040 (est.)	191,934

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3.7 Other Social, Economic, and Demographic Factors

Placer County provides demographic reports for each of their supervisorial district along with a county wide report [4]. Placer County uses Environmental Systems Research Institute (ESRI) as its platform to produce demographics reports for the county. Based on the 2020 report, the median household income is $88,965 with the per capita income of $45,529. Approximately 86% of the working population (ages 16 and over) were employed.

The demographic reports also present percentage of urban versus rural housing. The Western Area consists of approximately 90% of urban housing with the remaining 10% consisting of urbanized clusters or rural housing. Majority of the Western Area has recently been developed and consist of newer water system facilities. Zone 3, located in the foothills of the Sierra Nevada foothills, has approximately 55% rural housing and 44% of urbanized clusters. Water system facilities in Zone 3 are relatively old, leading to more water loss. As water system facilities are replaced, water loss will decrease and, in turn, Zone 3 gross water use will decrease.

3.8 Land Uses within Service Area

PCWA's service area consist of Agriculture, Greenbelt/Open Space, Rural Residential, Commercial/Professional, Industrial, Mixed-Use, Public, Specific Plan Area and Urban/Suburban Residential.

Figure 3-8 illustrates the land use within Placer County per the 2013 Updated General Plan. **Appendix F** contains land use exhibits for City of Rocklin, Town of Loomis, and City of Auburn.

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[4] https://www.placer.ca.gov/1438/Demographics

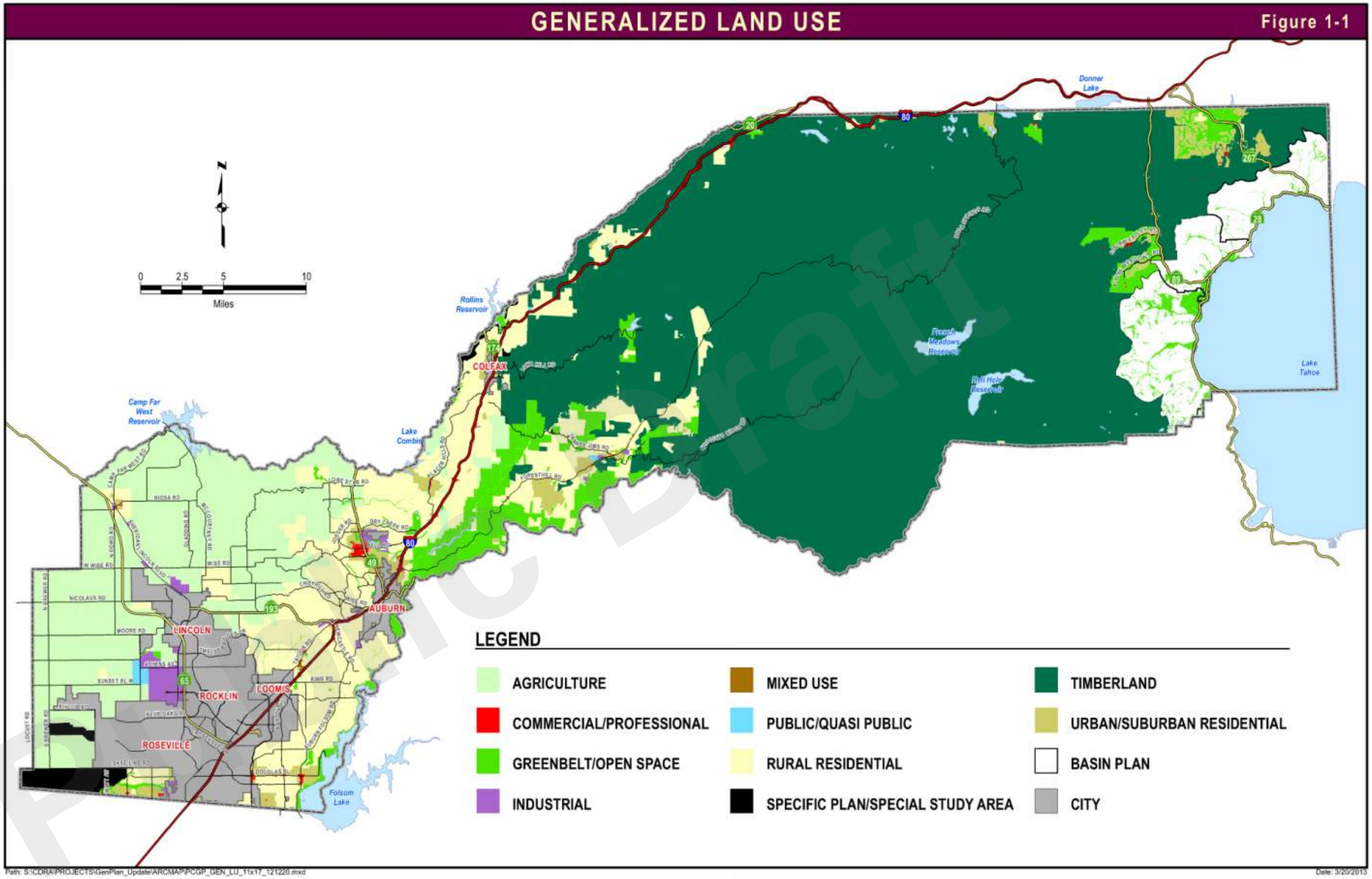

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Figure 3-8. Placer County Land Use Map

4 Water Use Characterization

PCWA's current treated and untreated retail demands are 101,613 AFY and are projected to increase to 125,188 AFY at buildout. PCWA's current treated and untreated wholesale demands are 31,376 AFY and are projected to increase to 128,282 AFY at buildout. This chapter characterizes PCWA's retail and wholesale customers existing and future demands.

4.1 Water Use

As previously stated, PCWA's system is broken down into the Western Area and Zone 3 for this UWMP. However, PCWA's system wide water use is summarized in **Section 4.4**.

PCWA's water use is broken down in four classifications:

- Retail Treated
- Retail Untreated
- Wholesale Treated
- Wholesale Untreated

PCWA currently does not have recycled water demands. There is a potential for recycled water to be available to PCWA's retail system in the future.

IN THIS CHAPTER

- Western Area Water Use
- Zone 3 Water Use
- Total PCWA Water Use

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4.1.1 Distribution System Water Losses

PCWA, like all water agencies, does have some water loss. Water loss is the difference between the amount of water produced and the amount of water billed to customers. PCWA has been conducting annual water audits of the Western Area and Zone 3 retail water distribution systems using the approach described in the American Water Works Association (AWWA) Manual M36 – Water Audits and Loss Control Programs since 2016. The purpose of the audit is to quantify the PCWA's real losses (water physically lost from the system through leaks, breaks, theft, and other means) as well as apparent losses (water lost through meter under registration and data handling errors).

Zone 3 only has AWWA Water Audits for 2018 and 2019. Since the Zone 3 system has less than 3,000 connections and supplies less than 3,000 acre-feet (AF) of treated water, the AWWA Water Audits did not need to be prepared. However, in early 2020 the DWR legal counsel re-read the regulation and determined that urban water suppliers with 3,000 or more connections, or deliveries of over 3,000 AF, were required to provide water audits for each system that the supplier operates even if individual systems do not exceed the 3,000 connections or deliveries of over 3,000 AF threshold. PCWA was required to provide AWWA Water Audits beginning with 2018 since DWR has already reviewed and accepted the 2015 through 2017 AWWA Water Audits.

The 2016 to 2019 reporting worksheets can be found in **Appendix E** and losses are summarized in **Table 4-1** for the Western Area and Zone 3. Where AWWA Water Audits were not available, the annual water loss was determined by comparing water production to water sales.

Table 4-1. Distribution System Water Losses

		2016	2017	2018	2019	2020
Western Area System	System Water Loss, AFY	2,221	3,266	3,434	2,025	3,549
	Percentage of Losses	11%	15%	15%	9%	14%
Zone 3 System	System Water Loss, AFY	235	325	269	193	172
	Percentage of Losses	33%	37%	34%	28%	24%

1. The Zone 3 system has higher percentage of losses due to the average age per linear foot of the water systems located in Zone 3.

4.1.1.1 Future Distribution System Water Losses

Based on the latest DWR Economic Water Loss Performance Standard Model (Version 4) available at the time this UWMP was prepared, the compliance water loss standard for the entire PCWA service area was estimated to be 6% or less by 2028. **Table 4-2** summarizes the estimated distribution system water loss for the Western Area system and the Zone 3 system for 2025 through buildout. These future distribution system water losses estimates were used in the future water use projections.

Table 4-2. Future Distribution System Water Losses

		2025	2030	2035	2040	BUILDOUT
Western Area System	Percentage of Losses	8%	6%	6%	6%	6%
Zone 3 System	Percentage of Losses	20%	6%	6%	6%	6%

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4.2 Western Area Water Use

This section presents the historical, current and projected water use for the Western Area. The Western Area consist of several classifications of water use which include treated retail, untreated retail, treated wholesale and untreated wholesale.

4.2.1 Western Area Classifications of Water Use

4.2.1.1 Western Area Treated Retail Water Use

Retail treated water use is a significant component of PCWA's long-term planning. Treated retail customer classifications include single family residential, multi-family residential, commercial, industrial[1], municipal, landscape and "other". The "other" customer classification includes water used for commercial fire and fire protection and customers involuntarily deprived of untreated service.

Although currently representing less than a quarter of PCWA's Western Area water use, treated retail water use is expected to see a large increase in water use over the next several decades as a result of anticipated growth of urban areas within Placer County. Large amount of growth is expected in various large urban areas of Placer County. The location and rate of this growth is difficult to predict for the treated retail system. Given these conditions, PCWA has projected treated retail water use will increase on average at a similar rate of growth seen during the past 20 years. PCWA's service area 20-year annual population growth rate is 2.9%. This growth rate was applied to the 2020 Western Area treated retail water use through 2040 for all customer classifications except industrial. PCWA currently has one industrial customer and does not expect a large growth of industrial water use within its service area. Therefore, it is assumed one industrial customer will connect to the Western Area system every five years. The 2020 demand for the current industrial customer will be applied to each new industrial customer.

The 2.9% population growth rate assumption covers growth and projected water use within the following Placer County area, cities, and existing/future developments:

- Auburn/Bowman
- City of Auburn
- City of Auburn (Airport)
- Newcastle/Ophir
- Unincorporated County Area C (Newcastle)
- Bickford Ranch
- Horseshoe Bar/Penryn
- Unincorporated County Area B (Loomis Basin)
- Town of Loomis
- Granite Bay
- City of Rocklin
- Whitney Ranch
- City of Roseville (area served by PCWA)
- Sunset Industrial Area
- Regional University Area

These planning subareas are show in **Figure 4-1**.

To accommodate a potential additional demand, PCWA established a regional buffer. The assumed buffer of 2,000 AF in 2040 is the approximate difference between PCWA's prior estimate of the Curry Creek area, which included the Regional University Area, and the current estimate of only the Regional University area. The assumed buffer of 8,000 AF at buildout accounts for consolidation of existing homes; this value is based on an estimated 10,000 parcels within the service area that are currently not served treated water from PCWA and assumes 50% of homes convert to treated water at 0.80 AFY per parcel.

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[1] PCWA defines an industrial customer as a customer who contracts to take an average of more than 10,000 billion units per month.

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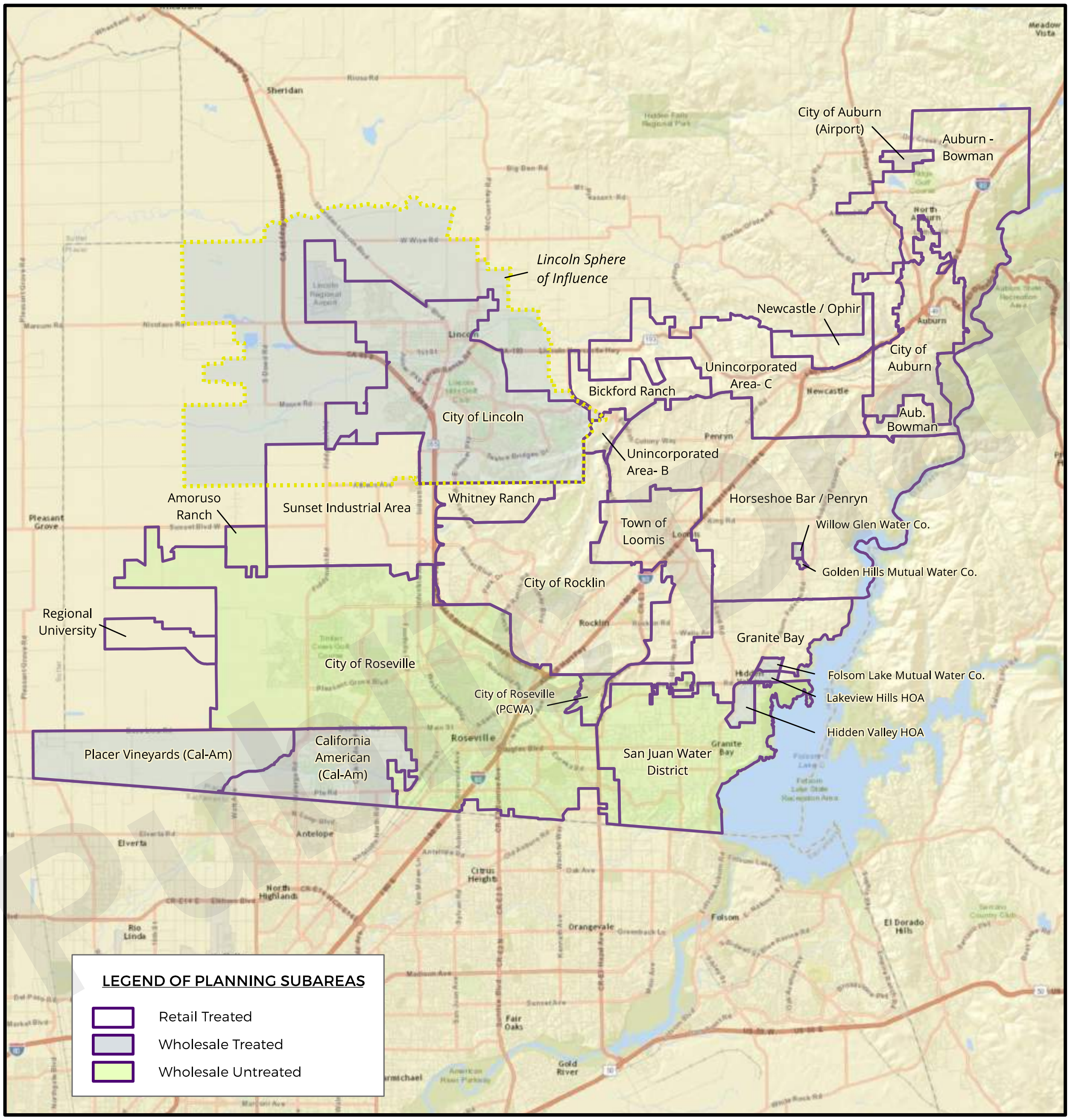

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Figure 4-1. Planning Subareas

4.2.1.2 Western Area Untreated Retail Water Use

Western Area untreated retail water use is a non-potable water use generally for commercial agriculture, irrigation customers, landscape greenbelts, and metered irrigation. The information presented below provides further details about these customers.

Commercial Agriculture. There are approximately 330 commercial agriculture accounts in Zone 1 and Zone 5. With planned growth by the City of Lincoln westward into Zone 5, PCWA expects the Zone 5 water use to decrease over the next twenty to thirty years. In contrast to Zone 5, the water use from the Zone 1 commercial agricultural customers is expected to remain consistent with current water use through this UWMP's planning horizon.

Irrigation. There are over 3,350 irrigation customers, including many rural residences within Zone 1 that receive irrigation canal water for use in gardens, for landscaping, for small pastures, to maintain stock water sources and storage, and for other rural residential needs. For purposes of long-term planning, PCWA anticipates irrigation water use to remain consistent with current water use, with expected annual variations depending on the length of the irrigation season[1].

Landscape. With only 24 active accounts, the landscape designation is used by PCWA to represent greenbelts irrigated with untreated retail water supplies. For purposes of long-term planning, PCWA anticipates landscape water use to remain consistent with current water use.

Metered. This classification of untreated retail water use has insignificant water use, reflecting less than 1% of recent annual untreated retail deliveries. PCWA anticipates this water use will remain consistent in the future.

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[1] It is PCWA's experience that irrigation water deliveries to irrigation customers vary depending on the timing of spring rainfall. When the rainy season is short, irrigation events begin earlier, increasing annual demand when compared to years when rain continues well into spring.

4.2.1.3 Western Area Treated Wholesale Water Use

PCWA wholesales treated water to several retail water systems located within Zone 1. This section presents the current and projected water use associated with these wholesale arrangements, and the basis for those projections.

City of Lincoln

The City of Lincoln (Lincoln) is the largest retail customer of treated wholesale water from PCWA. Lincoln has a renewable contract with the PCWA for treated surface water. Based on the Lincoln's 2008 General Plan, PCWA will supply the volume of potable surface water required to meet maximum day demands for build-out of Lincoln contract limits on a "first-come first served" basis. With significant growth occurring over the last decade, Lincoln has steadily increased its demand for treated water. During 2020 UWMP preparation, PCWA coordinated with Lincoln to understand its most recent forecast for future demands. Lincoln provided a 20-year demand forecast but did not provide a buildout forecast at the time of this UWMP; therefore, PCWA used Lincoln's 2017 Water Master Plan, Lincoln anticipates total potential buildout water use to be around 35,986 AFY. While some of this demand may be met with other Lincoln water assets under some circumstances, Lincoln primarily plans for this demand to be served by PCWA supplies.

California American Water

With multiple retail service areas around greater Sacramento, Cal-Am specifically receives wholesale treated supplies from PCWA for its West Placer service area (located in western Placer County just southwest of the Roseville). The general area of Cal-Am's West Placer service area is anticipated to grow, resulting in an expanded wholesale agreement with Cal-Am. For purposes of PCWA's long-term planning, the anticipated growth in this general area is represented within this category of PCWA customers, and is subdivided into two growth areas: Placer Vineyards and Existing Cal-Am.

- **Placer Vineyards:** This currently undeveloped region is slated for significant growth, with over 13,000 new residential units expected over the planning horizon. Demands for this project were estimated using the project's 2006 study as a baseline[2]. PCWA reduced the project's overall demand of 11,400 AF by about 25% to reflect today's estimated water demand for the same project.
- **Existing Cal-Am:** This includes the existing service of about 1,000 AF annually, with an expected slight reduction through customer conservation activities over time, and significant new growth. Combined, this portion of Cal-Am's service is expected to increase demands to nearly 2,400 AF.

Small Community Retail Systems

Several small community retail water systems exist within Zone 1 (there are no retail suppliers in Zone 5). Generally organized as homeowner associations, these small retail systems include Folsom Lake Mutual Water Company, Golden Hills Mutual Water Company, Hidden Valley Community Association, Lakeview Hills Community Association, and Willow-Glen Water Company.

With most of these small retail systems serving communities that are built-out or are nearly built-out, PCWA does not anticipate growth within this category of treated wholesale water and assumes demands will remain constant through 2040.

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[2] MacKay & Somps Civil Engineers, Water Supply and Distribution Master Plan for Placer Vineyards Specific Plan, March 2006.

4.2.1.4 Western Area Untreated Wholesale Water Use

In addition to being a retail purveyor of treated and untreated water suppliers, PCWA also wholesales untreated water to several retail water systems located within Zone 1. PCWA has contracts with SJWD, SSWD, and Roseville to provide each with untreated water supplies up to quantities as defined in each contract. This section presents the current and projected water use associated with these wholesale arrangements, and the basis for those projections. **Table 4-3** summarizes PCWA's supply that is contractually available to the Wholesale agencies during average, single dry year, and five-consecutive year drought.

San Juan Water District

PCWA's current contract with SJWD includes an annual entitlement of up to 25,000 AF of water from the MFP. SJWD's available surface water supply from the MFP is subject to terms in its PCWA contract, combined with WFA restrictions that limit the amount of water that SJWD is able to divert from the American River under certain conditions. SJWD also has an agreement with Roseville to supply 4,000 AF of its 25,000 AF PCWA contract supply to Roseville under certain conditions as well.

According to SJWD's WFA Purveyor Specific Agreement, SJWD's American River diversion restrictions are dependent upon the projected March through November Unimpaired Inflow into Folsom Reservoir (UIFR). SJWD can divert its full 82,200 AFY of the water rights water and contractual supplies from the American River in wetter years when the projected March through November UIFR is greater than 950,000 AF. This would include up to 25,000 AF MFP supply from PCWA. During drier years when the UIFR is between 950,000 and 400,000 AF, SJWD will proportionally decrease its diversion amounts from 82,200 AFY to 54,200 AFY, which includes a proportional reduction of the MFP supply to 10,000 AF. During the driest years when projected March through November UIFR is less than 400,000 AF, the WFA signatories have agreed to meet and confer to develop a plan for water use.

Based on coordination with SJWD during preparation of each purveyor's 2020 UWMP, SJWD's demand projections through 2040 estimate total retail demand of 15,500 AF plus 4,000 AF for Roseville. SJWD's need for MFP supply is assumed to remain at 19,500 AF under multi-dry year conditions but drop to 10,000 AF in driest years. For purposes of demand forecasting, SJWD's 2040 retail demand is reached incrementally, growing from the current estimated 9,663 AF (the 2020 delivered quantity) at a rate of 3% annually to 2040, then remaining at the maximum value through the remainder of PCWA's planning horizon.

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City of Roseville

PCWA's current contract with the Roseville includes an annual entitlement of up to 30,000 AF of water from the MFP. Roseville's available surface water supply from the MFP is subject to terms in its PCWA contract, combined with WFA restrictions that limit the amount of water that Roseville is able to divert from the American River under certain conditions.

According to Roseville's WFA Purveyor Specific Agreement, Roseville's American River diversion restrictions are dependent upon the projected March through November UIFR. Roseville can divert 54,900 AFY from the American River in wetter years when the projected March through November UIFR is greater than 950,000 AF. During drier years when the UIFR is between 950,000 and 400,000 AF, Roseville will proportionally decrease its diversion amounts from 54,900 AFY down to 39,800 AFY. During the driest years when projected March through November UIFR is less than 400,000 AF, the WFA signatories have agreed to meet and confer to develop a plan for water use.

Based on coordination with Roseville during preparation of this 2020 UWMP, PCWA's interpretation of Roseville's contractual demand for MFP water is 30,000 AF in all future year types.

For purposes of demand forecasting, the 2040 demand is reached incrementally, growing from the current estimated 7,016 AF (the 2020 delivered quantity) at a rate of 5% annually to 2040, then remaining at the maximum value through the remainder of PCWA's planning horizon.

Sacramento Suburban Water District

PCWA's current contract with SSWD includes an annual entitlement of up to 29,000 AF of water from the MFP. SSWD's available surface water supply from the MFP is subject to terms in its PCWA contract, combined with WFA restrictions that limit the amount of water that SSWD is able to divert from the American River under certain conditions.

According to SSWD's WFA Purveyor Specific Agreement, SSWD's American River diversion restrictions are dependent upon the projected March through November UIFR. SSWD can divert 29,000 AFY of MFP water from Folsom Reservoir in wetter years when the projected March through November UIFR is greater than 1,600,000 AF. During drier years when the UIFR is less than 1,600,000 AF, SSWD does not receive MFP water from PCWA.

Based on coordination with SSWD during preparation of this 2020 UWMP, PCWA's interpretation of SSWD's build-out demand for MFP water in normal years is 29,000 AF, reducing to zero AF in single dry and multiple dry years. For planning purposes, PCWA is assuming the SSWD full demand will occur by 2025 and continue to exist throughout PCWA's 2020 UWMP planning horizon.

Table 4-3. PCWA Available Supply to Wholesale Agencies

WHOLESALE AGENCY	AVERAGE	SINGLE DRY YEAR	FIVE-CONSECUTIVE YEAR DROUGHT
SJWD	25,000	10,000	25,000
Roseville	30,000	30,000	30,000
SSWD	29,000	0	0
TOTAL AVAILABLE PCWA SUPPLY	**84,000**	**40,000**	**55,000**

Figure 4-2 presents PCWA's water supplies and the places of use. PCWA's supplies are described in further detail in Chapter 6.

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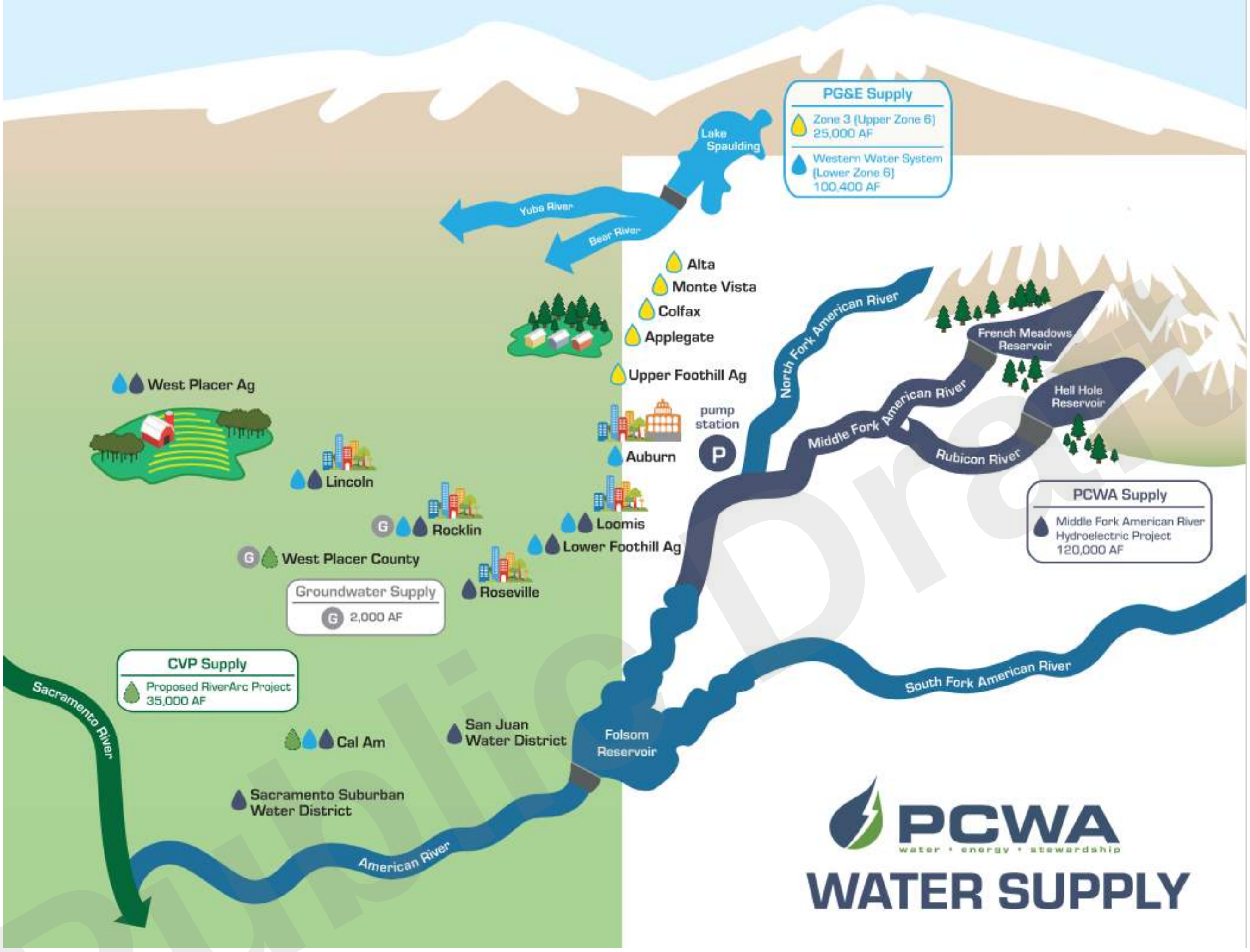

Figure 4-2. Water Supply Summary Map

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4.2.2 Western Area Historical and Current Water Use

Based on available records for water production, water sales and deliveries, **Table 4-4** summarizes the historical water use for the different classes of water usage in the Western Area.

Table 4-4. Western Area Historical Water Use, AFY

CLASSIFICATION OF WATER USE	2016	2017	2018	2019	2020
Treated Retail Water	20,404	22,120	23,084	23,295	24,812
Treated Retail Water Loss	2,221	3,266	3,434	2,025	3,549
Untreated Retail Water	59,457	49,803	55,079	53,233	64,642
RETAIL SUBTOTAL	**82,082**	**75,190**	**81,598**	**78,554**	**93,003**
Treated Wholesale Water	8,834	9,637	10,259	9,989	11,450
Untreated Wholesale Water	21,559	21,313	21,613	21,134	17,816
WHOLESALE SUBTOTAL	**30,393**	**30,951**	**31,872**	**31,123**	**29,266**
WESTERN AREA TOTAL WATER USE	**112,475**	**106,141**	**113,469**	**109,677**	**122,269**

4.2.2.1 Treated Retail Demand Factors for Western Area

While preparing this UWMP, PCWA developed demand factors for the Western Area Treated Retail Water customers. These demand factors were not used in the development of the water use projections for this 2020 UWMP; but are made available for PCWA to use in evaluating future proposed projects. Using 2020 account information and meter data, PCWA used GIS to link the lot size designations with 2020 customer meter data, generating average demand factors for each lot-size for both the upper and lower portions of Zone 1. **Table 4-5** presents the 2020 demand factors for each customer classification. Demand factors are presented by residential lot size for upper Zone 1 customers and lower Zone 1 customers, since these areas have varied climates and demographics, as described previously.

PCWA experienced a decrease in water use due to conservation and now expects a rebound as existing customers start to use more water coming out of the drought. PCWA also expects new customers will use less water due to more water efficient plumbing. PCWA expects that demand factors to remain consistent into the future as conservation and post-drought water use rebound will offset each other.

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Table 4-5. Western Area Treated Retail Demand Factors

CUSTOMER TYPE		LOT SIZE	DEMAND FACTOR	
SINGLE-FAMILY RESIDENTIAL				
UPPER ZONE 1				
	Upper SF 1	<2.9k	0.13	AFY/unit
	Upper SF 2	2.9k-4.4k	0.22	AFY/unit
	Upper SF 3	4.4k-5.5k	0.26	AFY/unit
	Upper SF 4	5.5k-7k	0.3	AFY/unit
	Upper SF 5	7k-10k	0.39	AFY/unit
	Upper SF 6	10k-17k	0.5	AFY/unit
	Upper SF 7	17k-35k	0.63	AFY/unit
	Upper SF 8	35k-90k	0.55	AFY/unit
	Upper SF 9	>90k	0.6	AFY/unit
LOWER ZONE 1				
	Lower SF 1	<2.9k	0.18	AFY/unit
	Lower SF 2	2.9k-4.4k	0.23	AFY/unit
	Lower SF 3	4.4k-5.5k	0.34	AFY/unit
	Lower SF 4	5.5k-7k	0.4	AFY/unit
	Lower SF 5	7k-10k	0.48	AFY/unit
	Lower SF 6	10k-17k	0.62	AFY/unit
	Lower SF 7	17k-35k	0.83	AFY/unit
	Lower SF 8	35k-90k	1.24	AFY/unit
	Lower SF 9	>90k	0.94	AFY/unit
MULTI-FAMILY RESIDENTIAL			**0.2**	**AFY/UNIT**
COMMERCIAL			**0.79**	**AFY/ACRE**
INDUSTRIAL[1]			**452**	**AFY/ACCOUNT**
PUBLIC /MUNICIPAL			**0.82**	**AFY/ACRE**
LANDSCAPE			**1.54**	**AFY/ACRE**

1) PCWA currently has one industrial account. The industrial demand factor is shown for informational purposes. New industrial development demand factors shall be determined on a case-by-case basis.

SF- square feet

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4.2.3 Western Area Projected Water Use

Assumptions described in **Section 4.2.1** were used in developing the projected water use for the Western Area. **Table 4-6** presents the expected water use for each 5-year increment through 2040.

Table 4-6. Western Area Projected Water Use, AFY

CLASSIFICATION OF WATER USE		2020	2025	2030	2035	2040	BUILDOUT
TREATED RETAIL	Single Family Residential	15,731	18,153	20,949	24,175	27,898	30,325
	Multi-Family Residential	1,897	2,190	2,527	2,916	3,365	3,658
	Commercial	2,703	3,120	3,600	4,154	4,794	5,211
	Industrial[1]	449	898	1,347	1,796	2,245	3,142
	Municipal	883	1,019	1,176	1,357	1,566	1,702
	Landscape	2,819	3,253	3,754	4,332	4,999	5,434
	Other	330	381	440	508	586	637
	Water Loss	3,549	2,321	2,028	2,354	2,727	2,964
	Regional Buffer	0	0	0	0	2,000	8,000
	TREATED RETAIL SUBTOTAL	**28,362**	**31,335**	**35,820**	**41,592**	**50,180**	**61,073**
UNTREATED RETAIL	Zone 1 Canal Customers	50,157	50,000	50,000	50,000	50,000	50,000
	Zone 5 Agriculture	14,485	12,808	10,898	9,281	7,913	4,698
	UNTREATED RETAIL SUBTOTAL	**64,642**	**62,808**	**60,898**	**59,281**	**57,913**	**54,698**
RETAIL SUBTOTAL		**93,003**	**94,143**	**96,718**	**100,873**	**108,093**	**115,772**
TREATED WHOLESALE	City of Lincoln	9,815	12,082	13,143	15,497	17,850	35,986
	Small Wholesale Purveyors	465	465	465	465	465	465
	Cal-Am Water Company	1,170	1,178	1,404	1,684	1,965	2,385
	Cal-Am Water Company - Placer Vineyards	0	1,688	3,376	5,064	6,752	8,440
	TREATED WHOLESALE SUBTOTAL	**11,450**	**15,413**	**18,388**	**22,710**	**27,032**	**47,276**
UNTREATED WHOLESALE	San Juan Water District	9,663	14,647	16,244	18,080	19,500	19,500
	Sacramento Suburban Water District	661	29,000	29,000	29,000	29,000	29,000
	City of Roseville	7,016	8,770	10,962	13,703	30,000	30,000
	Christian Valley Park, CSD	476	396	396	396	396	396
	UNTREATED WHOLESALE SUBTOTAL	**17,816**	**52,813**	**56,602**	**61,179**	**78,896**	**78,896**
WHOLESALE SUBTOTAL		**29,266**	**68,226**	**74,990**	**83,889**	**105,928**	**126,172**
WESTERN AREA TOTAL WATER USE		**122,269**	**162,369**	**171,708**	**184,762**	**214,021**	**241,944**

1) It is assumed one industrial customer will connect to the Western Area system every five years.

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4.3 Zone 3 Water Use

This section presents the historical, current, and projected water use for Zone 3. Zone 3 is the second largest zone in the PCWA system and extends through Applegate, Weimer, Meadow Vista, Colfax, Gold Run, Monte Vista, Dutch Flat, and Alta. Zone 3 consists of several classifications of water use which include treated retail, untreated retail, and untreated wholesale.

4.3.1 Zone 3 Classifications of Water Use

4.3.1.1 Zone 3 Treated Retail Water Use

Retail treated water uses in Zone 3 represent a fraction of PCWA's current water use and will increase slightly over the next several decades as a result of nominal growth (approximately 1%) of mountain communities within Placer County. Changes in this zone are unlikely to have significant impacts on the expected increase in total water use served by PCWA.

4.3.1.2 Zone 3 Untreated Retail Water Use

Zone 3 untreated retail water use is a non-potable water use generally for commercial agriculture, irrigation customers, landscape greenbelts, and metered irrigation. The information presented below provides further details about these customers.

Commercial Agriculture. There are currently only 15 commercial agriculture accounts in Zone 3. Zone 3 commercial agricultural water use is expected to remain consistent though the UWMP planning horizon.

Irrigation. Approximately 300 irrigation customer accounts include the many rural residences within Zone 3 that receive irrigation canal water for use in gardens, for landscaping, for small pastures, to maintain stock water sources and small ponds, and for other rural residential needs. For purposes of long-term planning, PCWA anticipates the untreated retail water use will remain consistent to existing water use, with expected annual variations depending on the length of the irrigation season.[3]

Landscape. With only one active account, the landscape designation is used by PCWA to represent greenbelts irrigated with untreated retail water supplies. For purposes of long-term planning, PCWA anticipates landscape demand to remain consistent with water use.

Metered. This classification of untreated retail water use has very insignificant water use, reflecting less than 2% of recent annual untreated retail deliveries in Zone 3. PCWA anticipates water use will remain consistent in the future.

4.3.1.3 Zone 3 Untreated Wholesale Water Use

This section presents the existing and anticipated future water use of five small water purveyors that purchase untreated wholesale water from PCWA for treatment and delivery. These purveyors include: Alpine Meadows Water Association, Dutch Flat Water Association, Heather Glen CSD, Meadow Vista County Water District, and Weimar Water Company. Recent sales to these retail agencies have remained fairly consistent. For purposes of long-term planning, PCWA anticipates the untreated wholesale water use to remain consistent with recent sales.

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[3] It is PCWA's experience that irrigation water deliveries to irrigation customers vary depending on the timing of spring rainfall. When the rainy season is short, irrigation events begin earlier, increasing annual demand when compared to years when rain continues well into spring.

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4.3.2 Zone 3 Historical and Current Water Use

Based on available records for water production, water sales and deliveries, **Table 4-7** summarizes the historical water use for the different classifications of water usage in Zone 3.

Table 4-7. Zone 3 Historic Water Use, AFY

CLASSIFICATION OF WATER USE	2016	2017	2018	2019	2020
Treated Retail Water	481	527	505	492	536
Treated Retail Water Loss	235	324	269	193	168
Untreated Retail Water	7,066	7,846	9,811	8,815	7,906
RETAIL SUBTOTAL	**7,782**	**8,697**	**10,585**	**9,500**	**8,610**
Wholesale Untreated Water	1,717	1,876	2,033	1,889	2,110
ZONE 3 TOTAL WATER USE	**9,500**	**10,572**	**12,618**	**11,388**	**10,720**

4.3.3 Zone 3 Projected Water Use

Assumptions described in the **Section 4.3.1** were used in developing the projected water use for Zone 3. **Table 4-8** presents the expected water use for each 5-year increment through 2040 and buildout conditions.

Table 4-8. Zone 3 Projected Water Use, AFY

CLASSIFICATION OF WATER USE		2020	2025	2030	2035	2040	BUILDOUT
TREATED RETAIL	Single Family Residential	88	92	97	102	107	119
	Multi-Family Residential	303	318	335	352	370	408
	Commercial	76	80	84	88	93	102
	Municipal	46	48	51	53	56	62
	Landscape	20	21	22	23	24	27
	Other	3	3	3	3	4	4
	Water Loss	168	113	36	37	39	41
	TREATED WATER TOTAL	**704**	**676**	**628**	**660**	**693**	**766**
Untreated Retail		7,906	8,400	8,400	8,400	8,400	8,400
RETAIL SUBTOTAL		**8,610**	**9,076**	**9,028**	**9,060**	**9,093**	**9,166**
Untreated Wholesale		2,110	2,110	2,110	2,110	2,110	2,110
Regional Buffer[1]		0	0	0	0	0	250
ZONE 3 TOTAL WATER USE		**10,720**	**11,186**	**11,138**	**11,170**	**11,203**	**11,526**

1) Regional Buffer includes future consolidation and groundwater substitutions within Zone 3.

4.4 Total PCWA Water Use

Table 4-9 provides the historical demand summary for the entire PCWA system.

Table 4-9. Summary of PCWA Historical Total Customer Demands, AFY

CLASSIFICATION OF WATER USE	2016	2017	2018	2019	2020
Treated Retail Water	20,885	22,647	23,589	23,788	25,348
Treated Retail Water Loss	2,456	3,591	3,703	2,218	3,717
Untreated Retail Water	66,523	57,649	64,891	62,048	72,547
RETAIL SUBTOTAL	**89,864**	**83,887**	**92,183**	**88,054**	**101,613**
Treated Wholesale Water	8,834	9,637	10,259	9,989	11,450
Untreated Wholesale Water	23,276	23,189	23,645	23,023	19,926
WHOLESALE SUBTOTAL	**32,110**	**32,826**	**33,904**	**33,011**	**31,376**
PCWA TOTAL WATER USE	**121,975**	**116,713**	**126,087**	**121,065**	**132,989**

As detailed in the previous sections, PCWA has many different customer types with different projected growth representations. **Table 4-10** provides the total PCWA customer demand summary for the 5-year increments through 2040 and buildout conditions.

Table 4-10. Summary of PCWA Total Customer Demand Projections, AFY

CLASSIFICATION OF WATER USE	2020	2025	2030	2035	2040	BUILDOUT
Treated Retail Water	29,066	32,011	36,448	42,252	50,873	62,089
Untreated Retail Water	72,548	71,208	69,298	67,681	66,313	63,098
RETAIL SUBTOTAL	**101,613**	**103,219**	**105,746**	**109,933**	**117,186**	**125,188**
Treated Wholesale Water	11,450	15,413	18,388	22,710	27,032	47,276
Untreated Wholesale Water	19,926	54,923	58,712	63,289	81,006	81,006
WHOLESALE SUBTOTAL	**31,376**	**70,336**	**77,100**	**85,999**	**108,038**	**128,282**
PCWA TOTAL WATER USE	**132,989**	**173,555**	**182,845**	**195,932**	**225,224**	**253,469**

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4.4.1 Exchanges

PCWA and Nevada Irrigation District (NID) exchange treated water for operational purposes. For each of the past five years, the water exchanged has been less than 100 AFY.

NID shares capacity in South Canal with PG&E to transport and release water into Auburn Ravine, below PG&E's Wise Powerhouse. Until NID constructs and operates a WTP for their service area in Lincoln, NID will wheel water through PCWA and Lincoln to NID's service area. NID uses a portion of their capacity in the South Canal to deliver NID raw water to PCWA's Foothill WTP without affecting the maximum PCWA Zone 1 flow diversion of 244.8 cfs. This water is treated at the Foothill WTP and delivered to Lincoln through the Lincoln Metering Station near the PCWA Sunset WTP. Lincoln then delivers this treated water to the NID service area.

4.5 Water Use for Lower Income Households

CWC section 10631.1 requires demand projections to include projected water use for single-family and multi-family residential housing needed for lower income households. Low-income households are defined as households making less than 80% of median household income.

The Placer County Adoption Draft Housing Element for 2021-2029 provides the income distribution used for this analysis. This housing element uses data from U.S. Census Bureau 2013-2017 American Community Survey. The median household income in Placer County in 2017 was $80,488, which is higher than California's median income of $67,169. In 2019, 66,668 households in Placer County were below the threshold for low income out of a total of 167,548 households. This is 39.8% of households. For lack of more detailed income distributions, this percentage is assumed to remain constant into the future. **Table 4-11** provides the current and future demands for "lower income" customers. These demands were developed using 39.8% of the projected population, a persons-per-household from the 2019 county average of 2.68, and an average demand factor from the single and multi-family housing units of 0.43 AFY/unit.

Table 4-11. Low-Income Water Use, AFY

	2025	2030	2035	2040
Projected Population	124,892	144,125	166,320	191,934
Low-Income Population	49,707	57,362	66,195	76,390
Low-Income Units Needed	18,547	21,404	24,700	28,504
LOW-INCOME WATER USE, AFY	**7,975**	**9,204**	**10,621**	**12,257**

4.6 Climate Change Considerations

As discussed in **Section 3.5**, the Basin region prepared the ARBS. The ARBS found that while climate change currently does have an impact on the basin, impacts are largely seen closer to the end of the century, and not within the timeline of the UWMP. Through proactive adaptation management actions, the ARBS highlights ways for the region to alleviate climate change impacts by the end of century; therefore, in consideration of the timeline of the UWMP, PCWA did not include climate change impacts in supply and demand scenarios within this UWMP.

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5 SBX7-7 Baseline, Targets and 2020 Compliance

This chapter demonstrates PCWA's compliance with the SBX7-7 water use targets as a retail water supplier.

IN THIS CHAPTER

- Baselines & Targets
- 2020 Compliance

5.1 General Requirements for Baseline and Targets

With the adoption of the Water Conservation Act of 2009, also known as SB X7-7, the State of California was required to reduce urban per capita water use by 20% by the year 2020. Water Code Section 10608.16(a) states: "The state shall achieve a 20% reduction in urban per capita water use in California on or before December 31, 2020." In order to achieve this statewide objective, the Legislature required each Retail Supplier subject to the Act to develop an urban water use target to help the state collectively achieve a 20% reduction. The Legislature stated that the cumulative results of each Retail Supplier's reduction would meet the statewide legislative requirement.

Pursuant to CWC Section 10608.40, PCWA is to report to DWR if PCWA complies with the 2020 Water Use Target as part of its 2020 UWMP. As part of the progress reports, PCWA should include its "compliance daily per capita water use" (Compliance Value), which is the gross water use during the final year of the reporting period, reported in gallons per capita per day[1]. Documentation of the Compliance Value must include the basis for determining the estimates, including references to supporting data. Furthermore, pursuant to CWC Section 10608.24(a), PCWA must demonstrate that it has met its 2020 gallons per capita per day (GPCD) Target as of December 31, 2020 through its calculation of its 2020 Compliance Value.

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[1] CWC § 10608.12(e).

5.2 2020 Compliance

Table 5-1 presents the population, associated gross water use, the resulting GPCD and the 2020 Water Use Target. As demonstrated, PCWA's 2020 Compliance Value is 240 GPCD, which is below the 2020 Water Use Target of 261 GPCD. As described in **Chapter 3** of the UWMP, the 2020 population was determined to be 108,225 by using the DWR persons per connection method as outlined in UWMP **Section 3.6**. The gross water use was determined based on 29,065 AFY[1]. The 2020 target GPCD water use was not adjusted or updated since the 2015 UWMP which developed the 2020 Water Use Target by DWR provisional method 4. Additionally, PCWA did not make any adjustment to the 2020 Gross Water Use.

Table 5-1. 2020 GPCD

YEAR	POPULATION	GROSS RETAIL WATER USE (AFY)	2020 ACTUAL GPCD	TARGET GPCD
2020	108,225	29,065	240	261

PCWA's SB X7-7 Verification Forms from PCWA's 2015 UWMP, which show the basis for the 261 GPCD target and PCWA's SB X7-7 Compliance Forms, which show the basis for the 240 GPCD water use, are in **Appendix D**.

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[1] PCWA's gross water use is calculated as the total water entering PCWA's treatment plants minus the sales to treated wholesale water customers.

6 Water Supply Characterization

This Chapter describes PCWA's existing and planned water supplies. PCWA projects current and planned water supplies will meet existing and future demands in various conditions.

IN THIS CHAPTER

- Groundwater Supply
- Surface Water Supply
- Summary of existing and Planned Supplies

6.1 Water Supply Analysis Overview

PCWA uses surface water as its primary water supply and delivers this supply to its wholesale and retail customers as described in **Chapter 4**. PCWA can also use groundwater in dry hydrologic conditions to meet demands in the Zone 1 service area and may also use recycled water – produced by the cities of Roseville and Lincoln – to meet demands in the future. PCWA's groundwater, surface water and recycled water supplies are discussed in the following subsections.

6.1.1 Groundwater

PCWA has historically produced a limited quantity of groundwater. Pumping in the Western Area occurs from the North American Subbasin of the Sacramento Valley Groundwater Basin (DWR Sub-basin 5-021.64) and is bounded by the Bear River to the north, American River to the south, Feather and Sacramento Rivers to the west and the Sierra Nevada foothills to the east. This subbasin is not adjudicated. Historical pumping by PCWA in the Western Area was limited to pumping for Bianchi Estates (Zone 2) and for the Sunset Industrial area. Pumping for Bianchi estates ceased in 2004 with PCWA serving the area with surface water. PCWA maintains the Sunset Industrial area wells, though these wells are in place only for dry year supplies.

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6.1.1.1 West Placer Groundwater Sustainability Agency

PCWA, along with Placer County, Roseville, Lincoln, NID and Cal-Am make up the West Placer Groundwater Sustainability Agency (WPGSA), which all pull from the North American Subbasin. The WPGSA was formed in 2017 to implement the Sustainable Groundwater Management Act passed in 2014. The WPGSA implements activities that preserve and enhance the current state of groundwater for the local cities, communities, agriculture, and the environment. More specifically, the locally controlled effort will protect the basin from overdraft, create sustainable water supplies for agriculture and current and future development, support a stable and growing local economy, and contribute to land and habitat conservation.

The Sustainable Groundwater Management Act requires the development and implementation of a Groundwater Sustainability Plan (GSP). The North American Subbasin was designated as a high priority subbasin and therefore formation of groundwater sustainability agencies and completion of the GSP is required. The North American Subbasin contains five partners (including WPGSA) that are currently in the process of developing the North American Subbasin GSP and have produced a draft covering description of plan area, hydrogeologic setting and groundwater conditions. The draft GSP for the North American Subbasin is provided in **Appendix G**. The final GSP is scheduled to be available and adopted late 2021. The North American Subbasin along with the subbasin partners are shown in **Figure 6-1**[1] .

6.1.1.2 Western Placer County Groundwater Management Plan

Prior to the WPGSA, PCWA adopted the Western Placer County Groundwater Management Plan (WPCGMP)[2]. The WPCGMP was designed to assist the City of Roseville, the City of Lincoln, PCWA, and Cal-Am in an effort to maintain a safe, sustainable and high-quality groundwater resource within a zone of the North American River Groundwater Sub-basin[3]. The objective of the WPCGMP was to maintain groundwater resources to meet backup, emergency, and peak demands without adversely affecting other groundwater uses within the WPCGMP area. Moreover, the WPCGMP provided a framework to coordinate groundwater management activities through a set of basin management objectives and specific implementation actions[4]. The WPCGMP will be superseded with the GWSP once it is adopted and finalized in late 2021.

6.1.1.3 Groundwater Supply System

PCWA does not anticipate utilizing groundwater to support its normal year water deliveries. Specifically, PCWA has two wells – the Sunset Well and the Tinker Well – each with a production capacity of 1,000 AFY. While these wells are used primarily for backup and dry-year supplies, they are nonetheless available as a supply in all scenarios.

PCWA has not used any groundwater in the past five years. PCWA's last use of groundwater was in August 2014. The proposed Regional University development plans to construct one new well and the proposed Placer Ranch development plans to construct two new wells. Therefore, PCWA is anticipating an increase of groundwater supply for single-dry year between 2025-2040 from 2,000 gpm to 5,000 gpm. **Section 6.2** below summarizes the available groundwater supplies through 2040.

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[1] Appears as Figure 2-1 in the Draft North American Subbasin GSP

[2] A copy of the Western Placer County Groundwater Management Plan is available on PCWA's website.

[3] WPCGMP, p. ES-1.

[4] WPCGMP, p. 1-3.

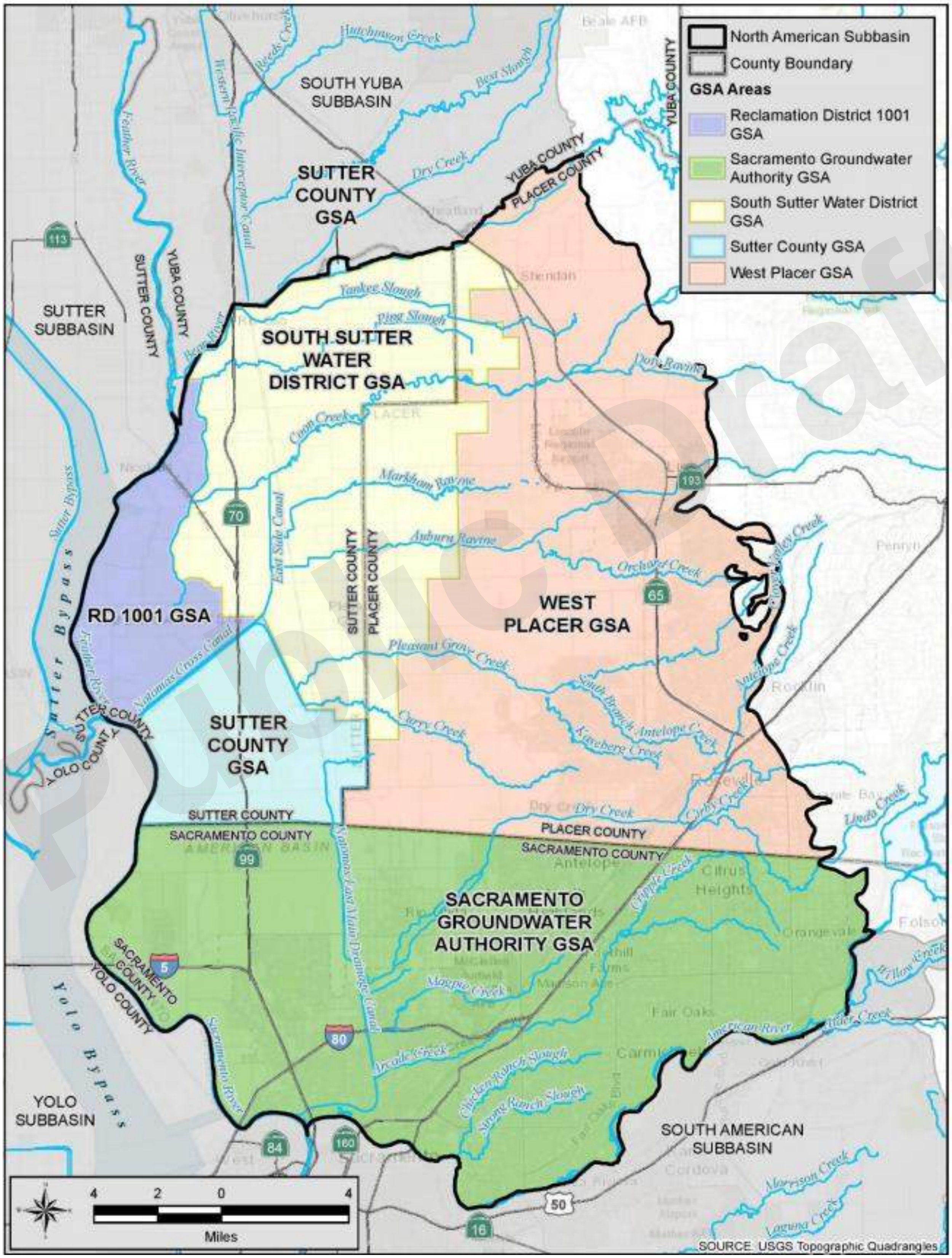

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Figure 6-1. Western Placer County Groundwater Management Plan Area

6.1.2 Surface Water

PCWA's surface water supplies consist of water diverted from the Yuba, Bear, and North Fork American River and its tributaries which includes:

- Water purchased from the PG&E from the Yuba and Bear Rivers under the 1982 Zone 3 Contract Purchase Agreement and the February 27, 2015 Water Supply Agreement;
- Water stored in its MFP under water rights permits 13856 and 13858;
- CVP water under CVP Repayment Contract 14-06-200-5082A-IR1-P from the American River; and
- Surface water from various small creeks under pre-1914 water rights.

A summary of PCWA's existing surface water supplies is provided in **Section 6.2** and **Table 6-1** based upon the existing water rights currently held and the contracts to which PCWA is a party. This section identifies the source, maximum available quantity, purpose of use, and place of use for each water asset. Note that to the extent a supply may be used in more than one zone, the total use cannot exceed the maximum quantity available under the water rights or contract, and that the use of a given quantity of a supply in one zone precludes the use of the same water in another zone.

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Table 6-1. PCWA Surface Water Supply Summary

SUPPLY	SOURCE	PURPOSE OF USE	MAX USE AFY	PLACE OF USE
Permits 13856-13858	American River	Irrigation, Domestic, Municipal, and Industrial, Recreation	120,000	Western Area; Portions of Sacramento County, including SJWD, SSWS and Rio Linda Water District service area
Central Valley Project Contract	American River	Municipal and Industrial	35,000	Zone 1
PG&E Water Supply Agreement (2015)	Yuba and Bear Rivers	Irrigation and Domestic	100,400	Western Area
PG&E (Zone 3) Purchase Agreement (1982)	Yuba and Bear Rivers	Irrigation and Domestic	25,000	Zone 3
Pre-1914 Appropriative Right (S000959)	Canyon Creek	Irrigation and Domestic	40 cfs (Max.)	Alta, Colfax, Monte Vista and rural areas (Not limited to Zone 3)
Pre-1914 Appropriative Right (S000967)	Tributary to Auburn Ravine	Irrigation and Stock Watering	Not Stated	"Boardman Canal" Area
Pre-1914 Appropriative Right (S010397)	South Fork Dry Creek Tributary to Coon Creek	Irrigation	Not Stated	Localized Irrigation Just East of Auburn
Pre-1914 Appropriative Right (S010398)	North Fork Dry Creek Tributary to Coon Creek	Irrigation	Not Stated	Localized Irrigation Just East of Auburn

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6.1.2.1 PG&E Contracts

PCWA has two water supply contracts with PG&E that provide opportunity to purchase up to 125,400 AFY for irrigation and domestic purposes; 100,400 AFY under one agreement for Zone 1 and 25,000 AFY under another agreement for Zone 3. The underlying rights for the PG&E supply are PG&E's pre-1914 appropriative rights to water in the Yuba and Bear Rivers, which were established prior to the time that PG&E developed hydroelectric facilities throughout the Yuba and Bear River watersheds. The water supply that PCWA purchases from PG&E is used to meet both untreated and treated water demands within PCWA's service area.

In 1968, PCWA purchased PG&E's lower Placer Water System, including its distribution canals, treated water systems, and rights to delivery of 100,400 AFY of water from PG&E's Drum-Spaulding Project to serve PCWA customers in Western Placer County (or also referred to as the Western Area in this UWMP)[5] . The Drum-Spaulding Project consists of 29 reservoirs, 6 major water conduits, 11 powerhouses as well as other infrastructure water, power, and recreation related facilities. In 2014, the Drum-Spaulding Project was divided into three distinct projects for purposes of Federal Energy Regulatory Commission (FERC): Upper Drum-Spaulding, Lower Drum, and Deer Creek hydroelectric projects[6]. The Deer Creek hydroelectric project was recently sold to NID. This does not affect PCWAs supplies from PG&E. The systems are currently operating on annual FERC license renewals; however, when the final FERC licenses are issued, they will have a term between 30 and 50 years.

Since the Upper Drum-Spaulding and Lower Drum hydroelectric projects are FERC licensed facilities, they are subject to the terms and conditions of the FERC Licenses affecting their operations. In concert with the terms of these licenses, PG&E provides wholesale water to PCWA for consumptive uses in PCWA's service area. While federal law allows for FERC to adopt permit conditions that mandate minimum flows and reservoir levels or set water temperature limitations related to operation of a hydroelectric facility, these provisions should not affect the appropriation and distribution of water for consumptive purposes at this time[7]. Future conditions in the FERC License renewal process could impact deliveries for consumptive purposes.

In 1982, PCWA purchased the remainder of PG&E's Upper Placer Water System[8]. In the PG&E and PCWA Purchase Agreement, PG&E agreed to deliver as much as 25,000 AF per year from PG&E's Drum Spaulding Project as part of the Upper Placer Water System conveyance[9]. PCWA typically acquires 25,000 AF during average years. PCWA purchases water from PG&E at various buy points, and untreated water is diverted into PCWA's Boardman Canal which begins near Alta and extends southwest along the Interstate 80 corridor to near Lake Theodore. From the Boardman Canal, PCWA delivers water to its four water treatment plant facilities located within Zone 3, multiple community water districts, and its untreated water customers.

The PG&E and PCWA Purchase Agreement has no termination date but does limit availability of water under certain conditions and maintenance needs. For instance, in Article 9, PG&E agrees – among other things – to use "due diligence in delivering water… but shall not be liable for curtailments of delivery caused by…actions or decisions by any governmental agency, officer or court, or other

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[5] The demarcation for Western Placer County is the service area line separating PCWA's Zone 3 from Zone 1 customers. For further information about this agreement please contact PCWA.

[6] NID's Yuba-Bear hydroelectric project is also incorporated into the Final FERC EIS.

[7] 16 U.S.C. § 821.

[8] Purchase Agreement between Pacific Gas and Electric Company and Placer County Water Agency dated November 17, 1982 (hereafter "PG&E and PCWA Purchase Agreement").

[9] PG&E and PCWA Purchase Agreement at Exhibit A.

conditions beyond PG&E's reasonable control." Accordingly, PG&E will deliver water as it is available but has limited obligations under certain conditions.

PCWA and PG&E entered a new Water Supply Agreement on February 29, 2015. In Article II of the Agreement, PG&E will continue to deliver 100,400 AF of water to PCWA from the Drum-Spaulding Project. PCWA will purchase this water during a water contract year from (Oct 1 to Sept 30 of the following year). PCWA is also entitled to purchase additional water if made available by PG&E. The 2015 Water Supply Agreement terminates upon "the expiration date of the New FERC License…."[10]

PG&E's pre-1914 water rights and supplies delivered through its system under these water rights are highly reliable during normal, single-dry, and multiple-dry year periods. PG&E relies on the Sacramento Valley Index (SVI) to determine contract availability for Drum Spaulding supply. Between 1987 and 1992, when the State of California generally experienced a drought, PCWA had a full Yuba/Bear river supply from PG&E each year. In the 2015 water year, one of the driest years on record in California, PG&E reduced their supply by approximately 40%. This reduction represents significantly greater supply reliability as compared to other sources of water in California in 2015 where supplies were reduced to a much greater extent (even zero in some instances).

Based on historical PG&E supply experience, PCWA conservatively estimates that it will experience a 50% reduction in its PG&E supply in a single dry year and a 0% reduction in multiple dry years. PCWA has developed an untreated water allocation strategy in the Western Placer System for dry-year shortage conditions. The dry-year shortage strategy also relies on the fact that commercial agricultural customers can more easily switch their source of supply in a dry year to groundwater.

Section 6.2 shows PG&E supplies through 2040.

6.1.2.2 Middle Fork Project (Permit 13856 and 13858)

PCWA owns and operates the MFP and holds appropriative North Fork American River water rights for the MFP pursuant to Permits 13856 and 13858 through the California State Water Resource Control Board (State Water Board), Division of Water Rights. PCWA's North Fork American River water rights include direct diversion rights from the North Fork American River, Folsom Dam, and other locations within PCWA's MFP and storage rights in MFP reservoirs and subsequent re-diversion rights of the stored water for irrigation, domestic, municipal, industrial, and recreational purposes. PCWA may divert water directly from the North Fork American River and Folsom Dam from November through June. The remainder of the year PCWA must redivert water released from its MFP reservoirs.

In 2014 and 2015, two of the driest years on record, PCWA's water rights were additionally curtailed from direct diversion or diversion to storage. The curtailments were from May 27 to November 19 in 2014 and from May 1 to November 6 in 2015, reducing the permitted diversion to storage season by 54 days in 2014 and 67 days in 2015. In 2014 and 2015, PCWA used 77,496 and 42,346 AF, respectively, of MFP water in Zone 1 and in raw water deliveries primarily to the City of Roseville, SJWD, and SSWD. In 2014, a 40,736 AF out of county transfer was made to East Bay Municipal Utilities District/Westlands Water District. This out of county transfer accounted for the water use differential in the water for these two years.

The two water rights permits provide water supplies to PCWA's treated and irrigation water customers from the American River Pump Station (ARPS) and to PCWA's wholesale customers from Folsom Dam. PCWA may use water under its permitted water rights in western Placer County, as well as portions of northern Sacramento County, including SJWD, SSWD, and Rio Linda/Elverta Community Water District service areas. PCWA's wholesale customers include the City of Roseville, SJWD, and SSWD.

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[10] 2015 Water Supply Agreement, Article I, paragraph 1.2

PCWA's total volume of water rights through these permits is greater than 300,000 AFY. However, PCWA has signed an interim agreement with USBR limiting its diversions under PCWA's permitted rights to 120,000 AFY off the North Fork American River for use within the existing PCWA place of use[11]. **Section 6.2** below shows the MFP supply through 2040.

Permit Extension of Time

The State Water Board-governed water rights system consists of a three-stage water rights process – application, permit and then licensing of the water put to beneficial use at the end of the permit term. PCWA's water rights are in the permit stage, meaning that PCWA has not yet put the water supplies under its permit to full beneficial use. The water rights system allows for an extension of time to the permit term.

PCWA's North Fork American River Water Rights Permit Nos. 13856 and 13858 state that the complete application of the water to the proposed use was to be made on or before December 1, 2007. PCWA did not fully utilize the water supply entitlements described in Water Rights Permits 13856 and 13858 prior to the specified date. PCWA judiciously filed petitions for a 36-year extension of time in which to put water allocated under these permits to full beneficial use. The petitions were accepted by the State Water Board in January 2008 and are undergoing formal administrative review. To support State Water Board's decision on the petitions for extension of time, PCWA is preparing an Environmental Impact Report (EIR) to assess potential environmental impacts of diverting the full 120,000 AFY under interim USBR agreement as compared to the baseline diversion quantity it put to beneficial use prior to December 1, 2007 (41,991 AFY). Although, PCWA anticipates approval of its petition by the State Water Board, the ultimate outcome of the process is yet to be determined.

ARPS Capacity

The ARPS, completed in 2008, has a current capacity of 189 cubic feet per second (cfs). PCWA has used the ARPS (and its predecessor pumping stations) to meet agriculture and treated water demands within its Zone 1 and Zone 5 service areas. In 2020, PCWA diverted 14,577 AF of water from the ARPS.

The ARPS EIR, completed in June of 2002, analyzed diversion of up to 35,500 AFY of North Fork American River water rights water. Future diversions above 35,500 AFY, if needed, would require additional environmental review. The EIR anticipated that PCWA may need to divert up to a total of 70,500 AFY at ARPS to meet future demand. To meet future demands in Zone 1, PCWA anticipates that it will need to expand the use of the ARPS.

Water Forum Agreement

PCWA approved the Memorandum of Understanding for the WFA in the year 2000. The WFA was updated in October of 2015 making amendments and changes to the original document. The updated WFA has two stated objectives: (1) Provide a reliable and safe water supply for the region's economic health and planned development through to the year 2030; (2) Preserve the fishery, wildlife, recreational, and aesthetic values of the lower American River.

Subject to certain conditions, terms in the WFA require PCWA to release up to 47,000 AF of additional water in drier years through reoperation of MFP reservoirs (27,000 AF for PCWA and 20,000 AF for the City of Roseville) to replace water diverted above the WFA 1995 baseline volumes[12]. When projected

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[11] Permits 13856 and 13858 can be reviewed at https://ciwqs.waterboards.ca.gov/ciwqs/ewrims/EWServlet?Redirect_Page=EWWaterRightPublicSearch.jsp&Purpose=getEWAppSearchPage

[12] PCWA's baseline volume is 8,500 AFY. The City of Roseville's baseline volume is 19,800 AFY.

March through November Unimpaired Inflow to Folsom Reservoir UIFR is between 400,000 AF and 950,000 AF, the amount of these additional water releases is linearly interpolated between 47,000 AF and 0 AF. When projected March through November UIFR is less than 400,000 AF, it is considered a "conference year" where Water Forum participants meet to determine how best to manage the available water, recognizing that there may not be sufficient water to meet both deliveries and environmental release requirements specified in the agreement.

In the WFA, PCWA would make the releases contingent upon the following conditions:

- Its ability to transfer the released water for use below the Lower American River on terms acceptable to PCWA; and
- PCWA's determination that it has sufficient water in its reservoirs to make the additional releases in dry years without jeopardizing the supply for PCWA's customers.

The water that PCWA releases pursuant to the WFA is PCWA water rights water intended to be transferred to another party downstream of the Lower American River and is not relinquished or abandoned water.

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6.1.2.3 Central Valley Project Contract

PCWA has a CVP water contract with USBR for delivery of up to 35,000 AFY for municipal and industrial purposes, including groundwater recharge programs that are consistent with applicable State law[13]. The CVP Repayment Contract 14-06-200-5082A-IR1-P (dated February 28, 2020) remains in effect in perpetuity with no expiration date.

PCWA's point of diversion for CVP water under the CVP Contract is Folsom Dam, but the contract also includes potential for other diversions, including the Sacramento River, if the points of diversion are agreed to by the Contracting Officer. PCWA does not currently own or control facilities that are capable of conveying CVP water from Folsom Dam to the PCWA service area. As such, the availability of the water supply is currently affected by physical limitation. PCWA is engaged in negotiations with the City of Roseville and other regional entities to potentially utilize existing facilities to divert and deliver PCWA's CVP project water supplies.

The CVP contract identifies only a portion of PCWA's Zone 1 service area as the area available for water deliveries from CVP Project supplies. Some portions of PCWA's Zone 1 service area, including portions in Sacramento County, are not identified as delivery areas in the CVP Contract map. The contract, however, specifies a procedure for administratively modifying the service area with USBR approval.

Article 3(b) of the CVP Contract indicates the amount of water that would likely be delivered in normal years is 32,000 AFY. USBR reserves the right to apportion the available CVP water supply among PCWA and other CVP water contractors under USBR's Municipal and Industrial Water Shortage Policy (M&I WSP). The M&I WSP generally defines water service terms and conditions under drought conditions. The M&I WSP is valid through 2030. Generally, reductions in municipal and industrial deliveries should not exceed 25%, unless conditions are severe. In 2015, M&I WSP allocations on the American River watershed were 25% of the historical use – meaning 25% of the last three normal years' average use adjusted for identified variables. At present, PCWA has used only a very small amount of CVP water. In the future, PCWA will need to demonstrate a record of use of CVP water in normal years to have access to water in drought years.

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[13] Contract No. 14-06-200-5082A-IR1

Several issues related to CVP water, including diversion facilities, the service area identified in the CVP Contract, and M&I WSP drought year allocations will need to be addressed if the CVP Contract water is to be utilized in PCWA's service area effectively[14].

Section 6.2 below shows the CVP supply through 2040.

6.1.2.4 Pre-1914 Appropriative Rights

PCWA holds four pre-1914 appropriative water rights for diversion of water from various small creeks and their tributaries in western Placer County. PCWA has filed Statements of Water Diversion and Use (SODU) with the State Water Board for each water right: S000959, S000967, S010397 and S010398.[15] These rights are generally for agricultural purposes, including irrigation and stockwatering. The pre-1914 appropriative water rights in Zone 1 are used to convey contract water, any diversions are incidental, and it is the goal of the canal operators to only divert the same amount of water that entered the natural water course from the PCWA's canals. Generally, water for diversion is only present during times of significant precipitation when availability exceeds of PCWA's demands. Other water that may be present outside of precipitation events is generally return flows from customer irrigation activities.

In 2014 and 2015, back to back dry years, the combined diversion from pre-1914 water rights were 2,687 AF and 3,792 AF, respectively. In recent years 2018 through 2019 that are more representative of a normal PCWA water year, the combined diversion from pre-1914 water rights were 4,968 AF and 5,304 AF, respectively.

Section 6.2 below shows the pre-1914 appropriative rights estimated supply through 2040.

6.1.3 Stormwater

There are currently no plans to develop stormwater supplies within the PCWA service area.

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[14] In 2014 and 2015, the extreme drought was accompanied by state mandated demand restrictions.

[15] The latest SODUs on file with the State Water Board.

6.1.4 Wastewater and Recycled Water

6.1.4.1 Wastewater System

PCWA does not collect, treat, or discharge municipal wastewater. Wastewater generated within PCWA's service area is conveyed to and treated by other local municipalities, including South Placer Municipal Utility District (SPMUD) and Placer County. A summary of sewer flows for SPMUD and Placer County are provided in **Table 6-2** and **Table 6-3**, respectively.

Table 6-2. SPMUD Sewer Flows

DISTRICT	WASTEWATER SYSTEM	Q1	Q2	Q3	Q4	TOTAL (MG)	TOTAL (AF)
Dry Creek	Dry Creek Wastewater Treatment Plant (WWTP)	190.02	155.60	141.91	157.75	645.28	1980
Pleasant Grove	Pleasant Grove WWTP	177.25	160.15	160.43	171.39	669.23	2054
Highlands	--	9.08	9.08	9.84	171.39	199.38	612

Table 6-3. Placer County Sewer Flows

DISTRICT	WASTEWATER SYSTEM	TOTAL (MG)	W/IN SERVICE AREA (MG)
SMD1	Lincoln WWTP	532.9	532.9
SMD2	Dry Creek WWTP	492.9	82.2
SMD3	Dry Creek WWTP	42.3	42.3
Dry Creek	Dry Creek WWTP	66.3	0.0
Livoti	Dry Creek WWTP & Sac Regional	15.9	0.0
Sunset	Pleasant Grove WWTP	37.0	37.0
TOTAL (MG)		**1,187.4**	**694.3**
TOTAL (AF)		**3,644**	**2,131**

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6.1.4.2 Recycled Water System

PCWA anticipates recycled water will be developed and potentially available as a supply in its retail service area. These supplies would be provided through agreements with the City of Lincoln and the City of Roseville as a potential user for each city's recycled water program. PCWA anticipates the quantities presented in **Section 6.2** to be made available to meet part of the broad array of PCWA customer demands, which include retail and wholesale customers adjacent to each city. The details of recycled water supply plans are being developed as part of on-going regional discussions.

6.1.5 Desalinated Water Opportunities

There are currently no plans to develop desalinated supplies within the PCWA service area.

6.1.6 Water Exchanges and Transfers

PCWA holds water rights and is party to contracts entitling it to water supplies that are adequate to meet its current and future projected needs. PCWA has historically transferred water outside of its service area in Placer and Sacramento Counties.

PCWA has transferred water pursuant to its commitments under the WFA as well as from water made available through reservoir reoperations. PCWA's water transfers have made water available to areas in water deficit and have provided additional water to Folsom Reservoir and benefits to the lower American River.

PCWA may engage in future water transfers to benefit areas with water supply deficits and to meet its commitments under the WFA. These transfer opportunities may include reservoir reoperation transfers, groundwater substitution transfers, conserved water transfers, or any other transfer or exchange opportunity allowed by law.

Beginning in the year 2030, PCWA anticipates its CVP contract will yield at least 35,000 AFY. Also, PCWA's pre-1914 appropriative rights are available for deliveries in portions of Zone 3 and in Zone 1[16] and the estimated yield is 3,400 AFY. Recycled water is projected to be available in the PCWA retail service area starting in 2030. These recycled water supplies would be derived from the City of Lincoln and City of Roseville to meet PCWA service area demands.

6.2 Summary of Existing and Planned Sources of Water

Table 6-4 summarize PCWA's existing and projected water supplies through 2040.

Table 6-4. Existing and Planned Supplies, AFY

SUPPLY SOURCE	2020	2025	2030	2035	2040	BUILDOUT
MFP	120,000	120,000	120,000	120,000	120,000	120,000
CVP[1]	0	0	35,000	35,000	35,000	35,000
PG&E	125,400	125,400	125,400	125,400	125,400	125,400
Pre 1914 Appropriative Rights	3,400	3,400	3,400	3,400	3,400	3,400
Recycled Water	0	0	2,500	5,000	7,000	9,000
Groundwater	2,000	2,000	4,000	4,000	5,000	5,000
Total Supply	**250,800**	**250,800**	**290,300**	**292,800**	**295,800**	**297,800**

1. CVP supply is currently not available due to physical limitations. Supply from CVP is 0 AFY until infrastructure is in place to access this supply, which is assumed to be in 2030.

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[16] Operationally, PCWA typically uses its Pre-1914 water rights supply in Zone 1. This supply may also be used in Zone 3. The quantity of water used in Zone 3 is unavailable for use in Zone 1.

6.3 Energy Intensity

Table 6-5 through **Table 6-8** provide the available estimated energy information used to extract or divert water supplies, convey water supplies to treatment plants and distribution systems, treat water supplies, and distribute water supplies. Information related to energy usage for treated water supplies in comparison to the energy use for nontreated water supplies, the amount of energy to place water into or withdraw water from storage, or any other energy related information that is available.

Table 6-5. Energy Estimate (in KW-Hours) for Extraction or Diversion of Water Supplies

YEAR	AMERICAN RIVER PUMP STATION	OPHIR ROAD PUMP STATION 1	OPHIR ROAD PUMP STATION 2
2016	1,400,634	211,885	858,592
2017	1,264,362	54,482	1,192,535
2018	1,542,137	132,052	1,440,338
2019	1,503,508	489,988	1,100,453

Table 6-6. Energy Estimate (in KW-Hours) for Conveying Supplies to WTPs or Distribution Systems

YEAR	WHITNEY PUMP STATION
2016	109,567
2017	104,642
2018	93,290
2019	36,104

Table 6-7. Energy Estimate (in KW-Hours) to Treat Water Supplies

YEAR	ALTA WTP	APPLEGATE WTP	AUBURN WTP	BOWMAN WTP	COLFAX WTP	FOOTHILL WTP	MONTE VISTA WTP	SUNSET WTP
2016	84,769	77,198	510,388	256,495	259,723	1,156,245	45,733	120,558
2017	90,311	77,037	543,057	300,766	300,766	1,068,421	53,606	102,104
2018	90,131	78,203	552,654	298,242	246,228	1,123,685	43,878	101,631
2019	112,767	80,403	403,313	381,072	230,876	1,135,147	41,922	98,044

Table 6-8. Energy Estimate (in KW-Hours) to Distribute Water Supplies

YEAR	TINKER	NORTH STAR PUMP STATION	STONERIDGE PUMP STATION	SKYRIDGE PUMP STATION	SUNSET WTP 10MG/PRS
2016	580,853	6,033	116,000	71,669	32,243
2017	718,633	6,814	197,807	75,295	32,042
2018	662,067	9,040	136,668	78,076	31,634
2019	769,390	8,949	196,527	71,256	38,774

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Water Service Reliability and Drought Risk Assessment

This Chapter compares PCWA water supply and demands over the next 20 years for an average water year, a single-dry water year, and five-consecutive dry years. Water supply and demand data presented in this Chapter are from Chapters 4 and 6 of this UWMP. During varying conditions, PCWA projects supplies will meet demands.

7.1 Water Service Reliability Assessment

7.1.1 Constraints on Water Sources

Impacts from climatic, legal, environment or water quality constraints on PCWA's water sources are summarized in **Table 7-1** and are discussed in further detail in **Chapter 6**.

IN THIS CHAPTER

- Water Service Reliability Assessment
- Drought Risk Assessment

Climatic constraints include hydrological circumstances, like a drought. Legal constraints include contractual relationships, like the WFA, and terms and conditions for FERC licensed supply facilities. Environmental constraints include issues like species protection in the Sacramento-San Joaquin Bay Delta and maintaining flows in Placer County creeks. Water quality constraints would include issues with groundwater or surface water sources.

Table 7-1. Water Supply Constraints

WATER SUPPLY SOURCES	SPECIFIC SOURCE NAME	CLIMATIC CONSTRAINTS	LEGAL CONSTRAINTS	ENVIRONMENTAL CONSTRAINTS	WATER QUALITY CONSTRAINTS
Surface Water	PG&E Contracts	✓	✓	✓	-
	MFP	-	✓	✓	-
	CVP Contract	✓	✓	✓	-
	Pre-1914 Appropriative Rights	✓	✓	✓	-
Groundwater		✓	✓	✓	✓

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7.1.2 Year Type Characterization

The water service reliability and Drought Risk Assessment (DRA) analyze supply over several water years: normal, single dry, and multiple dry years. DWR defines these years as:

Average 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.

Single Dry Year. The single dry year is recommended to be the year that represents the lowest water supply available.

Five-Consecutive Year Drought. The driest five-year historical sequence for the Supplier, which may be the lowest average water supply available for five years in a row.

7.1.3 Supply Reliability

The factors affecting the reliability of PCWA's water supplies are discussed in **Chapter 6**. The average year or normal year is based on typical supplies available to PCWA in most years. The single dry year and five-consecutive year drought events are based on UIFR for MFP, pre-1914, and CVP supplies and SVI for PG&E supplies. The single dry year supply is based on the single driest year period in PCWA's recent history (1977). The five-consecutive year drought year supply values were based on the 1988 to 1992 multi-year dry period. Each supplies' reliability for average year, single dry year and five-consecutive year drought are described below.

7.1.3.1 Average Year

Under average conditions, PCWA estimates availability of the following supplies:

- **PG&E:** PG&E supply will be 125,400 AFY.
- **MFP:** PCWA's modeling over an 82-year hydrologic record indicates that 120,000 AFY will be available from the MRP supply.
- **CVP:** Based on Reclamation estimates of availability as written in PCWA's CVP contract and CalSim II modeling conducted by PCWA, PCWA estimates that 35,000 AFY of CVP water will be available after 2030.
- **Pre-1914:** The pre-1914 appropriative rights will provide approximately 3,400 AFY.
- **Recycled water:** As buildout of Lincoln and the planning areas west of Roseville occurs, recycled water should be available in both average and dry years.
- **Groundwater:** It is anticipated that groundwater will be available in average years.

Table 7-2 summarizes the available supplies under average conditions from 2025-2040 and buildout conditions.

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Table 7-2. Average Year Supplies

WATER SUPPLY SOURCES	2025	2030	2035	2040	BUILDOUT	% REDUCTION
PG&E	125,400	125,400	125,400	125,400	125,400	0%
MFP	120,000	120,000	120,000	120,000	120,000	0%
CVP	0	35,000	35,000	35,000	35,000	0%
Pre-1914 Appropriative Rights	3,400	3,400	3,400	3,400	3,400	0%
Recycled Water	0	2,500	5,000	7,000	9,000	0%
Groundwater	2,000	4,000	4,000	5,000	5,000	0%
TOTAL SUPPLY	**250,800**	**290,300**	**292,800**	**295,800**	**297,800**	

7.1.3.2 Single Dry Year

If hydrologic conditions were similar to those experienced during the 1977 drought year (PCWAs worst drought year on record), PCWA estimates that single dry year supplies would reduce as follows:

- **PG&E:** PG&E supply is assumed to reduce by 50%.
- **MFP:** Due to the ability to store and deliver supplies under this permit, MFP supply will not see a reduction.
- **CVP:** CVP supply is assumed to reduce by 50% of full contract allocations based on the Reclamation's current M&I shortage policy.
- **Pre-1914:** The pre-1914 appropriative right supply is assumed to reduce by 75%, given that the creeks from which PCWA diverts are runoff dependent.
- **Recycled water:** It is assumed recycled water supplies will not be reduced.
- **Groundwater:** Any potential shortfall in supply that may occur in Zone 1 in a dry year will be addressed through groundwater production. Groundwater may be produced by overlying users and/or appropriators to meet demands, consistent with the GMP discussed in **Section 6.1.1.3**. It is assumed groundwater supplies will not be reduced.

Table 7-3 summarizes the available supplies under single dry year conditions from 2025-2040 and buildout conditions.

Table 7-3. Single Dry Year Supplies

WATER SUPPLY SOURCES	2025	2030	2035	2040	BUILDOUT	% REDUCTION
PG&E	62,700	62,700	62,700	62,700	62,700	50%
MFP	120,000	120,000	120,000	120,000	120,000	0%
CVP	0	17,500	17,500	17,500	17,500	50%
Pre-1914 Appropriative Rights	850	850	850	850	850	75%
Recycled Water	0	2,500	5,000	7,000	9,000	0%
Groundwater	2,000	4,000	4,000	5,000	5,000	0%
TOTAL SUPPLY	**185,550**	**207,550**	**210,050**	**213,050**	**215,050**	

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7.1.3.3 Five-Consecutive Year Drought

During a five-consecutive year drought, PCWA anticipates supplies to reduce as follows:

- **PG&E:** Based on historical five-year periods, it is assumed PG&E supply will not be reduced.
- **MFP:** Due to the ability to store and deliver supplies under this permit, MFP supply will not see a reduction.
- **CVP:** CVP supply is assumed to reduce by 25% for all five years.
- **Pre-1914:** The pre-1914 appropriative right supply is assumed to reduce by 50% for all five years.
- **Recycled water:** It is assumed recycled water supplies will not be reduced.
- **Groundwater:** Any potential shortfall in supply that may occur in Zone 1 in dry years will be addressed through groundwater production. Groundwater may be produced by overlying users and/or appropriators to meet demands, consistent with the GMP discussed in **Section 6.1.1.3**. It is assumed groundwater supplies will not be reduced.

Table 7-4 summarizes the available supplies under five-consecutive years drought conditions from 2025-2040 and buildout conditions. The supply reduction will be the same for each of the five years.

Table 7-4. Five Consecutive Year Drought

WATER SUPPLY SOURCES	2025	2030	2035	2040	BUILDOUT	% REDUCTION
PG&E	125,400	125,400	125,400	125,400	125,400	0%
MFP	120,000	120,000	120,000	120,000	120,000	0%
CVP	0	26,250	26,250	26,250	26,250	25%
Pre-1914 Appropriative Rights	1,700	1,700	1,700	1,700	1,700	50%
Recycled Water	0	2,500	5,000	7,000	9,000	0%
Groundwater	2,000	4,000	4,000	5,000	5,000	0%
TOTAL SUPPLY	**249,100**	**279,850**	**282,350**	**285,350**	**287,350**	

7.1.4 Water Service Reliability

This section compares projected supplies and demands for an average year, single-dry year, and five-year consecutive drought for the entire PCWA system.

7.1.4.1 Average Year

Under an average year, PCWA anticipates receiving full supplies as described in **Section 7.1.3.1**. Demands during an average year conditions are assumed as projected in **Table 4-10**. The supply and demand comparison for the average year is presented in **Table 7-5**.

Table 7-5. Average Year Supply and Demand Comparison

	2025	2030	2035	2040	BUILDOUT
Supply Totals	250,800	290,300	292,800	295,800	297,800
Demand Totals	173,555	182,845	195,932	225,224	253,469
DIFFERENCE:	**77,245**	**107,455**	**96,868**	**70,576**	**44,331**

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7.1.4.2 Single Dry Year

For a single dry year, PCWA anticipates receiving reduced supplies as described in **Section 7.1.3.2**. Demands presented in **Table 4-10** were used; however, the untreated wholesale demands were updated to reflect PCWA's supply available during a single dry year per wholesale contracts, as presented in **Table 4-3**. The supply and demand comparison for the single-dry year is presented in **Table 7-6**.

Table 7-6. Single Dry Year Supply and Demand Comparison

	2025	2030	2035	2040	BUILDOUT
Supply Totals	185,550	207,550	210,050	213,050	215,050
Demand Totals	139,908	147,601	158,852	186,724	214,719
DIFFERENCE:	**45,642**	**59,949**	**51,198**	**26,326**	**331**

7.1.4.3 Five-Consecutive Year Drought

For purposes of this UMWP, PCWA has assessed a five-year series of dry conditions that mimic supply conditions from 1988 through 1992. The supplies available during this series of multiple dry years were not as constrained as during the representative single dry year condition. Although, as experienced with the 2012-2016 drought period, actual water supply availability over multiple years is dependent on many factors that will require flexibility for PCWA to manage supplies and implementation of its WSCP stages accordingly.

The supply assumptions for the five-consecutive year drought condition are described in **Section 7.1.3.3**. Demands presented in **Table 4-10** were used; however, the untreated wholesale demands were updated to reflect PCWA's supply available during a five-consecutive year drought per wholesale contracts, as presented in **Table 4-3**. The supply and demand comparison for the five-consecutive year drought is presented in **Table 7-7**.

Table 7-7. Multiple Dry Years Supply and Demand Comparison

		2025	2030	2035	2040	BUILDOUT
First Year	Supply Totals	249,100	279,850	282,350	285,350	287,350
	Demand Totals	144,555	153,845	166,932	196,224	224,219
DIFFERENCE:		**104,545**	**126,005**	**115,418**	**89,126**	**63,131**
Second Year	Supply Totals	249,100	279,850	282,350	285,350	287,350
	Demand Totals	144,555	153,845	166,932	196,224	224,219
DIFFERENCE:		**104,545**	**126,005**	**115,418**	**89,126**	**63,131**
Third Year	Supply Totals	249,100	279,850	282,350	285,350	287,350
	Demand Totals	144,555	153,845	166,932	192,224	224,219
DIFFERENCE:		**104,545**	**126,005**	**115,418**	**89,126**	**63,131**
Fourth Year	Supply Totals	249,100	279,850	282,350	285,350	287,350
	Demand Totals	144,555	153,845	166,932	192,224	224,219
DIFFERENCE:		**104,545**	**126,005**	**115,418**	**89,126**	**63,131**
Fifth Year	Supply Totals	249,100	279,850	282,350	285,350	287,350
	Demand Totals	144,555	153,845	166,932	192,224	224,219
DIFFERENCE:		**104,545**	**126,005**	**115,418**	**89,126**	**63,131**

7.2 Drought Risk Assessment

A new provision of the Water Code directs Suppliers to prepare a DRA. The DRA considers a drought period lasting five consecutive years, starting from the year following the when the assessment is conducted. For this UWMP, the DRA considers five consecutive dry years from 2021 through 2025. PCWA may conduct an interim update or updates to this DRA within the five-year cycle of its UWMP update.

The DRA analysis allows PCWA to examine the management of its supplies during stressed hydrologic conditions and an opportunity to evaluate if PCWA may need to enact its WSCP during the next drought period lasting at least five years.

The projected gross water use for the five-year DRA is based on unconstrained potable demand.

The reliability of supplies over a five-consecutive year drought is described in **Section 7.1.3.3**. Demands presented in **Table 4-10** were used; however, the untreated wholesale demands were updated to reflect PCWA's supply available during a five-consecutive year drought per wholesale contracts, as presented in **Table 4-3**. **Table 7-8** compares the total projected supply and demand for the 5-year DRA for 2021 through 2025. As shown, PCWA does not expect to enact its WSCP for a 5-year consecutive year drought based on the 2021-2025 unrestricted potable demand projections and the current supply portfolio and reliability.

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Table 7-8. Five-Year Drought Risk Assessment

2021	Gross Water Use	133,844
	Total Supplies	249,100
	Surplus/Shortfall without WSCP Action	115,256
	Planned WSCP Actions (Use Reduction and Supply Augmentation)	
	WSCP (Supply Augmentation Benefit)	0
	WSCP (Use Reduction Savings Benefit)	0
	Revised Surplus/Shortfall	115,256
	Resulting Percent Use Reduction from WSCP Action	0%
2022	Gross Water Use	141,957
	Total Supplies	249,100
	Surplus/Shortfall without WSCP Action	107,143
	Planned WSCP Actions (Use Reduction and Supply Augmentation)	
	WSCP (Supply Augmentation Benefit)	0
	WSCP (Use Reduction Savings Benefit)	0
	Revised Surplus/Shortfall	107,143
	Resulting Percent Use Reduction from WSCP Action	0%
2023	Gross Water Use	150,070
	Total Supplies	249,100
	Surplus/Shortfall without WSCP Action	99,030
	Planned WSCP Actions (Use Reduction and Supply Augmentation)	
	WSCP (Supply Augmentation Benefit)	0
	WSCP (Use Reduction Savings Benefit)	0
	Revised Surplus/Shortfall	99,030
	Resulting Percent Use Reduction from WSCP Action	0%
2024	Gross Water Use	158,184
	Total Supplies	249,100
	Surplus/Shortfall without WSCP Action	90,916
	Planned WSCP Actions (Use Reduction and Supply Augmentation)	
	WSCP (Supply Augmentation Benefit)	0
	WSCP (Use Reduction Savings Benefit)	0
	Revised Surplus/Shortfall	90,916
	Resulting Percent Use Reduction from WSCP Action	0%
2025	Gross Water Use	166,297
	Total Supplies	249,100
	Surplus/Shortfall without WSCP Action	82,803
	Planned WSCP Actions (Use Reduction and Supply Augmentation)	
	WSCP (Supply Augmentation Benefit)	0
	WSCP (Use Reduction Savings Benefit)	0
	Revised Surplus/Shortfall	82,803
	Resulting Percent Use Reduction from WSCP Action	0%

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8 Water Shortage Contingency Plan

This Chapter provides a summary of PCWA's Water Shortage Contingency Plan.

IN THIS CHAPTER

- Water Shortage Contingency Plan Overview

The WSCP is a detailed plan for how PCWA intends to respond to foreseeable and unforeseeable water shortages. A water shortage occurs when the supply is reduced to a level that cannot support the normal demand at any given time or if the state mandates a cutback regardless of supplies.

The intent of the WSCP is to provide guidance to PCWA's governing body, its staff, and the public by identifying anticipated water shortages and response actions to allow for efficient management of any water shortage with predictability and accountability. Good preparation provides the tools to maintain reliable supplies and reduce the impacts of supply interruptions due to extended drought or catastrophic supply interruptions.

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PCWA's WSCP describes the following:

1. **Water Supply Reliability Analysis:** Identifies the key issues that may trigger a shortage condition within the service area.
2. **Annual Water Supply and Demand Assessment Procedures:** Describes the methodology for assessing the system's reliability for the coming year and the steps to formally approve any water shortage levels and response actions.
3. **Six Standard Water Shortage Stages:** Establishes water shortage levels to clearly identify and prepare for shortages.
4. **Shortage Response Actions:** Describes the response actions that may be implemented or considered for each stage to reduce gaps between supply and demand.
5. **Communication Protocols:** Describes communication protocols to ensure customers, the public, and government agencies are informed of shortage conditions and requirements.
6. **Compliance and Enforcement:** Defines compliance and enforcement actions available to administer demand reductions.
7. **Legal Authority:** Lists the legal authorities available to declare a water shortage and implement and enforce response actions.
8. **Financial Consequences of WSCP Implementation:** Describes the anticipated financial impact of implementing water shortage stages and identifies mitigation strategies.
9. **Monitoring and Reporting:** Summarizes the monitoring and reporting techniques to evaluate the effectiveness of shortage response actions and overall WSCP implementation. Results are used to determine if additional shortage response actions should be activated or if efforts are successful and response actions should be adjusted.
10. **WSCP Refinement Procedures:** Discusses the factors that may trigger updates to the WSCP as new information becomes available.
11. **Special Water Features Distinctions:** Defines special water features, which are separate from pools and spa.
12. **Plan Adoption, Submittal, and Availability:** Describes the process for the WSCP adoption, submittal, and availability after each revision.

The 2021 WSCP is a standalone document that can be modified as needed and is included as **Appendix H**.

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9 Demand Management Measures

Consistent with the requirements of the CWC, this Chapter describes the wholesale and retail systems' demand measurement measures (DMM) that have been implemented in the past five years and will continue to be implemented by PCWA.

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IN THIS CHAPTER

- Wholesale DMM
- Retail DMM

9.1 Demand Management Measures for Wholesale Suppliers

PCWA's wholesale system DMMs and implementation over the past five years are discussed in the following sections.

9.1.1 Metering

PCWA's wholesale system is fully metered. Meters are read monthly and test intervals are updated based on prior years test results. Meters are tested at low, medium, and high thresholds based on meter size. Meters are rebuilt, recalibrated or replaced based on test results or age.

9.1.2 Public Education/Outreach and Wholesale Supplier Assistance

PCWA participates in variety of outreach events to promote water conservation, sustainable landscaping, and efficient irrigation. These events are discussed in **Section 9.2.4**. PCWA also coordinates with their retail purveyors during a declared WSCP stage. During a declared WSCP stage, PCWA will provide messaging and informational material for their retail purveyors, as well as other interested stakeholders, to use to help reduce demands.

9.1.3 Water Conservation Program Coordination and Staffing

When mutually agreeable and beneficial, PCWA provides assistance to wholesale customers' water conservation programs. PCWA may include technical support for program development, regional partnerships, presenting and sharing information on water conservation programs.

9.1.4 Asset Management

PCWA’s asset management program is made up of several systems and processes. Typically, all horizontal assets of the distribution system including meters, valves, pipelines are maintained in GIS. GIS contains attributes of the various infrastructure including installation date and material type. While vertical assets, such as pump stations, storage tanks, and water treatment plants are also in GIS, PCWA utilizes a computerized maintenance management system (CMMS) to store information on the various components of these facilities and implement a preventative maintenance schedule. Crews are scheduled to fix and repair mains and services. Information regarding leaks is then stored in the GIS system and utilized to prioritize treated water main replacement projects. Large replacement projects as well as major upgrades and/or rehabilitation projects of the facilities are identified and prioritized in PCWA’s capital improvement program, which identifies projects for the next five years. The 5-year capital improvement program is updated annually. PCWA also conducted a 25-year renewal and replacement study to support long range planning efforts.

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9.2 Existing Demand Management Measures for Retail

PCWA's retail system DMMs and implementation over the past five years are discussed in the following sections.

9.2.1 Water Waste Prevention Ordinances

PCWA actively enforces prohibitions against wasteful use of water in PCWA's Rules and Regulations. Water waste prevention actions are addressed in PCWA's WSCP. PCWA enforces these actions regardless of the availability of water.

9.2.2 Metering

PCWA's retail system is fully metered and PCWA is able to understand the characteristics of its customers' use. To assist with this understanding, PCWA maintains a database of meter use information, categorized by land-use classification. Existing customers are categorized into a number of classifications in the meter database including but not limited to single family residential, multi-family residential, commercial, industrial, municipal, and landscape.

9.2.3 Conservation Pricing

Conservation pricing is designed to discourage wasteful water habits and encourage conservation. PCWA has increasing block water rate structure for all customer classes except for fire lines, which is uniform.

9.2.4 Public Education and Outreach

PCWA has made water efficiency one of the core focuses of its communications outreach to its customers and has utilized a variety of innovative ways of incorporating traditional and new media, public events, and partnerships with local businesses.

PCWA participates in a variety of outreach events to promote water conservation, sustainable landscaping, and efficient irrigation. From 2016 through 2019, PCWA participated in a total of 29 events (approximately 7 events each year). These events include Run Rocklin, Auburn Some Kind of Earth Day, Mulch Mayhem, Home Depot Water Event, and Garden Faire.

In 2019, PCWA was honored with its first United States Environmental Protection Agency (EPA) WaterSense Excellence Award in Education and Outreach. PCWA received this honor for participation in Fix a Leak Week and partnering with local Eagle Scout candidates as described in the Strategic Partnerships section below.

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Online Advertising

In 2016, PCWA began an extensive online geo-targeted advertising campaign on news and weather websites and Facebook. The advertising campaign has been on the news and weather websites including AccuWeather, New York Times, Sacramento Bee, San Francisco Chronicle, USA Today, Weather.com, and the Washington Post. The ads have promoted PCWA's rebates for sprinkler system upgrades, weather-based sprinkler controllers, water-wise house calls, the benefits of fall planting, leak detection, low-water use gardens, WaterSense, and more.

Some of these ads are described below with number of interactions with the ads since 2016:

- Sprinklers Anonymous, a humorous video about a support group for people who overwatered their lawn reached nearly 65,000 people and generated 262,740 impressions on Facebook.
- An animated Leak Detective video received 57,957 plays on Facebook.
- A Valentine's themed promotion for WaterSense's "Show Your Bathroom Some Love" campaign. The ad campaign ran on Facebook and news and weather websites and featured colorful pastel candy hearts imprinted with the WaterSense logo and fun water conservation messages, like "Detect My Leak," "Don't be a Drip," "You Turn My Faucets," and "Water Wise 4Ever." The ads, which ran for two weeks, received a combined 991 clicks and generated 310,569 impressions.

Traditional Media Advertising Campaigns/Public Service Announcements

PCWA has created radio and outdoor advertising campaigns to promote various initiatives, including:

- Mulch Mayhem, a semi-annual event offering free mulch to its customers.
- Rethink Your Yard, a campaign highlighting customers who have created low-water use yards.
- Water-Wise House and Business Calls, a complimentary service offered by PCWA that helps customers detect leaks, improve their water efficiency and find out about available rebates.

School Outreach

In 2019, PCWA went the "extra mile" to promote WaterSense's Fix a Leak Week by developing a unique partnership with Del Oro High School. PCWA worked with the high school's video production and broadcasting class to create a thirty second video showing the Golden Eagle, the school's mascot, racing the region's water mascot Les Leaky before a crowd of students holding up signs that read "Water Sense Rules" and chanting "Beat the Leak." KTXL-TV (FOX40) covered the filming of the video live on their morning newscast. The segment was three minutes long and reached nearly 50,000 people for a publicity value of $7,200. The video was used as the central part of an online Fix a Leak Week advertising campaign on Facebook. The online campaign generated 790 clicks and 388,405 impressions.

Strategic Partnerships

PCWA has developed partnerships with local nurseries and irrigation supply stores to promote the benefits of fall plantings and PCWA's rebate program. For the fall planting campaign, PCWA created colorful graphics and promotional material, including posters, banners and tip cards that were placed near the register at the participating stores. PCWA also created a new web page on PCWA.net to promote the fall planting effort, developed a radio public service announcement that was used by the local radio station, and a PCWA spokesperson appeared on Studio 40 Live, a local morning talk show on FOX40, to talk about the benefits of fall planting, low-water use plants and irrigation upgrades.

In addition, PCWA partnered with two Eagle Scout candidates and the City of Auburn Fire Department in a months-long project to transform the fire station's expansive swath of lawn into a beautiful fire-resistant, water-wise landscape. The project was part of the boys' application to earn the rank of Eagle

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Scout. The new landscape features more than 100 beautiful flowers, plants and shrubs, as well as an efficient irrigation system with subsurface drip irrigation and a WaterSense-labeled weather-based sprinkler timer. The project was covered by top-rated Sacramento news radio station KFBK-AM/FM, profiled in PCWA's seasonal newspaper insert and customer newsletter, and highlighted on social media and on the PCWA website. The landscape features educational signage and serves as an on-going demonstration garden for the community.

Regional Public Education and Outreach Programs

In addition to local public education and outreach programs, PCWA also participates in a regional public education and outreach program through the RWA. The RWA is a joint powers authority formed in 2001 to promote collaboration on water management and water supply reliability programs in the greater Sacramento, Placer, El Dorado, Yolo and Sutter counties. In collaboration with 22 water provider members and other wastewater, stormwater and energy partners, RWA formed the Water Efficiency Program (WEP) in 2001 to bring cost effectiveness through economies of scale to public education and outreach activities.

The WEP operates on an average annual budget of $530,000 and is supplemented by grant funding. Grants are an important funding resource for the WEP. Since 2003, WEP has been awarded $13.2 million in grant funding for public outreach and education as well as a variety of rebate programs, fixture direct install programs, system water loss, individualized customer usage reports, large landscape budgets and more. Of those funds, $3.8 million was awarded between 2016 and 2020.

The main function of WEP is to develop and distribute public outreach messages to customers in the region by collaborating with its water provider members. WEP distributes these messages on a regional scale through regional media and advertising buys and was honored with the United States EPA WaterSense Excellence in Education and Outreach Award in 2016. From 2016-2020, WEP created a series of public outreach campaigns, including the "Rethink Your Yard" Campaign a "Check and Save" message encouraging residents to check the soil moisture with a moisture meter before turning on sprinklers.

Campaigns are implemented through both paid advertising buys and earned media from public service announcements (PSAs). Every year the campaigns can be heard on local radio stations such as Capital Public Radio and online through google, Facebook and YouTube advertisements. The 2016-2020 WEP public outreach campaigns production is summarized in **Table 9-1**.

Table 9-1. WEP Advertising Summary

MEDIA TYPE	DETAILS	IMPRESSIONS
Radio	3,443 radio advertisements ran	17.2 million impressions
Digital	Facebook, Google Display Network, Spotify – 1.8 million digital advertisements ran (262,900 clicks)	24.3 million impressions
Billboards	Billboards throughout region	51.6 million impressions
Public Service Announcements	$570,000 in value had they been purchased as advertising.	20 million impressions

WEP continues public outreach through its own Facebook page and website bewatersmart.info to reach customers throughout the region. From 2016-2020, WEP created about 60 Facebook posts a year featuring water saving tips and other relevant information. Between 2016 and 2020, the website averaged 96,000 unique visitors per year. For more targeted outreach, WEP distributed quarterly e-

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newsletters to participating residents. The e-newsletters are filled with water savings tips, upcoming events and other interesting articles. The e-newsletter reaches 6,300 households.

In addition to public outreach, WEP also coordinates school education activities. Since 2012, WEP has hosted the Water Spots Video Contest for high school and middle school students. WEP provides a new contest theme each year and provides the region's teacher and students with relevant facts and images to help develop 30 second video PSAs.

To support public outreach messaging and water savings tips, WEP also coordinated several regional rebate programs, which were partially funded by state and federal grants. A variety of rebate options were provided including toilets, clothes washers and irrigation efficiencies (full summary in **Table 9-2**). Collectively these rebates and installations will produce an estimated lifetime (10 years) savings of 6 billion gallons of water and 6.4 million kilowatt hours of energy.

9.2.5 Programs to Assess and Manage Distribution System Real Losses

PCWA uses the AWWA Water Audits to perform and validate water audits in compliance with Senate Bill 555. PCWA maintains an active meter testing program for its 3" to 8" meters with testing intervals set at AWWA standard and then updated based on testing results, throughput and age of the meter. PCWA will continue to utilize the water audits and validations to assess areas for water loss improvements.

9.2.6 Water Conservation Program Coordination and Staffing Support

PCWA's Water Efficiency Division is comprised of a Deputy Director, Supervisor, six Water Efficiency Specialists, a Customer Service Specialist and 2 temporary staff. Each full-time team members splits their time among metering and water efficiency programs. The Deputy Director and Supervisor coordinate to manage both the team and water efficiency programs that is implemented by the entire Division.

Contact: Deputy Director of Customer Services – Linda Higgins, (lhiggins@pcwa.net)

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Table 9-2. Regional Rebates and Installation from 2016-2020

REBATE / INSTALLATION TYPE	2016	2017	2018	2019	2020	LIFETIME WATER SAVINGS PER TYPE 2016-2020 (MG)	LIFETIME ENERGY SAVINGS PER TYPE 2016-2020 (KWH)**
High Efficiency Clothes Washers Rebates	491	480	453	366	518	111.2	118,094
High Efficiency Toilets Rebates	4,494	3,124	2,255	1,686	904	512.3	544,076
Smart Irrigation Controllers Rebates	245	358	801	556	1,298	667.9	709,299
Irrigation Efficiencies Rebates*	21,271	5,879	5.548	1,724	NA	3786.4	4,021,178
Turf Replacement Rebates (sq ft)	376,613	584,535	236,064	85,375	NA	474.6	503,980
Toilet Direct Installation	1,943	4,542	968	NA	NA	237.4	252,066
Showerhead Direct Installation	1,141	2,512	704	NA	NA	222.6	236,447
Faucet Aerators Direct Installation	1,162	4,314	317	NA	NA	18.5	19,648
Urinal Direct Installation	NA	403	73	NA	NA	10.2	10,878
TOTAL WATER SAVINGS PER YEAR/LIFETIME (MG)	**285.9**	**138.2**	**104.4**	**42.9**	**32.8**	**6,041.1**	
TOTAL ENERGY SAVINGS PER YEAR/LIFETIME (KWH)**	**303,626**	**146,717**	**110,915**	**45,509**	**34,799**		**6,415,665**

*Includes: pressure regulator equipment, pipe, and pipe fittings, drip, or low volume equipment, and sprinkler heads or nozzles.

**Regional average of 1,062 kilowatt hours per MG

kWh = kilowatt hours; MG = million gallons; NA = no funding available, Lifetime = 10 years

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9.2.7 Other Demand Management Measures

PCWA offers a variety of rebate programs for residential and commercial customers, which help customers upgrade to low-maintenance and water-wise landscapes, as well as to incorporate new and more water-efficient household appliances. When available, PCWA receives RWA grant funding for these rebates. These rebates are as follows:

Residential

Irrigation Efficiencies Rebate. Upgrading existing in-ground irrigation systems with new high efficiency equipment and/or installing an EPA Water Sense approved weather-based irrigation controller up to $500.

Lawn Replacement Rebate. Conversion of water-thirsty lawns to water-efficient landscaping at a rate of $0.50 per square foot up to $500.

High-Efficiency Toilet/Urinal Rebate Program. Replacement of old 3 gallons per flush pre-1994 toilets with new high-efficiency 1.28 gallons per flush toilets. Replacement of commercial urinals with EPA WaterSense approved or waterless urinals.

High-Efficiency Clothes Washing Machine Rebate Program. Replacement of an old clothes washing machine with a new high-efficiency machine that has a CEE Advanced tier 1 or tier 2 water factor.

Commercial

PCWA's commercial customers include businesses, schools, government facilities, parks, hotels, restaurants, and churches.

Irrigation Efficiencies Rebate. Upgrading existing in-ground irrigation systems with new high efficiency equipment and/or installing an EPA Water Sense approved weather-based irrigation controller up to $1,500.

Lawn Replacement Rebate. Conversion of water-thirsty lawns to water-efficient landscaping at a rate of $0.50 per square foot up to $2,000.

High-Efficiency Toilet/Urinal Rebate Program. Replacement of old 3 gallons per flush or pre-1994 toilets with new high-efficiency 1.28 gallons per flush toilets. Replacement of commercial urinals with EPA WaterSense approved or waterless urinals.

Table 9-3 through **Table 9-5** summarize PCWA's rebate programs from 2016 through 2020.

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Table 9-3. 2016-2020 Lawn Removal and Irrigation Efficiencies Rebates

YEAR	LAWN REMOVED (SQ. FT.)	RESIDENTIAL LAWN REBATES	RESIDENTIAL EQUIP REBATES	CII LAWN REBATES	CII EQUIP REBATES	TOTAL REBATES	TOTAL LAWN REBATE AMOUNT	TOTAL EQUIPMENT REBATE AMOUNT	TOTAL AMOUNT REBATED
2016	109,966	138	164	0	2	304	$109,965.50	$42,618.15	$152,583.65
2017	25,066	50	99	1	2	152	$25,066.30	$32,478.18	$57,544.48
2018	27,185	52	102	1	2	157	$27,185.00	$35,429.74	$62,614.74
2019	34,162	33	120	2	1	156	$17,080.96	$38,599.15	$55,680.11
2020	46,660	48	199	0	2	249	$23,330.00	$75,281.12	$98,611.12
TOTALS	**243,039**	**321**	**684**	**4**	**9**	**1018**	**$202,627.76**	**$224,406.34**	**$427,034.10**

Table 9-4. 2016-2020 Toilet and Urinal Rebates

YEAR	TOTAL REBATES	AMOUNT REBATED
2016	257	$26,094.29
2017	191	$18,386.76
2018	138	$14,769.45
2019	330	$33,140.00
2020	176	$17,600.00
TOTAL	**1092**	**$109,990.50**

Table 9-5. 2016-2020 Clothes Washing Machine Rebates

YEAR	TOTAL REBATES	AMOUNT REBATED
2016	56	$8,400
2017	84	$12,600
2018	43	$6,450
2019	16	$2,400
2020	33	$4,950
TOTAL	**232**	**$34,800.00**

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Along with its rebate program, PCWA performs residential, landscape, and CII surveys to help customers find ways to save water and investigate abnormal usage. **Table 9-6** summarizes work orders performed from 2016-2020.

Table 9-6. Water Efficiency Program Work Orders Performed (2016-2020)

	2016	2017	2018	2019	2020	TOTAL
Water Surveys	635	450	284	493	120	1,982
Reread Check Leaks	286	537	571	527	657	2,578
Water Waste	12	16	3	4	2	37

9.3 Implementation Achieve Water Use Targets

PCWA met the SBX7-7 2015 GPCD and 2020 GPCD targets. Despite meeting the SBX7-7 targets, PCWA will continue to implement existing conservation programs and explore additional programs to avoid substantial increases in demands.

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10 Plan Adoption, Submittal, and Implementation

This Chapter describes steps taken to adopt and submit the UWMP and to make it publicly available. PCWA's 2020 UWMP was adopted on June 3,2021.

10.1 Notice of Public Hearing

Prior to adoption of the WSCP and 2020 UWMP, PCWA held a public hearing regarding its WSCP on May 20,2021 and its 2020 UWMP on June 3, 2021. Before the hearings, PCWA made a draft of the WSCP and the 2020 UWMP available for public inspection at PCWA's office and on the PCWA website. Pursuant to CWC Section 10642, general notice of the public hearing was provided through publication of the hearing date and time and posting of the hearing at PCWA's office.

Table 2-1 provides a summary of the notifications that were issued as a part of the development of PCWA's UWMP.

IN THIS CHAPTER

- Public Hearing and Adoption
- Plan Submittal
- Plan Availability
- Amending Adopted UWMP or WSCP

10.2 Public Hearing and Adoption

PCWA notified the public within its service area of the opportunity to provide input regarding the Plan. A copy of the public outreach materials, including newspaper notices and invitation letters, are included in **Appendix A**.

Before the hearing, PCWA made a draft of the 2020 UWMP available for public inspection at PCWA's office and on the PCWA website. Pursuant to CWC Section 10642, general notice of the public hearing was provided through publication of the hearing date and time and posting of the hearing at PCWA's office.

The 2020 Draft WSCP was publicly reviewed during the May 20, 2021 public hearing. This hearing provided the cities and counties and other members of the public a chance to review the staff report and attend the hearing to provide comment. The public hearing took place before the adoption allowing opportunity for the report to be modified in response to public input. Following the public hearing, the 2020 WSCP was adopted by PCWA on May 20, 2021. Following the public hearing, the 2020 UWMP was adopted by PCWA on June 3, 2021.

Public Draft

A copy of the Resolution of Plan Adoption signed by the PCWA board of directors and attached cover letter addressed to DWR is included as **Appendix I** of the UWMP. The UWMP includes all applicable information necessary to meet the requirements of California Water Code. The 2020 UWMP and WSCP were submitted to the DWR within 30 days of adoption.

10.3 Plan Submittal

A hard copy of the Final 2020 UWMP and WSCP were sent to the California State Library and electronical copies to DWR (electronically using the WUEdata reporting tool), and electronical copies to all cities and counties within PCWA's service area within 30 days of adoption.

10.4 Public Availability

To fulfill the requirements of Water Code Section 10642 of the UWMPA, PCWA made the 2020 UWMP and WSCP available online (see below) and at the main PCWA office located at 144 Ferguson Road, Auburn, CA 95603, between the hours of 8:00 am and 5:00 pm, for public review within 30 days of adoption.

10.5 Amending an Adopted UWMP or WSCP

Amendments to the PCWA's 2020 UWMP and WSCP will be made on an as needed basis. Should PCWA need to amend the adopted 2020 UWMP or WSCP in the future, PCWA will hold a public hearing for review of the proposed amendments to the document and send a 60-day notification letter to all cities and counties within their service area and notify the public in same manner as set forth in this UWMP. Once the amended document is adopted, a copy of the finalized version will be distributed to the California State Library, DWR (electronically using the WUEdata reporting tool), and all cities and counties within PCWA's service area within 30 days of adoption. The finalized version will also be made available to the public both online on PCWA's website and in person at PCWA's main office during normal business hours.

Public Draft

A

Appendix A - Notification to Agencies

Public Draft

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November 19, 2020

Jennifer Hanson
City of Lincoln
600 Sixth Street
Lincoln, CA 95648

Subject: PCWA's 2020 UWMP Notification Letter

Dear Jennifer Hanson,

As you may know, the 2020 Urban Water Management Plan (UWMP) updates are being prepared for both of our agencies for submittal to the Department of Water Resources (DWR) by July 1, 2021. As a Placer County Water Agency (PCWA) wholesale treated water customer, we want to officially notify you of PCWA's 2020 UWMP efforts, pursuant to California Water Code Section 10621(b).

In addition to this notification, this letter is to initiate coordination of our water projections in accordance with Water Code Section 10631(j). The following is a modified summary of our 2015 UWMP that we intend to include in our 2020 UWMP:

In addition to being a retail purveyor of treated and raw water suppliers, PCWA also wholesales treated water to a number of retail water systems located within Zone 1. This section presents the current and projected demands associated with these wholesale arrangements, and the basis for those projections.

- *City of Lincoln – The City of Lincoln is the largest retail customer of wholesale treated water from PCWA, receiving about 90 percent of the wholesale treated water currently sold by PCWA. The City has a renewable contract with the PCWA for treated surface water. PCWA, based on the City's current General Plan, will supply to the City limits, on a "first-come- first-served" basis, the volume of potable surface water required to meet maximum day demands for build-out of the City limits. With significant growth occurring over the last decade, the City has steadily increased its demand for treated water from PCWA under the first-come-first served basis. During the course of this 2020 UWMP preparation, PCWA coordinated with the City to understand its most recent forecast for future demands. According to discussions with the City, the City anticipates total potential demands estimated to be about 37,400 acre-feet annually to* *serve the entire City's projected growth.*[1] *While some of this demand may be met with other City water assets under some circumstances, the City primarily plans for this demand to be served by PCWA supplies. The table below provides our preliminary representation of your future demands on our water system based on current demands and demand projections used in the 2020 UWMP.*

Table 1. Current and Projected Water Demands, AFY

	Current	2025	2030	2035	2040	BO
Lincoln	8,700	13,239	15,421	18,335	21,187	37,392

If you do not agree with this representation or with the explanation, please contact us immediately and we can collaborate on refined characterizations. The values and explanation may be adjusted throughout the UWMP process based on your input and PCWA's UWMP analysis. Following this initial coordination, we will provide you with our draft UWMP analysis for your input and review in February 2021.

Notification (including date, time, and location) for a public hearing to adopt our 2020 UWMP will be given at a later date. Access to a copy of the draft UWMP for review will be given at that time.

If you have any questions or concerns regarding our current representation of your demands, please contact me at (530) 823-2066. We appreciate your on-going efforts to help us incorporate the most representative information in our respective UWMPs.

Sincerely,

Jeremy Shepard, P.E.
Deputy Director of Technical Services

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[1] This demand is significantly lower than the 53,000 acre-feet the City had initially estimated in its 2008 General Plan. The reduction is primarily a result of on-going conservation efforts coupled with building and plumbing code requirements, the State's Model Water Efficient Landscape Ordinance, and low-water using appliances and fixtures.

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November 19, 2020

Audie Foster
California American Water Company
4701 Beloit Drive
Sacramento, CA 95838

Subject: PCWA's 2020 UWMP Notification Letter

Dear Audie Foster,

As you may know, the 2020 Urban Water Management Plan (UWMP) updates are being prepared for both of our agencies for submittal to the Department of Water Resources (DWR) by July 1, 2021. As a Placer County Water Agency (PCWA) wholesale treated water customer, we want to officially notify you of PCWA's 2020 UWMP efforts, pursuant to California Water Code Section 10621(b).

In addition to this notification, this letter is to initiate coordination of our water projections in accordance with Water Code Section 10631(j). The following is a modified summary of our 2015 UWMP that we intend to include in our 2020 UWMP:

In addition to being a retail purveyor of treated and raw water suppliers, PCWA also wholesales treated water to a number of retail water systems located within Zone 1. This section presents the current and projected demands associated with these wholesale arrangements, and the basis for those projections.

- *California American Water – With multiple retail service areas around greater Sacramento, California American (Cal-Am) specifically receives wholesale treated supplies from PCWA for its West Placer community (located in western Placer County just southwest of the City of Roseville). Currently, this Cal-Am service area receives about 10 percent of the PCWA wholesale treated supplies. The general area of Cal-Am's West Placer service area is anticipated to grow, resulting in an expanded wholesale agreement with Cal-Am. For purposes of PCWA's long-term planning, the anticipated growth in this general area is represented within this category of PCWA customers, and is subdivided into two growth areas: (1) Placer Vineyards and (2) Existing Cal-Am.*
    1. *Placer Vineyards: This currently undeveloped region is slated for significant growth, with over 13,000 new residential units expected over the planning horizon. Demands for this project were estimated using the project's 2006 study as a baseline, then reducing demands to reflect the various unit demand factor drivers discussed in Section 4.3.*[1] *PCWA reduced the*

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[1] MacKay & Somps Civil Engineers, Water Supply and Distribution Master Plan for Placer Vineyards Specific Plan, March 2006.

project's overall demand of 11,400 acre-feet by about 25 percent to reflect today's estimated water demand for the same project.

Existing Cal-Am: This includes the existing service of about 1,000 acre-feet annually, with an expected slight reduction through customer conservation activities over time, and significant new growth. Combined, this portion of Cal-Am's service is expected to increase to nearly 2,400 acre-feet.

The table below provides our preliminary representation of your future demands on our water system based on current demands and demand projections used in the 2020 UWMP.

Table 1. Current and Projected Water Demands, AFY

	Current	2025	2030	2035	2040	BO
Cal-Am	1,021	1,178	1,404	1,684	1,965	2,385
Placer Vineyards	-	1,688	3,376	5,064	6,752	8,440

If you do not agree with this representation or with the explanation, please contact us immediately and we can collaborate on refined characterizations. The values and explanation may be adjusted throughout the UWMP process based on your input and PCWA's UWMP analysis. Following this initial coordination, we will provide you with our draft UWMP analysis for your input and review in February 2021.

Notification (including date, time, and location) for a public hearing to adopt our 2020 UWMP will be given at a later date. Access to a copy of the draft UWMP for review will be given at that time.

If you have any questions or concerns regarding our current representation of your demands, please contact me at (530) 823-2066. We appreciate your on-going efforts to help us incorporate the most representative information in our respective UWMPs.

Sincerely,

Jeremy Shepard, P.E.
Deputy Director of Technical Services

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November 19, 2020

Dominick Casey
City of Roseville
2005 Hilltop Circle
Roseville, CA 95747

Subject: PCWA's 2020 UWMP Notification Letter

Dear Dominick Casey,

As you may know, the 2020 Urban Water Management Plan (UWMP) updates are being prepared for both of our agencies for submittal to the Department of Water Resources (DWR) by July 1, 2021. As a Placer County Water Agency (PCWA) wholesale raw water customer, we want to officially notify you of PCWA's 2020 UWMP efforts, pursuant to California Water Code Section 10621(b).

In addition to this notification, this letter is to initiate coordination of our water projections in accordance with Water Code Section 10631(j). The following is a modified summary of our 2015 UWMP that we intend to include in our 2020 UWMP:

PCWA's current contract with the City of Roseville (Roseville) includes an annual entitlement of 30,000 acre-feet of water from the Middle Fork Project (MFP). Roseville's available surface water supply from the MFP is subject to terms in its PCWA contract, combined with Water Forum Agreement restrictions that limit the amount of water that Roseville is able to divert from the American River.

According to Roseville's Water Forum Purveyor Specific Agreement, Roseville's American River diversion restrictions are dependent upon the projected March through November UIFR. Roseville can divert 54,900 acre-feet per year from the American River in wet years (when projected March through November UIFR is greater than 950,000 acre-feet). During drier years when the UIFR is between 950,000 and 400,000 acre-feet, Roseville decreases its diversion amounts from 54,900 acre-feet per year down to 39,800 acre-feet per year. During the driest years when projected March through November UIFR is less than 400,000 acre-feet, the Water Forum signatories have agreed to meet and confer to develop a plan for water use.

The MFP supply will be delivered to Roseville pursuant to its contract with PCWA and Water Forum Agreement commitments, as described above. PCWA intends to meet all obligations of its contract with Roseville as future conditions and contract terms evolve. Based on coordination with Roseville during *preparation of this 2020 UWMP, PCWA's interpretation of Roseville's contractual demand for MFP water is 30,000 acre-feet in all year types.*

For purposes of demand forecasting, the 2040 demand is reached incrementally, growing from the current demand of 18,253 acre-feet (the 2015 delivered quantity) at a rate of 5 percent annually to 2040, then remaining at the maximum value through the remainder of PCWA's planning horizon as summarized in the table below.

Table 1. Current and Projected Water Demands, AFY

	Current	Year-Type	2025	2030	2035	2040	BO
Roseville	18,253	Average	22,816	28,520	30,000	30,000	30,000
		Multi-Dry	22,816	28,520	30,000	30,000	30,000
		Single-dry	22,816	28,520	30,000	30,000	30,000

If you do not agree with this representation or with the explanation, please contact us immediately and we can collaborate on refined characterizations. The values and explanation may be adjusted throughout the UWMP process based on your input and PCWA's UWMP analysis. Following this initial coordination, we will provide you with our draft UWMP analysis for your input and review in February 2021.

Notification (including date, time, and location) for a public hearing to adopt our 2020 UWMP will be given at a later date. Access to a copy of the draft UWMP for review will be given at that time.

If you have any questions or concerns regarding our current representation of your demands, please contact me at (530) 823-2066. We appreciate your on-going efforts to help us incorporate the most representative information in our respective UWMPs.

Sincerely,

Jeremy Shepard, P.E.
Deputy Director of Technical Services

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November 19, 2020

Paul Helliker
San Juan Water District
9935 Auburn Folsom Road
Granite Bay, CA 95746

Subject: PCWA's 2020 UWMP Notification Letter

Dear Paul Helliker,

As you may know, the 2020 Urban Water Management Plan (UWMP) updates are being prepared for both of our agencies for submittal to the Department of Water Resources (DWR) by July 1, 2021. As a Placer County Water Agency (PCWA) wholesale raw water customer, we want to officially notify you of PCWA's 2020 UWMP efforts, pursuant to California Water Code Section 10621(b).

In addition to this notification, this letter is to initiate coordination of our water projections in accordance with Water Code Section 10631(j). The following is a modified summary of our 2015 UWMP that we intend to include in our 2020 UWMP:

PCWA's current contract with SJWD includes an annual entitlement of 25,000 acre-feet of water from the Middle Fork Project (MFP). SJWD's available surface water supply from the MFP is subject to terms in its PCWA contract, combined with Water Forum Agreement restrictions that limit the amount of water that SJWD is able to divert from the American River. SJWD also has an agreement with the City of Roseville (the City) to supply 4,000 acre-feet of its PCWA contract supply to the City in wet years, as defined in the Water Forum Agreement.

According to SJWD's Water Forum Purveyor Specific Agreement, SJWD's American River diversion restrictions are dependent upon the projected March through November Unimpaired Inflow into Folsom Reservoir (UIFR). SJWD can divert its full 82,200 acre-feet per year from the American River in wet years (when projected March through November UIFR is greater than 950,000 acre-feet). This would include the 25,000 acre-feet MFP supply from PCWA. During drier years when the UIFR is between 950,000 and 400,000 acre-feet, SJWD decreases its diversion amounts from 82,200 acre-feet per year to 54,200 acre-feet per year, which includes a reduction of the MFP supply to 10,000 ac-ft. During the driest years when projected March through November UIFR is less than 400,000 acre-feet, the Water Forum signatories have agreed to meet and confer to develop a plan for water use.

The MFP supply will be delivered to SJWD pursuant to its contract with PCWA and Water Forum Agreement commitments, as described above. In the future, if SJWD amends its current Warren Act Contract with the U.S. Bureau of Reclamation to include delivery of MFP water into its Sacramento County retail service area, PCWA will reevaluate SJWD's build-out demand and update in future UWMP projections. PCWA intends to meet all obligations of its contract with SJWD as future conditions and contract terms evolve.

Based on coordination with SJWD during preparation of each purveyor's 2020 UWMP, SJWD's demand projections through 2040 estimate total retail demand of 20,672 acre-feet. PCWA's interpretation of SJWD's 2040 demand for MFP water in its Placer County retail service area in wet and normal years is 15,500 acre-feet plus an additional 4,000 acre-feet (Roseville supply). For purposes of this UWMP, the Roseville supply is not available in single-dry and multi-dry conditions. The primary SJWD supply is assumed to remain at 15,500 acre-feet under multi-dry year conditions, but drop to 10,000 acre-feet in driest years.

For purposes of demand forecasting, the 2040 demand is reached incrementally, growing from the current estimated 9,258 acre-feet (the 2018 delivered quantity) at a rate of 3 percent annually to 2040, then remaining at the maximum value through the remainder of PCWA's planning horizon as depicted by table below:

Table 1. Current and Projected Water Demands, AFY

	Current	*Year-Type*	*2025*	*2030*	*2035*	*2040*	*BO*
San Juan Water District	*9,258*	*Average*	*10,647*	*12,244*	*14,080*	*15,500*	*15,500*
		Multi-Dry	*10,647*	*12,244*	*14,080*	*15,500*	*15,500*
		Single-dry	*10,000*	*10,000*	*10,000*	*10,000*	*10,000*

If you do not agree with this representation or with the explanation, please contact us immediately and we can collaborate on refined characterizations. The values and explanation may be adjusted throughout the UWMP process based on your input and PCWA's UWMP analysis. Following this initial coordination, we will provide you with our draft UWMP analysis for your input and review in February 2021.

Notification (including date, time, and location) for a public hearing to adopt our 2020 UWMP will be given at a later date. Access to a copy of the draft UWMP for review will be given at that time.

If you have any questions or concerns regarding our current representation of your demands, please contact me at (530) 823-2066. We appreciate your on-going efforts to help us incorporate the most representative information in our respective UWMPs.

Sincerely,

Jeremy Shepard, P.E.
Director of Technical Services

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December 1, 2020

Dan York
Sacramento Suburban Water District
3701 Marconi Ave, #100
Sacramento, CA 95821

Subject: PCWA's 2020 UWMP Notification Letter

Dear Dan York,

As you may know, the 2020 Urban Water Management Plan (UWMP) updates are being prepared for both of our agencies for submittal to the Department of Water Resources (DWR) by July 1, 2021. As a Placer County Water Agency (PCWA) wholesale raw water customer, we want to officially notify you of PCWA's 2020 UWMP efforts, pursuant to California Water Code Section 10621(b).

In addition to this notification, this letter is to initiate coordination of our water projections in accordance with Water Code Section 10631(j). The following is a modified summary of our 2015 UWMP that we intend to include in our 2020 UWMP:

PCWA's current contract with Sacramento Suburban Water District (SSWD) includes an annual entitlement of 29,000 acre-feet of water from the Middle Fork Project (MFP). SSWD's available surface water supply from the MFP is subject to terms in its PCWA contract, combined with Water Forum Agreement restrictions that limit the amount of water that SSWD is able to divert from the American River.

According to SSWD's Water Forum Purveyor Specific Agreement, SSWD's American River diversion restrictions are dependent upon the projected March through November UIFR. SSWD can divert 29,000 acre-feet per year of MFP water from Folsom Reservoir in wet years (when projected March through November UIFR is greater than 1,600,000 acre-feet). During drier years when the UIFR is less than 1,600,000 acre-feet, SSWD does not receive MFP water from PCWA.

MFP water will be delivered pursuant to SSWD's contract with PCWA and Water Forum Agreement commitments, as described above. PCWA intends to meet all obligations of its contract with SSWD as future conditions and contract terms evolve. Based on the 2020 UWMP, PCWA's interpretation of SSWD's build-out demand for MFP water in normal years is 29,000 acre-feet, reducing to zero acre-feet in single dry and multiple dry years

For purposes of demand forecasting, PCWA is assuming the full demand will occur by 2025 and continue to exist throughout PCWA's 2020 UWMP planning horizon:

Table 1. Current and Projected Water Demands, AFY

	Current	*Year-Type*	*2025*	*2030*	*2035*	*2040*	*BO*
Sacramento Suburban Water District	*Varies*	*Average*	*29,000*	*29,000*	*29,000*	*29,000*	*29,000*
		Multi-Dry	*0*	*0*	*0*	*0*	*0*
		Single-dry	*0*	*0*	*0*	*0*	*0*

If you do not agree with this representation or with the explanation, please contact us immediately and we can collaborate on refined characterizations. The values and explanation may be adjusted throughout the UWMP process based on your input and PCWA's UWMP analysis. Following this initial coordination, we will provide you with our draft UWMP analysis for your input and review in February 2021.

Notification (including date, time, and location) for a public hearing to adopt our 2020 UWMP will be given at a later date. Access to a copy of the draft UWMP for review will be given at that time.

If you have any questions or concerns regarding our current representation of your demands, please contact me at (530) 823-2066. We appreciate your on-going efforts to help us incorporate the most representative information in our respective UWMPs.

Sincerely,

Jeremy Shepard, P.E.
Director of Technical Services

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May 13, 2021

David Mintline
Dutch Flat Mutual Water Company
PO Box 50
Dutch Flat, CA 95714

SUBJECT: Notice of Availability and Hearing for Placer County Water Agency's Draft 2020 Urban Water Management Plan for Public Review

Dear David Mintline:

The Placer County Water Agency (Agency) has updated its Urban Water Management Plan (UWMP) for 2020 as required by the California Water Code (CWC), which requires an update at least every five years. You were notified in November 2020 of the Agency's intent to update its UWMP; this letter is providing notice to interested counties, cities, water suppliers, and other organizations that the draft update is ready for public review and a hearing has been scheduled.

Urban Water Management Plans are intended to ensure prudent levels of water supply planning in the land use entitlement process and incorporate water use efficiency and evaluation of dry year conditions into this planning. The plan content includes a water supply summary, a forecast of future demands, a supply versus demand strategy, including dry year scenarios, elements addressing water use efficiency, and a Water Shortage Contingency Plan.

A copy of the plan will be placed on the Agency's website at www.pcwa.net no later than Tuesday May 20, 2021 and the hearing will be held on Thursday, June 3, 2021 at 2 p.m. at the Agency's Business Center located at 144 Ferguson Road, Auburn, CA. Written comments may be submitted prior to the hearing, addressed to me, and mailed to Placer County Water Agency, PO Box 6570, Auburn, CA, 95604 or emailed to engineering@pcwa.net.

The Agency encourages public input in this plan update. If you have any questions or comments, please do not hesitate to contact me at (530) 823-4886.

Sincerely,

Jeremy Shepard, PE
Deputy Director of Technical Services

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May 13, 2021

Max Bailey
Heather Glen CSD
PO Box 715
Applegate, CA 95703

SUBJECT: Notice of Availability and Hearing for Placer County Water Agency's Draft 2020 Urban Water Management Plan for Public Review

Dear Max Bailey:

The Placer County Water Agency (Agency) has updated its Urban Water Management Plan (UWMP) for 2020 as required by the California Water Code (CWC), which requires an update at least every five years. You were notified in November 2020 of the Agency's intent to update its UWMP; this letter is providing notice to interested counties, cities, water suppliers, and other organizations that the draft update is ready for public review and a hearing has been scheduled.

Urban Water Management Plans are intended to ensure prudent levels of water supply planning in the land use entitlement process and incorporate water use efficiency and evaluation of dry year conditions into this planning. The plan content includes a water supply summary, a forecast of future demands, a supply versus demand strategy, including dry year scenarios, elements addressing water use efficiency, and a Water Shortage Contingency Plan.

A copy of the plan will be placed on the Agency's website at www.pcwa.net no later than Tuesday May 20, 2021 and the hearing will be held on Thursday, June 3, 2021 at 2 p.m. at the Agency's Business Center located at 144 Ferguson Road, Auburn, CA. Written comments may be submitted prior to the hearing, addressed to me, and mailed to Placer County Water Agency, PO Box 6570, Auburn, CA, 95604 or emailed to engineering@pcwa.net.

The Agency encourages public input in this plan update. If you have any questions or comments, please do not hesitate to contact me at (530) 823-4886.

Sincerely,

Jeremy Shepard, PE
Deputy Director of Technical Services

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May 13, 2021

Norman Dean
Meadow Vista County Water District
PO Box 278
Meadow Vista, CA 95722

SUBJECT: Notice of Availability and Hearing for Placer County Water Agency's Draft 2020 Urban Water Management Plan for Public Review

Dear Norman Dean:

The Placer County Water Agency (Agency) has updated its Urban Water Management Plan (UWMP) for 2020 as required by the California Water Code (CWC), which requires an update at least every five years. You were notified in November 2020 of the Agency's intent to update its UWMP; this letter is providing notice to interested counties, cities, water suppliers, and other organizations that the draft update is ready for public review and a hearing has been scheduled.

Urban Water Management Plans are intended to ensure prudent levels of water supply planning in the land use entitlement process and incorporate water use efficiency and evaluation of dry year conditions into this planning. The plan content includes a water supply summary, a forecast of future demands, a supply versus demand strategy, including dry year scenarios, elements addressing water use efficiency, and a Water Shortage Contingency Plan.

A copy of the plan will be placed on the Agency's website at www.pcwa.net no later than Tuesday May 20, 2021 and the hearing will be held on Thursday, June 3, 2021 at 2 p.m. at the Agency's Business Center located at 144 Ferguson Road, Auburn, CA. Written comments may be submitted prior to the hearing, addressed to me, and mailed to Placer County Water Agency, PO Box 6570, Auburn, CA, 95604 or emailed to engineering@pcwa.net.

The Agency encourages public input in this plan update. If you have any questions or comments, please do not hesitate to contact me at (530) 823-4886.

Sincerely,

Jeremy Shepard, PE
Deputy Director of Technical Services

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May 13, 2021

Gerry LaBudde
Weimar Water Co.
PO Box 598
Weimar, CA 95736

SUBJECT: Notice of Availability and Hearing for Placer County Water Agency's Draft 2020 Urban Water Management Plan for Public Review

Dear Gerry LaBudde:

The Placer County Water Agency (Agency) has updated its Urban Water Management Plan (UWMP) for 2020 as required by the California Water Code (CWC), which requires an update at least every five years. You were notified in November 2020 of the Agency's intent to update its UWMP; this letter is providing notice to interested counties, cities, water suppliers, and other organizations that the draft update is ready for public review and a hearing has been scheduled.

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The Agency encourages public input in this plan update. If you have any questions or comments, please do not hesitate to contact me at (530) 823-4886.

Sincerely,

Jeremy Shepard, PE
Deputy Director of Technical Services

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May 13, 2021

Jason Tiffany
Midway Heights County Water District
PO Box 596
Meadow Vista, CA 95722

SUBJECT: Notice of Availability and Hearing for Placer County Water Agency's Draft 2020 Urban Water Management Plan for Public Review

Dear Jason Tiffany:

The Placer County Water Agency (Agency) has updated its Urban Water Management Plan (UWMP) for 2020 as required by the California Water Code (CWC), which requires an update at least every five years. You were notified in November 2020 of the Agency's intent to update its UWMP; this letter is providing notice to interested counties, cities, water suppliers, and other organizations that the draft update is ready for public review and a hearing has been scheduled.

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Jeremy Shepard, PE
Deputy Director of Technical Services

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May 13, 2021

Gerry LaBudde
Christian Valley Park CSD
PO Box 3138
Auburn, CA 95604

SUBJECT: Notice of Availability and Hearing for Placer County Water Agency's Draft 2020 Urban Water Management Plan for Public Review

Dear Gerry LaBudde:

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Deputy Director of Technical Services

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May 13, 2021

Alan Johnston
Folsom Lake Mutual Water Company
6514 Mimus Lane
Granite Bay, CA 95746

SUBJECT: Notice of Availability and Hearing for Placer County Water Agency's Draft 2020 Urban Water Management Plan for Public Review

Dear Alan Johnston:

The Placer County Water Agency (Agency) has updated its Urban Water Management Plan (UWMP) for 2020 as required by the California Water Code (CWC), which requires an update at least every five years. You were notified in November 2020 of the Agency's intent to update its UWMP; this letter is providing notice to interested counties, cities, water suppliers, and other organizations that the draft update is ready for public review and a hearing has been scheduled.

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Deputy Director of Technical Services

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May 13, 2021

David Muscarella
Golden Hills Mutual Water Co.
4061 Miners Drive
Loomis, CA 95650

SUBJECT: Notice of Availability and Hearing for Placer County Water Agency's Draft 2020 Urban Water Management Plan for Public Review

Dear David Muscarella:

The Placer County Water Agency (Agency) has updated its Urban Water Management Plan (UWMP) for 2020 as required by the California Water Code (CWC), which requires an update at least every five years. You were notified in November 2020 of the Agency's intent to update its UWMP; this letter is providing notice to interested counties, cities, water suppliers, and other organizations that the draft update is ready for public review and a hearing has been scheduled.

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Sincerely,

Jeremy Shepard, PE
Deputy Director of Technical Services

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May 13, 2021

Paul Schmidt
Hidden Valley Community Association
7072 Pine Gate Way
Granite Bay, CA 95746

SUBJECT: Notice of Availability and Hearing for Placer County Water Agency's Draft 2020 Urban Water Management Plan for Public Review

Dear Paul Schmidt:

The Placer County Water Agency (Agency) has updated its Urban Water Management Plan (UWMP) for 2020 as required by the California Water Code (CWC), which requires an update at least every five years. You were notified in November 2020 of the Agency's intent to update its UWMP; this letter is providing notice to interested counties, cities, water suppliers, and other organizations that the draft update is ready for public review and a hearing has been scheduled.

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Jeremy Shepard, PE
Deputy Director of Technical Services

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May 13, 2021

Rick LaFrance
Lakeview Hills Community Association
1739 Creekside Drive
Folsom, CA 95630

SUBJECT: Notice of Availability and Hearing for Placer County Water Agency's Draft 2020 Urban Water Management Plan for Public Review

Dear Rick LaFrance:

The Placer County Water Agency (Agency) has updated its Urban Water Management Plan (UWMP) for 2020 as required by the California Water Code (CWC), which requires an update at least every five years. You were notified in November 2020 of the Agency's intent to update its UWMP; this letter is providing notice to interested counties, cities, water suppliers, and other organizations that the draft update is ready for public review and a hearing has been scheduled.

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Jeremy Shepard, PE
Deputy Director of Technical Services

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May 13, 2021

Aly Zimmerman
City of Rocklin
3970 Rocklin Road
Rocklin, CA 95677

SUBJECT: Notice of Availability and Hearing for Placer County Water Agency's Draft 2020 Urban Water Management Plan for Public Review

Dear Aly Zimmerman:

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May 13, 2021

Sean Rabe
Town of Loomis
3665 Taylor Road
Loomis, CA 95650

SUBJECT: Notice of Availability and Hearing for Placer County Water Agency's Draft 2020 Urban Water Management Plan for Public Review

Dear Sean Rabe:

The Placer County Water Agency (Agency) has updated its Urban Water Management Plan (UWMP) for 2020 as required by the California Water Code (CWC), which requires an update at least every five years. You were notified in November 2020 of the Agency's intent to update its UWMP; this letter is providing notice to interested counties, cities, water suppliers, and other organizations that the draft update is ready for public review and a hearing has been scheduled.

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Deputy Director of Technical Services

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May 13, 2021

Jon Donlevy
City of Auburn
1225 Lincoln Way
Auburn, CA 95603

SUBJECT: Notice of Availability and Hearing for Placer County Water Agency's Draft 2020 Urban Water Management Plan for Public Review

Dear Jon Donlevy:

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May 13, 2021

Wes Heathcock
City of Colfax
PO Box 702
Colfax, CA 95713

SUBJECT: Notice of Availability and Hearing for Placer County Water Agency's Draft 2020 Urban Water Management Plan for Public Review

Dear Wes Heathcock:

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Jeremy Shepard, PE
Deputy Director of Technical Services

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PLACER COUNTY WATER AGENCY
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May 13, 2021

Todd Leopold
Placer County CEO
175 Fulweiler Avenue
Auburn, CA 95603

SUBJECT: Notice of Availability and Hearing for Placer County Water Agency's Draft 2020 Urban Water Management Plan for Public Review

Dear Todd Leopold:

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May 13, 2021

Ann Edwards
Sacramento County CEO
700 H Street, Room 7650
Sacramento, CA 95814

SUBJECT: Notice of Availability and Hearing for Placer County Water Agency's Draft 2020 Urban Water Management Plan for Public Review

Dear Ann Edwards:

The Placer County Water Agency (Agency) has updated its Urban Water Management Plan (UWMP) for 2020 as required by the California Water Code (CWC), which requires an update at least every five years. You were notified in November 2020 of the Agency's intent to update its UWMP; this letter is providing notice to interested counties, cities, water suppliers, and other organizations that the draft update is ready for public review and a hearing has been scheduled.

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Deputy Director of Technical Services

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May 13, 2021

Jennifer Hanson
City of Lincoln
600 Sixth Street
Lincoln, CA 95648

SUBJECT: Notice of Availability and Hearing for Placer County Water Agency's Draft 2020 Urban Water Management Plan for Public Review

Dear Jennifer Hanson:

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May 13, 2021

Dominick Casey
City of Roseville
2005 Hilltop Circle
Roseville, CA 95747

SUBJECT: Notice of Availability and Hearing for Placer County Water Agency's Draft 2020 Urban Water Management Plan for Public Review

Dear Dominick Casey:

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The Agency encourages public input in this plan update. If you have any questions or comments, please do not hesitate to contact me at (530) 823-4886.

Sincerely,

Jeremy Shepard, PE
Deputy Director of Technical Services

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May 13, 2021

Greg Jones
Nevada Irrigation District
1036 West Main Street
Grass Valley, CA 95945

SUBJECT: Notice of Availability and Hearing for Placer County Water Agency's Draft 2020 Urban Water Management Plan for Public Review

Dear Greg Jones:

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May 13, 2021

President
Willo-Glen Water Co
PO Box 659
Loomis, CA 95650

SUBJECT: Notice of Availability and Hearing for Placer County Water Agency's Draft 2020 Urban Water Management Plan for Public Review

Dear President:

The Placer County Water Agency (Agency) has updated its Urban Water Management Plan (UWMP) for 2020 as required by the California Water Code (CWC), which requires an update at least every five years. You were notified in November 2020 of the Agency's intent to update its UWMP; this letter is providing notice to interested counties, cities, water suppliers, and other organizations that the draft update is ready for public review and a hearing has been scheduled.

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May 13, 2021

Paul Helliker
San Juan Water District
9935 Auburn Folsom Road
Granite Bay, CA 95746

SUBJECT: Notice of Availability and Hearing for Placer County Water Agency's Draft 2020 Urban Water Management Plan for Public Review

Dear Paul Helliker:

The Placer County Water Agency (Agency) has updated its Urban Water Management Plan (UWMP) for 2020 as required by the California Water Code (CWC), which requires an update at least every five years. You were notified in November 2020 of the Agency's intent to update its UWMP; this letter is providing notice to interested counties, cities, water suppliers, and other organizations that the draft update is ready for public review and a hearing has been scheduled.

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May 13, 2021

Dan York
Sacrmento Suburban Water District
3701 Marconi Ave, #100
Sacramento, CA 95821

SUBJECT: Notice of Availability and Hearing for Placer County Water Agency's Draft 2020 Urban Water Management Plan for Public Review

Dear Dan York:

The Placer County Water Agency (Agency) has updated its Urban Water Management Plan (UWMP) for 2020 as required by the California Water Code (CWC), which requires an update at least every five years. You were notified in November 2020 of the Agency's intent to update its UWMP; this letter is providing notice to interested counties, cities, water suppliers, and other organizations that the draft update is ready for public review and a hearing has been scheduled.

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May 13, 2021

Audie Foster
California American Water Co.
4701 Beloit Drive
Sacramento, CA 95838

SUBJECT: Notice of Availability and Hearing for Placer County Water Agency's Draft 2020 Urban Water Management Plan for Public Review

Dear Audie Foster:

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Sincerely,

Jeremy Shepard, PE
Deputy Director of Technical Services

Public Draft

B

Appendix B - DWR Tables

Public Draft

2-1R | Public Water Systems

STATUS: Published

NOTES: -

Public Water System Number	Public Water System Name	Number of Municipal Connections 2020	Volume of Water Supplied 2020
CA3110124	CWA Monte Vista	See Note	See Note
CA3110040	CWA Binachi	See Note	See Note
CA3110050	CWA Appegate	See Note	See Note
CA3110024	CWA Alta	See Note	See Note
CA3110006	CWA Colfax	See Note	See Note
CA3110005	CWA Auburn/Bowm	See Note	See Note
CA3110025	CWA Foothill	See Note	See Note
	Total:	**38,630**	**29,065**

Note: See Chapter 3

2-2 | Public Water Systems

STATUS: Published

NOTES: -

Type of Plan	Member of RUWMP	Member of Regional Alliance	Name of RUWMP or Regional Alliance
Individual UWMP	No	No	

2-3 | Agency Identification

STATUS: Published

NOTES: -

Type of Supplier	Year Type	First Day of Year		Unit Type
		DD	MM	
Retailer/Wholesaler	Calendar Years			Acre Feet (AF)

Conversion to Gallons: *325851*
Conversion to Gallons per Day: *892.7425*

2-4R | Water Supplier Information Exchange

STATUS: Published

NOTES: -

Wholesale Water Supplier Name
See Note
Note: PCWA does not receive purchased water from a wholesaler.

2-4W | Water Supplier Information Exchange

STATUS: Published

NOTES:

Supplier has informed more than 10 other water suppliers of water supplies available in accordance with Water Code Section 10631. Completion of the table below is optional.

If not completed, include a list of the water suppliers that were informed.

Location of List: Section 2.2

Wholesale Water Supplier Name

3-1R | Current & Projected Population

STATUS: Published

NOTES: See Chapter 3. Population shown is for the treated retail service.

Population Served	**2020**	**2025**	**2030**	**2035**	**2040**
PCWA	108,225	124,892	144,125	166,320	191,934
Total	**108,225**	**124,892**	**144,125**	**166,320**	**191,934**

4-1R | Actual Demands for Water

STATUS: Published

NOTES: -

Use Type	**Additional Description**	**Level of Treatment When Delivered**	**2020 Volume**
Single Family		Drinking Water	15,731
Multi-Family		Drinking Water	1,897
Commercial		Drinking Water	2,703
Industrial		Drinking Water	449
Institutional/Governmental	Municipal	Drinking Water	883
Landscape		Drinking Water	2,819
Other	See Note 1	Drinking Water	330
Losses		Drinking Water	3,549
Other	See Note 2	Raw Water	64,642
		Total:	**93,003**

Note:
1. “Other” customer classification includes water used for commercial fire and fire protection and customers involuntarily deprived of untreated service
2. Commercial agriculture, irrigation, lanscape and meter uses, including losses.

4-1W | Actual Demands for Water

STATUS: Published

NOTES: -

Use Type	**Additional Description**	**Level of Treatment When Delivered**	**2020 Volume**
Sales/Transfers/Exchanges to Other Agencies		Drinking Water	11,450
Sales/Transfers/Exchanges to Other Agencies		Raw Water	17,816
		Total:	**29,266**

4-2R | Projected Demands for Water

STATUS: Published

NOTES:

Use Type	Additional Description	Projected Water Use				
		2025	2030	2035	2040	Buildout
Single Family		18,245	21,046	24,277	28,005	30,444
Multi-Family		2,508	2,862	3,268	3,735	4,066
Commercial		3,200	3,684	4,242	4,887	5,313
Industrial		898	1,347	1,796	2,245	3,142
Institutional/Governmental	Municipal	1,067	1,227	1,410	1,622	1,764
Landscape		3,274	3,776	4,355	5,023	5,461
Other	See Note 1	384	443	511	590	641
Losses		2,434	2,063	2,392	2,766	3,005
Other	Regional Buffer	-	-	-	2,000	8,250
Other	See Note 2	71,208	69,298	67,681	66,313	63,098
Total:		**103,219**	**105,746**	**109,933**	**117,186**	**125,186**

Note:
1. “Other” customer classification includes water used for commercial fire and fire protection and customers involuntarily deprived of untreated service
2. Raw water provided for commercial agriculture, irrigation, lanscape and meter uses, including losses.

4-2W | Projected Demands for Water

STATUS: Published

NOTES:

Use Type	**Additional Description**	**Projected Water Use**				
		2025	**2030**	**2035**	**2040**	**Buildout**
Sales/Transfers/Exchanges to Other Agencies	Drinking Water	15,413	18,388	22,710	27,032	47,276
Sales/Transfers/Exchanges to Other Agencies	Raw Water	54,923	58,712	63,289	81,006	81,006
	Total:	**70,336**	**77,100**	**85,999**	**108,038**	**128,282**

4-3R | Total Gross Water Use

STATUS: Published

NOTES: -

	2020	2025	2030	2035	2040	Buildout
Potable and Raw Water From Table 4-1R and 4-2R	93,003	103,219	105,746	109,933	117,186	125,186
Recycled Water Demand* From Table 6-4R	-	-	-	-	-	-
Total Water Use:	**93,003**	**103,219**	**105,746**	**109,933**	**117,186**	**125,186**

4-3W | Total Water Use

STATUS: Published

NOTES:

	2020	2025	2030	2035	2040	Buildout
Potable and Raw Water From Table 4-1W and 4-2W	29,266	70,336	77,100	85,999	108,038	128,282
Recycled Water Demand* From Table 6-4W	-	-	-	-	-	-
Total Water Demand:	**29,266**	**70,336**	**77,100**	**85,999**	**108,038**	**128,282**

4-4R | 12 Month Water Loss Audit Reporting

STATUS: Published

NOTES: -

Report Period Start Date		Volume of Water Loss*
MM	YYYY	
1	2016	2,456
1	2017	3,592
1	2018	3,703
1	2019	2,218
1	2020	3,721

1. Volume of Water Loss includes water loss from the Western Area and Zone 3.
2. Taken from the field "Water Losses" (a combination of apparent losses and real losses) from the AWWA worksheet.
3. Western Area 2020 Water Loss and Zone 3 2016-2017 & 2020 Water Loss were estimated using billed consumption use and production data.

4-5R | Inclusion in Water Use Projections

STATUS: Published

NOTES: -

Are Future Water Savings Included in Projections? Refer to Appendix K of UWMP Guidebook.	Yes
Section or page number where the citations utilized in the demand projects can it be found:	Section 4.2.2.1
Are Lower Income Residential Demands Included in Projections?	Yes

5-1R | Baselines & Targets Summary

STATUS: Published

NOTES: -

Baseline Period	**Start Year**	**End Year**	**Average Baseline GPCD***	**Confirmed 2020 Target ***
10-15 Year	1995	2004	322	261
5 Year	2004	2008	299	

*All values are in Gallons per Capita per Day (GPCD)
* All cells in this table are populated manually from the supplier's SBX7-7 Verification Form.

5-2R | 2020 Compliance

STATUS: Published

NOTES: -

Actual 2020 GPCD*	Optional Adjustments to 2020 GPCD					2020 GPCD* (Adjusted if applicable)	Supplier Achieved Targeted Reduction in 2020
	Extraordinary Events*	Economic Adjustment*	Weather Normalization*	Total Adjustments*	Adjusted 2020 GPCD*		
240	-	-	-	-	-	240	Yes

*All values are in Gallons per Capita per Day (GPCD)
*All cells in this table are populated manually from the supplier's SBX7-7 Verification Form.

6-1R | Groundwater Volume Pumped

STATUS: Published

NOTES: -

Supplier does not pump groundwater. The supplier will not complete the table.

Groundwater Type	Location or Basin Name	2016	2017	2018	2019	2020
Alluvial Basin	North American Subbasin	-	-	-	-	-
	Total:	**-**	**-**	**-**	**-**	**-**

See Chapter 6.

6-1W | Groundwater Volume Pumped

STATUS: Published

NOTES:

Supplier does not pump groundwater. The supplier will not complete the table.

Groundwater Type	Location or Basin Name	2016	2017	2018	2019	2020
Alluvial Basin	North American Subbasin	-	-	-	-	-
	Total:	**-**	**-**	**-**	**-**	**-**

See Chapter 6.

6-2R | Wastewater Collected within Service Area in 2020

STATUS: Published

NOTES: -

The supplier will complete the table.						
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**	**Wastewater Volume Collected from UWMP Service Area in 2020**	**Name of Wastewater Agency Receiving Collected Wastewater**	**Wastewater Treatment Plant Name**	**Wastewater Treatment Plant Located within UWMP Area**	**WWTP Operation Contracted to a Third Party**
South Placer Municipal Utility District	Estimated	4,646	**City of Roseville**	Dry Creek Wastewater Treatment Plant (WWTP) & Pleasant Grove WWTP	Yes	No
Placer County	Estimated	2,131	**City of Lincoln and City of Roseville**	Lincoln WWTP, Dry Creek WWTP & Pleasant Grove WWTP	Yes	No
	Total:	**6,777**				

6-3R | Wastewater Treatment & Discharge Within Service Area in 2020

STATUS: Published

NOTES: -

No wastewater is treated or disposed of within the UWMP service area. The supplier will not complete the table.

Wastewater Treatment Plant Name	Discharge Location Name or Identifier	Discharge Location Description	Wastewater Discharge ID Number	Method of Disposal	Plant Treats Wastewater Generated Outside the Service Area	Treatment Level	2020 Volumes				
							Wastewater Treated	Discharged Treated Wastewater	Recycled Within Service Area	Recycled Outside of Service Area	Instream Flow Permit Requirement
						Total:	-	-	-	-	-

[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

6-3W | Wastewater Treatment & Discharge Within Service Area in 2020

STATUS: Published

NOTES: -

Wholesale Supplier neither distributes nor provides supplemental treatment to recycled water. The supplier will not complete the table.

Wastewater Treatment Plant Name	Discharge Location Name or Identifier	Discharge Location Description	Wastewater Discharge ID Number	Method of Disposal	Plant Treats Wastewater Generated Outside the Service Area	Treatment Level	2020 Volumes				
							Wastewater Treated	Discharged Treated Wastewater	Recycled Within Service Area	Recycled Outside of Service Area	Instream Flow Permit Requirement
							Total:	-	-	-	-	-

6-4R | Recycled Water Direct Beneficial Uses Within Service Area

STATUS: Published

NOTES: -

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.

Name of Supplier Producing (Treating) the Recycled Water:

Name of Supplier Operating the Recycled Water Distribution System:

Supplemental Volume of Water Added in 2020:

Source of 2020 Supplemental Water:

Beneficial Use Type	Potential Beneficial Uses of Recycled Water	Amount of Potential Uses of Recycled Water	General Description of 2020 Uses	Level of Treatment	2020	2025	2030	2035	2040	Buildout
					Total:	-	-	-	-	-	-
Internal Reuse (Not included in Statewide Recycled Water Volume).										

Note: PCWA anticipates Recycled Water to be made available to meet part of a broad array of PCWA customer demands, which include retail and wholesale customers adjacent to each City, in the future. The details of recycled water supply/use plans are being developed as part of on-going regional discussions.

6-4W | Current & Projected Retailers Provided Recycled Water within Service Area

STATUS: Published

NOTES: -

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.

Name of Receiving Supplier or Direct Use by Wholesaler	Level of Treatment	2020	2025	2030	2035	2040	2045
	Total:	-	-	-	-	-	-

Note: See Table 6-4R.

6-5R | 2015 Recycled Water Use Projection Compared to 2020 Actual

STATUS: Published

NOTES: -

Recycled water was not used in 2015 nor projected for use in 2020. The supplier will not complete the table.

Beneficial Use Type	**2015 Projection for 2020**	**2020 Actual Use**
Agricultural Irrigation		
Landscape Irrigation (excludes golf courses)		
Golf Course Irrigation		
Commercial Use		
Industrial Use		
Geothermal and Other Energy Production		
Seawater Intrusion Barrier		
Recreational Impoundment		
Wetlands or Wildlife Habitat		
Groundwater Recharge (IPR)*		
Surface Water Augmentation (IPR)*		
Direct Potable Reuse		
Total:	**-**	**-**

6-5W | 2015 Recycled Water Use Projection Compared to 2020 Actual

STATUS: Published

NOTES: -

Recycled water was not used or distributed by the supplier in 2015, nor projected for use or distribution in 2020. The supplier will not complete the table.

Name of Receiving Supplier or Direct Use by Wholesaler	2015 Projection for 2020	2020 Actual Use
Total:	-	-

6-6R | Methods to Expand Future Recycled Water Use

STATUS: Published

NOTES: -

The supplier does not plan to expand recycled water use in the future. The supplier will not complete the table below but will provide narrative explanation.			
Page Location for Narrative in UWMP:		Section 6.1.4.2	
Name of Action	**Description**	**Planned Implementation Year**	**Expected Increase of Recycled Water Use**
		Total:	-

6-7R | Expected Future Water Supply Projects or Programs

STATUS: Published

NOTES: -

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.

Page Location for Narrative in UWMP:

Name of Future Projects or Programs	Joint Project with Other Suppliers	Agency Name	Description	Planned Implementation Year	Planned for Use in Year Type	Expected Increase in Water Supply to Supplier

6-7W | Expected Future Water Supply Projects or Programs

STATUS: Published

NOTES: -

No expected future water supply projects or programs that provide a quantifiable increase to the agency's water supply. The supplier will not complete the table.

Name of Future Projects or Programs	Joint Project with Other Suppliers	Agency Name	Description	Planned Implementation Year	Planned for Use in Year Type	Expected Increase in Water Supply to Supplier

6-8R | Actual Water Supplies

STATUS: Published

NOTES: -

Water Supply	**Additional Detail on Water Supply**	**2020**		
		Actual Volume	**Water Quality**	**Total Right or Safe Yield**
Surface water (not desalinated)	MFP	29,805	Drinking Water	
Purchased or Imported Water	CVP Contract	-	Drinking Water	
Purchased or Imported Water	PG&E Agreement	97,556	Drinking Water	
Surface water (not desalinated)	Pre 1914 Appropriations	5,628	Drinking Water	
Recycled Water	From City of Lincoln/Roseville	-	Recycled Water	
Groundwater (not desalinated)		-	Drinking Water	
	Total:	**132,989**		**-**

Note: See Chapter 6. These values are manged dynamically as PCWA's overall supply to meet it's treated retail, untreated retail, treated wholesale and untreated wholesale customer demands. These vaules are the same as reported on Table 6-8W.

6-8W | Actual Water Supplies

STATUS: Published

NOTES: -

Water Supply	Additional Detail on Water Supply	2020		
		Actual Volume	Water Quality	Total Right or Safe Yield
Surface water (not desalinated)	MFP	29,805	Drinking Water	
Purchased or Imported Water	CVP Contract	-	Drinking Water	
Purchased or Imported Water	PG&E Agreement	97,556	Drinking Water	
Surface water (not desalinated)	Pre 1914 Appropriations	5,628	Drinking Water	
Recycled Water	From City of Lincoln/Roseville	-	Recycled Water	
Groundwater (not desalinated)		-	Drinking Water	
	Total:	**132,989**		**-**

Note: See Chapter 6. These values are manged dynamically as PCWA's overall supply to meet it's treated retail, untreated retail, treated wholesale and untreated wholesale customer demands. These vaules are the same as reported on Table 6-8R.

6-8DS | Source Water Desalination

STATUS: Published

NOTES: -

Neither groundwater nor surface water are reduced in salinity prior to distribution. The supplier will not complete the table.

Plant Name or Well ID	Plant Capacity	Intake Type	Source Water Type	Influent TDS	Brine Discharge	Volume of Water Desalinated in AFY				
						2016	2017	2018	2019	2020
Total:						**-**	**-**	**-**	**-**	**-**

6-9R | Projected Water Supplies

STATUS: Published

NOTES: -

Water Supply	Additional Detail on Water Supply	Projected Water Supply									
		2025		2030		2035		2040		Buildout	
		Reasonably Available Volume	Total Right or Safe Yield	Reasonably Available Volume	Total Right or Safe Yield	Reasonably Available Volume	Total Right or Safe Yield	Reasonably Available Volume	Total Right or Safe Yield	Reasonably Available Volume	Total Right or Safe Yield
Surface water (not desalinated)	MFP	120,000		120,000		120,000		120,000		120,000	
Purchased or Imported Water	CVP Contract	-		35,000		35,000		35,000		35,000	
Purchased or Imported Water	PG&E Agreement	125,400		125,400		125,400		125,400		125,400	
Surface water (not desalinated)	Pre 1914 Appropriations	3,400		3,400		3,400		3,400		3,400	
Recycled Water	From City of Lincoln/Roseville	-		2,500		5,000		7,000		9,000	
Groundwater (not desalinated)		2,000		4,000		4,000		5,000		5,000	
	Total:	**250,800**	**-**	**290,300**	**-**	**292,800**	**-**	**295,800**	**-**	**297,800**	**-**

Note: CVP supply is currently not available due to physical limitations. Supply from CVP is 0 AFY until infrastructure is in place to access this supply, which is assumed to be in 2030.
These values are managed dynamically as PCWA's overall supply to meet it's treated retail, untreated retail, treated wholesale and untreated wholesale customer demands. These vaules are the same as reported on Table 6-9W.

6-9W | Projected Water Supplies

STATUS: Published

NOTES: -

Water Supply	Additional Detail on Water Supply	Projected Water Supply									
		2025		2030		2035		2040		Buildout	
		Reasonably Available Volume	Total Right or Safe Yield	Reasonably Available Volume	Total Right or Safe Yield	Reasonably Available Volume	Total Right or Safe Yield	Reasonably Available Volume	Total Right or Safe Yield	Reasonably Available Volume	Total Right or Safe Yield
Surface water (not desalinated)	MFP	120,000		120,000		120,000		120,000		120,000	
Purchased or Imported Water	CVP Contract	-		35,000		35,000		35,000		35,000	
Purchased or Imported Water	PG&E Agreement	125,400		125,400		125,400		125,400		125,400	
Surface water (not desalinated)	Pre 1914 Appropriations	3,400		3,400		3,400		3,400		3,400	
Recycled Water	From City of Lincoln/Roseville	-		2,500		5,000		7,000		9,000	
Groundwater (not desalinated)		2,000		4,000		4,000		5,000		5,000	
	Total:	**250,800**	**-**	**290,300**	**-**	**292,800**	**-**	**295,800**	**-**	**297,800**	**-**

Note: CVP supply is currently not available due to physical limitations. Supply from CVP is 0 AFY until infrastructure is in place to access this supply, which is assumed to be in 2030.
These values are managed dynamically as PCWA's overall supply to meet it's treated retail, untreated retail, treated wholesale and untreated wholesale customer demands. These vaules are the same as reported on Table 6-9W.

7-1R | Basis of Water Year Data (Reliability Assessment)

STATUS: Published

NOTES: -

Quantification of available supplies is not compatible with this table and is provided elsewhere in the UWMP.

Page Location for Narrative in UWMP: Section 7.1.3

Year Type	Base Year	Available Supply if Year Type Repeats	
		Volume Available	Percent of Average Supply
Average Year			
Single-Dry Year			
Consecutive Dry Years 1st Year			
Consecutive Dry Years 2nd Year			
Consecutive Dry Years 3rd Year			
Consecutive Dry Years 4th Year			
Consecutive Dry Years 5th Year			

7-1W | Basis of Water Year Data (Reliability Assessment)

STATUS: Published

NOTES: -

Quantification of available supplies is not compatible with this table and is provided elsewhere in the UWMP.

Year Type	**Base Year**	**Available Supply if Year Type Repeats**	
		Volume Available	**Percent of Average Supply**
Average Year			
Single-Dry Year			
Consecutive Dry Years 1st Year			
Consecutive Dry Years 2nd Year			
Consecutive Dry Years 3rd Year			
Consecutive Dry Years 4th Year			
Consecutive Dry Years 5th Year			

Note: See Section 7.1.3

7-2R | Normal Year Supply and Demand Comparison

STATUS: Published

NOTES:

	2025	2030	2035	2040	Buildout
Supply Totals	250,800	290,300	292,800	295,800	297,800
Demand Totals	173,555	182,845	195,932	225,224	253,469
Difference:	**77,245**	**107,455**	**96,868**	**70,576**	**44,331**

Note: Since PCWA manages its supplies, wholesale demands and retail demands collectively, these vaules are the sames as reported on Table 7-2W.

7-2W | Normal Year Supply and Demand Comparison

STATUS: Published

NOTES: -

	2025	2030	2035	2040	Buildout
Supply Totals From Table 6-9W	250,800	290,300	292,800	295,800	297,800
Demand Totals From Table 4-3W	173,555	182,845	195,932	225,224	253,469
Difference:	**77,245**	**107,455**	**96,868**	**70,576**	**44,331**

Note: Since PCWA manages its supplies, wholesale demands and retail demands collectively, these vaules are the sames as reported on Table 7-2R.

7-3R | Single Dry Year Supply & Demand Comparison

STATUS: Published

NOTES: -

	2025	2030	2035	2040	Buildout
Supply Totals	185,550	207,550	210,050	213,050	215,050
Demand Totals	139,908	147,601	158,852	186,724	214,719
Difference:	**45,642**	**59,949**	**51,198**	**26,326**	**331**

Note: Since PCWA manages its supplies, wholesale demands and retail demands collectively, these vaules are the sames as reported on Table 7-3W.

7-3W | Single Dry Year Supply & Demand Comparison

STATUS: Published

NOTES: -

	2025	2030	2035	2040	Buildout
Supply Totals	185,550	207,550	210,050	213,050	215,050
Demand Totals	139,908	147,601	158,852	186,724	214,719
Difference:	**45,642**	**59,949**	**51,198**	**26,326**	**331**

Note: Since PCWA manages its supplies, wholesale demands and retail demands collectively, these vaules are the sames as reported on Table 7-3R.

7-4R | Multiple Dry Years Supply & Demand Comparison

STATUS: Published

NOTES: -

		2025	2030	2035	2040	Buildout
First Year	**Supply Totals**	249,100	279,850	282,350	285,350	287,350
	Demand Totals	144,555	153,845	166,932	196,224	224,219
	Difference:	**104,545**	**126,005**	**115,418**	**89,126**	**63,131**
Second Year	**Supply Totals**	249,100	279,850	282,350	285,350	287,350
	Demand Totals	144,555	153,845	166,932	196,224	224,219
	Difference:	**104,545**	**126,005**	**115,418**	**89,126**	**63,131**
Third Year	**Supply Totals**	249,100	279,850	282,350	285,350	287,350
	Demand Totals	144,555	153,845	166,932	196,224	224,219
	Difference:	**104,545**	**126,005**	**115,418**	**89,126**	**63,131**
Fourth Year	**Supply Totals**	249,100	279,850	282,350	285,350	287,350
	Demand Totals	144,555	153,845	166,932	196,224	224,219
	Difference:	**104,545**	**126,005**	**115,418**	**89,126**	**63,131**
Fifth Year	**Supply Totals**	249,100	279,850	282,350	285,350	287,350
	Demand Totals	144,555	153,845	166,932	196,224	224,219
	Difference:	**104,545**	**126,005**	**115,418**	**89,126**	**63,131**

Note: Since PCWA manages its supplies, wholesale demands and retail demands collectively, these vaules are the sames reported on Table 7-4W.

7-4W | Multiple Dry Years Supply & Demand Comparison

STATUS: Published

NOTES: -

		2025	2030	2035	2040	2045
First Year	**Supply Totals**	249,100	279,850	282,350	285,350	287,350
	Demand Totals	144,555	153,845	166,932	196,224	224,219
	Difference:	**104,545**	**126,005**	**115,418**	**89,126**	**63,131**
Second Year	**Supply Totals**	249,100	279,850	282,350	285,350	287,350
	Demand Totals	144,555	153,845	166,932	196,224	224,219
	Difference:	**104,545**	**126,005**	**115,418**	**89,126**	**63,131**
Third Year	**Supply Totals**	249,100	279,850	282,350	285,350	287,350
	Demand Totals	144,555	153,845	166,932	196,224	224,219
	Difference:	**104,545**	**126,005**	**115,418**	**89,126**	**63,131**
Fourth Year	**Supply Totals**	249,100	279,850	282,350	285,350	287,350
	Demand Totals	144,555	153,845	166,932	196,224	224,219
	Difference:	**104,545**	**126,005**	**115,418**	**89,126**	**63,131**
Fifth Year	**Supply Totals**	249,100	279,850	282,350	285,350	287,350
	Demand Totals	144,555	153,845	166,932	196,224	224,219
	Difference:	**104,545**	**126,005**	**115,418**	**89,126**	**63,131**
Sixth Year	**Supply Totals**					
	Demand Totals					
	Difference:	**0**	**0**	**0**	**0**	**0**

Note: Since PCWA manages its supplies, wholesale demands and retail demands collectively, these vaules are the sames as reported on Table 7-4R.

7-5 | Five-Year Drought Risk Assessment Tables to Address Water Code Section 10635(b)

STATUS: Published

NOTES: -

2021	**Gross Water Use**	133,844
	Total Supplies	249,100
	Surplus/Shortfall without WSCP Action	**115,256**
	Planned WSCP Actions (Use Reduction and Supply Augmentation)	
	WSCP (Supply Augmentation Benefit)	0
	WSCP (Use Reduction Savings Benefit)	0
	Revised Surplus/Shortfall	**115,256**
	Resulting Percent Use Reduction from WSCP Action	**0%**
2022	**Gross Water Use**	141,957
	Total Supplies	249,100
	Surplus/Shortfall without WSCP Action	**107,143**
	Planned WSCP Actions (Use Reduction and Supply Augmentation)	
	WSCP (Supply Augmentation Benefit)	0
	WSCP (Use Reduction Savings Benefit)	0
	Revised Surplus/Shortfall	**107,143**
	Resulting Percent Use Reduction from WSCP Action	**0%**
2023	**Gross Water Use**	150,070
	Total Supplies	249,100
	Surplus/Shortfall without WSCP Action	**99,030**
	Planned WSCP Actions (Use Reduction and Supply Augmentation)	
	WSCP (Supply Augmentation Benefit)	0
	WSCP (Use Reduction Savings Benefit)	0
	Revised Surplus/Shortfall	**99,030**
	Resulting Percent Use Reduction from WSCP Action	**0%**
2024	**Gross Water Use**	158,184
	Total Supplies	249,100
	Surplus/Shortfall without WSCP Action	**90,916**
	Planned WSCP Actions (Use Reduction and Supply Augmentation)	
	WSCP (Supply Augmentation Benefit)	0
	WSCP (Use Reduction Savings Benefit)	0
	Revised Surplus/Shortfall	**90,916**
	Resulting Percent Use Reduction from WSCP Action	**0%**
2025	**Gross Water Use**	166,297
	Total Supplies	249,100
	Surplus/Shortfall without WSCP Action	**82,803**
	Planned WSCP Actions (Use Reduction and Supply Augmentation)	
	WSCP (Supply Augmentation Benefit)	0
	WSCP (Use Reduction Savings Benefit)	0
	Revised Surplus/Shortfall	**82,803**
	Resulting Percent Use Reduction from WSCP Action	**0%**

8-1 | Water Shortage Contingency Plan Levels

STATUS: Published

NOTES: -

Shortage Level	**Percent Shortage Range**[1] (Numerical Value as a Percent)	**Shortage Response Actions**
1	Up to 10%	Actions are voluntary and will be reinforced through local and regional public education and awareness measures. Actions include customers fixing leaking fixtures and covering pools with covers.
2	Up to 20%	Actions, which are mandatory, include limiting landscape watering to certain time of day and number of days; prohibiting washing down of impervious surfaces; and prohibiting non-essential flushing of mains and fire hydrants.
3	Up to 30%	Actions, which are mandatory, include limiting landscape watering to certain number of days; limiting construction water use; and requiring Commercial, Industrial, and Institutional properties to implement sector appropriate water efficiency measures.
4	Up to 40%	Actions, which are mandatory, include limiting landscape watering to certain number of days; prohibiting irrigation of ornamental turf on public street medians with potable water and other irrigation activities; requiring car washing to occur at commercial carwash.
5	Up to 50%	Actions, which are mandatory, include water use for public health and safety purposes only and prohibiting irrigation of turf.
6	>50%	Actions, which are mandatory, include water use for public health and safety purposes only. Customer rationing may be implemented.

[1] One stage in the Water Shortage Contingency Plan must address a water shortage of 50%.

8-2 | Demand Reduction Actions

STATUS: Published

NOTES: -

Shortage Level	Demand Reduction Actions	How much is this going to reduce the shortage gap?	Additional Explanation or Reference	Penalty, Charge, or Other Enforcement
1	CII - Lodging establishment must offer opt out of linen service	0-1%		No
1	CII - Other CII restriction or prohibition	0-1%		No
1	Decrease Line Flushing	0-1%		No
1	Expand Public Information Campaign	0-1%		No
1	Landscape - Other landscape restriction or prohibition	0-6%		No
1	Landscape - Restrict or prohibit runoff from landscape irrigation	0-5%		No
1	Other - Customers must repair leaks, breaks, and malfunctions in a timely manner	0-2%		No
1	Other - Require automatic shut of hoses	0-1%		No
1	Water Features - Restrict water use for decorative water features, such as fountains	0-1%		No
1	Pools and Spas - Require covers for pools and spas	0-1%		No
1	CII - Restaurants may only serve water upon request	0-1%		No
2	Decrease Line Flushing	5-15%		No
2	Landscape - Limit landscape irrigation to specific times	5-10%		No
2	Landscape - Limit landscape irrigation to specific days	5-10%		No
2	Other - Prohibit use of potable water for washing hard surfaces	0-1%		No
2	Other	0-10%		No
3	CII - Other CII restriction or prohibition	0-5%		No
3	Landscape - Limit landscape irrigation to specific days	10-25%		No
3	Landscape - Other landscape restriction or prohibition	0-1%		No
3	Other - Prohibit use of potable water for construction and dust control	0-1%		No
3	Other water feature or swimming pool restriction	0-1%		No
4	Landscape - Limit landscape irrigation to specific days	5-20%		No

4	Landscape - Other landscape restriction or prohibition	0-3%		No
4	Other - Prohibit vehicle washing except at facilities using recycled or recirculating water	0-1%		No
4	Other water feature or swimming pool restriction	0-1%		No
4	Other	0-1%		No
5	Landscape - Other landscape restriction or prohibition	0-50%	Water use for public health and safety purposes only.	Yes
6	Landscape - Other landscape restriction or prohibition	0-70%	Water use for public health and safety purposes only. Customer rationing may be implemented.	Yes

8-3 | Supply Augmentation & Other Actions

STATUS: Published

NOTES: -

Shortage Level	Supply Augmentation Methods and Other Actions by Water Supplier	How much is this going to reduce the shortage gap?	Additional Explanation or Reference
All	Transfers	0-15%	Transfers with neighboring agencies - Nevada Irrigation District, San Juan Water District, City of Lincoln and the City of Roseville through interties.
All	Other Actions (describe)	0-15%	Through contracts with treated water wholesale customers (Cal Am and City of Lincoln), PCWA can request these customers transfer to their groundwater supply.

10-1R | Notification to Cities & Counties

STATUS: Published

NOTES: -

City	60 Day Notice	Notice of Public Hearing	Other
City of Rocklin	Yes	Yes	
Town of Loomis	Yes	Yes	
City of Auburn			
City of Colfax			
County	**60 Day Notice**	**Notice of Public Hearing**	**Other**
Placer County	Yes	Yes	
Sacramento County	Yes	Yes	
Other	**60 Day Notice**	**Notice of Public Hearing**	**Other**
Nevada Irrigation District	Yes	Yes	
General Public	No	Yes	

10-1W | Notification to Cities & Counties

STATUS: Published

NOTES: -

Supplier has notified more than 10 cities or counties in accordance with Water Code Sections 10621 (b) and 10642. Completion of the table is not required. Provide a separate list of the cities and counties that were notified.

Page Location for List in UWMP: Section 2.2

City	60 Day Notice	Notice of Public Hearing	Other

County	60 Day Notice	Notice of Public Hearing	Other

Other	60 Day Notice	Notice of Public Hearing	Other

Note: See Section 2.2

Public Draft

C

Appendix C - DWR Checklist

Public Draft

Retail	Wholesale	2020 Guidebook Location	Water Code Section	Summary as Applies to UWMP	Subject	2020 UWMP Location (Optional Column for Agency Review Use)
x	x	Chapter 1	10615	A plan shall describe and evaluate sources of supply, reasonable and practical efficient uses, reclamation and demand management activities.	Introduction and Overview	Chapter 1
x	x	Chapter 1	10630.5	Each plan shall include a simple description of the supplier's plan including water availability, future requirements, a strategy for meeting needs, and other pertinent information. Additionally, a supplier may also choose to include a simple description at the beginning of each chapter.	Summary	Within Each Chapter
x	x	Section 2.2	10620(b)	Every person that becomes an urban water supplier shall adopt an urban water management plan within one year after it has become an urban water supplier.	Plan Preparation	Chapter 2
x	x	Section 2.6	10620(d)(2)	Coordinate the preparation of its plan with other appropriate agencies in the area, including other water suppliers that share a common source, water management agencies, and relevant public agencies, to the extent practicable.	Plan Preparation	Section 2.2
x	x	Section 2.6.2	10642	Provide supporting documentation that the water supplier has encouraged active involvement of diverse social, cultural, and economic elements of the population within the service area prior to and during the preparation of the plan and contingency plan.	Plan Preparation	Section 2.2
x		Section 2.6, Section 6.1	10631(h)	Retail suppliers will include documentation that they have provided their wholesale supplier(s) - if any - with water use projections from that source.	System Supplies	-
	x	Section 2.6	10631(h)	Wholesale suppliers will include documentation that they have provided their urban water suppliers with identification and quantification of the existing and planned sources of water available from the wholesale to the urban supplier during various water year types.	System Supplies	Appendix A
x	x	Section 3.1	10631(a)	Describe the water supplier service area.	System Description	Section 3.1
x	x	Section 3.3	10631(a)	Describe the climate of the service area of the supplier.	System Description	Section 3.4
x	x	Section 3.4	10631(a)	Provide population projections for 2025, 2030, 2035, 2040 and optionally 2045.	System Description	Section 3.6
x	x	Section 3.4.2	10631(a)	Describe other social, economic, and demographic factors affecting the supplier's water management planning.	System Description	Section 3.7
x	x	Sections 3.4 and 5.4	10631(a)	Indicate the current population of the service area.	System Description and Baselines and Targets	Section 3.6
x	x	Section 3.5	10631(a)	Describe the land uses within the service area.	System Description	Section 3.8
x	x	Section 4.2	10631(d)(1)	Quantify past, current, and projected water use, identifying the uses among water use sectors.	System Water Use	Section 4.2.2 & Section 4.3.2
x	x	Section 4.2.4	10631(d)(3)(C)	Retail suppliers shall provide data to show the distribution loss standards were met.	System Water Use	Section 4.1.1
x	x	Section 4.2.6	10631(d)(4)(A)	In projected water use, include estimates of water savings from adopted codes, plans and other policies or laws.	System Water Use	Section 4.2.2.1
x	x	Section 4.2.6	10631(d)(4)(B)	Provide citations of codes, standards, ordinances, or plans used to make water use projections.	System Water Use	Section 4.2.2.1
x	optional	Section 4.3.2.4	10631(d)(3)(A)	Report the distribution system water loss for each of the 5 years preceding the plan update.	System Water Use	Section 4.1.1
x	optional	Section 4.4	10631.1(a)	Include projected water use needed for lower income housing projected in the service area of the supplier.	System Water Use	Section 4.5
x	x	Section 4.5	10635(b)	Demands under climate change considerations must be included as part of the drought risk assessment.	System Water Use	Section 4.6
x		Chapter 5	10608.20(e)	Retail suppliers shall provide baseline daily per capita water use, urban water use target, interim urban water use target, and compliance daily per capita water use, along with the bases for determining those estimates, including references to supporting data.	Baselines and Targets	Chapter 5, Appendix D
x		Chapter 5	10608.24(a)	Retail suppliers shall meet their water use target by December 31, 2020.	Baselines and Targets	Chapter 5, Appendix D
	x	Section 5.1	10608.36	Wholesale suppliers shall include an assessment of present and proposed future measures, programs, and policies to help their retail water suppliers achieve targeted water use reductions.	Baselines and Targets	Chapter 9.1
x		Section 5.2	10608.24(d)(2)	If the retail supplier adjusts its compliance GPCD using weather normalization, economic adjustment, or extraordinary events, it shall provide the basis for, and data supporting the adjustment.	Baselines and Targets	-
x		Section 5.5	10608.22	Retail suppliers' per capita daily water use reduction shall be no less than 5 percent of base daily per capita water use of the 5 year baseline. This does not apply if the suppliers base GPCD is at or below 100.	Baselines and Targets	-
x		Section 5.5 and Appendix E	10608.4	Retail suppliers shall report on their compliance in meeting their water use targets. The data shall be reported using a standardized form in the SBX7-7 2020 Compliance Form.	Baselines and Targets	Appendix D
x	x	Sections 6.1 and 6.2	10631(b)(1)	Provide a discussion of anticipated supply availability under a normal, single dry year, and a drought lasting five years, as well as more frequent and severe periods of drought.	System Supplies	Section 7.1.3
x	x	Sections 6.1	10631(b)(1)	Provide a discussion of anticipated supply availability under a normal, single dry year, and a drought lasting five years, as well as more frequent and severe periods of drought, *including changes in supply due to climate change.*	System Supplies	Section 7.1.3
x	x	Section 6.1	10631(b)(2)	When multiple sources of water supply are identified, describe the management of each supply in relationship to other identified supplies.	System Supplies	Chapter 6

Retail	Wholesale	2020 Guidebook Location	Water Code Section	Summary as Applies to UWMP	Subject	2020 UWMP Location (Optional Column for Agency Review Use)
x	x	Section 6.1.1	10631(b)(3)	Describe measures taken to acquire and develop planned sources of water.	System Supplies	Chapter 6
x	x	Section 6.2.8	10631(b)	Identify and quantify the existing and planned sources of water available for 2020, 2025, 2030, 2035, 2040 and optionally 2045.	System Supplies	Section 6.2
x	x	Section 6.2	10631(b)	Indicate whether groundwater is an existing or planned source of water available to the supplier.	System Supplies	Section 6.1.1
x	x	Section 6.2.2	10631(b)(4)(A)	Indicate whether a groundwater sustainability plan or groundwater management plan has been adopted by the water supplier or if there is any other specific authorization for groundwater management. Include a copy of the plan or authorization.	System Supplies	Section 6.1.1
x	x	Section 6.2.2	10631(b)(4)(B)	Describe the groundwater basin.	System Supplies	Section 6.1.1
x	x	Section 6.2.2	10631(b)(4)(B)	Indicate if the basin has been adjudicated and include a copy of the court order or decree and a description of the amount of water the supplier has the legal right to pump.	System Supplies	Section 6.1.1
x	x	Section 6.2.2.1	10631(b)(4)(B)	For unadjudicated basins, indicate whether or not the department has identified the basin as a high or medium priority. Describe efforts by the supplier to coordinate with sustainability or groundwater agencies to achieve sustainable groundwater conditions.	System Supplies	Section 6.1.1
x	x	Section 6.2.2.4	10631(b)(4)(C)	Provide a detailed description and analysis of the location, amount, and sufficiency of groundwater pumped by the urban water supplier for the past five years	System Supplies	Section 6.1.1
x	x	Section 6.2.2	10631(b)(4)(D)	Provide a detailed description and analysis of the amount and location of groundwater that is projected to be pumped.	System Supplies	Section 6.1.1
x	x	Section 6.2.7	10631(c)	Describe the opportunities for exchanges or transfers of water on a short-term or long- term basis.	System Supplies	Section 6.1.6
x	x	Section 6.2.5	10633(b)	Describe the quantity of treated wastewater that meets recycled water standards, is being discharged, and is otherwise available for use in a recycled water project.	System Supplies (Recycled Water)	Section 6.1.4.2
x	x	Section 6.2.5	10633(c)	Describe the recycled water currently being used in the supplier's service area.	System Supplies (Recycled Water)	Section 6.1.4.2
x	x	Section 6.2.5	10633(d)	Describe and quantify the potential uses of recycled water and provide a determination of the technical and economic feasibility of those uses.	System Supplies (Recycled Water)	Section 6.1.4.2
x	x	Section 6.2.5	10633(e)	Describe the projected use of recycled water within the supplier's service area at the end of 5, 10, 15, and 20 years, and a description of the actual use of recycled water in comparison to uses previously projected.	System Supplies (Recycled Water)	Section 6.1.4.2
x	x	Section 6.2.5	10633(f)	Describe the actions which may be taken to encourage the use of recycled water and the projected results of these actions in terms of acre-feet of recycled water used per year.	System Supplies (Recycled Water)	Section 6.1.4.2
x	x	Section 6.2.5	10633(g)	Provide a plan for optimizing the use of recycled water in the supplier's service area.	System Supplies (Recycled Water)	Section 6.1.4.2
x	x	Section 6.2.6	10631(g)	Describe desalinated water project opportunities for long-term supply.	System Supplies	Section 6.1.5
x	x	Section 6.2.5	10633(a)	Describe the wastewater collection and treatment systems in the supplier's service area with quantified amount of collection and treatment and the disposal methods.	System Supplies (Recycled Water)	Section 6.1.4.1
x	x	Section 6.2.8, Section 6.3.7	10631(f)	Describe the expected future water supply projects and programs that may be undertaken by the water supplier to address water supply reliability in average, single-dry, and for a period of drought lasting 5 consecutive water years.	System Supplies	Chapter 6
x	x	Section 6.4 and Appendix O	10631.2(a)	The UWMP must include energy information, as stated in the code, that a supplier can readily obtain.	System Suppliers, Energy Intensity	Section 6.3
x	x	Section 7.2	10634	Provide information on the quality of existing sources of water available to the supplier and the manner in which water quality affects water management strategies and supply reliability	Water Supply Reliability Assessment	Chapter 6
x	x	Section 7.2.4	10620(f)	Describe water management tools and options to maximize resources and minimize the need to import water from other regions.	Water Supply Reliability Assessment	Chapter 6
x	x	Section 7.3	10635(a)	Service Reliability Assessment: Assess the water supply reliability during normal, dry, and a drought lasting five consecutive water years by comparing the total water supply sources available to the water supplier with the total projected water use over the next 20 years.	Water Supply Reliability Assessment	Chapter 7.1.4
x	x	Section 7.3	10635(b)	Provide a drought risk assessment as part of information considered in developing the demand management measures and water supply projects.	Water Supply Reliability Assessment	Chapter 7.2
x	x	Section 7.3	10635(b)(1)	Include a description of the data, methodology, and basis for one or more supply shortage conditions that are necessary to conduct a drought risk assessment for a drought period that lasts 5 consecutive years.	Water Supply Reliability Assessment	Chapter 7.1.3
x	x	Section 7.3	10635(b)(2)	Include a determination of the reliability of each source of supply under a variety of water shortage conditions.	Water Supply Reliability Assessment	Chapter 7.1.4
x	x	Section 7.3	10635(b)(3)	Include a comparison of the total water supply sources available to the water supplier with the total projected water use for the drought period.	Water Supply Reliability Assessment	Chapter 7.1.4

Retail	Wholesale	2020 Guidebook Location	Water Code Section	Summary as Applies to UWMP	Subject	2020 UWMP Location (Optional Column for Agency Review Use)
x	x	Section 7.3	10635(b)(4)	Include considerations of the historical drought hydrology, plausible changes on projected supplies and demands under climate change conditions, anticipated regulatory changes, and other locally applicable criteria.	Water Supply Reliability Assessment	Chapter 7.1.3
x	x	Chapter 8	10632(a)	Provide a water shortage contingency plan (WSCP) with specified elements below.	Water Shortage Contingency Planning	Chapter 8
x	x	Chapter 8	10632(a)(1)	Provide the analysis of water supply reliability (from Chapter 7 of Guidebook) in the WSCP	Water Shortage Contingency Planning	PCWA's WSCP
x	x	Section 8.10	10632(a)(10)	Describe reevaluation and improvement procedures for monitoring and evaluation the water shortage contingency plan to ensure risk tolerance is adequate and appropriate water shortage mitigation strategies are implemented.	Water Shortage Contingency Planning	PCWA's WSCP
x	x	Section 8.2	10632(a)(2)(A)	Provide the written decision-making process and other methods that the supplier will use each year to determine its water reliability.	Water Shortage Contingency Planning	PCWA's WSCP
x	x	Section 8.2	10632(a)(2)(B)	Provide data and methodology to evaluate the supplier's water reliability for the current year and one dry year pursuant to factors in the code.	Water Shortage Contingency Planning	PCWA's WSCP
x	x	Section 8.3	10632(a)(3)(A)	Define six standard water shortage levels of 10, 20, 30, 40, 50 percent shortage and greater than 50 percent shortage. These levels shall be based on supply conditions, including percent reductions in supply, changes in groundwater levels, changes in surface elevation, or other conditions. The shortage levels shall also apply to a catastrophic interruption of supply.	Water Shortage Contingency Planning	PCWA's WSCP
x	x	Section 8.3	10632(a)(3)(B)	Suppliers with an existing water shortage contingency plan that uses different water shortage levels must cross reference their categories with the six standard categories.	Water Shortage Contingency Planning	PCWA's WSCP
x	x	Section 8.4	10632(a)(4)(A)	Suppliers with water shortage contingency plans that align with the defined shortage levels must specify locally appropriate supply augmentation actions.	Water Shortage Contingency Planning	PCWA's WSCP
x	x	Section 8.4	10632(a)(4)(B)	Specify locally appropriate demand reduction actions to adequately respond to shortages.	Water Shortage Contingency Planning	PCWA's WSCP
x	x	Section 8.4	10632(a)(4)(C)	Specify locally appropriate operational changes.	Water Shortage Contingency Planning	PCWA's WSCP
x	x	Section 8.4	10632(a)(4)(D)	Specify additional mandatory prohibitions against specific water use practices that are in addition to state-mandated prohibitions are appropriate to local conditions.	Water Shortage Contingency Planning	PCWA's WSCP
x	x	Section 8.4	10632(a)(4)(E)	Estimate the extent to which the gap between supplies and demand will be reduced by implementation of the action.	Water Shortage Contingency Planning	PCWA's WSCP
x	x	Section 8.4.6	10632.5	The plan shall include a seismic risk assessment and mitigation plan.	Water Shortage Contingency Plan	PCWA's WSCP
x	x	Section 8.5	10632(a)(5)(A)	Suppliers must describe that they will inform customers, the public and others regarding any current or predicted water shortages.	Water Shortage Contingency Planning	PCWA's WSCP
x	x	Section 8.5 and 8.6	10632(a)(5)(B) 10632(a)(5)(C)	Suppliers must describe that they will inform customers, the public and others regarding any shortage response actions triggered or anticipated to be triggered and other relevant communications.	Water Shortage Contingency Planning	PCWA's WSCP
x		Section 8.6	10632(a)(6)	Retail supplier must describe how it will ensure compliance with and enforce provisions of the WSCP.	Water Shortage Contingency Planning	PCWA's WSCP
x		Section 8.7	10632(a)(7)(A)	Describe the legal authority that empowers the supplier to enforce shortage response actions.	Water Shortage Contingency Planning	PCWA's WSCP
x	x	Section 8.7	10632(a)(7)(B)	Provide a statement that the supplier will declare a water shortage emergency Water Code Chapter 3.	Water Shortage Contingency Planning	PCWA's WSCP
x	x	Section 8.7	10632(a)(7)(C)	Provide a statement that the supplier will coordinate with any city or county within which it provides water for the possible proclamation of a local emergency.	Water Shortage Contingency Planning	PCWA's WSCP
x	x	Section 8.8	10632(a)(8)(A)	Describe the potential revenue reductions and expense increases associated with activated shortage response actions.	Water Shortage Contingency Planning	PCWA's WSCP
x	x	Section 8.8	10632(a)(8)(B)	Provide a description of mitigation actions needed to address revenue reductions and expense increases associated with activated shortage response actions.	Water Shortage Contingency Planning	PCWA's WSCP
x		Section 8.8	10632(a)(8)(C)	Retail suppliers must describe the cost of compliance with Water Code Chapter 3.3: Excessive Residential Water Use During Drought	Water Shortage Contingency Planning	PCWA's WSCP
x		Section 8.9	10632(a)(9)	Retail suppliers must describe the monitoring and reporting requirements and procedures that ensure appropriate data is collected, tracked, and analyzed for purposes of monitoring customer compliance.	Water Shortage Contingency Planning	PCWA's WSCP
x		Section 8.11	10632(b)	Analyze and define water features that are artificially supplied with water, including ponds, lakes, waterfalls, and fountains, separately from swimming pools and spas.	Water Shortage Contingency Planning	PCWA's WSCP
x	x	Sections 8.12 and 10.4	10635(c)	Provide supporting documentation that Water Shortage Contingency Plan has been, or will be, provided to any city or county within which it provides water, no later than 30 days after the submission of the plan to DWR.	Plan Adoption, Submittal, and Implementation	PCWA's WSCP
x	x	Section 8.14	10632(c)	Make available the Water Shortage Contingency Plan to customers and any city or county where it provides water within 30 after adopted the plan.	Water Shortage Contingency Planning	PCWA's WSCP

Retail	Wholesale	2020 Guidebook Location	Water Code Section	Summary as Applies to UWMP	Subject	2020 UWMP Location (Optional Column for Agency Review Use)
	x	Sections 9.1 and 9.3	10631(e)(2)	Wholesale suppliers shall describe specific demand management measures listed in code, their distribution system asset management program, and supplier assistance program.	Demand Management Measures	Chapter 9.1
x		Sections 9.2 and 9.3	10631(e)(1)	Retail suppliers shall provide a description of the nature and extent of each demand management measure implemented over the past five years. The description will address specific measures listed in code.	Demand Management Measures	Chapter 9.2
x		Chapter 10	10608.26(a)	Retail suppliers shall conduct a public hearing to discuss adoption, implementation, and economic impact of water use targets (recommended to discuss compliance).	Plan Adoption, Submittal, and Implementation	Section 10.2
x	x	Section 10.2.1	10621(b)	Notify, at least 60 days prior to the public hearing, any city or county within which the supplier provides water that the urban water supplier will be reviewing the plan and considering amendments or changes to the plan. Reported in Table 10-1.	Plan Adoption, Submittal, and Implementation	Section 2.2 and Section 10.1
x	x	Section 10.4	10621(f)	Each urban water supplier shall update and submit its 2020 plan to the department by July 1, 2021.	Plan Adoption, Submittal, and Implementation	Section 10.2
x	x	Sections 10.2.2, 10.3, and 10.5	10642	Provide supporting documentation that the urban water supplier made the plan and contingency plan available for public inspection, published notice of the public hearing, and held a public hearing about the plan and contingency plan.	Plan Adoption, Submittal, and Implementation	Section 10.1 and Appendix A
x	x	Section 10.2.2	10642	The water supplier is to provide the time and place of the hearing to any city or county within which the supplier provides water.	Plan Adoption, Submittal, and Implementation	Section 10.2 and Appendix A
x	x	Section 10.3.2	10642	Provide supporting documentation that the plan and contingency plan has been adopted as prepared or modified.	Plan Adoption, Submittal, and Implementation	Appendix I
x	x	Section 10.4	10644(a)	Provide supporting documentation that the urban water supplier has submitted this UWMP to the California State Library.	Plan Adoption, Submittal, and Implementation	Appendix I
x	x	Section 10.4	10644(a)(1)	Provide supporting documentation that the urban water supplier has submitted this UWMP to any city or county within which the supplier provides water no later than 30 days after adoption.	Plan Adoption, Submittal, and Implementation	Appendix I
x	x	Sections 10.4.1 and 10.4.2	10644(a)(2)	The plan, or amendments to the plan, submitted to the department shall be submitted electronically.	Plan Adoption, Submittal, and Implementation	Section 10.3
x	x	Section 10.5	10645(a)	Provide supporting documentation that, not later than 30 days after filing a copy of its plan with the department, the supplier has or will make the plan available for public review during normal business hours.	Plan Adoption, Submittal, and Implementation	Appendix I
x	x	Section 10.5	10645(b)	Provide supporting documentation that, not later than 30 days after filing a copy of its water shortage contingency plan with the department, the supplier has or will make the plan available for public review during normal business hours.	Plan Adoption, Submittal, and Implementation	Appendix I
x	x	Section 10.6	10621(c)	If supplier is regulated by the Public Utilities Commission, include its plan and contingency plan as part of its general rate case filings.	Plan Adoption, Submittal, and Implementation	-
x	x	Section 10.7.2	10644(b)	If revised, submit a copy of the water shortage contingency plan to DWR within 30 days of adoption.	Plan Adoption, Submittal, and Implementation	Section 10.5

Public Draft

D

Appendix D - SBX7-7 Forms

Public Draft

SBX7-7 Verification Forms (From 2015 UWMP)

SB X7-7 Table 0: Units of Measure Used in UWMP* *(select one from the drop down list)*
Acre Feet
**The unit of measure must be consistent with Table 2-3*
NOTES:

SB X7-7 Table-1: Baseline Period Ranges

Baseline	Parameter	Value	Units
10- to 15-year baseline period	2008 total water deliveries	31,336	Acre Feet
	2008 total volume of delivered recycled water	-	Acre Feet
	2008 recycled water as a percent of total deliveries	0.00%	Percent
	Number of years in baseline period[1, 2]	10	Years
	Year beginning baseline period range	1995	▨
	Year ending baseline period range[3]	2004	▨
5-year baseline period	Number of years in baseline period	5	Years
	Year beginning baseline period range	2004	▨
	Year ending baseline period range[4]	2008	▨

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

[3] The ending year must be between December 31, 2004 and December 31, 2010.

[4] The ending year must be between December 31, 2007 and December 31, 2010.

NOTES:

SB X7-7 Table 2: Method for Population Estimates	
Method Used to Determine Population (may check more than one)	
☐	**1. Department of Finance** (DOF) DOF Table E-8 (1990 - 2000) and (2000-2010) and DOF Table E-5 (2011 - 2015) when available
☐	**2. Persons-per-Connection Method**
☒	**3. DWR Population Tool**
☐	**4. Other** DWR recommends pre-review
NOTES: See Section 4.1	

SB X7-7 Table 3: Service Area Population

Year		Population
10 to 15 Year Baseline Population		
Year 1	1995	54,744
Year 2	1996	56,504
Year 3	1997	58,458
Year 4	1998	59,544
Year 5	1999	62,851
Year 6	2000	67,321
Year 7	2001	72,056
Year 8	2002	76,923
Year 9	2003	81,149
Year 10	2004	84,273
5 Year Baseline Population		
Year 1	2004	84,273
Year 2	2005	85,942
Year 3	2006	88,676
Year 4	2007	90,312
Year 5	2008	90,977
2015 Compliance Year Population		
2015		98,128

NOTES: See Section 4.1

SB X7-7 Table 4: Annual Gross Water Use *

Baseline Year *Fm SB X7-7 Table 3*		**Volume Into Distribution System** *This column will remain blank until SB X7-7 Table 4-A is completed.*	**Deductions**					**Annual Gross Water Use**
			Exported Water	**Change in Dist. System Storage** (+/-)	**Indirect Recycled Water** *This column will remain blank until SB X7-7 Table 4-B is completed.*	**Water Delivered for Agricultural Use**	**Process Water** *This column will remain blank until SB X7-7 Table 4-D is completed.*	
10 to 15 Year Baseline - Gross Water Use								
Year 1	1995	19,004			-		-	19,004
Year 2	1996	19,760			-		-	19,760
Year 3	1997	22,976			-		-	22,976
Year 4	1998	19,792			-		-	19,792
Year 5	1999	24,061			-		-	24,061
Year 6	2000	23,497			-		-	23,497
Year 7	2001	26,918			-		-	26,918
Year 8	2002	28,471			-		-	28,471
Year 9	2003	27,911			-		-	27,911
Year 10	2004	30,957			-		-	30,957
10 - 15 year baseline average gross water use								**24,335**
5 Year Baseline - Gross Water Use								
Year 1	2004	30,957			-		-	30,957
Year 2	2005	27,632			-		-	27,632
Year 3	2006	27,976			-		-	27,976
Year 4	2007	29,338			-		-	29,338
Year 5	2008	31,371			-		-	31,371
5 year baseline average gross water use								**29,455**
2015 Compliance Year - Gross Water Use								
2015		22,366	-		-		-	**22,366**

* NOTE that the units of measure must remain consistent throughout the UWMP, as reported in Table 2-3

NOTES: See Section 4.1

SB X7-7 Table 4-A: Volume Entering the Distribution System(s)

Complete one table for each source.

Name of Source: All Retail Treated Water in Zone 1 and Zone 3

This water source is:

☐ The supplier's own water source

☐ A purchased or imported source

Baseline Year *Fm SB X7-7 Table 3*		Volume Entering Distribution System	Meter Error Adjustment* *Optional (+/-)*	Corrected Volume Entering Distribution System
10 to 15 Year Baseline - Water into Distribution System				
Year 1	1995	19,004		19,004
Year 2	1996	19,760		19,760
Year 3	1997	22,976		22,976
Year 4	1998	19,792		19,792
Year 5	1999	24,061		24,061
Year 6	2000	23,497		23,497
Year 7	2001	26,918		26,918
Year 8	2002	28,471		28,471
Year 9	2003	27,911		27,911
Year 10	2004	30,957		30,957
5 Year Baseline - Water into Distribution System				
Year 1	2004	30,957		30,957
Year 2	2005	27,632		27,632
Year 3	2006	27,976		27,976
Year 4	2007	29,338		29,338
Year 5	2008	31,371		31,371
2015 Compliance Year - Water into Distribution System				
2015		22,366		22,366

** Meter Error Adjustment - See guidance in Methodology 1, Step 3 of Methodologies Document*

NOTES: See Table 4-1 in Section 4.1

SB X7-7 Table 5: Gallons Per Capita Per Day (GPCD)

Baseline Year *Fm SB X7-7 Table 3*		Service Area Population *Fm SB X7-7 Table 3*	Annual Gross Water Use *Fm SB X7-7 Table 4*	Daily Per Capita Water Use (GPCD)
10 to 15 Year Baseline GPCD				
Year 1	1995	54,744	19,004	310
Year 2	1996	56,504	19,760	312
Year 3	1997	58,458	22,976	351
Year 4	1998	59,544	19,792	297
Year 5	1999	62,851	24,061	342
Year 6	2000	67,321	23,497	312
Year 7	2001	72,056	26,918	334
Year 8	2002	76,923	28,471	330
Year 9	2003	81,149	27,911	307
Year 10	2004	84,273	30,957	328
10-15 Year Average Baseline GPCD				**322**
5 Year Baseline GPCD				
Baseline Year *Fm SB X7-7 Table 3*		Service Area Population *Fm SB X7-7 Table 3*	Gross Water Use *Fm SB X7-7 Table 4*	Daily Per Capita Water Use
Year 1	2004	84,273	30,957	328
Year 2	2005	85,942	27,632	287
Year 3	2006	88,676	27,976	282
Year 4	2007	90,312	29,338	290
Year 5	2008	90,977	31,371	308
5 Year Average Baseline GPCD				**299**
2015 Compliance Year GPCD				
2015		98,128	22,366	**203**

NOTES:

SB X7-7 Table 6: Gallons per Capita per Day

Summary From Table SB X7-7 Table 5

10-15 Year Baseline GPCD	322
5 Year Baseline GPCD	299
2015 Compliance Year GPCD	203

NOTES:

SB X7-7 Table 7: 2020 Target Method

Select Only One

Target Method		Supporting Documentation
☐	Method 1	SB X7-7 Table 7A
☐	Method 2	SB X7-7 Tables 7B, 7C, and 7D *Contact DWR for these tables*
☐	Method 3	SB X7-7 Table 7-E
☒	Method 4	Method 4 Calculator

NOTES:

SB X7-7 Table 7-A: Target Method 1
20% Reduction

10-15 Year Baseline GPCD	**2020 Target GPCD**
322	**258**

NOTES:

SB X7-7 Table 7-F: Confirm Minimum Reduction for 2020 Target

5 Year Baseline GPCD *From SB X7-7 Table 5*	Maximum 2020 Target[1]	Calculated 2020 Target[2]	**Confirmed 2020 Target**
299	284	261	**261**

[1] Maximum 2020 Target is 95% of the 5 Year Baseline GPCD *[2] 2020 Target is calculated based on the selected Target Method, see SB X7-7 Table 7 and corresponding tables for agency's calculated target.*

NOTES:

SB X7-7 Table 8: 2015 Interim Target GPCD

Confirmed 2020 Target *Fm SB X7-7 Table 7-F*	10-15 year Baseline GPCD *Fm SB X7-7 Table 5*	**2015 Interim Target GPCD**
261	322	**292**

NOTES:

SBX7-7 2020 Compliance Forms

SB X7-7 Table 0: Units of Measure Used in 2020 UWMP* *(select one from the drop down list)*
Acre Feet
**The unit of measure must be consistent throughout the UWMP, as reported in Submittal Table 2-3.*
NOTES:

SB X7-7 Table 2: Method for 2020 Population Estimate	
Method Used to Determine 2020 Population (may check more than one)	
☐	**1. Department of Finance** (DOF) or **American Community Survey** (ACS)
☑	**2. Persons-per-Connection Method**
☐	**3. DWR Population Tool**
☐	**4. Other** DWR recommends pre-review
NOTES:	

SB X7-7 Table 3: 2020 Service Area Population	
2020 Compliance Year Population	
2020	108,225
NOTES:	

SB X7-7 Table 4: 2020 Gross Water Use

Compliance Year 2020	2020 Volume Into Distribution System *This column will remain blank until SB X7-7 Table 4-A is completed.*	2020 Deductions					2020 Gross Water Use
		Exported Water *	Change in Dist. System Storage* (+/-)	Indirect Recycled Water *This column will remain blank until SB X7-7 Table 4-B is completed.*	Water Delivered for Agricultural Use*	Process Water *This column will remain blank until SB X7-7 Table 4-D is completed.*	
	29,065			-		-	**29,065**

*** Units of measure (AF, MG , or CCF)** must remain consistent throughout the UWMP, as reported in SB X7-7 Table 0 and Submittal Table 2-3.

NOTES:

SB X7-7 Table 4-A: 2020 Volume Entering the Distribution System(s), Meter Error Adjustment

Complete one table for each source.

Name of Source	Surface Water		
This water source is *(check one)* **:**			
☑	The supplier's own water source		
☐	A purchased or imported source		
Compliance Year 2020	Volume Entering Distribution System [1]	Meter Error Adjustment [2] *Optional* *(+/-)*	Corrected Volume Entering Distribution System
	29,065	-	29,065

[1] ***Units of measure (AF, MG , or CCF)*** *must remain consistent throughout the UWMP, as reported in SB X7-7 Table 0 and Submittal Table 2-3.* [2] ***Meter Error Adjustment*** *- See guidance in Methodology 1, Step 3 of Methodologies Document*

NOTES

SB X7-7 Table 5: 2020 Gallons Per Capita Per Day (GPCD)

2020 Gross Water ***Fm SB X7-7 Table 4***	**2020 Population** ***Fm SB X7-7 Table 3***	**2020 GPCD**
29,065	108,225	**240**

NOTES:

SB X7-7 Table 9: 2020 Compliance

Actual 2020 GPCD[1]	Optional Adjustments to 2020 GPCD					2020 Confirmed Target GPCD [1, 2]	**Did Supplier Achieve Targeted Reduction for 2020?**
	Enter "0" if Adjustment Not Used			TOTAL Adjustments[1]	Adjusted 2020 GPCD [1] *(Adjusted if applicable)*		
	Extraordinary Events[1]	Weather Normalization[1]	Economic Adjustment[1]				
240	-	-	-	-	240	261	**YES**

[1] *All values are reported in GPCD*

[2] ***2020 Confirmed Target GPCD*** *is taken from the Supplier's SB X7-7 Verification Form Table SB X7-7, 7-F.*

NOTES:

Public Draft

E

Appendix E - AWWA Water Audits

Public Draft

Western Area AWWA Water Audits (2016-2019)

AWWA Free Water Audit Software:
Reporting Worksheet

WAS v5.0

American Water Works Association.

? Click to access definition
\+ Click to add a comment

Water Audit Report for: Placer County Water Agency - Auburn/Bowman (3110005)
Reporting Year: 2016 1/2016 - 12/2016

Please enter data in the white cells below. Where available, metered values should be used; if metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the input data by grading each component (n/a or 1-10) using the drop-down list to the left of the input cell. Hover the mouse over the cell to obtain a description of the grades

All volumes to be entered as: ACRE-FEET PER YEAR

To select the correct data grading for each input, determine the highest grade where the utility meets or exceeds all criteria for that grade and all grades below it.

Master Meter and Supply Error Adjustments

WATER SUPPLIED

<----------- Enter grading in column 'E' and 'J' ---------->

							Pcnt:		Value:	
Volume from own sources:	+	?	4	4,815.520	acre-ft/yr	+ 3	-5.00%	● ○		acre-ft/yr
Water imported:	+	?	4	0.110	acre-ft/yr	+ 1		● ○		acre-ft/yr
Water exported:	+	?	2	57.040	acre-ft/yr	+ 1		● ○		acre-ft/yr

Enter negative % or value for under-registration
Enter positive % or value for over-registration

WATER SUPPLIED: **5,012.038** acre-ft/yr

AUTHORIZED CONSUMPTION

Click here: ? for help using option buttons below

						Pcnt:		Value:	
Billed metered:	+	?	7	4,513.000	acre-ft/yr				
Billed unmetered:	+	?	n/a	0.000	acre-ft/yr				
Unbilled metered:	+	?	3	101.780	acre-ft/yr				
Unbilled unmetered:	+	?	9	0.110	acre-ft/yr		○ ●	0.110	acre-ft/yr

Use buttons to select percentage of water supplied
OR
value

AUTHORIZED CONSUMPTION: ? **4,614.890** acre-ft/yr

WATER LOSSES (Water Supplied - Authorized Consumption)

397.148 acre-ft/yr

Apparent Losses

						Pcnt:		Value:	
Unauthorized consumption:	+	?		12.530	acre-ft/yr	0.25%	● ○		acre-ft/yr

Default option selected for unauthorized consumption - a grading of 5 is applied but not displayed

Customer metering inaccuracies:	+	?	6	167.375	acre-ft/yr	3.50%	● ○		acre-ft/yr
Systematic data handling errors:	+	?	5	0.001	acre-ft/yr		○ ●	0.001	acre-ft/yr

Apparent Losses: ? **179.907** acre-ft/yr

Real Losses (Current Annual Real Losses or CARL)

Real Losses = Water Losses - Apparent Losses: ? **217.242** acre-ft/yr

WATER LOSSES: **397.148** acre-ft/yr

NON-REVENUE WATER

NON-REVENUE WATER: ? **499.038** acre-ft/yr

= Water Losses + Unbilled Metered + Unbilled Unmetered

SYSTEM DATA

Length of mains:	+	?	7	155.9	miles
Number of active AND inactive service connections:	+	?	9	8,765	
Service connection density:		?		56	conn./mile main

Are customer meters typically located at the curbstop or property line? Yes

Average length of customer service line: + ? (length of service line, beyond the property boundary, that is the responsibility of the utility)

Average length of customer service line has been set to zero and a data grading score of 10 has been applied

Average operating pressure: + ? 5 74.0 psi

COST DATA

Total annual cost of operating water system:	+	?	10	$20,246,215	$/Year
Customer retail unit cost (applied to Apparent Losses):	+	?	9	$1.67	$/100 cubic feet (ccf)
Variable production cost (applied to Real Losses):	+	?	5	$492.00	$/acre-ft

☐ Use Customer Retail Unit Cost to value real losses

WATER AUDIT DATA VALIDITY SCORE:

***** YOUR SCORE IS: 56 out of 100 *****

A weighted scale for the components of consumption and water loss is included in the calculation of the Water Audit Data Validity Score

PRIORITY AREAS FOR ATTENTION:

Based on the information provided, audit accuracy can be improved by addressing the following components:

1: Volume from own sources

2: Unbilled metered

3: Variable production cost (applied to Real Losses)

AWWA Free Water Audit Software: Reporting Worksheet

WAS v5.0

American Water Works Association.

?	Click to access definition
+	Click to add a comment

Water Audit Report for: Placer County Water Agency - Foothill/Sunset (3110025)
Reporting Year: 2016 | 1/2016 - 12/2016

Please enter data in the white cells below. Where available, metered values should be used; if metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the input data by grading each component (n/a or 1-10) using the drop-down list to the left of the input cell. Hover the mouse over the cell to obtain a description of the grades

All volumes to be entered as: ACRE-FEET PER YEAR

To select the correct data grading for each input, determine the highest grade where the utility meets or exceeds all criteria for that grade and all grades below it.

<----------- Enter grading in column 'E' and 'J' ---------->

Master Meter and Supply Error Adjustments

WATER SUPPLIED

						Pcnt:		Value:	
Volume from own sources:	+ ?	4	25,435.640	acre-ft/yr	+ 3	0.00%	● ○		acre-ft/yr
Water imported:	+ ?	4	937.900	acre-ft/yr	+ 1	0.00%	● ○		acre-ft/yr
Water exported:	+ ?	2	8,844.830	acre-ft/yr	+ 1	0.00%	● ○		acre-ft/yr

Enter negative % or value for under-registration
Enter positive % or value for over-registration

WATER SUPPLIED:	**17,528.710**	acre-ft/yr

AUTHORIZED CONSUMPTION

Click here: ? for help using option buttons below

					Pcnt:		Value:	
Billed metered:	+ ?	7	15,694.000	acre-ft/yr				
Billed unmetered:	+ ?	n/a	0.000	acre-ft/yr				
Unbilled metered:	+ ?	3	8.080	acre-ft/yr				
Unbilled unmetered:	+ ?	9	2.900	acre-ft/yr		○ ●	2.900	acre-ft/yr

Use buttons to select percentage of water supplied **OR** value

AUTHORIZED CONSUMPTION:	?	**15,704.980**	acre-ft/yr

WATER LOSSES (Water Supplied - Authorized Consumption)

WATER LOSSES (Water Supplied - Authorized Consumption)	**1,823.730**	acre-ft/yr

Apparent Losses

					Pcnt:		Value:	
Unauthorized consumption:	+ ?		43.822	acre-ft/yr	0.25%	● ○		acre-ft/yr

Default option selected for unauthorized consumption - a grading of 5 is applied but not displayed

Customer metering inaccuracies:	+ ?	6	569.505	acre-ft/yr	3.50%	● ○		acre-ft/yr
Systematic data handling errors:	+ ?	5	0.001	acre-ft/yr		○ ●	0.001	acre-ft/yr

Apparent Losses:	?	**613.328**	acre-ft/yr

Real Losses (Current Annual Real Losses or CARL)

Real Losses = Water Losses - Apparent Losses:	?	**1,210.402**	acre-ft/yr
WATER LOSSES:		**1,823.730**	acre-ft/yr

NON-REVENUE WATER

NON-REVENUE WATER:	?	**1,834.710**	acre-ft/yr

= Water Losses + Unbilled Metered + Unbilled Unmetered

SYSTEM DATA

Length of mains:	+ ?	7	411.2	miles
Number of active AND inactive service connections:	+ ?	9	26,260	
Service connection density:	?		64	conn./mile main

Are customer meters typically located at the curbstop or property line? Yes

Average length of customer service line: + ? (length of service line, beyond the property boundary, that is the responsibility of the utility)

Average length of customer service line has been set to zero and a data grading score of 10 has been applied

Average operating pressure:	+ ?	5	75.0	psi

COST DATA

Total annual cost of operating water system:	+ ?	10	$20,246,215	$/Year
Customer retail unit cost (applied to Apparent Losses):	+ ?	9	$1.67	$/100 cubic feet (ccf)
Variable production cost (applied to Real Losses):	+ ?	5	$492.00	$/acre-ft

☐ Use Customer Retail Unit Cost to value real losses

WATER AUDIT DATA VALIDITY SCORE:

***** YOUR SCORE IS: 55 out of 100 *****

A weighted scale for the components of consumption and water loss is included in the calculation of the Water Audit Data Validity Score

PRIORITY AREAS FOR ATTENTION:

Based on the information provided, audit accuracy can be improved by addressing the following components:

1: Volume from own sources

2: Water exported

3: Unbilled metered

AWWA Free Water Audit Software:
Reporting Worksheet

WAS v5.0

American Water Works Association.

?	Click to access definition
+	Click to add a comment

Water Audit Report for: Placer County Water Agency - Auburn/Bowman (3110005)
Reporting Year: 2017 | 1/2017 - 12/2017

Please enter data in the white cells below. Where available, metered values should be used; if metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the input data by grading each component (n/a or 1-10) using the drop-down list to the left of the input cell. Hover the mouse over the cell to obtain a description of the grades

All volumes to be entered as: ACRE-FEET PER YEAR

To select the correct data grading for each input, determine the highest grade where the utility meets or exceeds all criteria for that grade and all grades below it.

Master Meter and Supply Error Adjustments

WATER SUPPLIED

<----------- Enter grading in column 'E' and 'J' ---------->

								Pcnt:		Value:	
Volume from own sources:	+	?	3	5,622.510	acre-ft/yr	+	3	-6.62%	● ○		acre-ft/yr
Water imported:	+	?	3	0.000	acre-ft/yr	+			● ○		acre-ft/yr
Water exported:	+	?	2	37.330	acre-ft/yr	+	1		● ○		acre-ft/yr

Enter negative % or value for under-registration
Enter positive % or value for over-registration

WATER SUPPLIED: 5,983.573 acre-ft/yr

AUTHORIZED CONSUMPTION

Click here: ? for help using option buttons below

						Pcnt:		Value:	
Billed metered:	+	?	7	4,882.880	acre-ft/yr				
Billed unmetered:	+	?	n/a	0.000	acre-ft/yr				
Unbilled metered:	+	?	3	64.120	acre-ft/yr				
Unbilled unmetered:	+	?	8	0.110	acre-ft/yr		○ ●	0.110	acre-ft/yr

Use buttons to select percentage of water supplied **OR** value

AUTHORIZED CONSUMPTION: ? 4,947.110 acre-ft/yr

WATER LOSSES (Water Supplied - Authorized Consumption) 1,036.463 acre-ft/yr

Apparent Losses

						Pcnt:		Value:	
Unauthorized consumption:	+	?		14.959	acre-ft/yr	0.25%	● ○		acre-ft/yr

Default option selected for unauthorized consumption - a grading of 5 is applied but not displayed

Customer metering inaccuracies:	+	?	6	179.425	acre-ft/yr	3.50%	● ○		acre-ft/yr
Systematic data handling errors:	+	?	5	0.001	acre-ft/yr		○ ●	0.001	acre-ft/yr

Apparent Losses: ? 194.385 acre-ft/yr

Real Losses (Current Annual Real Losses or CARL)

Real Losses = Water Losses - Apparent Losses: ? 842.079 acre-ft/yr

WATER LOSSES: 1,036.463 acre-ft/yr

NON-REVENUE WATER

NON-REVENUE WATER: ? 1,100.693 acre-ft/yr

= Water Losses + Unbilled Metered + Unbilled Unmetered

SYSTEM DATA

Length of mains:	+	?	7	156.3	miles
Number of active AND inactive service connections:	+	?	7	10,536	
Service connection density:		?		67	conn./mile main

Are customer meters typically located at the curbstop or property line? Yes

Average length of customer service line: + ? (length of service line, beyond the property boundary, that is the responsibility of the utility)

Average length of customer service line has been set to zero and a data grading score of 10 has been applied

Average operating pressure: + ? 5 74.0 psi

COST DATA

Total annual cost of operating water system:	+	?	10	$8,437,223	$/Year
Customer retail unit cost (applied to Apparent Losses):	+	?	9	$1.71	$/100 cubic feet (ccf)
Variable production cost (applied to Real Losses):	+	?	5	$151.00	$/acre-ft

☐ Use Customer Retail Unit Cost to value real losses

WATER AUDIT DATA VALIDITY SCORE:

***** YOUR SCORE IS: 53 out of 100 *****

A weighted scale for the components of consumption and water loss is included in the calculation of the Water Audit Data Validity Score

PRIORITY AREAS FOR ATTENTION:

Based on the information provided, audit accuracy can be improved by addressing the following components:

1: Volume from own sources
2: Unbilled metered
3: Variable production cost (applied to Real Losses)

AWWA Free Water Audit Software:
Reporting Worksheet

WAS v5.0

American Water Works Association.

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Water Audit Report for: Placer County Water Agency - Foothill/Sunset (3110025)
Reporting Year: 2017 | 1/2017 - 12/2017

Please enter data in the white cells below. Where available, metered values should be used; if metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the input data by grading each component (n/a or 1-10) using the drop-down list to the left of the input cell. Hover the mouse over the cell to obtain a description of the grades

All volumes to be entered as: ACRE-FEET PER YEAR

To select the correct data grading for each input, determine the highest grade where the utility meets or exceeds all criteria for that grade and all grades below it.

Master Meter and Supply Error Adjustments

<----------- Enter grading in column 'E' and 'J' ---------->

WATER SUPPLIED

								Pcnt:		Value:	
Volume from own sources:	+	?	3	28,001.480	acre-ft/yr	+	3	0.00%	● ○		acre-ft/yr
Water imported:	+	?	3	1,235.030	acre-ft/yr	+	1	0.00%	● ○		acre-ft/yr
Water exported:	+	?	2	9,665.660	acre-ft/yr	+	1	0.00%	● ○		acre-ft/yr

Enter negative % or value for under-registration
Enter positive % or value for over-registration

WATER SUPPLIED:	**19,570.850**	acre-ft/yr

AUTHORIZED CONSUMPTION

Click here: ? for help using option buttons below

						Pcnt:		Value:	
Billed metered:	+	?	7	17,323.170	acre-ft/yr				
Billed unmetered:	+	?	n/a	0.000	acre-ft/yr				
Unbilled metered:	+	?	3	14.830	acre-ft/yr				
Unbilled unmetered:	+	?	8	2.900	acre-ft/yr		○ ●	2.900	acre-ft/yr

Use buttons to select percentage of water supplied
OR
value

AUTHORIZED CONSUMPTION:	?	**17,340.900**	acre-ft/yr

WATER LOSSES (Water Supplied - Authorized Consumption)

2,229.950	acre-ft/yr

Apparent Losses

						Pcnt:		Value:	
Unauthorized consumption:	+	?		48.927	acre-ft/yr	0.25%	● ○		acre-ft/yr

Default option selected for unauthorized consumption - a grading of 5 is applied but not displayed

Customer metering inaccuracies:	+	?	6	628.839	acre-ft/yr	3.50%	● ○		acre-ft/yr
Systematic data handling errors:	+	?	5	0.001	acre-ft/yr		○ ●	0.001	acre-ft/yr

Apparent Losses:	?	**677.768**	acre-ft/yr

Real Losses (Current Annual Real Losses or CARL)

Real Losses = Water Losses - Apparent Losses:	?	**1,552.182**	acre-ft/yr
WATER LOSSES:		**2,229.950**	acre-ft/yr

NON-REVENUE WATER

NON-REVENUE WATER:	?	**2,247.680**	acre-ft/yr

= Water Losses + Unbilled Metered + Unbilled Unmetered

SYSTEM DATA

Length of mains:	+	?	7	411.4	miles
Number of active AND inactive service connections:	+	?	7	31,080	
Service connection density:		?		76	conn./mile main

Are customer meters typically located at the curbstop or property line?				Yes	
Average length of customer service line:	+	?			(length of service line, beyond the property boundary, that is the responsibility of the utility)

Average length of customer service line has been set to zero and a data grading score of 10 has been applied

Average operating pressure:	+	?	5	82.0	psi

COST DATA

Total annual cost of operating water system:	+	?	10	$41,118,758	$/Year
Customer retail unit cost (applied to Apparent Losses):	+	?	9	$1.71	$/100 cubic feet (ccf)
Variable production cost (applied to Real Losses):	+	?	5	$151.00	$/acre-ft

☐ Use Customer Retail Unit Cost to value real losses

WATER AUDIT DATA VALIDITY SCORE:

***** YOUR SCORE IS: 52 out of 100 *****

A weighted scale for the components of consumption and water loss is included in the calculation of the Water Audit Data Validity Score

PRIORITY AREAS FOR ATTENTION:

Based on the information provided, audit accuracy can be improved by addressing the following components:

1: Volume from own sources
2: Water exported
3: Unbilled metered

AWWA Free Water Audit Software:
Reporting Worksheet

WAS v5.0

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Water Audit Report for: Placer County Water Agency - Auburn/Bowman (3110005)
Reporting Year: 2018 1/2018 - 12/2018

Please enter data in the white cells below. Where available, metered values should be used; if metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the input data by grading each component (n/a or 1-10) using the drop-down list to the left of the input cell. Hover the mouse over the cell to obtain a description of the grades

All volumes to be entered as: ACRE-FEET PER YEAR

To select the correct data grading for each input, determine the highest grade where the utility meets or exceeds all criteria for that grade and all grades below it.

<----------- Enter grading in column 'E' and 'J' ---------->

Master Meter and Supply Error Adjustments

WATER SUPPLIED

		Grade	Value	Unit		Grade	Pcnt:		Value:	Unit
Volume from own sources:	+ ?	3	5,786.900	acre-ft/yr	+ ?	1	-7.00%	● ○		acre-ft/yr
Water imported:	+ ?	3	0.000	acre-ft/yr	+ ?			● ○		acre-ft/yr
Water exported:	+ ?	3	0.010	acre-ft/yr	+ ?	1		● ○		acre-ft/yr
WATER SUPPLIED:			**6,222.463**	acre-ft/yr						

Enter negative % or value for under-registration
Enter positive % or value for over-registration

AUTHORIZED CONSUMPTION

Click here: ? for help using option buttons below

		Grade	Value	Unit	Pcnt:		Value:	Unit
Billed metered:	+ ?	7	5,197.000	acre-ft/yr				
Billed unmetered:	+ ?	n/a	0.000	acre-ft/yr				
Unbilled metered:	+ ?	3	68.510	acre-ft/yr				
Unbilled unmetered:	+ ?	3	1.170	acre-ft/yr		○ ●	1.170	acre-ft/yr
AUTHORIZED CONSUMPTION:	?		**5,266.680**	acre-ft/yr				

Use buttons to select percentage of water supplied **OR** value

WATER LOSSES (Water Supplied - Authorized Consumption)

955.783 acre-ft/yr

Apparent Losses

		Grade	Value	Unit	Pcnt:		Value:	Unit
Unauthorized consumption:	+ ?		15.556	acre-ft/yr	0.25%	● ○		acre-ft/yr

Default option selected for unauthorized consumption - a grading of 5 is applied but not displayed

		Grade	Value	Unit	Pcnt		Value	Unit
Customer metering inaccuracies:	+ ?	5	205.150	acre-ft/yr	3.75%	● ○		acre-ft/yr
Systematic data handling errors:	+ ?	5	0.001	acre-ft/yr		○ ●	0.001	acre-ft/yr
Apparent Losses:	?		**220.707**	acre-ft/yr				

Real Losses (Current Annual Real Losses or CARL)

Real Losses = Water Losses - Apparent Losses:	?	**735.076**	acre-ft/yr
WATER LOSSES:		**955.783**	acre-ft/yr

NON-REVENUE WATER

NON-REVENUE WATER:	?	**1,025.463**	acre-ft/yr

= Water Losses + Unbilled Metered + Unbilled Unmetered

SYSTEM DATA

		Grade	Value	Unit
Length of mains:	+ ?	7	156.1	miles
Number of active AND inactive service connections:	+ ?	7	8,869	
Service connection density:	?		57	conn./mile main
Are customer meters typically located at the curbstop or property line?			Yes	
Average length of customer service line:	+ ?			(length of service line, beyond the property boundary, that is the responsibility of the utility)

Average length of customer service line has been set to zero and a data grading score of 10 has been applied

		Grade	Value	Unit
Average operating pressure:	+ ?	5	82.0	psi

COST DATA

		Grade	Value	Unit
Total annual cost of operating water system:	+ ?	10	$9,104,670	$/Year
Customer retail unit cost (applied to Apparent Losses):	+ ?	7	$1.67	$/100 cubic feet (ccf)
Variable production cost (applied to Real Losses):	+ ?	5	$152.00	$/acre-ft

☐ Use Customer Retail Unit Cost to value real losses

WATER AUDIT DATA VALIDITY SCORE:

***** YOUR SCORE IS: 49 out of 100 *****

A weighted scale for the components of consumption and water loss is included in the calculation of the Water Audit Data Validity Score

PRIORITY AREAS FOR ATTENTION:

Based on the information provided, audit accuracy can be improved by addressing the following components:

1: Volume from own sources
2: Unbilled metered
3: Customer metering inaccuracies

AWWA Free Water Audit Software:
Reporting Worksheet

WAS v5.0

American Water Works Association.

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Water Audit Report for: Placer County Water Agency - Foothill/Sunset (3110025)

Reporting Year: 2018 | 1/2018 - 12/2018

Please enter data in the white cells below. Where available, metered values should be used; if metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the input data by grading each component (n/a or 1-10) using the drop-down list to the left of the input cell. Hover the mouse over the cell to obtain a description of the grades

All volumes to be entered as: ACRE-FEET PER YEAR

To select the correct data grading for each input, determine the highest grade where the utility meets or exceeds all criteria for that grade and all grades below it.

<----------- Enter grading in column 'E' and 'J' ---------->

Master Meter and Supply Error Adjustments

WATER SUPPLIED

						Pcnt:		Value:	
Volume from own sources:	+ ?	3	29,388.990	acre-ft/yr	+	3	-1.00%	● ○		acre-ft/yr
Water imported:	+ ?	3	1,125.590	acre-ft/yr	+	1	-1.00%	● ○		acre-ft/yr
Water exported:	+ ?	2	10,356.780	acre-ft/yr	+	1	-1.00%	● ○		acre-ft/yr

Enter negative % or value for under-registration
Enter positive % or value for over-registration

WATER SUPPLIED:	**20,361.414**	acre-ft/yr

AUTHORIZED CONSUMPTION

Click here: ? for help using option buttons below

					Pcnt:		Value:	
Billed metered:	+ ?	7	17,873.000	acre-ft/yr				
Billed unmetered:	+ ?	n/a	0.000	acre-ft/yr				
Unbilled metered:	+ ?	3	8.710	acre-ft/yr				
Unbilled unmetered:	+ ?	3	1.170	acre-ft/yr		○ ●	1.170	acre-ft/yr

Use buttons to select percentage of water supplied **OR** value

AUTHORIZED CONSUMPTION:	?	**17,882.880**	acre-ft/yr

WATER LOSSES (Water Supplied - Authorized Consumption)	**2,478.534**	acre-ft/yr

Apparent Losses

					Pcnt:		Value:	
Unauthorized consumption:	+ ?		50.904	acre-ft/yr	0.25%	● ○		acre-ft/yr

Default option selected for unauthorized consumption - a grading of 5 is applied but not displayed

Customer metering inaccuracies:	+ ?	5	745.071	acre-ft/yr	4.00%	● ○		acre-ft/yr
Systematic data handling errors:	+ ?	5	0.001	acre-ft/yr		○ ●	0.001	acre-ft/yr

Apparent Losses:	?	**795.976**	acre-ft/yr

Real Losses (Current Annual Real Losses or CARL)

Real Losses = Water Losses - Apparent Losses:	?	**1,682.558**	acre-ft/yr
WATER LOSSES:		**2,478.534**	acre-ft/yr

NON-REVENUE WATER

NON-REVENUE WATER:	?	**2,488.414**	acre-ft/yr

= Water Losses + Unbilled Metered + Unbilled Unmetered

SYSTEM DATA

Length of mains:	+ ?	7	417.6	miles
Number of active AND inactive service connections:	+ ?	7	27,101	
Service connection density:	?		65	conn./mile main

Are customer meters typically located at the curbstop or property line?		Yes
Average length of customer service line:	+ ?	

(length of service line, beyond the property boundary, that is the responsibility of the utility)

Average length of customer service line has been set to zero and a data grading score of 10 has been applied

Average operating pressure:	+ ?	5	82.0	psi

COST DATA

Total annual cost of operating water system:	+ ?	10	$41,591,788	$/Year
Customer retail unit cost (applied to Apparent Losses):	+ ?	7	$1.67	$/100 cubic feet (ccf)
Variable production cost (applied to Real Losses):	+ ?	5	$152.00	$/acre-ft

☐ Use Customer Retail Unit Cost to value real losses

WATER AUDIT DATA VALIDITY SCORE:

***** YOUR SCORE IS: 49 out of 100 *****

A weighted scale for the components of consumption and water loss is included in the calculation of the Water Audit Data Validity Score

PRIORITY AREAS FOR ATTENTION:

Based on the information provided, audit accuracy can be improved by addressing the following components:

1: Volume from own sources

2: Water exported

3: Unbilled metered

AWWA Free Water Audit Software:
Reporting Worksheet

WAS v5.0
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Water Audit Report for: Placer County Water Agency - Auburn/Bowman (3110005)
Reporting Year: 2019 1/2019 - 12/2019

Please enter data in the white cells below. Where available, metered values should be used; if metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the input data by grading each component (n/a or 1-10) using the drop-down list to the left of the input cell. Hover the mouse over the cell to obtain a description of the grades

All volumes to be entered as: ACRE-FEET PER YEAR

To select the correct data grading for each input, determine the highest grade where the utility meets or exceeds all criteria for that grade and all grades below it.

<----------- Enter grading in column 'E' and 'J' ---------->

Master Meter and Supply Error Adjustments

WATER SUPPLIED

		Grade	Volume	Unit		Grade	Pcnt:		Value:	
Volume from own sources:	+ ?	3	4,974.690	acre-ft/yr	+ ?	6	-9.30%	● ○		acre-ft/yr
Water imported:	+ ?	3	0.000	acre-ft/yr	+ ?			● ○		acre-ft/yr
Water exported:	+ ?	2	10.210	acre-ft/yr	+ ?	1	-1.00%	● ○		acre-ft/yr

Enter negative % or value for under-registration
Enter positive % or value for over-registration

WATER SUPPLIED: **5,474.461** acre-ft/yr

AUTHORIZED CONSUMPTION

Click here: ? for help using option buttons below

		Grade	Volume	Unit	Pcnt:		Value:	
Billed metered:	+ ?	7	4,827.000	acre-ft/yr				
Billed unmetered:	+ ?	n/a	0.000	acre-ft/yr				
Unbilled metered:	+ ?	3	105.370	acre-ft/yr				
Unbilled unmetered:	+ ?		68.431	acre-ft/yr	1.25%	● ○		acre-ft/yr

Default option selected for Unbilled unmetered - a grading of 5 is applied but not displayed

AUTHORIZED CONSUMPTION: ? **5,000.801** acre-ft/yr

Use buttons to select percentage of water supplied
OR
value

WATER LOSSES (Water Supplied - Authorized Consumption) **473.660** acre-ft/yr

Apparent Losses

		Grade	Volume	Unit	Pcnt:		Value:	
Unauthorized consumption:	+ ?		13.686	acre-ft/yr	0.25%	● ○		acre-ft/yr

Default option selected for unauthorized consumption - a grading of 5 is applied but not displayed

		Grade	Volume	Unit	Pcnt:		Value:	
Customer metering inaccuracies:	+ ?	5	194.834	acre-ft/yr	3.80%	● ○		acre-ft/yr
Systematic data handling errors:	+ ?	5	0.001	acre-ft/yr		○ ●	0.001	acre-ft/yr

Apparent Losses: ? **208.521** acre-ft/yr

Real Losses (Current Annual Real Losses or CARL)

Real Losses = Water Losses - Apparent Losses: ? **265.139** acre-ft/yr

WATER LOSSES: **473.660** acre-ft/yr

NON-REVENUE WATER

NON-REVENUE WATER: ? **647.461** acre-ft/yr

= Water Losses + Unbilled Metered + Unbilled Unmetered

SYSTEM DATA

		Grade	Value	Unit
Length of mains:	+ ?	7	163.7	miles
Number of active AND inactive service connections:	+ ?	7	8,971	
Service connection density:	?		55	conn./mile main

Are customer meters typically located at the curbstop or property line? Yes

Average length of customer service line: + ? (length of service line, beyond the property boundary, that is the responsibility of the utility)

Average length of customer service line has been set to zero and a data grading score of 10 has been applied

		Grade	Value	Unit
Average operating pressure:	+ ?	6	82.0	psi

COST DATA

		Grade	Value	Unit
Total annual cost of operating water system:	+ ?	10	$7,609,136	$/Year
Customer retail unit cost (applied to Apparent Losses):	+ ?	8	$1.66	$/100 cubic feet (ccf)
Variable production cost (applied to Real Losses):	+ ?	5	$153.00	$/acre-ft

☐ Use Customer Retail Unit Cost to value real losses

WATER AUDIT DATA VALIDITY SCORE:

***** YOUR SCORE IS: 52 out of 100 *****

A weighted scale for the components of consumption and water loss is included in the calculation of the Water Audit Data Validity Score

PRIORITY AREAS FOR ATTENTION:

Based on the information provided, audit accuracy can be improved by addressing the following components:

1: Volume from own sources
2: Unbilled metered
3: Customer metering inaccuracies

AWWA Free Water Audit Software:
Reporting Worksheet

WAS v5.0
American Water Works Association.
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? Click to access definition
\+ Click to add a comment

Water Audit Report for: Placer County Water Agency - Foothill/Sunset (3110025)
Reporting Year: 2019 | 1/2019 - 12/2019

Please enter data in the white cells below. Where available, metered values should be used; if metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the input data by grading each component (n/a or 1-10) using the drop-down list to the left of the input cell. Hover the mouse over the cell to obtain a description of the grades

All volumes to be entered as: ACRE-FEET PER YEAR

To select the correct data grading for each input, determine the highest grade where the utility meets or exceeds all criteria for that grade and all grades below it.

<----------- Enter grading in column 'E' and 'J' ---------->

Master Meter and Supply Error Adjustments

WATER SUPPLIED

					Grade	Pcnt:		Value:	
Volume from own sources:	+ ?	3	29,391.200	acre-ft/yr	6	0.60%	● ○		acre-ft/yr
Water imported:	+ ?	3	1,336.380	acre-ft/yr	1	-1.00%	● ○		acre-ft/yr
Water exported:	+ ?	2	10,388.360	acre-ft/yr	1	-1.00%	● ○		acre-ft/yr

Enter negative % or value for under-registration
Enter positive % or value for over-registration

WATER SUPPLIED: **20,072.490** acre-ft/yr

AUTHORIZED CONSUMPTION

Click here: ? for help using option buttons below

					Pcnt:		Value:	
Billed metered:	+ ?	7	18,264.000	acre-ft/yr				
Billed unmetered:	+ ?	n/a	0.000	acre-ft/yr				
Unbilled metered:	+ ?	8	5.780	acre-ft/yr				
Unbilled unmetered:	+ ?		250.906	acre-ft/yr	1.25%	● ○		acre-ft/yr

Default option selected for Unbilled unmetered - a grading of 5 is applied but not displayed

Use buttons to select percentage of water supplied
OR
value

AUTHORIZED CONSUMPTION: ? **18,520.686** acre-ft/yr

WATER LOSSES (Water Supplied - Authorized Consumption) **1,551.804** acre-ft/yr

Apparent Losses

					Pcnt:		Value:	
Unauthorized consumption:	+ ?		50.181	acre-ft/yr	0.25%	● ○		acre-ft/yr

Default option selected for unauthorized consumption - a grading of 5 is applied but not displayed

Customer metering inaccuracies:	+ ?	5	721.675	acre-ft/yr	3.80%	● ○		acre-ft/yr
Systematic data handling errors:	+ ?	5	0.001	acre-ft/yr		○ ●	0.001	acre-ft/yr

Apparent Losses: ? **771.858** acre-ft/yr

Real Losses (Current Annual Real Losses or CARL)

Real Losses = Water Losses - Apparent Losses: ? **779.947** acre-ft/yr

WATER LOSSES: **1,551.804** acre-ft/yr

NON-REVENUE WATER

NON-REVENUE WATER: ? **1,808.490** acre-ft/yr

= Water Losses + Unbilled Metered + Unbilled Unmetered

SYSTEM DATA

Length of mains:	+ ?	7	446.0	miles
Number of active AND inactive service connections:	+ ?	7	27,635	
Service connection density:	?		62	conn./mile main

Are customer meters typically located at the curbstop or property line? Yes

Average length of customer service line: + ? (length of service line, beyond the property boundary, that is the responsibility of the utility)

Average length of customer service line has been set to zero and a data grading score of 10 has been applied

Average operating pressure: + ? 6 82.0 psi

COST DATA

Total annual cost of operating water system:	+ ?	10	$43,465,884	$/Year
Customer retail unit cost (applied to Apparent Losses):	+ ?	8	$1.67	$/100 cubic feet (ccf)
Variable production cost (applied to Real Losses):	+ ?	5	$153.00	$/acre-ft

☐ Use Customer Retail Unit Cost to value real losses

WATER AUDIT DATA VALIDITY SCORE:

***** YOUR SCORE IS: 54 out of 100 *****

A weighted scale for the components of consumption and water loss is included in the calculation of the Water Audit Data Validity Score

PRIORITY AREAS FOR ATTENTION:

Based on the information provided, audit accuracy can be improved by addressing the following components:

1: Volume from own sources

2: Water exported

3: Customer metering inaccuracies

Zone 3 AWWA Water Audits (2018-2019)

AWWA Free Water Audit Software:
Reporting Worksheet

WAS v5.0

American Water Works Association.

?	Click to access definition
+	Click to add a comment

Water Audit Report for: Placer County Water Agency (Alta - 3110024)
Reporting Year: 2018 | 1/2018 - 12/2018

Please enter data in the white cells below. Where available, metered values should be used; if metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the input data by grading each component (n/a or 1-10) using the drop-down list to the left of the input cell. Hover the mouse over the cell to obtain a description of the grades

All volumes to be entered as: ACRE-FEET PER YEAR

To select the correct data grading for each input, determine the highest grade where the utility meets or exceeds all criteria for that grade and all grades below it.

Master Meter and Supply Error Adjustments

WATER SUPPLIED

<----------- Enter grading in column 'E' and 'J' ---------->

							Pcnt:		Value:	
Volume from own sources:	+ ?	3	148.290	acre-ft/yr	+	4	-1.00%	● ○		acre-ft/yr
Water imported:	+ ?	n/a	0.000	acre-ft/yr	+			● ○		acre-ft/yr
Water exported:	+ ?	n/a	0.000	acre-ft/yr	+			● ○		acre-ft/yr

Enter negative % or value for under-registration
Enter positive % or value for over-registration

WATER SUPPLIED: **149.788** acre-ft/yr

AUTHORIZED CONSUMPTION

Click here: ? for help using option buttons below

					Pcnt:		Value:	
Billed metered:	+ ?	7	79.450	acre-ft/yr				
Billed unmetered:	+ ?	n/a	0.000	acre-ft/yr				
Unbilled metered:	+ ?	3	0.050	acre-ft/yr				
Unbilled unmetered:	+ ?		1.872	acre-ft/yr	1.25%	● ○		acre-ft/yr

Default option selected for Unbilled unmetered - a grading of 5 is applied but not displayed

AUTHORIZED CONSUMPTION: ? **81.372** acre-ft/yr

Use buttons to select percentage of water supplied
OR
value

WATER LOSSES (Water Supplied - Authorized Consumption) **68.416** acre-ft/yr

Apparent Losses

					Pcnt:		Value:	
Unauthorized consumption:	+ ?		0.374	acre-ft/yr	0.25%	● ○		acre-ft/yr

Default option selected for unauthorized consumption - a grading of 5 is applied but not displayed

Customer metering inaccuracies:	+ ?	3	2.883	acre-ft/yr	3.50%	● ○		acre-ft/yr
Systematic data handling errors:	+ ?		0.199	acre-ft/yr	0.25%	● ○		acre-ft/yr

Default option selected for Systematic data handling errors - a grading of 5 is applied but not displayed

Apparent Losses: ? **3.457** acre-ft/yr

Real Losses (Current Annual Real Losses or CARL)

Real Losses = Water Losses - Apparent Losses: ? **64.959** acre-ft/yr

WATER LOSSES: **68.416** acre-ft/yr

NON-REVENUE WATER

NON-REVENUE WATER: ? **70.338** acre-ft/yr

= Water Losses + Unbilled Metered + Unbilled Unmetered

SYSTEM DATA

Length of mains:	+ ?	7	7.9	miles
Number of active AND inactive service connections:	+ ?	7	279	
Service connection density:	?		36	conn./mile main

Are customer meters typically located at the curbstop or property line? Yes

Average length of customer service line: + ? (length of service line, beyond the property boundary, that is the responsibility of the utility)

Average length of customer service line has been set to zero and a data grading score of 10 has been applied

Average operating pressure: + ? 4 91.0 psi

COST DATA

Total annual cost of operating water system:	+ ?	10	$217,271	$/Year
Customer retail unit cost (applied to Apparent Losses):	+ ?	6	$1.67	$/100 cubic feet (ccf)
Variable production cost (applied to Real Losses):	+ ?	5	$152.00	$/acre-ft

☐ Use Customer Retail Unit Cost to value real losses

WATER AUDIT DATA VALIDITY SCORE:

***** YOUR SCORE IS: 48 out of 100 *****

A weighted scale for the components of consumption and water loss is included in the calculation of the Water Audit Data Validity Score

PRIORITY AREAS FOR ATTENTION:

Based on the information provided, audit accuracy can be improved by addressing the following components:

1: Volume from own sources

2: Unbilled metered

3: Customer metering inaccuracies

AWWA Free Water Audit Software:
Reporting Worksheet

WAS v5.0

American Water Works Association.

?	Click to access definition
+	Click to add a comment

Water Audit Report for: Placer County Water Agency (Applegate - 3110050)

Reporting Year: 2018 | 1/2018 - 12/2018

Please enter data in the white cells below. Where available, metered values should be used; if metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the input data by grading each component (n/a or 1-10) using the drop-down list to the left of the input cell. Hover the mouse over the cell to obtain a description of the grades

All volumes to be entered as: ACRE-FEET PER YEAR

To select the correct data grading for each input, determine the highest grade where the utility meets or exceeds all criteria for that grade and all grades below it.

Master Meter and Supply Error Adjustments

WATER SUPPLIED

<----------- Enter grading in column 'E' and 'J' ---------->

								Pcnt:		Value:	
Volume from own sources:	+	?	2	19.820	acre-ft/yr	+	3	-2.00%	● ○		acre-ft/yr
Water imported:	+	?	n/a	0.000	acre-ft/yr	+			● ○		acre-ft/yr
Water exported:	+	?	n/a	0.000	acre-ft/yr	+			● ○		acre-ft/yr

Enter negative % or value for under-registration

Enter positive % or value for over-registration

WATER SUPPLIED:	**20.224**	acre-ft/yr

AUTHORIZED CONSUMPTION

Click here: ? for help using option buttons below

						Pcnt:		Value:	
Billed metered:	+	?	7	19.400	acre-ft/yr				
Billed unmetered:	+	?	n/a	0.000	acre-ft/yr				
Unbilled metered:	+	?	4	0.100	acre-ft/yr				
Unbilled unmetered:	+	?	4	0.010	acre-ft/yr		○ ●	0.010	acre-ft/yr

Use buttons to select percentage of water supplied

OR

value

AUTHORIZED CONSUMPTION:	?	**19.510**	acre-ft/yr

WATER LOSSES (Water Supplied - Authorized Consumption)	**0.714**	acre-ft/yr

Apparent Losses

						Pcnt:		Value:	
Unauthorized consumption:	+	?		0.051	acre-ft/yr	0.25%	● ○		acre-ft/yr

Default option selected for unauthorized consumption - a grading of 5 is applied but not displayed

Customer metering inaccuracies:	+	?	3	0.603	acre-ft/yr	3.00%	● ○		acre-ft/yr
Systematic data handling errors:	+	?		0.049	acre-ft/yr	0.25%	● ○		acre-ft/yr

Default option selected for Systematic data handling errors - a grading of 5 is applied but not displayed

Apparent Losses:	?	**0.702**	acre-ft/yr

Real Losses (Current Annual Real Losses or CARL)

Real Losses = Water Losses - Apparent Losses:	?	**0.012**	acre-ft/yr
WATER LOSSES:		**0.714**	acre-ft/yr

NON-REVENUE WATER

NON-REVENUE WATER:	?	**0.824**	acre-ft/yr

= Water Losses + Unbilled Metered + Unbilled Unmetered

SYSTEM DATA

Length of mains:	+	?	7	1.5	miles
Number of active AND inactive service connections:	+	?	7	67	
Service connection density:		?		44	conn./mile main

Are customer meters typically located at the curbstop or property line? Yes

Average length of customer service line: + ? (length of service line, beyond the property boundary, that is the responsibility of the utility)

Average length of customer service line has been set to zero and a data grading score of 10 has been applied

Average operating pressure:	+	?	4	82.0	psi

COST DATA

Total annual cost of operating water system:	+	?	10	$31,039	$/Year
Customer retail unit cost (applied to Apparent Losses):	+	?	6	$1.67	$/100 cubic feet (ccf)
Variable production cost (applied to Real Losses):	+	?	5	$152.00	$/acre-ft

☐ Use Customer Retail Unit Cost to value real losses

WATER AUDIT DATA VALIDITY SCORE:

***** YOUR SCORE IS: 45 out of 100 *****

A weighted scale for the components of consumption and water loss is included in the calculation of the Water Audit Data Validity Score

PRIORITY AREAS FOR ATTENTION:

Based on the information provided, audit accuracy can be improved by addressing the following components:

1: Volume from own sources

2: Customer metering inaccuracies

3: Unbilled metered

AWWA Free Water Audit Software:
Reporting Worksheet

WAS v5.0
American Water Works Association.

? Click to access definition
\+ Click to add a comment

Water Audit Report for: Placer County Water Agency (Colfax - 3110006)
Reporting Year: 2018 | 1/2018 - 12/2018

Please enter data in the white cells below. Where available, metered values should be used; if metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the input data by grading each component (n/a or 1-10) using the drop-down list to the left of the input cell. Hover the mouse over the cell to obtain a description of the grades

All volumes to be entered as: ACRE-FEET PER YEAR

To select the correct data grading for each input, determine the highest grade where the utility meets or exceeds all criteria for that grade and all grades below it.

<----------- Enter grading in column 'E' and 'J' ---------->

Master Meter and Supply Error Adjustments

WATER SUPPLIED

		Grade	Value	Unit		Grade	Pcnt:		Value:	
Volume from own sources:	+ ?	3	579.780	acre-ft/yr	+	4	-1.00%	● ○		acre-ft/yr
Water imported:	+ ?	n/a	0.000	acre-ft/yr	+			● ○		acre-ft/yr
Water exported:	+ ?	n/a	0.000	acre-ft/yr	+			● ○		acre-ft/yr

Enter negative % or value for under-registration
Enter positive % or value for over-registration

WATER SUPPLIED: 585.636 acre-ft/yr

AUTHORIZED CONSUMPTION

Click here: ? for help using option buttons below

		Grade	Value	Unit	Pcnt:		Value:	
Billed metered:	+ ?	7	379.830	acre-ft/yr				
Billed unmetered:	+ ?	n/a	0.000	acre-ft/yr				
Unbilled metered:	+ ?	3	0.300	acre-ft/yr				
Unbilled unmetered:	+ ?		7.320	acre-ft/yr	1.25%	● ○		acre-ft/yr

Default option selected for Unbilled unmetered - a grading of 5 is applied but not displayed

AUTHORIZED CONSUMPTION: ? 387.450 acre-ft/yr

Use buttons to select percentage of water supplied
OR
value

WATER LOSSES (Water Supplied - Authorized Consumption)

198.186 acre-ft/yr

Apparent Losses

		Grade	Value	Unit	Pcnt:		Value:	
Unauthorized consumption:	+ ?		1.464	acre-ft/yr	0.25%	● ○		acre-ft/yr

Default option selected for unauthorized consumption - a grading of 5 is applied but not displayed

		Grade	Value	Unit	Pcnt		Value	
Customer metering inaccuracies:	+ ?	3	13.787	acre-ft/yr	3.50%	● ○		acre-ft/yr
Systematic data handling errors:	+ ?		0.950	acre-ft/yr	0.25%	● ○		acre-ft/yr

Default option selected for Systematic data handling errors - a grading of 5 is applied but not displayed

Apparent Losses: ? 16.201 acre-ft/yr

Real Losses (Current Annual Real Losses or CARL)

Real Losses = Water Losses - Apparent Losses: ? 181.985 acre-ft/yr

WATER LOSSES: 198.186 acre-ft/yr

NON-REVENUE WATER

NON-REVENUE WATER: ? 205.806 acre-ft/yr

= Water Losses + Unbilled Metered + Unbilled Unmetered

SYSTEM DATA

		Grade	Value	Unit
Length of mains:	+ ?	7	18.5	miles
Number of active AND inactive service connections:	+ ?	7	945	
Service connection density:	?		51	conn./mile main

Are customer meters typically located at the curbstop or property line? Yes

Average length of customer service line: + ? (length of service line, beyond the property boundary, that is the responsibility of the utility)

Average length of customer service line has been set to zero and a data grading score of 10 has been applied

Average operating pressure: + ? 4 78.0 psi

COST DATA

		Grade	Value	Unit
Total annual cost of operating water system:	+ ?	10	$775,966	$/Year
Customer retail unit cost (applied to Apparent Losses):	+ ?	6	$1.67	$/100 cubic feet (ccf)
Variable production cost (applied to Real Losses):	+ ?	5	$152.00	$/acre-ft

☐ Use Customer Retail Unit Cost to value real losses

WATER AUDIT DATA VALIDITY SCORE:

***** YOUR SCORE IS: 48 out of 100 *****

A weighted scale for the components of consumption and water loss is included in the calculation of the Water Audit Data Validity Score

PRIORITY AREAS FOR ATTENTION:

Based on the information provided, audit accuracy can be improved by addressing the following components:

1: Volume from own sources
2: Unbilled metered
3: Customer metering inaccuracies

AWWA Free Water Audit Software:
Reporting Worksheet

WAS v5.0

American Water Works Association.

?	Click to access definition
+	Click to add a comment

Water Audit Report for: Placer County Water Agency (Monte Vista - 3110124)
Reporting Year: 2018 | 1/2018 - 12/2018

Please enter data in the white cells below. Where available, metered values should be used; if metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the input data by grading each component (n/a or 1-10) using the drop-down list to the left of the input cell. Hover the mouse over the cell to obtain a description of the grades

All volumes to be entered as: ACRE-FEET PER YEAR

To select the correct data grading for each input, determine the highest grade where the utility meets or exceeds all criteria for that grade and all grades below it.

Master Meter and Supply Error Adjustments

WATER SUPPLIED

<----------- Enter grading in column 'E' and 'J' ---------->

								Pcnt:		Value:	
Volume from own sources:	+	?	3	23.440	acre-ft/yr	+	4	-3.33%	● ○		acre-ft/yr
Water imported:	+	?	n/a	0.000	acre-ft/yr	+			● ○		acre-ft/yr
Water exported:	+	?	n/a	0.000	acre-ft/yr	+			● ○		acre-ft/yr

Enter negative % or value for under-registration
Enter positive % or value for over-registration

WATER SUPPLIED: **24.247** acre-ft/yr

AUTHORIZED CONSUMPTION

Click here: ?
for help using option buttons below

						Pcnt:		Value:	
Billed metered:	+	?	7	21.620	acre-ft/yr				
Billed unmetered:	+	?	n/a	0.000	acre-ft/yr				
Unbilled metered:	+	?	n/a	0.000	acre-ft/yr				
Unbilled unmetered:	+	?	4	0.900	acre-ft/yr		○ ●	0.900	acre-ft/yr

Unbilled Unmetered volume entered is greater than the recommended default value

Use buttons to select percentage of water supplied
OR
value

AUTHORIZED CONSUMPTION: ? **22.520** acre-ft/yr

WATER LOSSES (Water Supplied - Authorized Consumption) **1.727** acre-ft/yr

Apparent Losses

						Pcnt:		Value:	
Unauthorized consumption:	+	?		0.061	acre-ft/yr	0.25%	● ○		acre-ft/yr

Default option selected for unauthorized consumption - a grading of 5 is applied but not displayed

Customer metering inaccuracies:	+	?	3	0.646	acre-ft/yr	2.90%	● ○		acre-ft/yr
Systematic data handling errors:	+	?	5	0.001	acre-ft/yr		○ ●	0.001	acre-ft/yr

Apparent Losses: ? **0.707** acre-ft/yr

Real Losses (Current Annual Real Losses or CARL)

Real Losses = Water Losses - Apparent Losses: ? **1.020** acre-ft/yr

WATER LOSSES: **1.727** acre-ft/yr

NON-REVENUE WATER

NON-REVENUE WATER: ? **2.627** acre-ft/yr

= Water Losses + Unbilled Metered + Unbilled Unmetered

SYSTEM DATA

Length of mains:	+	?	7	0.8	miles
Number of active AND inactive service connections:	+	?	7	16	
Service connection density:		?		19	conn./mile main

Are customer meters typically located at the curbstop or property line? Yes

Average length of customer service line: + ? (length of service line, beyond the property boundary, that is the responsibility of the utility)

Average length of customer service line has been set to zero and a data grading score of 10 has been applied

Average operating pressure:	+	?	4	82.0	psi

COST DATA

Total annual cost of operating water system:	+	?	10	$36,212	$/Year
Customer retail unit cost (applied to Apparent Losses):	+	?	6	$1.67	$/100 cubic feet (ccf)
Variable production cost (applied to Real Losses):	+	?	5	$152.00	$/acre-ft

☐ Use Customer Retail Unit Cost to value real losses

WATER AUDIT DATA VALIDITY SCORE:

***** YOUR SCORE IS: 50 out of 100 *****

A weighted scale for the components of consumption and water loss is included in the calculation of the Water Audit Data Validity Score

PRIORITY AREAS FOR ATTENTION:

Based on the information provided, audit accuracy can be improved by addressing the following components:

1: Volume from own sources

2: Customer metering inaccuracies

3: Variable production cost (applied to Real Losses)

AWWA Free Water Audit Software:
Reporting Worksheet

WAS v5.0
American Water Works Association.

?	Click to access definition
+	Click to add a comment

Water Audit Report for: Placer County Water Agency (Alta - 3110024)
Reporting Year: 2019 1/2019 - 12/2019

Please enter data in the white cells below. Where available, metered values should be used; if metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the input data by grading each component (n/a or 1-10) using the drop-down list to the left of the input cell. Hover the mouse over the cell to obtain a description of the grades

All volumes to be entered as: ACRE-FEET PER YEAR

To select the correct data grading for each input, determine the highest grade where the utility meets or exceeds all criteria for that grade and all grades below it.

Master Meter and Supply Error Adjustments

WATER SUPPLIED

<----------- Enter grading in column 'E' and 'J' ---------->

							Pcnt:		Value:	
Volume from own sources:	+ ?	3	121.170	acre-ft/yr	+	6	-1.00%	● ○		acre-ft/yr
Water imported:	+ ?	n/a	0.000	acre-ft/yr	+			● ○		acre-ft/yr
Water exported:	+ ?	n/a	0.000	acre-ft/yr	+			● ○		acre-ft/yr

Enter negative % or value for under-registration
Enter positive % or value for over-registration

WATER SUPPLIED: **122.394** acre-ft/yr

AUTHORIZED CONSUMPTION

Click here: ? for help using option buttons below

					Pcnt:		Value:	
Billed metered:	+ ?	7	79.990	acre-ft/yr				
Billed unmetered:	+ ?	n/a	0.000	acre-ft/yr				
Unbilled metered:	+ ?	3	0.080	acre-ft/yr				
Unbilled unmetered:	+ ?		1.530	acre-ft/yr	1.25%	● ○		acre-ft/yr

Default option selected for Unbilled unmetered - a grading of 5 is applied but not displayed

AUTHORIZED CONSUMPTION: ? **81.600** acre-ft/yr

Use buttons to select percentage of water supplied
OR
value

WATER LOSSES (Water Supplied - Authorized Consumption)

40.794 acre-ft/yr

Apparent Losses

					Pcnt:		Value:	
Unauthorized consumption:	+ ?		0.306	acre-ft/yr	0.25%	● ○		acre-ft/yr

Default option selected for unauthorized consumption - a grading of 5 is applied but not displayed

Customer metering inaccuracies:	+ ?	3	2.904	acre-ft/yr	3.50%	● ○		acre-ft/yr
Systematic data handling errors:	+ ?		0.200	acre-ft/yr	0.25%	● ○		acre-ft/yr

Default option selected for Systematic data handling errors - a grading of 5 is applied but not displayed

Apparent Losses: ? **3.410** acre-ft/yr

Real Losses (Current Annual Real Losses or CARL)

Real Losses = Water Losses - Apparent Losses: ? **37.384** acre-ft/yr

WATER LOSSES: **40.794** acre-ft/yr

NON-REVENUE WATER

NON-REVENUE WATER: ? **42.404** acre-ft/yr

= Water Losses + Unbilled Metered + Unbilled Unmetered

SYSTEM DATA

Length of mains:	+ ?	7	7.9	miles
Number of active AND inactive service connections:	+ ?	7	280	
Service connection density:	?		36	conn./mile main

Are customer meters typically located at the curbstop or property line? Yes

Average length of customer service line: + ? (length of service line, beyond the property boundary, that is the responsibility of the utility)

Average length of customer service line has been set to zero and a data grading score of 10 has been applied

Average operating pressure: + ? 4 91.0 psi

COST DATA

Total annual cost of operating water system:	+ ?	10	$166,776	$/Year
Customer retail unit cost (applied to Apparent Losses):	+ ?	6	$1.66	$/100 cubic feet (ccf)
Variable production cost (applied to Real Losses):	+ ?	5	$153.00	$/acre-ft

☐ Use Customer Retail Unit Cost to value real losses

WATER AUDIT DATA VALIDITY SCORE:

***** YOUR SCORE IS: 48 out of 100 *****

A weighted scale for the components of consumption and water loss is included in the calculation of the Water Audit Data Validity Score

PRIORITY AREAS FOR ATTENTION:

Based on the information provided, audit accuracy can be improved by addressing the following components:

1: Volume from own sources
2: Unbilled metered
3: Customer metering inaccuracies

AWWA Free Water Audit Software:
Reporting Worksheet

WAS v5.0

American Water Works Association.

? Click to access definition
\+ Click to add a comment

Water Audit Report for: Placer County Water Agency (Applegate - 3110050)
Reporting Year: 2019 1/2019 - 12/2019

Please enter data in the white cells below. Where available, metered values should be used; if metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the input data by grading each component (n/a or 1-10) using the drop-down list to the left of the input cell. Hover the mouse over the cell to obtain a description of the grades

All volumes to be entered as: ACRE-FEET PER YEAR

To select the correct data grading for each input, determine the highest grade where the utility meets or exceeds all criteria for that grade and all grades below it.

<----------- Enter grading in column 'E' and 'J' ---------->

Master Meter and Supply Error Adjustments

WATER SUPPLIED

						Pcnt:		Value:	
Volume from own sources:	+ ?	2	20.690	acre-ft/yr	+ 3	-3.00%	● ○		acre-ft/yr
Water imported:	+ ?	n/a	0.000	acre-ft/yr	+		● ○		acre-ft/yr
Water exported:	+ ?	n/a	0.000	acre-ft/yr	+		● ○		acre-ft/yr

Enter negative % or value for under-registration
Enter positive % or value for over-registration

WATER SUPPLIED: 21.330 acre-ft/yr

AUTHORIZED CONSUMPTION

Click here: ? for help using option buttons below

					Pcnt:		Value:	
Billed metered:	+ ?	7	20.140	acre-ft/yr				
Billed unmetered:	+ ?	n/a	0.000	acre-ft/yr				
Unbilled metered:	+ ?	n/a	0.000	acre-ft/yr				
Unbilled unmetered:	+ ?		0.267	acre-ft/yr	1.25%	● ○		acre-ft/yr

Default option selected for Unbilled unmetered - a grading of 5 is applied but not displayed

AUTHORIZED CONSUMPTION: ? 20.407 acre-ft/yr

Use buttons to select percentage of water supplied
OR
value

WATER LOSSES (Water Supplied - Authorized Consumption) 0.923 acre-ft/yr

Apparent Losses

					Pcnt:		Value:	
Unauthorized consumption:	+ ?		0.053	acre-ft/yr	0.25%	● ○		acre-ft/yr

Default option selected for unauthorized consumption - a grading of 5 is applied but not displayed

Customer metering inaccuracies:	+ ?	3	0.730	acre-ft/yr	3.50%	● ○		acre-ft/yr
Systematic data handling errors:	+ ?		0.050	acre-ft/yr	0.25%	● ○		acre-ft/yr

Default option selected for Systematic data handling errors - a grading of 5 is applied but not displayed

Apparent Losses: ? 0.834 acre-ft/yr

Real Losses (Current Annual Real Losses or CARL)

Real Losses = Water Losses - Apparent Losses: ? 0.089 acre-ft/yr

WATER LOSSES: 0.923 acre-ft/yr

NON-REVENUE WATER

NON-REVENUE WATER: ? 1.190 acre-ft/yr

= Water Losses + Unbilled Metered + Unbilled Unmetered

SYSTEM DATA

Length of mains:	+ ?	7	1.5	miles
Number of active AND inactive service connections:	+ ?	7	67	
Service connection density:	?		44	conn./mile main

Are customer meters typically located at the curbstop or property line? Yes

Average length of customer service line: + ? (length of service line, beyond the property boundary, that is the responsibility of the utility)

Average length of customer service line has been set to zero and a data grading score of 10 has been applied

Average operating pressure: + ? 4 82.0 psi

COST DATA

Total annual cost of operating water system:	+ ?	10	$31,270	$/Year
Customer retail unit cost (applied to Apparent Losses):	+ ?	6	$1.66	$/100 cubic feet (ccf)
Variable production cost (applied to Real Losses):	+ ?	5	$153.00	$/acre-ft

☐ Use Customer Retail Unit Cost to value real losses

WATER AUDIT DATA VALIDITY SCORE:

***** YOUR SCORE IS: 47 out of 100 *****

A weighted scale for the components of consumption and water loss is included in the calculation of the Water Audit Data Validity Score

PRIORITY AREAS FOR ATTENTION:

Based on the information provided, audit accuracy can be improved by addressing the following components:

1: Volume from own sources
2: Customer metering inaccuracies
3: Variable production cost (applied to Real Losses)

AWWA Free Water Audit Software:
Reporting Worksheet

WAS v5.0

American Water Works Association.

? Click to access definition
\+ Click to add a comment

Water Audit Report for: Placer County Water Agency (Colfax - 3110006)
Reporting Year: 2019 1/2019 - 12/2019

Please enter data in the white cells below. Where available, metered values should be used; if metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the input data by grading each component (n/a or 1-10) using the drop-down list to the left of the input cell. Hover the mouse over the cell to obtain a description of the grades

All volumes to be entered as: ACRE-FEET PER YEAR

To select the correct data grading for each input, determine the highest grade where the utility meets or exceeds all criteria for that grade and all grades below it.

Master Meter and Supply Error Adjustments

WATER SUPPLIED

<----------- Enter grading in column 'E' and 'J' ---------->

						Pcnt:		Value:	
Volume from own sources:	+ ?	3	511.800	acre-ft/yr	+ 6	-1.00%	● ○		acre-ft/yr
Water imported:	+ ?	n/a	0.000	acre-ft/yr	+		● ○		acre-ft/yr
Water exported:	+ ?	n/a	0.000	acre-ft/yr	+		● ○		acre-ft/yr

Enter negative % or value for under-registration
Enter positive % or value for over-registration

WATER SUPPLIED: 516.970 acre-ft/yr

AUTHORIZED CONSUMPTION

Click here: ? for help using option buttons below

					Pcnt:		Value:	
Billed metered:	+ ?	7	360.210	acre-ft/yr				
Billed unmetered:	+ ?	n/a	0.000	acre-ft/yr				
Unbilled metered:	+ ?	3	0.230	acre-ft/yr				
Unbilled unmetered:	+ ?		6.462	acre-ft/yr	1.25%	● ○		acre-ft/yr

Default option selected for Unbilled unmetered - a grading of 5 is applied but not displayed

AUTHORIZED CONSUMPTION: ? 366.902 acre-ft/yr

Use buttons to select percentage of water supplied
OR
value

WATER LOSSES (Water Supplied - Authorized Consumption) 150.068 acre-ft/yr

Apparent Losses

					Pcnt:		Value:	
Unauthorized consumption:	+ ?		1.292	acre-ft/yr	0.25%	● ○		acre-ft/yr

Default option selected for unauthorized consumption - a grading of 5 is applied but not displayed

Customer metering inaccuracies:	+ ?	3	13.073	acre-ft/yr	3.50%	● ○		acre-ft/yr
Systematic data handling errors:	+ ?		0.901	acre-ft/yr	0.25%	● ○		acre-ft/yr

Default option selected for Systematic data handling errors - a grading of 5 is applied but not displayed

Apparent Losses: ? 15.266 acre-ft/yr

Real Losses (Current Annual Real Losses or CARL)

Real Losses = Water Losses - Apparent Losses: ? 134.802 acre-ft/yr

WATER LOSSES: 150.068 acre-ft/yr

NON-REVENUE WATER

NON-REVENUE WATER: ? 156.760 acre-ft/yr

= Water Losses + Unbilled Metered + Unbilled Unmetered

SYSTEM DATA

Length of mains:	+ ?	7	19.0	miles
Number of active AND inactive service connections:	+ ?	7	977	
Service connection density:	?		51	conn./mile main

Are customer meters typically located at the curbstop or property line? Yes

Average length of customer service line: + ? (length of service line, beyond the property boundary, that is the responsibility of the utility)

Average length of customer service line has been set to zero and a data grading score of 10 has been applied

Average operating pressure: + ? 4 78.0 psi

COST DATA

Total annual cost of operating water system:	+ ?	10	$714,008	$/Year
Customer retail unit cost (applied to Apparent Losses):	+ ?	6	$1.66	$/100 cubic feet (ccf)
Variable production cost (applied to Real Losses):	+ ?	5	$153.00	$/acre-ft

☐ Use Customer Retail Unit Cost to value real losses

WATER AUDIT DATA VALIDITY SCORE:

***** YOUR SCORE IS: 48 out of 100 *****

A weighted scale for the components of consumption and water loss is included in the calculation of the Water Audit Data Validity Score

PRIORITY AREAS FOR ATTENTION:

Based on the information provided, audit accuracy can be improved by addressing the following components:

1: Volume from own sources
2: Unbilled metered
3: Customer metering inaccuracies

AWWA Free Water Audit Software:
Reporting Worksheet

WAS v5.0

American Water Works Association.

?	Click to access definition
+	Click to add a comment

Water Audit Report for: Placer County Water Agency (Monte Vista - 3110124)
Reporting Year: 2019 | 1/2019 - 12/2019

Please enter data in the white cells below. Where available, metered values should be used; if metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the input data by grading each component (n/a or 1-10) using the drop-down list to the left of the input cell. Hover the mouse over the cell to obtain a description of the grades

All volumes to be entered as: ACRE-FEET PER YEAR

To select the correct data grading for each input, determine the highest grade where the utility meets or exceeds all criteria for that grade and all grades below it.

Master Meter and Supply Error Adjustments

WATER SUPPLIED

<----------- Enter grading in column 'E' and 'J' ---------->

							Pcnt:		Value:	
Volume from own sources:	+ ?	3	31.743	acre-ft/yr	+	6	-3.33%	● ○		acre-ft/yr
Water imported:	+ ?	n/a	0.000	acre-ft/yr	+			● ○		acre-ft/yr
Water exported:	+ ?	n/a	0.000	acre-ft/yr	+			● ○		acre-ft/yr

Enter negative % or value for under-registration
Enter positive % or value for over-registration

WATER SUPPLIED: **32.836** acre-ft/yr

AUTHORIZED CONSUMPTION

Click here: ? for help using option buttons below

					Pcnt:		Value:	
Billed metered:	+ ?	7	30.920	acre-ft/yr				
Billed unmetered:	+ ?	n/a	0.000	acre-ft/yr				
Unbilled metered:	+ ?	n/a	0.000	acre-ft/yr				
Unbilled unmetered:	+ ?	4	0.900	acre-ft/yr		○ ●	0.900	acre-ft/yr

Unbilled Unmetered volume entered is greater than the recommended default value

Use buttons to select percentage of water supplied **OR** value

AUTHORIZED CONSUMPTION: ? **31.820** acre-ft/yr

WATER LOSSES (Water Supplied - Authorized Consumption) **1.016** acre-ft/yr

Apparent Losses

					Pcnt:		Value:	
Unauthorized consumption:	+ ?		0.082	acre-ft/yr	0.25%	● ○		acre-ft/yr

Default option selected for unauthorized consumption - a grading of 5 is applied but not displayed

Customer metering inaccuracies:	+ ?	5	0.923	acre-ft/yr	2.90%	● ○		acre-ft/yr
Systematic data handling errors:	+ ?	5	0.001	acre-ft/yr		○ ●	0.001	acre-ft/yr

Apparent Losses: ? **1.007** acre-ft/yr

Real Losses (Current Annual Real Losses or CARL)

Real Losses = Water Losses - Apparent Losses: ? **0.010** acre-ft/yr

WATER LOSSES: **1.016** acre-ft/yr

NON-REVENUE WATER

NON-REVENUE WATER: ? **1.916** acre-ft/yr

= Water Losses + Unbilled Metered + Unbilled Unmetered

SYSTEM DATA

Length of mains:	+ ?	7	0.8	miles
Number of active AND inactive service connections:	+ ?	7	16	
Service connection density:	?		19	conn./mile main

Are customer meters typically located at the curbstop or property line? Yes

Average length of customer service line: + ? (length of service line, beyond the property boundary, that is the responsibility of the utility)

Average length of customer service line has been set to zero and a data grading score of 10 has been applied

Average operating pressure: + ? 4 82.0 psi

COST DATA

Total annual cost of operating water system:	+ ?	10	$46,906	$/Year
Customer retail unit cost (applied to Apparent Losses):	+ ?	6	$1.66	$/100 cubic feet (ccf)
Variable production cost (applied to Real Losses):	+ ?	5	$153.00	$/acre-ft

☐ Use Customer Retail Unit Cost to value real losses

WATER AUDIT DATA VALIDITY SCORE:

***** YOUR SCORE IS: 52 out of 100 *****

A weighted scale for the components of consumption and water loss is included in the calculation of the Water Audit Data Validity Score

PRIORITY AREAS FOR ATTENTION:

Based on the information provided, audit accuracy can be improved by addressing the following components:

1: Volume from own sources

2: Customer metering inaccuracies

3: Variable production cost (applied to Real Losses)

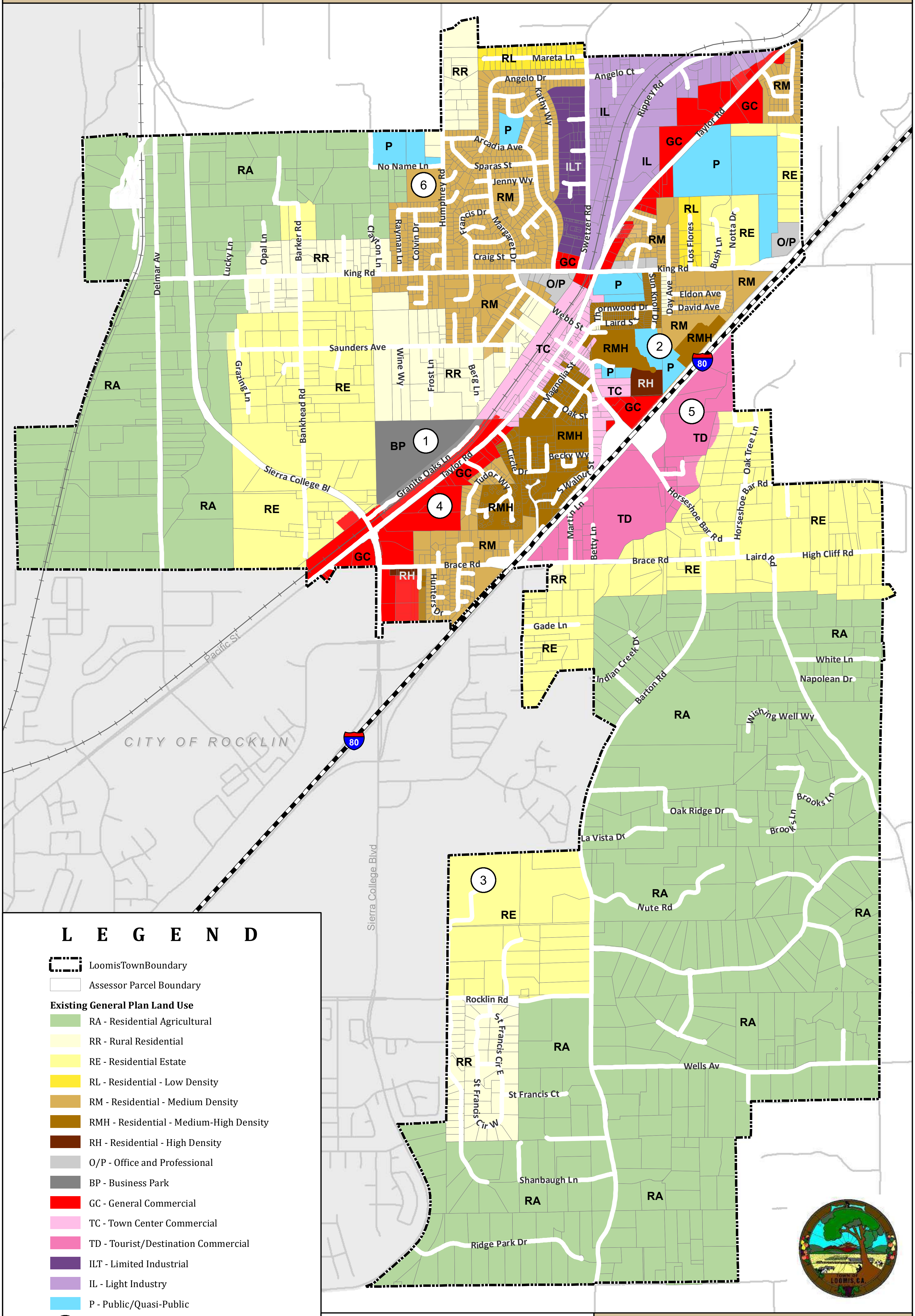
Public Draft

F

Appendix F - Land Use Exhibits

Public Draft

TOWN OF LOOMIS



L E G E N D

LoomisTownBoundary
Assessor Parcel Boundary

Existing General Plan Land Use

- RA - Residential Agricultural
- RR - Rural Residential
- RE - Residential Estate
- RL - Residential - Low Density
- RM - Residential - Medium Density
- RMH - Residential - Medium-High Density
- RH - Residential - High Density
- O/P - Office and Professional
- BP - Business Park
- GC - General Commercial
- TC - Town Center Commercial
- TD - Tourist/Destination Commercial
- ILT - Limited Industrial
- IL - Light Industry
- P - Public/Quasi-Public

\# Land Use Special District

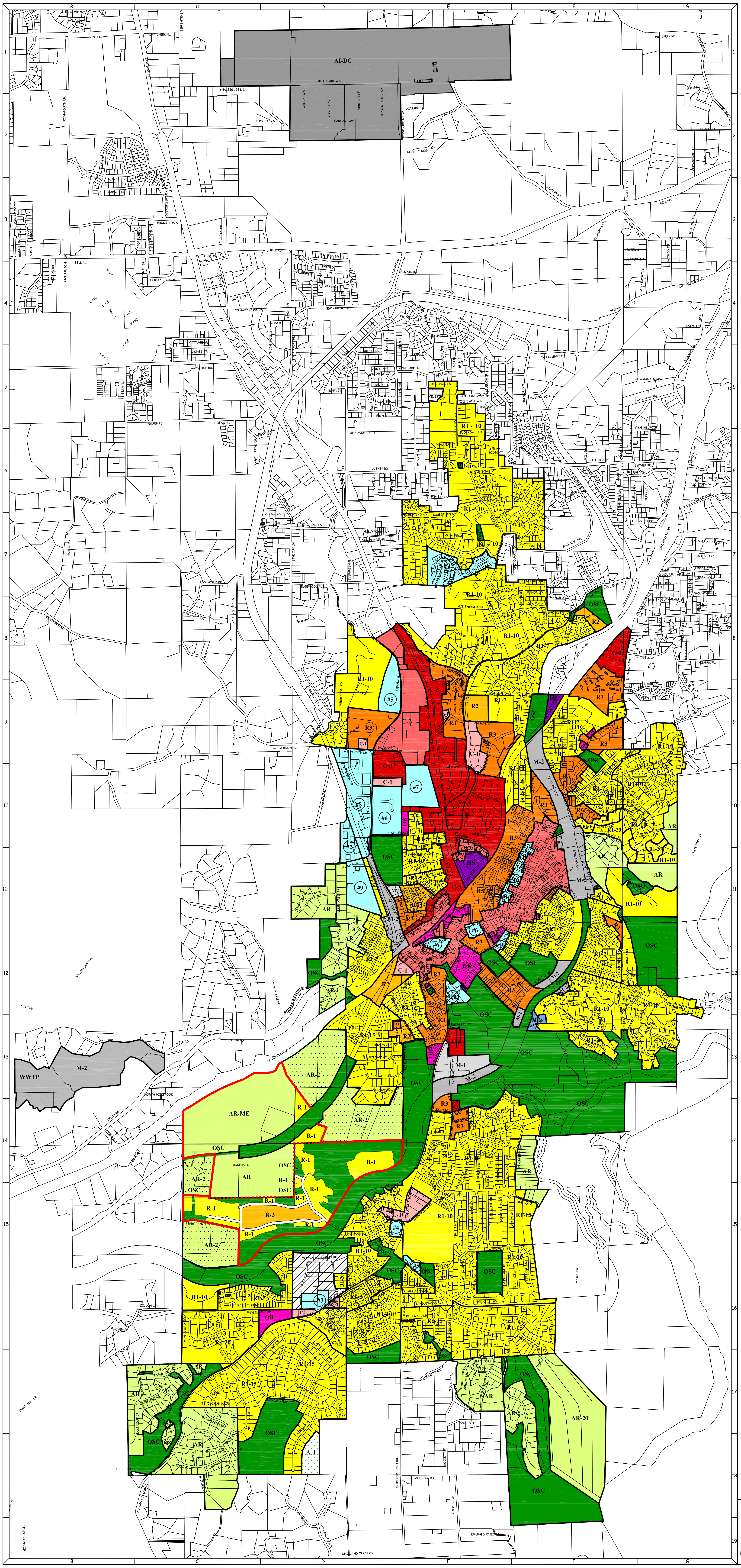
Sources: Town of Loomis, LoomisParcels_v1; Placer County GIS. Map date: October 1, 2019.

0 1,000 2,000
Feet

Amended: January 8, 2019

Figure 3.1

LAND USE DIAGRAM



CITY OF AUBURN ZONING MAP:

SINGLE USE ZONING DISTRICTS:

A-1	Exclusive Agricultural	= A-1
AR-#	Agricultural Residential	= AR, AR-2, AR-3.6 = AR-5, AR-20
R1-#	Single-Family Residential	= R1-5, R1-7, R1-8.5 = R1-10, R1-15, R1-20
R-2	Two-Family Residential	= R-2
R-3	Medium Density Multiple-Family Residential	= R-3
OB	Office Building District	= OB
C-1	Neighborhood Commercial	= C-1
C-2	Central Business District	= C-2
C-2A	Central Business District	= C-2A
C-3	Regional Commercial	= C-3
C-3-ES	Regional Commercial - Emergency Shelter	= C-3-ES
HS	Highway Service Distrct	= HS
M-L	Light Manufacturing	= M-L
M-1	Industrial Park District	= M-1
M-2	Industrial District	= M-2
AI-DC	Airport Industrial - Design Control	= AI-DC
OSC	Open Space & Conservation	= OSC

MIXED USE ZONING DISTRICTS:

#1	Agricultural Residential & Mineral Extraction Combining	= AR/ME
#2	Neighborhood Commercial & Light Manufacturing	= C-1/M-L
#3	Neighborhood Commercial & Single Family Residential	= C-1/R1-7
#4	Neighborhood Commercial & Two Family Residential	= C-1/R-2
#5	Neighborhood Commercial & Medium Density Multiple-Family Residential	= C-1/R-3
#6	Central Business District Open Space & Conservation	= C-2/OSC
#7	Regional Commercial Open Space & Conservation	= C-3/OSC
#8	Industrial Park District Neighborhood Commercial	= M-1/C-1
#9	Industrial Park District Single Family Residential Open Space & Conservation	= M-1/R1-10/OSC
#10	Office Building District Medium Density Multiple-Family Residential	= OB/R-3
#11	Single Family Residential Mineral Extraction Combining	= R1-10/ME
#12	Single Family Residential Open Space & Conservation	= R1-10/OSC
#13	Medium Density Multiple-Family Residential Open Space & Conservation	= R-3/OSC

This map does not represent legal parcel/lot boundaries; it is intended for zoning identification purposes only. Direct all zoning and urban reserve inquiries to:

* Community Development --- (530) 823-4211.

CITY OF AUBURN - PUBLIC WORKS DEPT.

Zoning Map

PLOT SCALE: 1" = 6200'

FILE: zoning.dwg

LAYOUT: 800PS

DATE: MARCH 23, 09

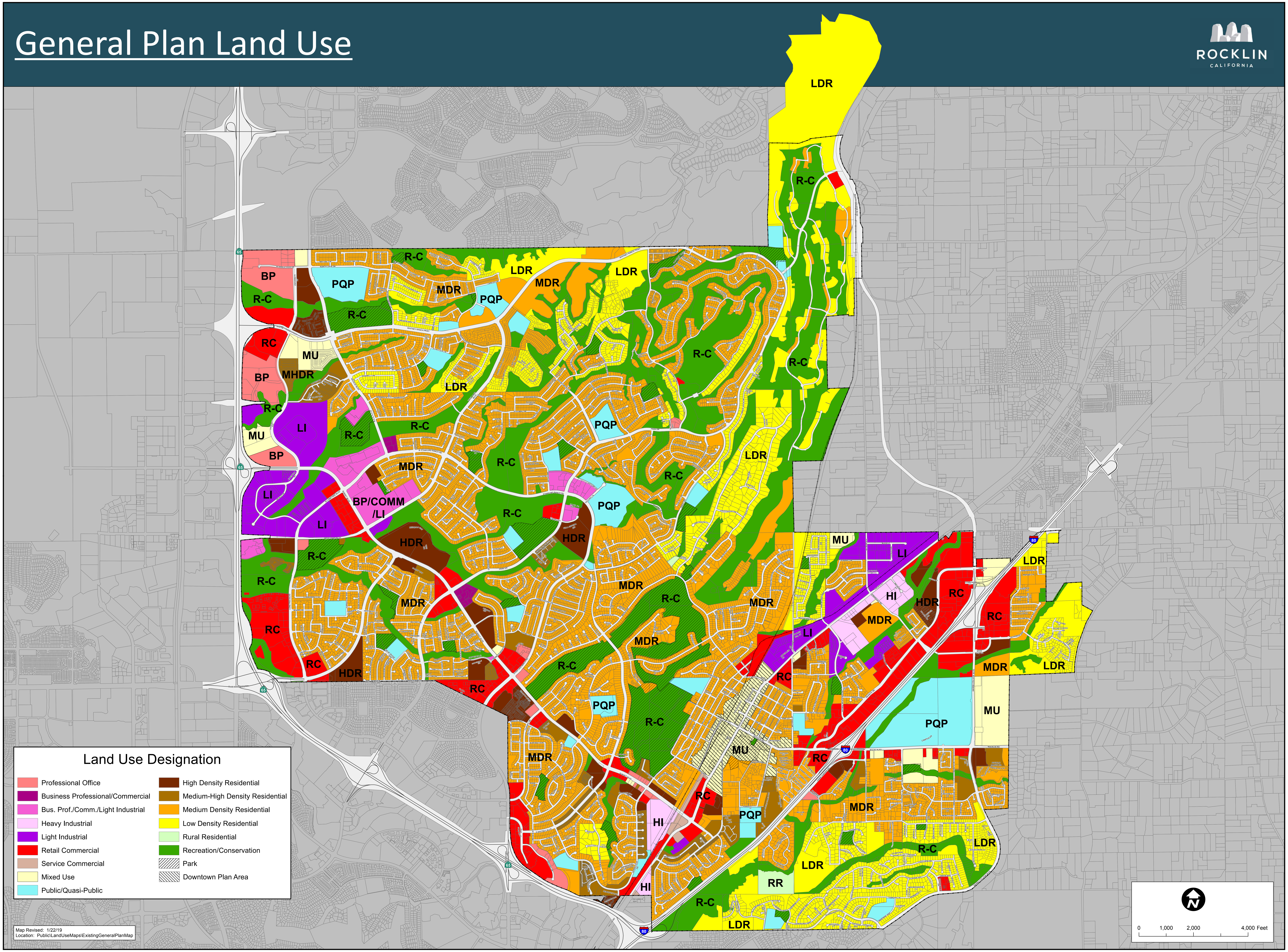
DRWN: KL

Req By: rm

CITY LIMITS	▬
COUNTY ISLAND	▨
BALTIMORE RAVINE SPECIFIC PLAN	🟥
STUDY AREA	⬚

General Plan Land Use

ROCKLIN
CALIFORNIA



Map Revised: 1/22/19
Location: Public\LandUseMaps\ExistingGeneralPlanMap

Public Draft

G

Appendix G - Draft GSP for the North American Subbasin

Public Draft

DRAFT

North American Subbasin Groundwater Sustainability Plan

Sections 1-3

Prepared for:

Sacramento Groundwater Authority GSA
Reclamation District 1001 GSA
South Sutter Water District GSA
Sutter County GSA
West Placer GSA

Prepared by:

GEI Consultants
2868 Prospect Park Drive, Suite 400
Sacramento, CA 95670

November 4, 2020

Table of Contents

List of Figures

List of Tables

List of Appendices

1. Introduction

In 2014, the Sustainable Groundwater Management Act (SGMA) was signed by the Governor of the state of California, setting the framework for local agencies to sustainably manage California's groundwater basins. To avoid potential State intervention, SGMA requires groundwater basins/subbasins designated by the California Department of Water Resources (DWR) as medium- or high-priority to follow four basic steps: 1) form Groundwater Sustainability Agency (GSA); 2) develop and adopt a Groundwater Sustainability Plan (GSP or Plan); 3) implement the Plan to achieve a sustainability goal and avoid undesirable results within 20 years; and 4) report the implementation activities to the DWR to document whether the sustainability goal and the avoidance of undesirable results has been achieved. Ultimately, five public GSAs were formed to manage groundwater in the North American Subbasin (NASb or Subbasin), completing Step 1. This GSP and adoption by each GSA will complete Step 2. This GSP will be updated every 5 years as additional information becomes available.

This GSP is a plan to provide for the sustainability of the NASb of the Sacramento Valley Groundwater Basin for the next 20 years. The NASb, designated as subbasin No. 5-021.64 by the DWR, is bounded on the north by the Bear River, on the south by the American River, to the west by the Feather and Sacramento Rivers, and on the east by the Sierra Nevada foothills (*see* **Figure 1-1**). The NASb was designated by DWR as a high priority subbasin and therefore the formation of GSAs and the completion of a GSP is required to avoid potential State Water Resources Control Board (SWRCB) intervention. Surrounding subbasins were also designated as medium- or high-priority and are required to comply with SGMA. The NASb groundwater is a critical resource to the Subbasin's community, economy, and environment by providing an average of 210,000 acre-feet per year (AFY) for drinking water and agriculture or about 40% of total water supply (DWR, 2019).

Agencies in the NASb have been actively managing groundwater for decades and have achieved positive groundwater management results. Groundwater levels within the Subbasin have been relatively stable for decades and have shown the ability to recover after periods of prolonged pumping and droughts. The passage of SGMA created an opportunity for a cooperative endeavor to develop a single GSP for the entire NASb. Beginning in January 2017, representatives of local agencies began coordination meetings that ultimately led to agreement to form five GSAs to cover the entirety of the Subbasin, while ensuring broad representation of the various stakeholder interests throughout the parts of the three counties comprising the NASb.

This GSP is organized into the following sections:

> Section 1 – Introduction – Provides an overview of SGMA and associated requirements and introduces the contents of the Plan.
>
> Section 2 – Agency Information – Provides a description of each GSA, contact information, implementation authority, and estimated costs for Plan implementation.

Section 3 – Plan Area – Describes the geography, historical and projected land uses, jurisdictional areas, water use sectors and water sources, existing water resources management plans, existing monitoring networks, and conjunctive use programs. The section also assesses the potential effects of implementing the Plan on water supplies.

Section 4 – Hydrogeologic Setting – Describes the geologic conditions that control how groundwater moves in the Subbasin, recharge and discharge areas, general water quality, and principal aquifers.

Section 5 – Groundwater Conditions – Describes historical and current groundwater levels, changes in groundwater storage, water quality, subsidence, change in storage, and identification of interconnected surface water and groundwater dependent ecosystems.

Section 6 – Water Budgets – Provides a historical water budget and forecasts future groundwater use for the next 50-years to assess whether groundwater conditions will remain sustainable including the influence of climate change.

Section 7 – Monitoring Networks – Describes the monitoring networks to be used to assess sustainability indicators and monitoring protocols. Establishes an annual reporting mechanism to assess the management performance and for 5-year updates of this GSP to adaptively maintain the Subbasin's sustainability.

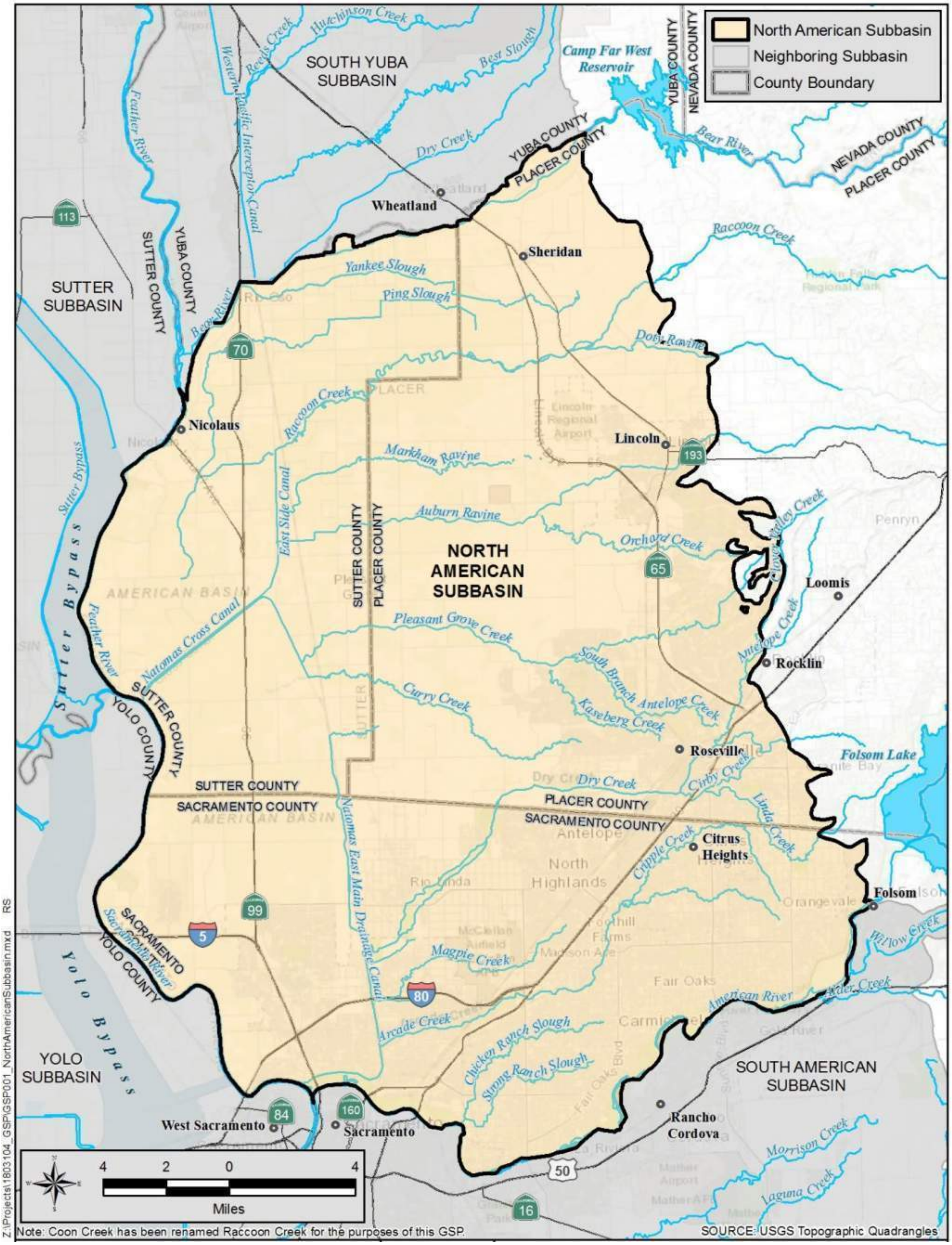
Section 8 – Sustainable Management Criteria – Describes locally defined sustainability goals and undesirable results for the SGMA groundwater sustainability indicators. Establishes management criteria, the operating range in which groundwater levels will be maintained, in the form of minimum thresholds and measurable objectives.

Section 9 – Projects and Management Actions – Identifies projects and management actions and a plan to maintain groundwater within the defined operating range for the next 20 years. Estimated costs for implementation of these projects and management actions were developed to assess fiscal impacts and to establish a strategy of how to fund and implement projects.

Section 10 – Notice and Communications – Provides a summary of GSA activities with interested parties.

Section 11 – References – List of materials used to develop this Plan.

This Plan was developed cooperatively by the GSAs in the NASb along with input from stakeholders and in coordination with the adjacent South Yuba, Sutter, Yolo, and South American subbasins.



Note: Coon Creek has been renamed Raccoon Creek for the purposes of this GSP.

SOURCE: USGS Topographic Quadrangles

Figure 1-1. North American Subbasin

2. Agency Information

This section provides a description of GSAs in the NASb and their legal authority to implement the GSP, along with contact information for the basin coordinator (Agency). A cost estimate for implementing the GSP is provided along with a general description of how the GSAs plan to fund these expenses.

2.1 GSA Organization and Management Structure

Five agencies in the NASb filed with DWR to become GSAs to cover the entire NASb. DWR designated them as exclusive in 2016 and 2017. The five GSAs are listed below:

- Sacramento Groundwater Authority GSA
- Reclamation District 1001 (RD 1001) GSA
- South Sutter Water District (SSWD) GSA
- Sutter County GSA
- West Placer GSA

Figure 2-1 shows the areas covered by each GSA. All the GSAs have the legal authority to implement this GSP. A brief description of each GSA and their member agencies is provided below.

2.1.1 Sacramento Groundwater Authority GSA

The Sacramento Groundwater Authority (SGA) is a Joint-Powers Authority formed in 1998 to manage the groundwater basin in Sacramento County north of the American River. In January 2016, SGA became the exclusive GSA in conformance with SGMA for its portion of the North American Subbasin.

The SGA draws its authority from a joint-powers agreement executed by the cities of Citrus Heights, Folsom, and Sacramento and the county of Sacramento utilizing their common police powers. The signatories chose to manage the basin cooperatively by creating a governing board of directors comprised of representatives of 14 water agencies and other water users within their jurisdiction:

- California American Water
- Carmichael Water District
- Citrus Heights Water District
- City of Folsom
- City of Sacramento
- County of Sacramento
- Del Paso Manor Water District
- Fair Oaks Water District
- Golden State Water Company
- Natomas Central Mutual Water Company
- Orange Vale Water Company
- Rio Linda/Elverta Community Water District
- Sacramento Suburban Water District
- San Juan Water District
- Agriculture Interests within SGA Boundaries
- Commercial/Industrial self-supplied water users within SGA boundaries

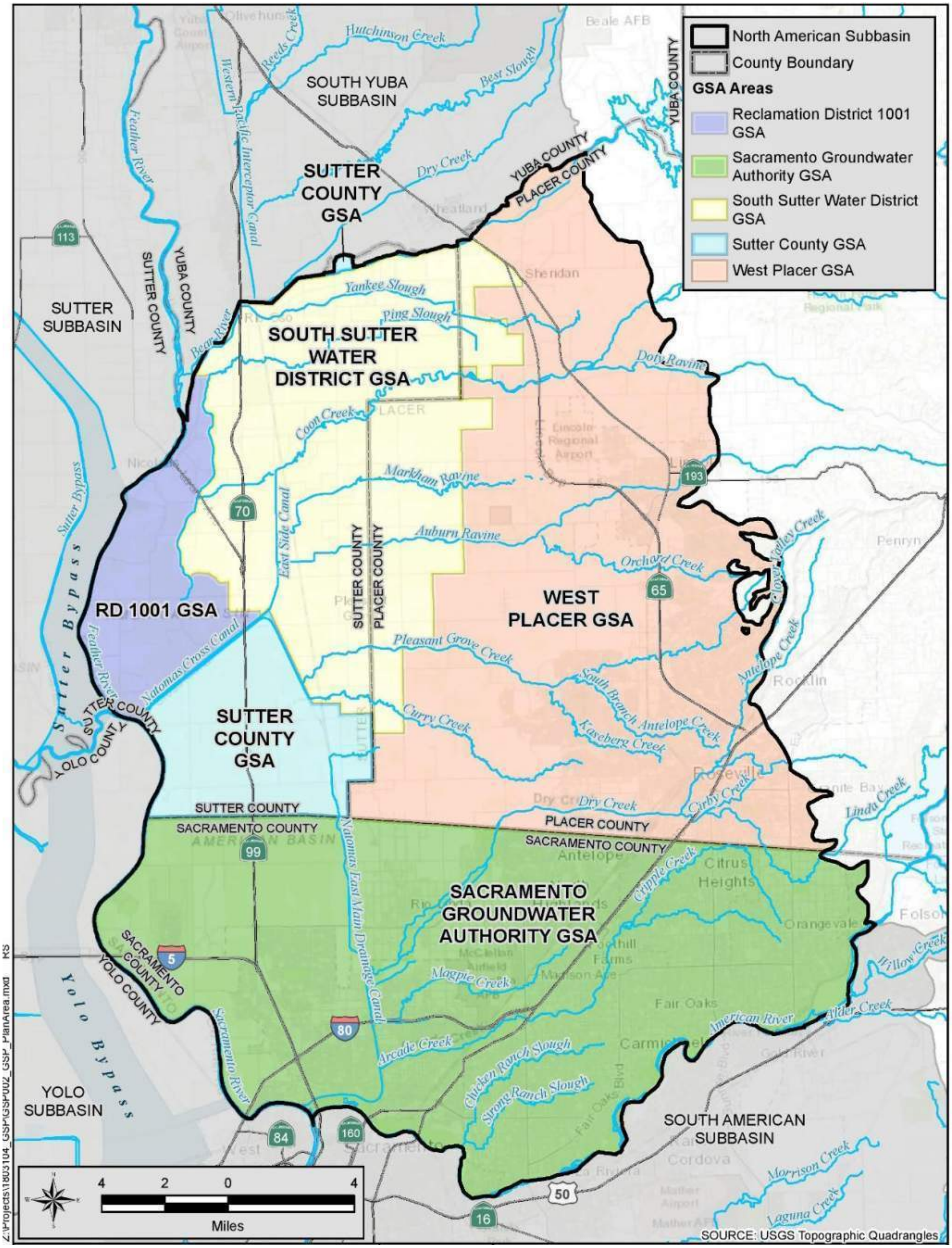


Figure 2-1. GSP Plan Area and GSAs

2.1.2 RD 1001 GSA

RD 1001 is a special-purpose district that provides flood protection for approximately 43,395 acres, including the communities of East Nicolaus, Nicolaus, Pleasant Grove, Rio Oso, Trowbridge, and Verona. The Reclamation District (RD) is governed by elected board members who own property or work on land in RD 1001.

RD 1001 is delegating certain activities regarding the implementation of SGMA to the Pleasant Grove-Verona Mutual Water Company, which is located within its service area, through a separate Memorandum of Agreement (MOA).

2.1.3 South Sutter Water District GSA

SSWD is a California water district organized, existing, and operating under the provisions of the California Water District Law, California Water Code Section 34000 et seq., and is thus a local agency authorized to exercise powers related to groundwater management under California Water Code Section 10721. SSWD was established in May 1954 to develop, store, and distribute surface water to reverse the effects groundwater pumping was having on the declining groundwater levels. The SSWD GSA covers some area within Placer County that is in the SSWD boundary. Placer County and SSWD have signed a MOA describing the management of shared lands to ensure that all areas are managed appropriately.

2.1.4 Sutter County GSA

The Sutter County Board of Supervisors serves as the legislative body for Sutter County and provides policy direction for all branches of county government. The Board of Supervisors authorized the Development Services Department to submit the necessary documents to form the Sutter County GSA and oversee the preparation of the GSP and its implementation in the NASb within Sutter County that is not represented by another GSA.

Sutter County is delegating certain activities regarding the implementation of SGMA to the Natomas Central Mutual Water Company, which is located within its service area through a separate MOA.

2.1.5 West Placer GSA

The West Placer GSA was formed by five public agencies with water management or land use authority in a portion of the NASb located within Placer County. The member agencies are Placer County, the cities of Roseville and Lincoln, the Placer County Water Agency, and the Nevada Irrigation District, all of which are water purveyors. In addition, through a separate participation agreement, the GSAs will allow for California American Water (an investor-owned utility) to participate in the West Placer GSA since they are a water supplier within the West Placer GSA portion of the Subbasin. The agencies have entered into a MOA to manage the groundwater within West Placer County and have been designated by DWR as an exclusive GSA for their area.

Other local agencies that provide water to small areas of the West Placer GSA portion of the Subbasin including San Juan Water District, Camp Far West Irrigation District, Citrus Heights Water District, RD 1001, and a land-use agency, the city of Rocklin, have agreed to allow the West Placer GSA to manage groundwater as required under SGMA on their behalf.

2.2 Plan Manager Contact Information

The five GSAs, by mutual agreement, selected SGA to be the Plan manager and lead agency for the preparation and implementation of the NASb GSP. SGA contact information is provided below:

Agency Name:	Sacramento Groundwater Authority	Contact person:	Rob Swartz
Agency Address:	5620 Birdcage Street, Suite 180 Citrus Heights, CA 95610	Phone Number:	(916) 967-7692
Agency Website:	https://www.sgah2o.org	Email:	rswartz@rwah2o.org

2.3 Implementation Authority

All five NASb GSAs (Partners) signed a MOA on January 31, 2017, for funding commitments to prepare a single GSP for the NASb.

To Be Completed. – A MOA is in process of being developed for the implementation of this GSP, which will include management of the Subbasin along with implementation of projects and management actions.

The legal authority, with specific reference to citations setting forth the duties, powers, and responsibilities of the Lead Agency, demonstrate the Lead Agency has the authority to implement the Plan.

2.4 GSP Implementation Costs

To Be Completed. - A thorough budget was developed for implementation of this GSP, which includes estimated annual operating budgets and costs for projects and management actions. A detailed budget is provided Appendix A.

3. Description of Plan Area

3.1 GSP Plan Area

The NASb encompasses about 342,000 acres in Sutter, Placer, and Sacramento counties bounded by the American, Bear, Feather, and Sacramento rivers. The Sierra Nevada foothills form the eastern boundary of the Subbasin. **Figure 3-1** shows the plan area. The eastern portion of the Subbasin is characterized by low rolling dissected uplands, while the western part is a nearly flat flood basin for the Bear, Feather, Sacramento, and American rivers. Between the rivers are several small tributaries that have low elevation and small watersheds. Most of the small tributaries drain to the Natomas Cross Canal, East Side Canal, and the Natomas East Main Drain Canal, which convey runoff to the Feather and Sacramento rivers. Some of the tributaries are used by irrigation and RDs to convey water to their customers. Several miles of agricultural drains are used by the RDs to control flooding and are also used to recapture excess applied water for reuse.

Water uses in the Subbasin include agricultural, municipal, industrial, domestic, and native vegetation and aquatic species. Some water purveyors rely exclusively on either groundwater or surface water, but most rely on a combination of surface water and groundwater.

Urban areas dominate in Sacramento County and the southeastern portion of Placer County, while the rest of the Subbasin is predominately agriculture and undeveloped land. Permanent crops dominate the western, eastern, and northern edges of the Subbasin and along the rivers, while rice and other non-permanent crops dominate the central and western portions of the Subbasin.

3.2 Adjudicated Areas

The Subbasin is not adjudicated, nor are the surrounding subbasins.

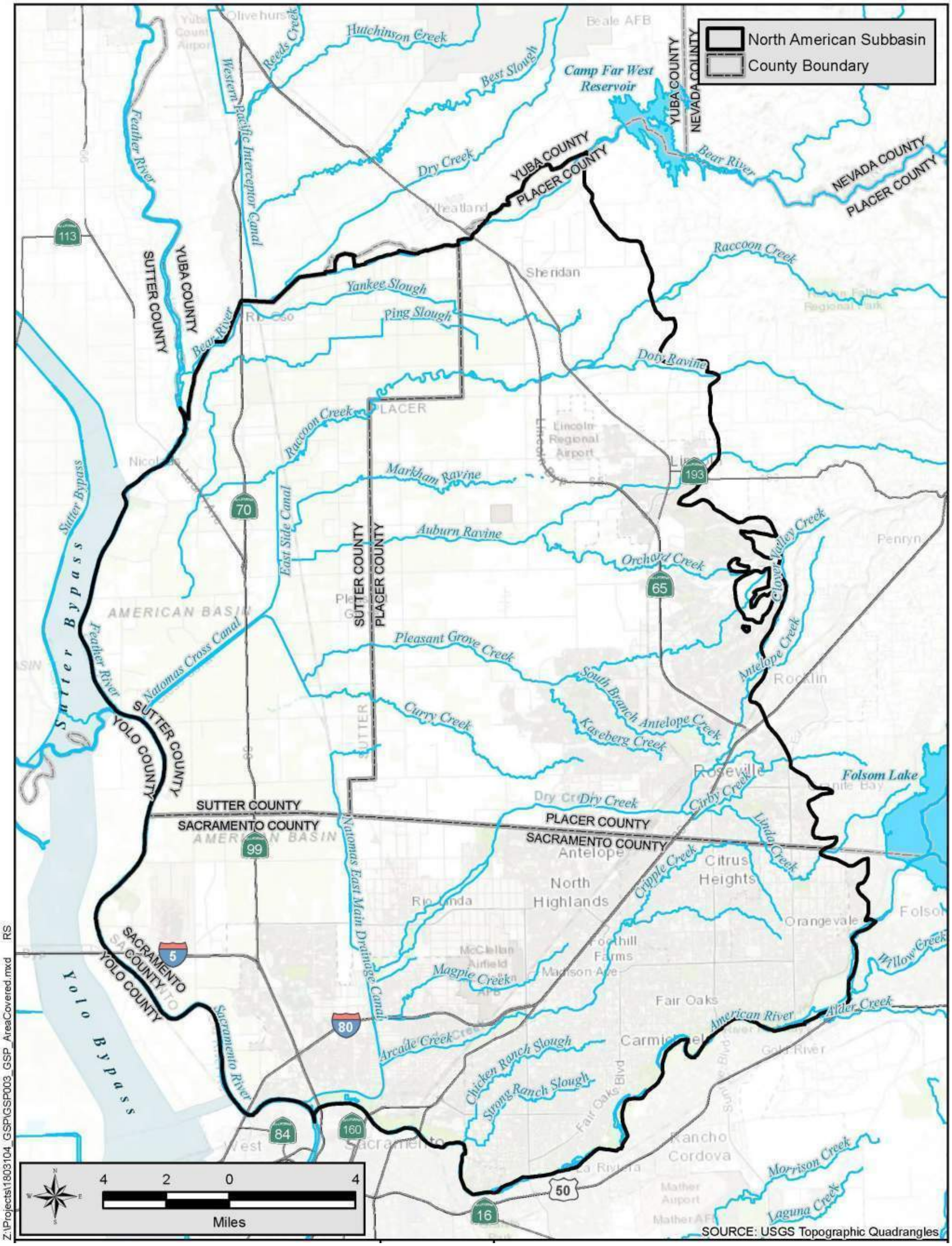


Figure 3-1. Area Covered by GSP

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3.3 Jurisdictional Areas

Within the NASb, there are federal, state, county, and tribal agencies with land use jurisdictional responsibilities. Within each county, there are cities with land-use authorities and water agencies that serve water within the Subbasin. Irrigation districts are also present that provide surface water for agriculture. Within many of the irrigation districts and cities are RDs that are responsible for managing and maintaining the levees, freshwater channels, or sloughs, canals, pumps, and other flood protection structures in the area. The following sections describe the jurisdictional areas and agencies within the Subbasin. **Figures 3-2 through 3-4** show these jurisdictional areas.

3.3.1 Federal

The United States (U.S.) Army Corps of Engineers has jurisdictional authorities on all navigable waterways in the Subbasin. The U.S. Bureau of Reclamation (Bureau of Reclamation) allocates surface water diversions from the Sacramento and American rivers.

The federal government (Air Force) retroceded jurisdiction for all portions of the former McClellan Air Force Base during post-closure of the base. This means that the U.S. Government no longer has “federal legislative jurisdiction” over any portion of the former base, i.e., the U.S. Government does not make or enforce laws/regulations for/on this land area any longer. The McClellan Air Force Base still owns some of the parcels but will ultimately transfer those properties as cleanup is achieved.

The federal government also owns a small parcel (less than 1 acre) that is managed by Beale Air Force Base west of the city of Lincoln.

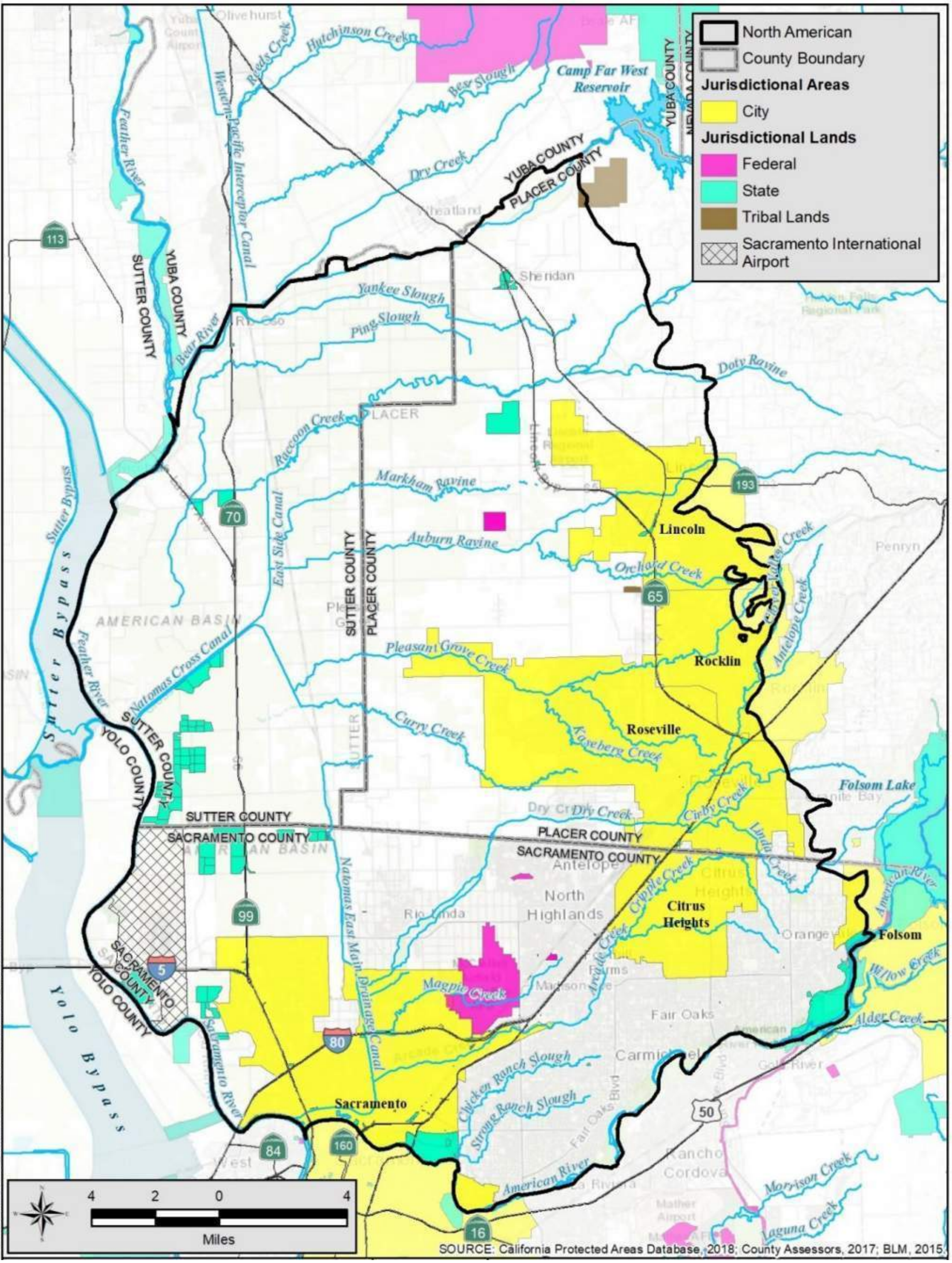
Figure 3-2 shows the federal lands in the Subbasin where the federal government may voluntarily agree to participate in administration of a GSP. Federal government officials have been invited to participate in the development of this GSP.

3.3.2 State of California

The California State Department of Transportation has authority for lands occupied by freeways and highways and maintenance yards. The State Department of Parks and Recreation has authority over the Folsom State Recreational Area, which extends along a portion of the American River west of Folsom Dam. The California State Lands Commission has authority over the Natomas Basin Conservancy area, located in the western portion of Sutter and Sacramento counties. The state also has authority over some small specific conservation land and preserves. DWR has jurisdictional authority for maintaining State Plan of Flood Control levees along the Sacramento and Feather rivers. **Figure 3-2** shows the state-owned lands in the Subbasin where SGMA does not apply, but the state government officials have been invited to assist in the development of this GSP.

3.3.3 California Native American Tribes

United Auburn Indian Community has jurisdiction over land in Placer County southeast of the city of Lincoln and northeast of the town of Sheridan, within the Subbasin. Similar to the federal government, any federally recognized Indian tribe may voluntarily agree to participate in administration of a GSP.



SOURCE: California Protected Areas Database, 2018; County Assessors, 2017; BLM, 2015.

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Figure 3-2. City, County, State, and Federal Jurisdictional Areas and Lands.

Tribal community members have been invited to participate in the development of this GSP and were sent public outreach information about SGMA and GSP development. **Figure 3-2** shows the tribal lands in the Subbasin.

3.3.4 County

Placer, Sacramento, and Sutter counties each cover about one-third of the NASb. **Figure 3-2** shows the county boundaries. Each of the counties has General Plans and land use authorities. Sacramento County also has land-use management authority along the American River Parkway and along Dry Creek and lands associated with Sacramento International Airport.

3.3.5 City

There are six incorporated cities within the NASb (**Figure 3-3**), including Citrus Heights, Folsom (just a small portion located within NASb), Lincoln, Rocklin, Roseville, and Sacramento. Each of the cities has land use management and planning authority granted through the state of California, which is derivative of the city or county general police power. This power allows cities and counties to establish land use and zoning laws that govern development.

3.3.6 Water Agencies

The following water agencies, water districts, city/county water departments and irrigation districts (classified as community water systems) are located within the Subbasin and provide potable water to residents (DWR, 2019). **Figure 3-3** shows the location of the water entities. Some are public entities, while others are private water companies. Their water supplies are derived from surface and groundwater or a combination of both.

- California American Water
- Carmichael Water District
- Citrus Heights Water District
- City of Folsom
- City of Lincoln
- City of Roseville
- City of Sacramento
- County of Sacramento
- Del Paso Manor Water District
- Fair Oaks Water District
- Golden State Water Company
- Orange Vale Water Company
- Rio Linda/Elverta Community Water District
- Sacramento Suburban Water District
- Sacramento County Water Agency
- San Juan Water District
- Placer County Water Agency
- Nevada Irrigation District
- Placer County (Area of Sheridan)

San Juan Water District (SJWD) is also a water wholesaler and provides treated surface water to Fair Oaks Water District, Orange Vale Water Company, and Citrus Heights Water District. SJWD also has interties to provide water to California American Water and the city of Roseville and a small portion of the city of Folsom (north of the American River) and periodically to another 171,000 customers in the Sacramento Suburban Water District.

There are multiple non-community non-transient water systems, mostly in the western portion of the Subbasin, that are overseen by the counties and the state.

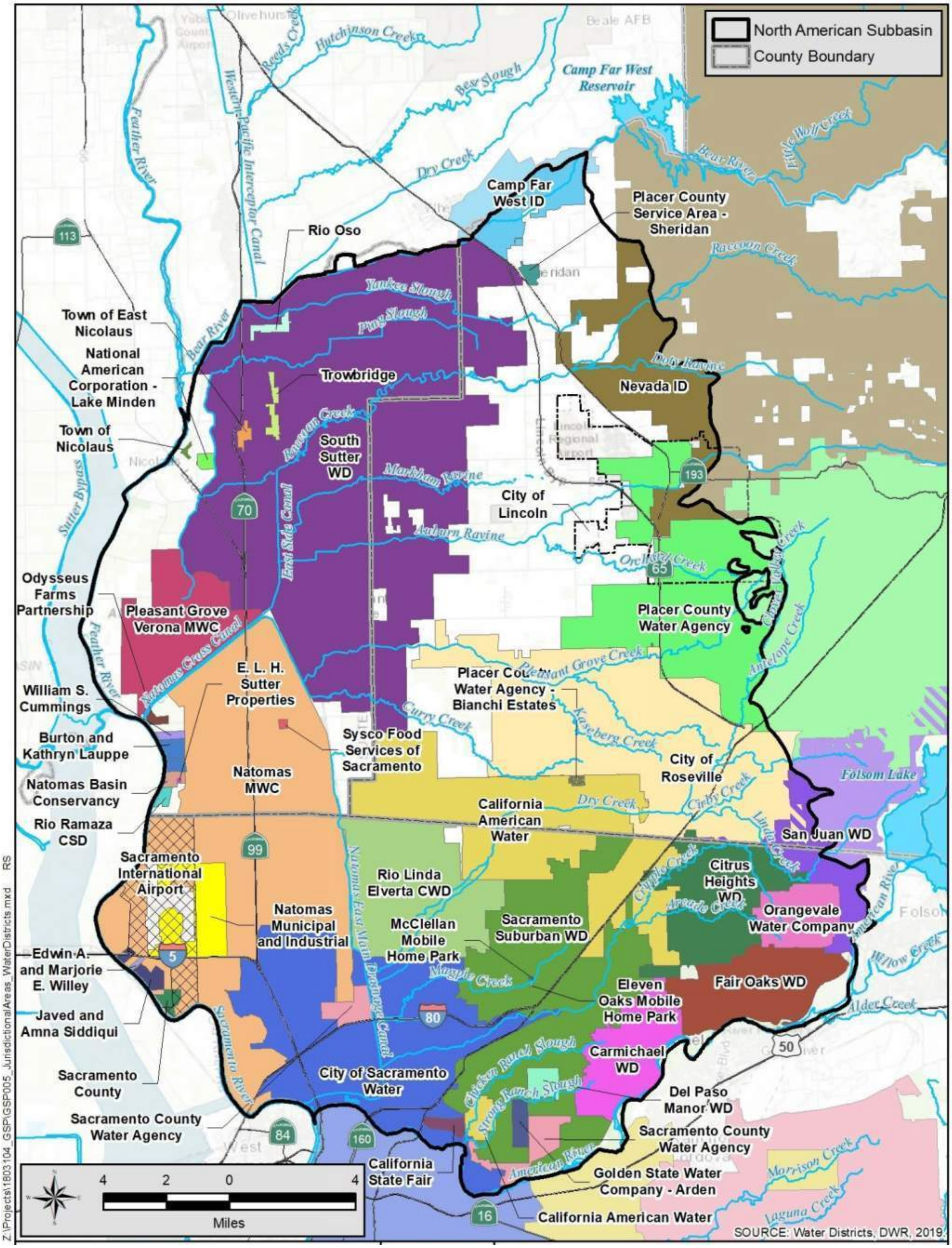

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Figure 3-3. Water Districts and Systems Areas

3.3.7 Agricultural Water Providers

The Sutter County area of the NASb is almost entirely agricultural, Placer County is about 60 percent agricultural, and Sacramento County is about 20 percent agricultural. Surface water is supplied to agriculture by:

- Camp Far West Irrigation District
- Natomas Mutual Water Company
- Nevada Irrigation District
- Pleasant Grove-Verona Mutual Water Company
- South Sutter Water District

The water companies typically only supply a portion of the water supplies for agricultural use. The unmet demand is provided by privately owned wells.

3.3.8 Reclamation Districts

RDs are a form of special-purpose districts in the United States that are responsible for reclaiming and/or maintaining land for agricultural, residential, commercial, or industrial use that is threatened by permanent or temporary flooding. Within the NASb are RD 1000 along the Sacramento River and RD 1001 along the Bear, Feather and Sacramento rivers. Along the Bear River, RD 817 and RD 2103 have small areas within the NASb. Some of the RD areas overlie other water and irrigation district areas. **Figure 3-4** shows the RDs in the NASb.

3.4 Land Use Designations

In 2014, the NASb was roughly about 40 percent urban, 30 percent farmland, and less than 1 percent riparian vegetation (Land IQ, 2017). About 30 percent of the land was not classified. The total acres by each significant land use category and crops are summarized in **Table 3-1**. **Figure 3-5** shows the 2014 land use in the Subbasin.

Most of the urban development is in Sacramento County and the southeastern portion of Placer County. The population is projected to increase by about 200,000 people by 2030 (DWR, 2019), with an increase in urban development extending the urban areas to the north and west. **Figure 3-6** shows the locations of approved urban development areas in the Subbasin as identified from Placer, Sacramento, and Sutter counties, and each city's General Plans.

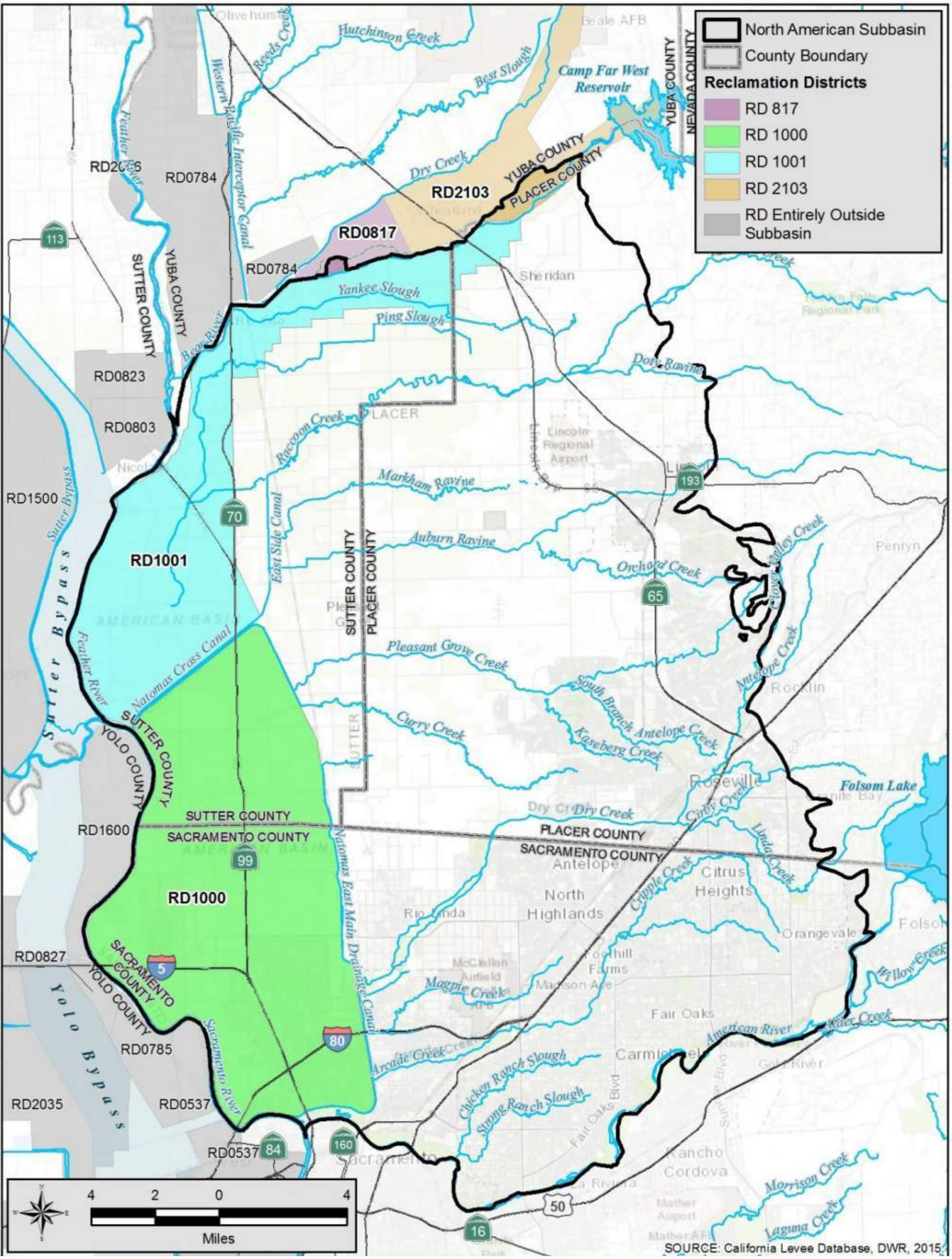


Figure 3-4. Reclamation Districts Jurisdictional Areas

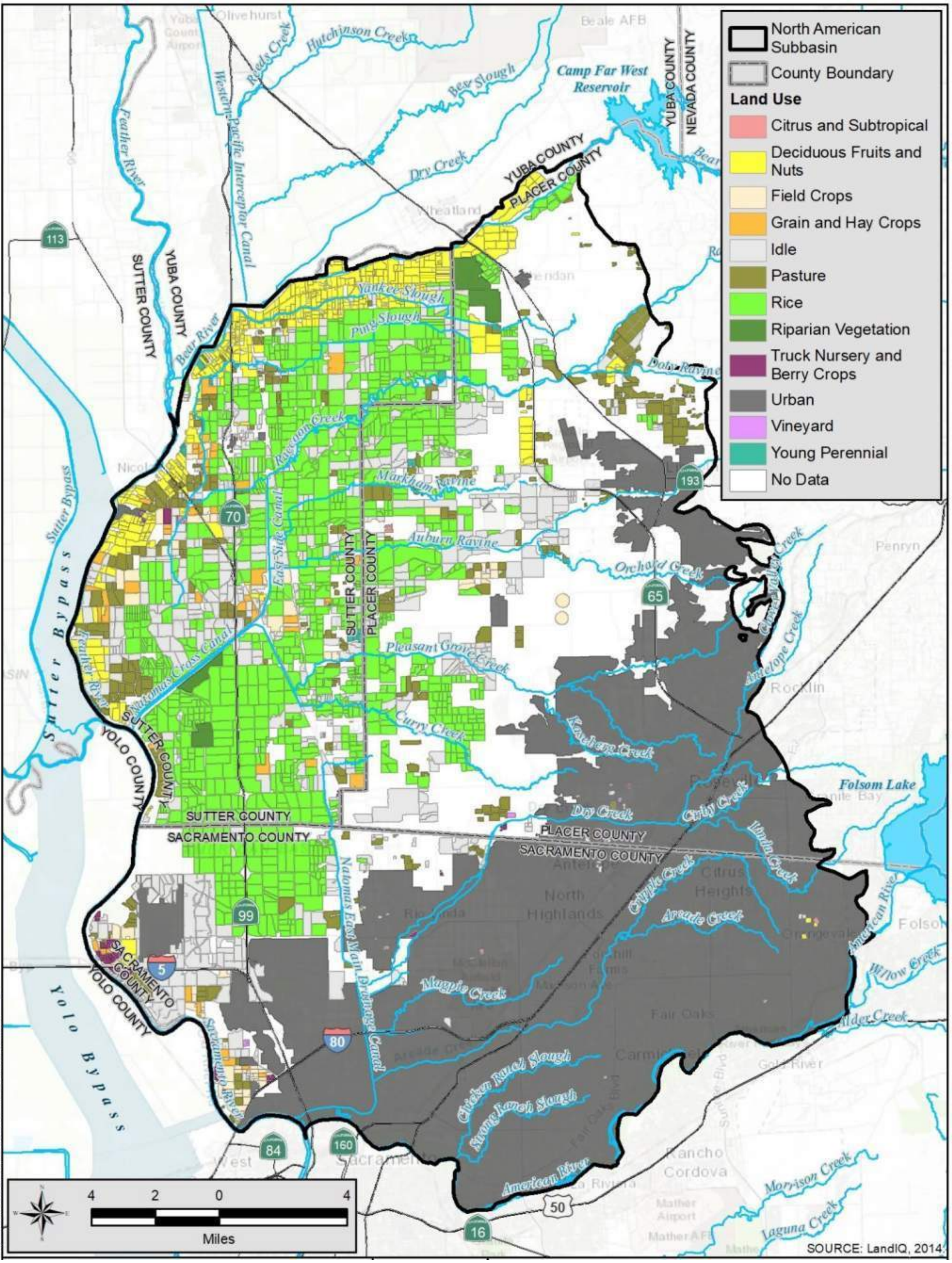
Table 3-1. Land Use Summary

Land Use	Acres	Percent
Urban	**131,504**	**38.39%**
Urban	131,504	38.39%
Agriculture	**115,446**	**33.71%**
Citrus and Subtropical	99	0.03%
Deciduous Fruits and Nuts	11,529	3.37%
Field Crops	2,867	0.84%
Grain and Hay Crops	2,242	0.65%
Idle	30,083	8.78%
Pasture	11,331	3.31%
Rice	56,316	16.44%
Truck Nursery and Berry Crops	660	0.19%
Vineyard	45	0.01%
Young Perennial	275	0.08%
Managed Wetlands	**1,745**	**0.51%**
Riparian Vegetation	1,745	0.51%
Not Classified	**93,821**	**27.39%**
No Data	93,821	27.39%
Total	**342,516**	**100%**

Source: Land IQ, 2014

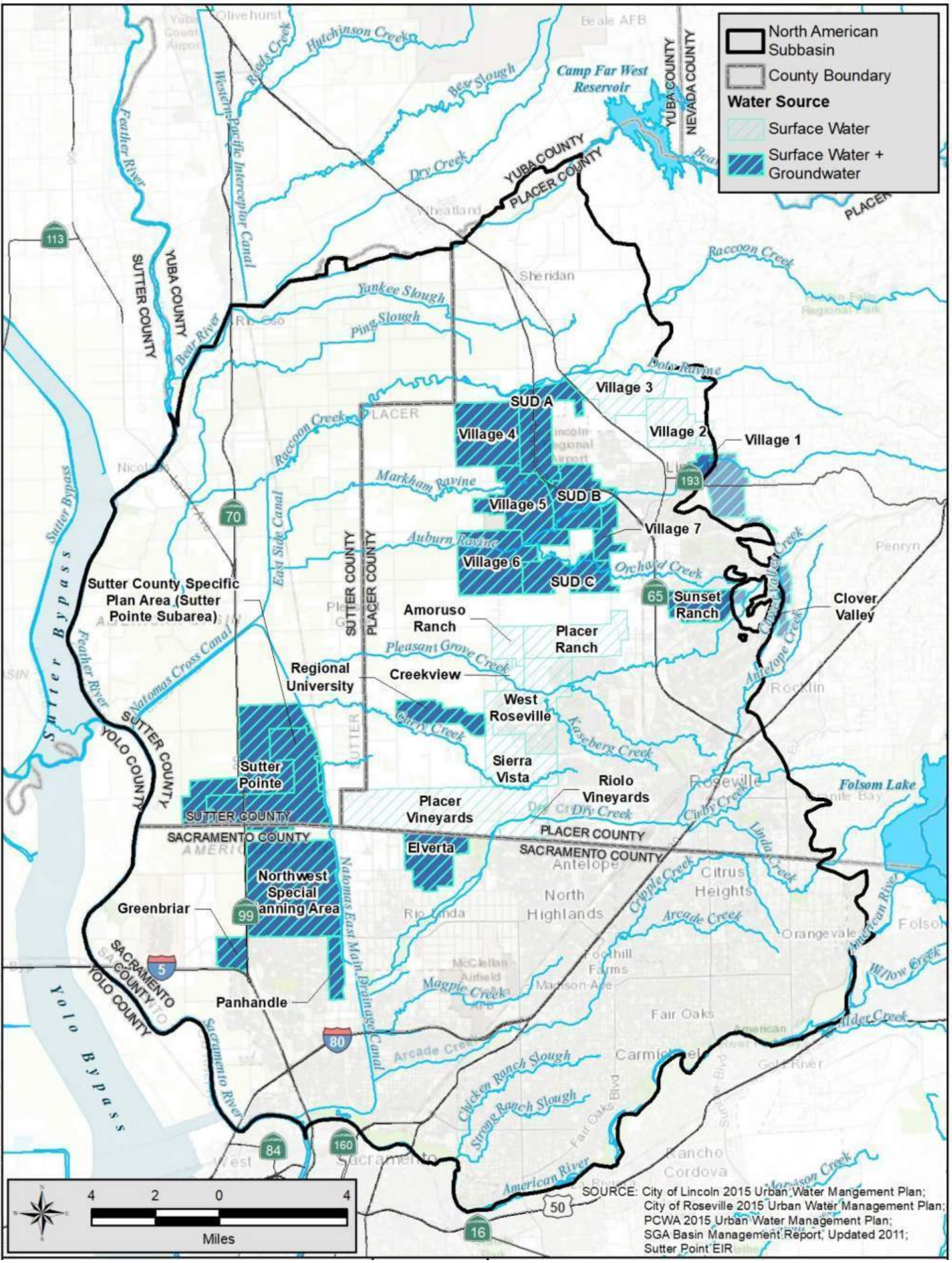
The Subbasin is a significant producer of pears, prunes, rice, tomatoes for processing, walnuts, peaches, beans, row crops, corn, and grapes. Agriculture uses about 50 percent of its acreage for growing rice and 10 percent for permanent crops, including orchards and vineyards. About 10 percent of the total farmland acreage is idle.

Urban development is projected to continue to increase, which will decrease agricultural lands. This has the potential to shift surface water use on permeable land to groundwater use on non-permeable ground thus, having a negative impact on the groundwater basin. **Figure 3-6** shows the locations of future urban development areas in the Subbasin as identified in Placer, Sacramento, and Sutter counties General and Specific Plans and their proposed water sources. Planned development areas will likely use groundwater as their initial sources of supply and ultimately plan to use both surface water and groundwater as their source of supply.



SOURCE: LandIQ, 2014

Figure 3-5. Existing Land Use Designations



SOURCE: City of Lincoln 2015 Urban Water Mangement Plan;
City of Roseville 2015 Urban Water Management Plan;
PCWA 2015 Urban Water Management Plan;
SGA Basin Management Report, Updated 2011;
Sutter Point EIR

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Figure 3-6. Planned Development Areas and Planned Water Source Types

3.5 Habitat Preserves and Easements

The counties in the NASb have each prepared conservation and habitat plans to assess current preserves and easements and provide goals and plans for the next 50 years to continue to increase these areas (Placer County Conservation Plan 2018, Natomas Basin Habitat Conservation Plan 2003). The Natomas Basin Habitat Conservation Plan was jointly developed by Sutter and Sacramento counties along with other parties. Currently, the NASb has about 16,900 acres of habitat conservation preserves and easements. **Figure 3-7** shows the locations of existing reserves, preserves, and easements. Some of the preserves do not have water supplies and rely on precipitation while others have surface water and groundwater.

Riparian vegetation typically occurs along the fringes of the rivers, canals, and tributaries. Natural marsh habitats are generally present near the Feather and Sacramento rivers in the area, generally known as the Natomas Basin. Key natural marsh areas include Pritchard Lake north of Sacramento International Airport and the area adjacent to Natomas Mutual Water Company's Elkhorn Pumping Plant, which also contains riparian habitat. Other natural marsh areas are scattered in approximately five small areas throughout unincorporated Sacramento County. Other habitat types include scattered pasture, idle, and ruderal lands, and include about 290 acres of grassland habitat adjacent to Natomas East Main Drainage Canal.

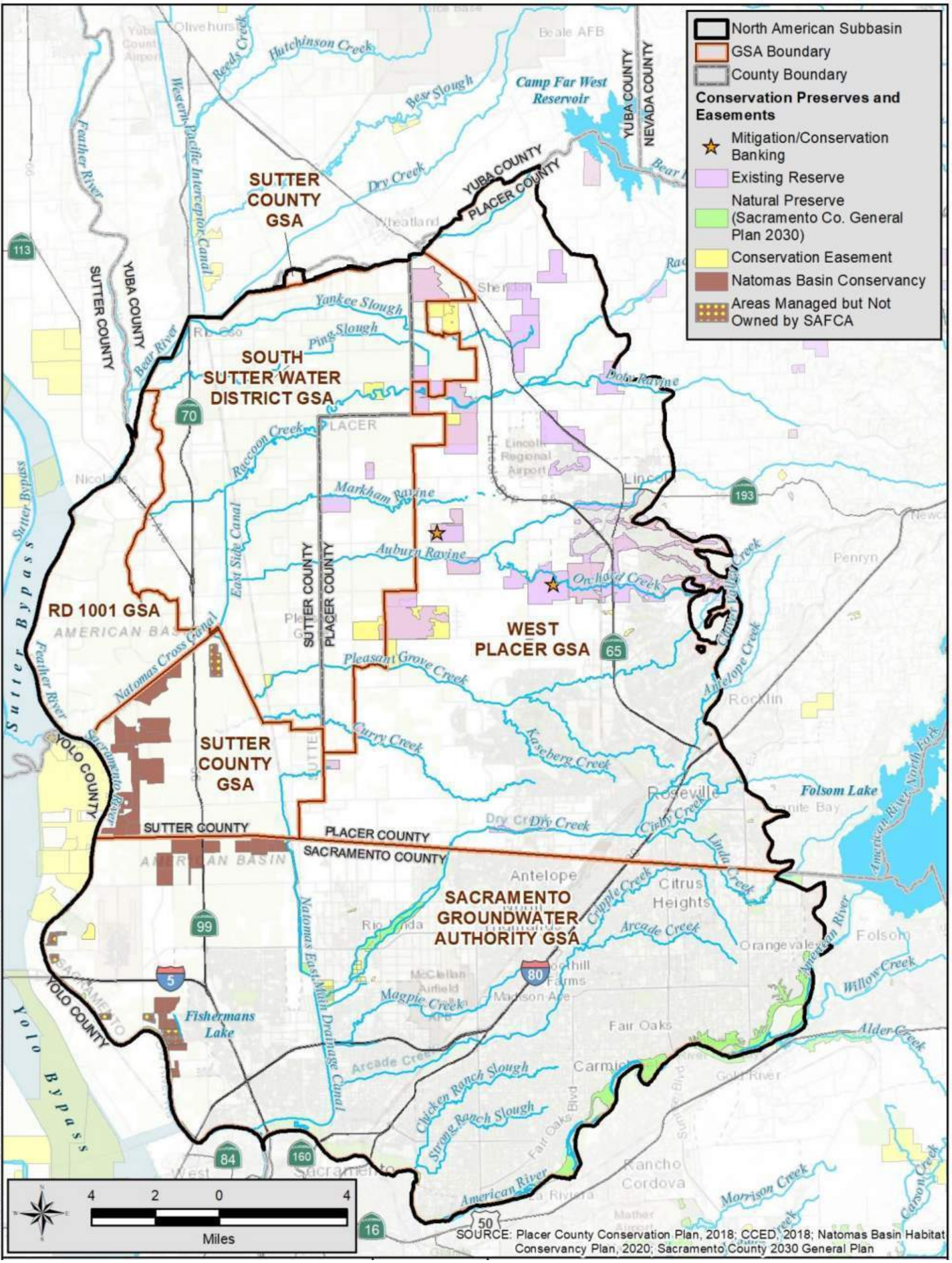

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Figure 3-7. Habitat Conservation Preserves and Easements

3.6 Water Use Sectors

Water use sectors in the Subbasin are urban (industrial included in this category), domestic, agriculture, environmental (native habitat, managed wetlands, and conservation areas) and groundwater remediation sites. **Figure 3-8** shows the water use sectors in the Subbasin, except for domestic users. Some of the water use sector areas may change with time as urbanization continues (*refer to* **Figure 3-6**).

Environmental cleanup is in progress in the Subbasin and some sites pump and treat groundwater to remove contaminants. Some of the water is used for municipal purposes while at other facilities the treated water is discharged to surface water.

3.6.1 Urban

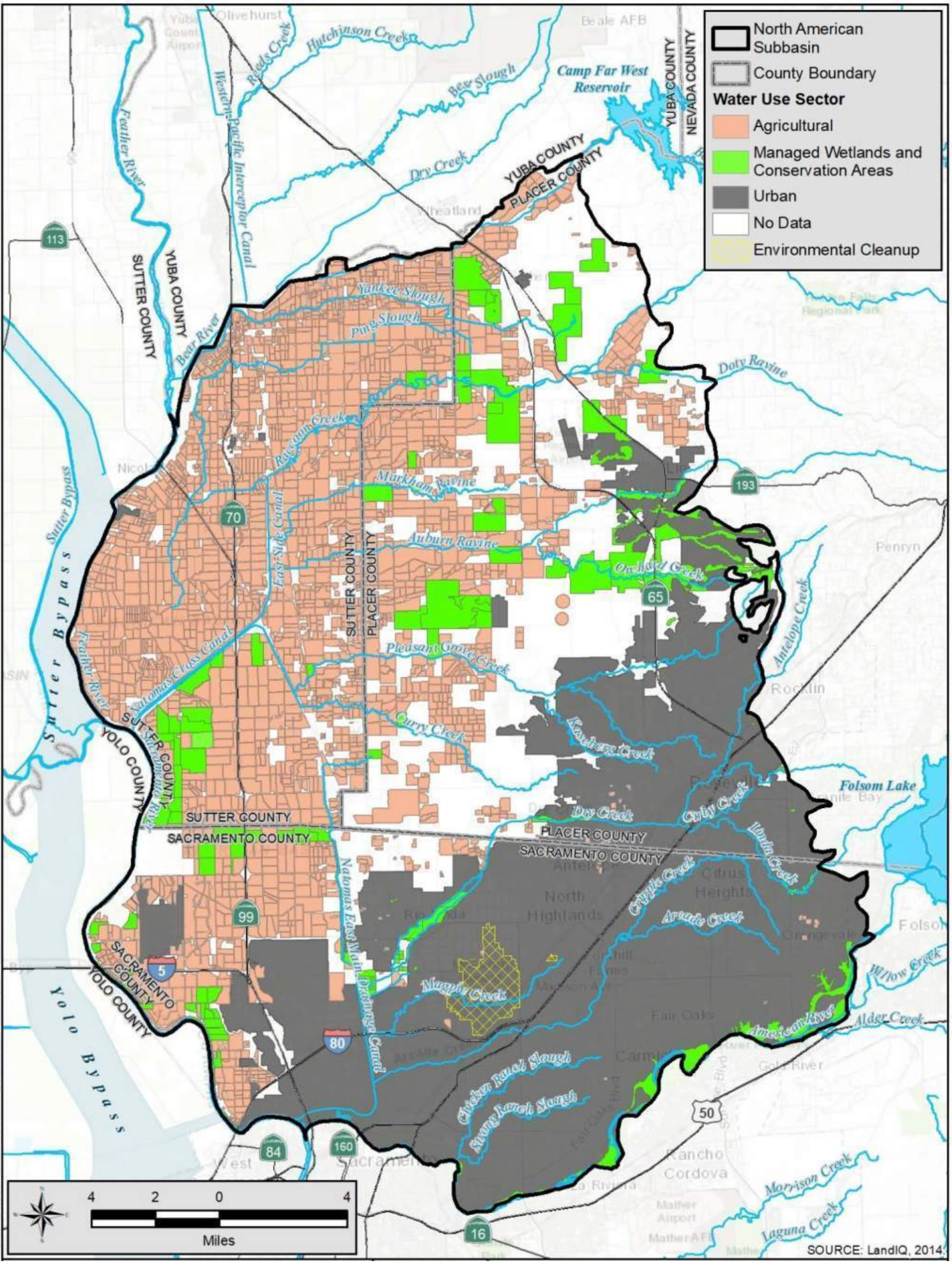
Land in the southern and eastern portions of the Subbasin is primarily urban and is served by groundwater and surface water, for the most part by multiple agencies, as shown on **Figure 3-8**. This widespread urban development initially used groundwater, and by the 1960s, a significant groundwater depression had developed in the Sacramento County portion of the Subbasin. By the 1980s, urban water supplies were augmented by surface water. In 1993, the Water Forum (*see* Section 3.9.2 for details) began a process to ensure a reliable water supply for the Sacramento region, including work to develop conjunctive use projects in the area, which expanded the option to use surface water. Currently, only the communities of Rio Linda, Arden, and Del Paso Manor rely solely on groundwater. **Figure 3-8** shows the water sources for urban areas.

3.6.2 Domestic

Domestic wells are used to supply groundwater to households in both urban and rural areas. They are scattered through the Subbasin.

3.6.3 Agriculture

Land in the northern and western portions of the Subbasin are predominately agriculture. A significant amount of surface water irrigates pastures, orchards, rice fields, and farms. Farmers in the Subbasin receive surface water from federal and local projects. Many also pump groundwater to augment their surface water supplies. During the dry year of 2014, surface water deliveries fell, causing farmers to rely more heavily on groundwater. Water districts, companies and irrigation districts manage surface water and encourage surface water use and basin recharge during wet years and groundwater use during dry years. **Figure 3-8** shows the availability of water sources for these agricultural areas.



SOURCE: LandIQ, 2014

Figure 3-8. Water Use Sectors

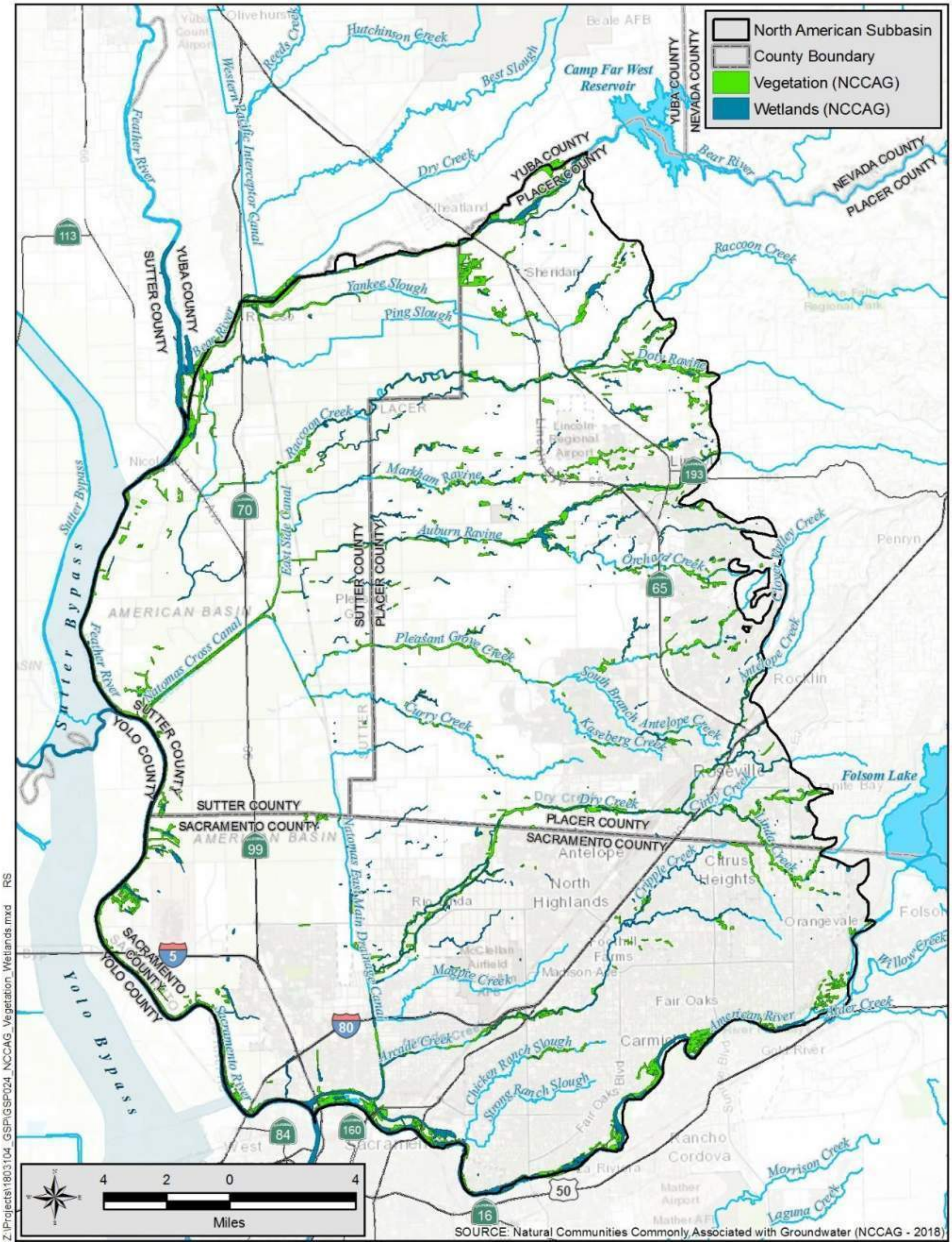
3.6.4 Environmental

Rivers and streams in the Subbasin support more than 40 species of native and nonnative fish, including naturally spawning fall-run Chinook salmon, steelhead, and American shad. Several of these species are of primary management concern because of their declining numbers or their importance to recreational/commercial fisheries. Auburn Ravine in Placer County is also a habitat area for Chinook salmon and steelhead. The banks of the many rivers and streams within the Subbasin provide riparian habitat, both scrub and forest consisting of cottonwood, valley oak, and willow, with occasional white alder, box elder, and Oregon ash. Emergent marsh habitat is found in still or slow-moving shallow water located on the edges of the rivers and on the banks of open water areas. These areas constitute less than one percent of the total NASb area. **Figure 3-9** shows vegetation and wetlands (NCCAG, 2018). Groundwater pumped and used to support some of the habitat preserves in Sutter and Sacramento counties is shown on **Figure 3-7**.

3.6.5 Groundwater Remediation

The federal government is in the process of remediating groundwater contamination beneath and near the former McClellan Air Force Base. Some of the cleanup involves pumping, treating, and discharging the treated groundwater to surface water. Pumping of the groundwater for cleanup of contaminants is relatively small, on the order of about 2,000 AFY and is expected to continue for about 30 to 200 years.

Aerojet also is performing groundwater remediation and is pumping wells north of the American River, in the vicinity of Fair Oaks and Carmichael and extracts about 3,000 AFY.



SOURCE: Natural Communities Commonly Associated with Groundwater (NCCAG - 2018)

Figure 3-9. Natural Communities Commonly Associated with Groundwater

3.7 Water Source Types

In general, water agencies in the NASb meet water demands with a mixture of surface water and groundwater. Groundwater is used to supply about 40 percent of the water needs in the Subbasin, with about 60 percent being surface water (DWR, 2019). Both the cities of Roseville and Lincoln are using recycled water and are planning to increase this use. Irrigation and RDs also reuse runoff from agricultural fields.

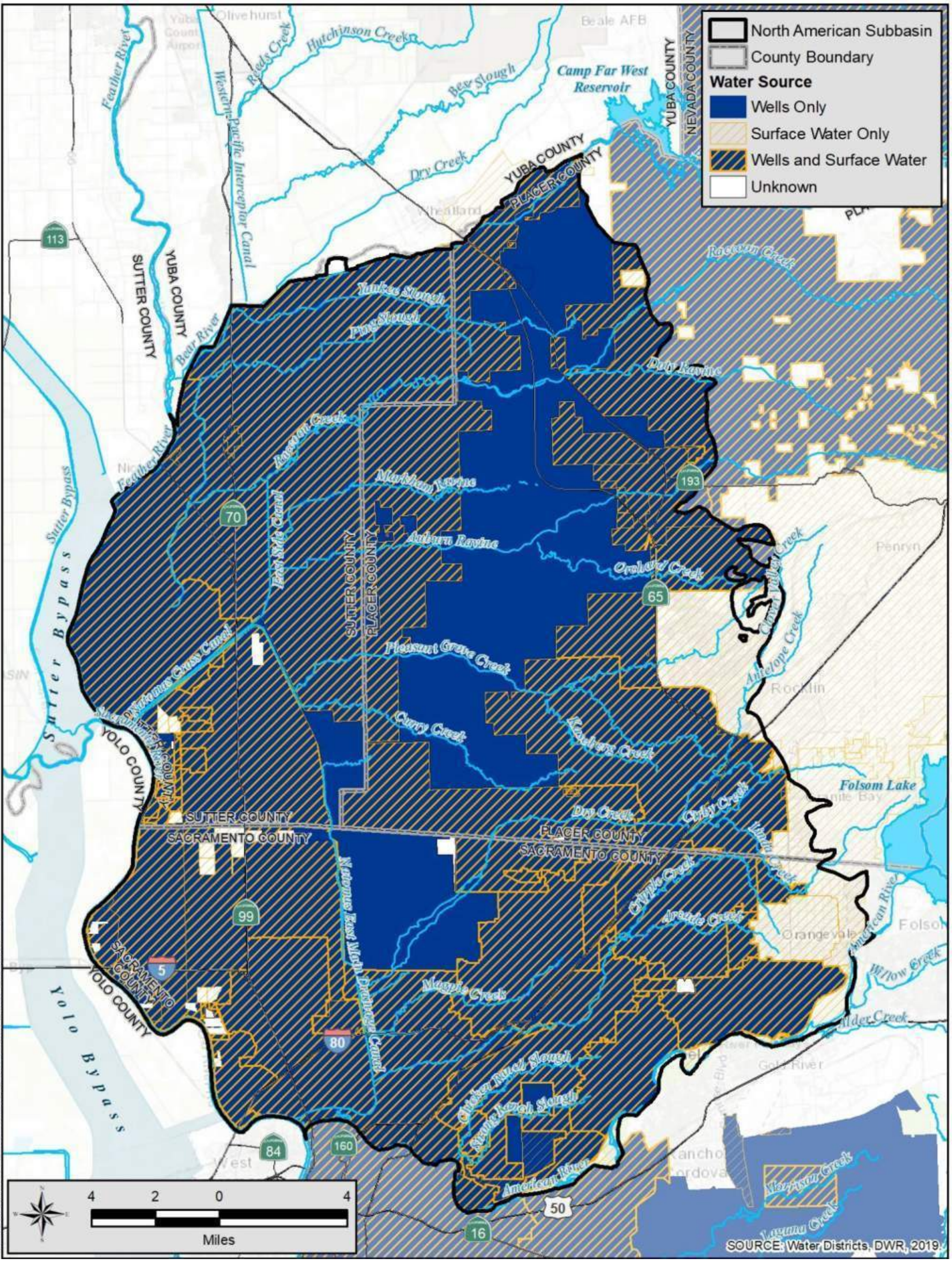
Water source types in the Subbasin are groundwater and surface water, with limited recycled water (treated wastewater) use at this time. Excess applied water to agricultural lands is reused by the irrigation and RDs. **Figure 3-10** shows the areas and water supply source types in the Subbasin. Due to the limited recycled water use and the extensive water reuse in the Subbasin, areas with these sources are not shown on **Figure 3-10** but are described in the following text. Most urban areas in Placer County, other than for the city of Lincoln, utilize surface water for their primary needs and only use groundwater during emergency, drought or other conditions. In Sacramento, most urban areas conjunctively use groundwater during dry periods and use surface water when abundant. **Figure 3-10** shows where groundwater is the sole source of water in the Subbasin. Some of the water source type areas shown on **Figure 3-10** may change as areas are developed as shown (*refer to* **Figure 3-6**). Most of the agricultural have groundwater and surface water sources and, therefore, can conjunctively use these resources to manage groundwater in those areas.

3.7.1 Groundwater

There are about 13,600 wells in the Subbasin, of which about 3,800 are production wells and include domestic, agricultural, and municipal water supply wells (DWR WCR, 2019). Wells were classified by DWR as production wells if the well casing was greater than or equal to 4 inches, and the total depth was greater than or equal to 22 feet. Most of the production wells in the Subbasin are domestic wells, which may be classified as de-minimis extractors who pump less than 2 AFY. **Table 3-2** summarizes the types of well categories.

Table 3-2. Well Type Summary

Well Type	Count	Percent
Production - Domestic	2,563	19%
Production - Agriculture	847	6%
Production - Municipal	372	3%
Production Well Total	**3,782**	**28%**
Monitoring	2,558	19%
Remediation	809	6%
Other/Abandoned/Unknown	6,471	48%
TOTAL	**13,620**	**100%**



SOURCE: Water Districts, DWR, 2019.

Figure 3-10. Water Source Types

3.7.2 Surface Water Sources

The SGA area of the NASb derives most of its surface water from the American and Sacramento rivers. The eastern two-thirds of the SGA region lies within the lower American watershed, and surface water served to that area typically comes from the American River. Seven agencies within the SGA boundaries identified in **Table 3-3** have water rights on the American River—Carmichael Water District, city of Folsom, city of Sacramento, and San Juan Water District (SGA, 2014).

Within the SGA GSA, Natomas Mutual Water Company (NMWC) has been using mostly surface water for many years, pursuant to riparian claims and water rights dating back to 1916 on the Sacramento River. In 1964, NMWC executed a settlement agreement with the Bureau of Reclamation to accommodate the development and operation of the Central Valley Project. The settlement agreement provided a supplement supply (Project Water: previously stored water from Shasta Reservoir) during times determined by the parties that the water rights were deficient. The senior water rights of NMWC and the security of the settlement contract have provided for a secure surface water supply for agricultural use which incidentally provides recharge to the groundwater basin. Water is diverted from the Sacramento River system at four points within the NASb: two diversions from Natomas Cross Canal, and two from the Sacramento River near the Sutter-Sacramento county line and near Elkhorn Road. About 75 percent of the water demand in the service area is met with surface water while groundwater makes up the remaining portion of the demand.

Within RD 1001 GSA, Pleasant Grove-Verona Mutual Water Company has an identical settlement arrangement as NMWC identified above except the quantities are less and the specific details of the water rights are slightly different. Surface water is diverted from the Sacramento River through the Natomas Cross Canal.

SSWD holds post-1914 appropriative water rights to store up to 102,100 AFY of water in the Camp Far West Reservoir located approximately six miles east-northeast of the city of Wheatland (*refer to* **Figure 3-3**), as well as direct diversion rights for the diversion and use of water from the Bear River and other small streams transecting the District. Pursuant to an agreement between Camp Far West Irrigation District (CFWID) and SSWD during the construction and enlargement of the reservoir, CFWID is entitled to the first 13,000 AF released from the reservoir each year to satisfy its senior water rights along the Bear River. CFWID also holds direct diversion water right licenses for small streams transecting the district service area. SSWD only provides surface water to agricultural users to meet about one-third of water demand, with the remaining two-thirds being met from private groundwater wells.

In addition to its rights and licenses on the Bear River and small streams, SSWD receives supplemental sources of surface water from Nevada Irrigation District (NID) via releases to Auburn Ravine except during the driest years. The amount of water received from NID ranges from zero to 20,000 AFY. The principal raw water delivery outside of the NID has been to SSWD.

Surface water is brought into the Placer County portion of the NASb by the city of Roseville, NID, Placer County Water Agency (PCWA), and San Juan Water District. The city of Roseville and San Juan Water District divert water from the American River from Folsom reservoir. PCWA's surface water supply sources consist of water purchased from PG&E from the Yuba and Bear rivers, Middle Fork Project water from the upper American River, and Central Valley Project water from the American River (Brown & Caldwell 2006). NID's primary source of supply is local surface water derived principally from the Yuba River, Bear River, and Deer Creek watersheds that are diverted and stored under the NID's pre-1914 and post-1914 appropriative water rights. The water rights allow for a diversion of up to 450,000 AFY. NID has an extensive system of small storage reservoirs. Through PCWA water rights and an agreement with the city of Roseville, the city treats surface water and delivers potable water to the California American Water service area in Placer County. The city of Lincoln purchases treated surface water from PCWA. PCWA also treats NID surface water to potable standards for delivery to NID areas within the city of Lincoln.

There are other small diverters of surface water with riparian water rights in the NASb. No attempt was made to identify and locate their diversion for this GSP from the SWRCB databases.

3.7.3 Recycled Water

Wastewater from urban areas and new developments will be treated at one of six wastewater treatment plants (WWTPs). **Figure 3-11** shows the location of the WWTPs. Five of the WWTPs are in the NASb, while one, the Sacramento Regional WWTP, is located outside of the Subbasin, in the South American Subbasin, as shown on **Figure 3-11**. The Sacramento Regional treatment plant receives water from the SGA area as well as other areas in Sacramento County. Interior urban water use, which originated from both groundwater and surface water supplies, is exported outside of the Subbasin to the Sacramento Regional WWTP.

Treated wastewater from the five WWTPs in the Subbasin is reused for irrigation of beltways, golf courses, and some agriculture along with some water features at golf courses. In 2016, about 23,000 AF of wastewater was treated by the cities of Lincoln and Roseville, of which about 3,600 AF was reused. Excess treated water, about 6,000 AF, was discharged into Dry and Pleasant Grove Creeks and Auburn Ravine (GEI SBR, 2018). The city of Roseville's Dry Creek WWTP is required to release an average of 10,000 AF for environmental purposes. The Urban Water Management Plans for the cities of Lincoln and Roseville detail reuse of the water currently being discharged to the creeks, other than flows that are committed for environmental purposes. Placer County operates the Sheridan WWTP, which does not discharge to nearby creeks but uses the water for irrigation of pasture. Wastewater from the Auburn area, which is outside of the Subbasin, is treated and then discharged to Auburn Ravine and enters the Subbasin near the city of Lincoln. Water from the northern portions of Auburn are sent to the city of Lincoln's WWTP and is discharged to Auburn Ravine via Orchard Creek. In 2016, about 1,300 AF was discharged and potentially entered the Subbasin from Auburn.

Table 3-3. Water Supply Sources

Individual Agencies by GSA	Groundwater	Surface Water					
		American River		Sacramento River		Bear River	
		Water Rights	Contracts and Agreements	Water Rights	Contracts and Agreements	Water Rights	Contracts and Agreements
SGA GSA							
Carmichael WD	x	x					
City of Folsom		x	x				
City of Sacramento North	x	x		x			
California American Water - Arden Area	x						
Del Paso Manor Water District	x		x				
Sacramento Suburban WD - Town & Country	x		x				
Golden State Water Company - Arden Town	x						
SCWMD - Arden Park Vista	x						
Portion of Natomas MWC	x(1)			x	x		
Sacramento Suburban Water District – North Service Area	x		x				
California American Water - Antelope and Lincoln Oaks	x						
Rio Linda/Elverta Community Water District	x						
Sacramento International Airport	x			x	x		
SCWMD - Northgate	x						
Citrus Heights Water District	x		x				
Fair Oaks Water District	x		x				
Orange Vale Water Company	x		x				
SJWD - Sacramento County		x	x				
WP GSA							
Placer County (Sheridan)	x	x					
City of Roseville	x		x				
Placer County Water Agency	x	x	x	x			
SJWD - Placer County Retail Area	x		x				
Nevada Irrigation District	x		x			x	x
Camp Far West Irrigation District						x	x
SSWD GSA							
SSWD	x(1)					x	x
RD1001 GSA							
Pleasant Grove-Verona Mutual Water Company	x(1)			x	x		
Sutter County GSA							
Portion of Natomas MWC	x(1)			x	x		

(1) Groundwater is used by landowners within company boundaries but is pumped from privately owned wells.
x = Existing available water supply

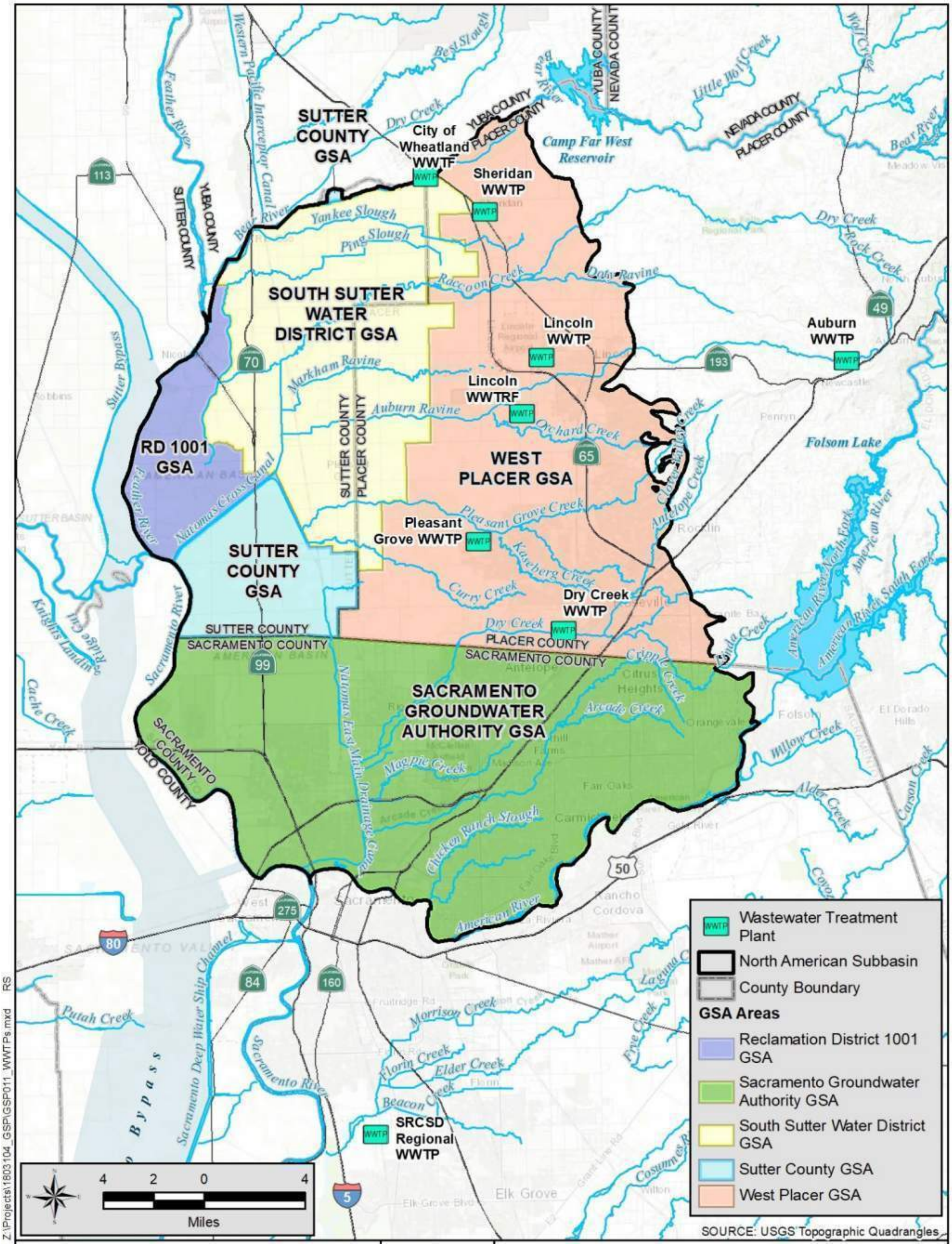


Figure 3-11. Wastewater Treatment Plants

3.7.4 Water Reuse

Excess applied surface water from agricultural fields either percolates into the soils or is returned to drains where it is recaptured by the RDs in the Subbasin. Shallow groundwater may also discharge to these drains, but only in areas where the groundwater surface is near the ground surface. In SSWD and RDs 1001 and 1000, excess applied surface water from agricultural fields is recaptured by drains and returned to the conveyance system to meet further water demands downstream.

Natomas Mutual Water Company has developed a complex closed system of unlined canals, laterals, drains, and lift pumps that circulate surface water around the service area. This system allows water users to take water from the system at any time during the irrigation season. The system also captures all return flow and recirculates it into the system for use by others. During a normal irrigation season, no agricultural drainage water returns to the Sacramento River until after October 15 each year.

3.8 Density of Wells

Groundwater in the Subbasin is used for municipal, industrial, irrigation, domestic, stock watering, frost protection, and other purposes. **Table 3-2** provides a summary of the number of wells by general type in the Subbasin. It should be noted that the number of wells is based on well logs filed and contained within DWR's Water Well Drillers Reports and may not reflect the actual number of active wells. Some wells contained in DWR files may have been destroyed, mis-located, mis-classified, constructed into granites beneath the Subbasin and are very old and may no longer be active.

Figures 3-12 and 3-14 show the density of domestic wells, as refined by GSP efforts, and production and municipal wells (from DWR database) per square mile and the minimum depths of the wells. **Appendix B** provides a description of the methods used to refine density and minimum depths of the domestic well database.

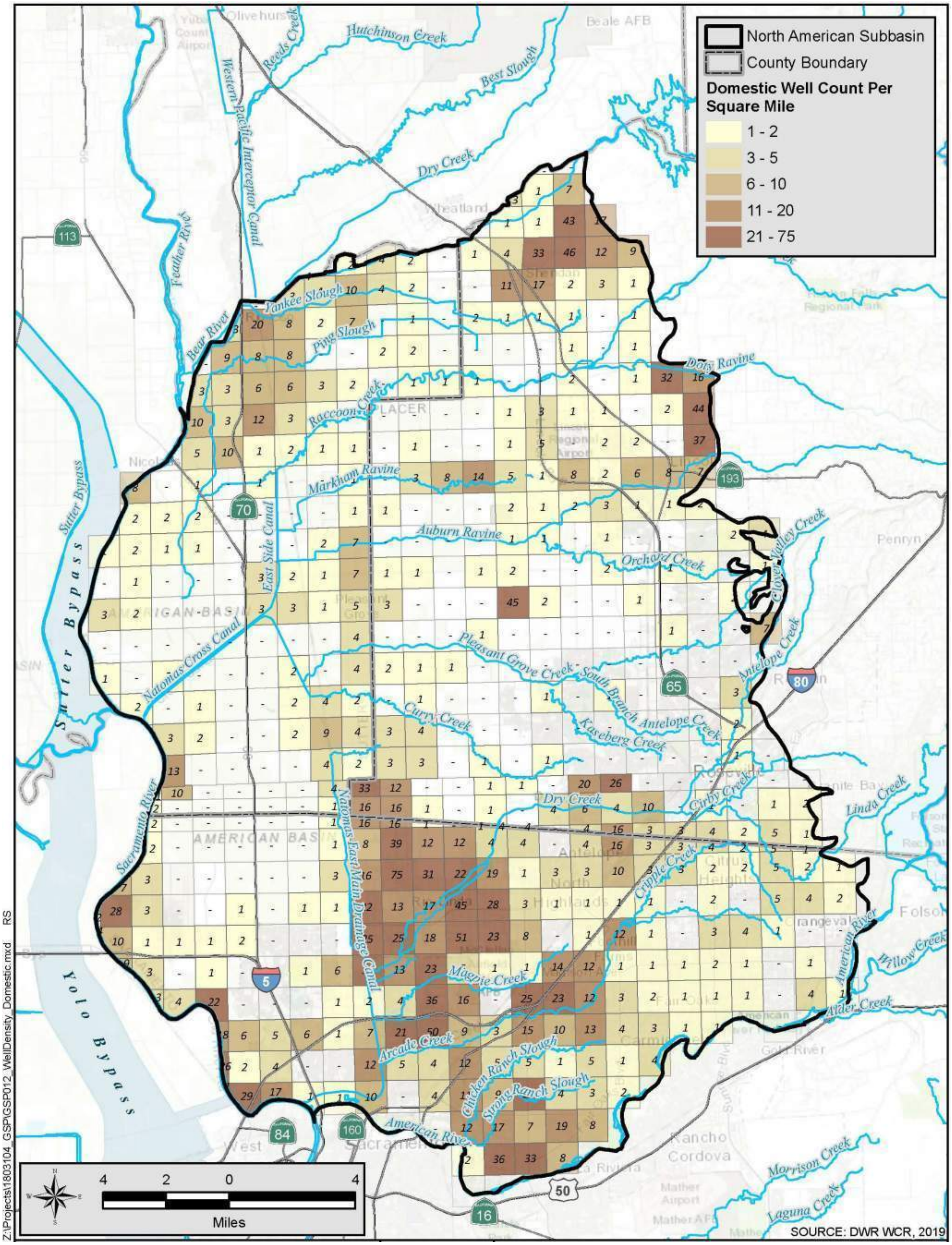


Figure 3-12. Density of Domestic Wells Per Square Mile

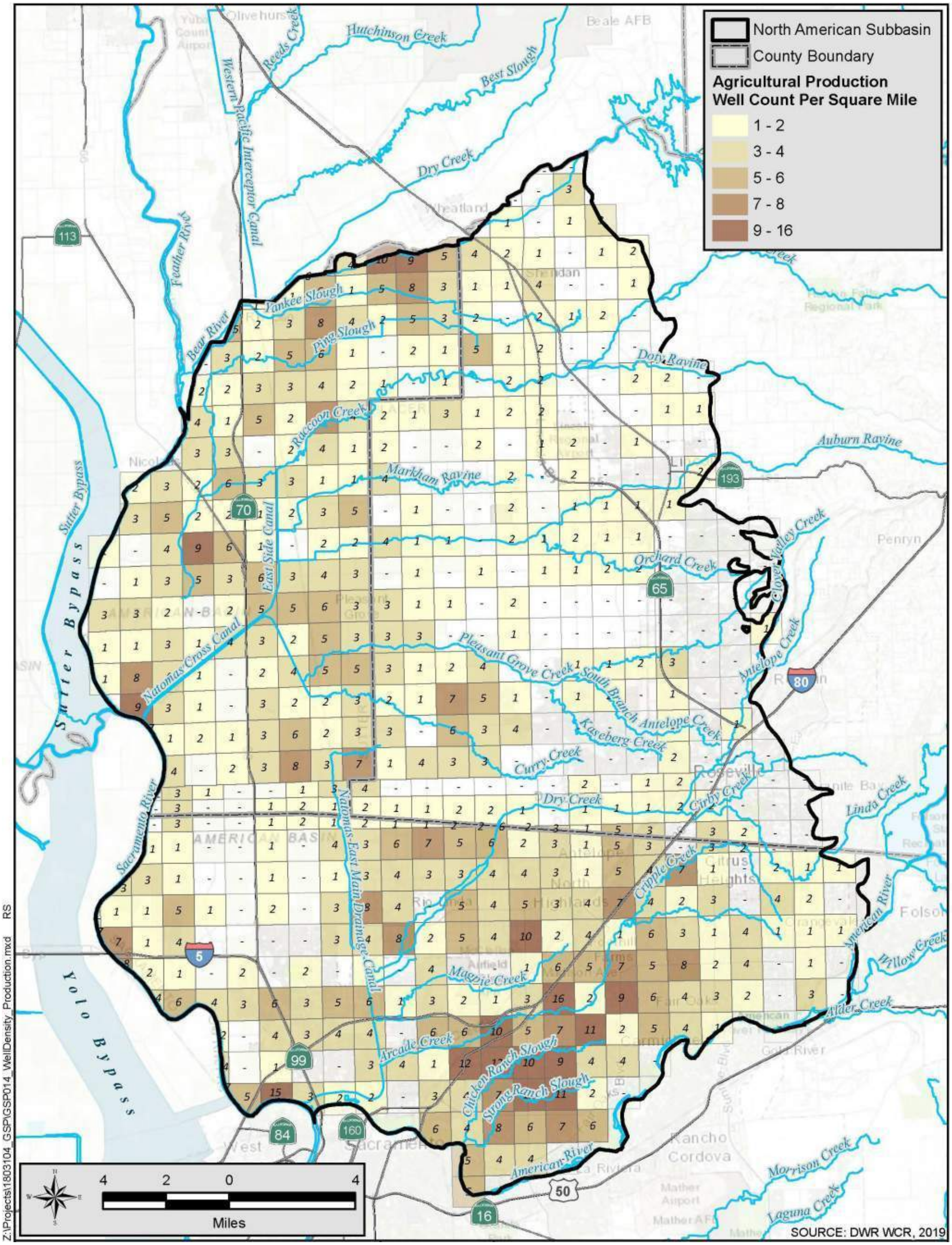


Figure 3-13. Density of Production Wells Per Square Mile

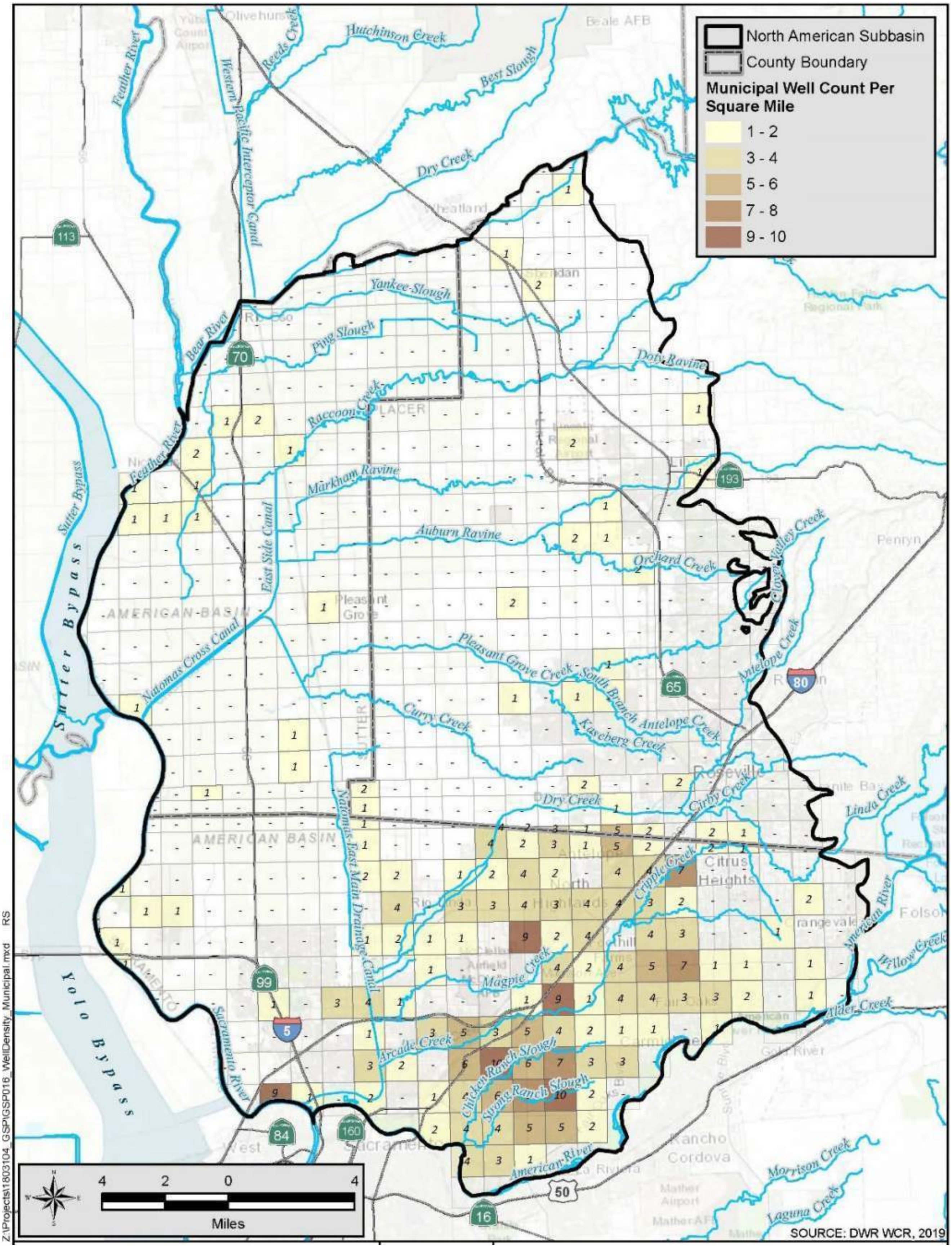


Figure 3-14. Density of Municipal Wells Per Square Mile

3.9 Existing Water Resources Management Plans

The Subbasin has many water resources management plans that cover activities that induces additional complexity to managing water resources. The following subsections provide a summary of other existing plans that the GSAs considered in the development of this GSP to manage groundwater resources in the Subbasin.

3.9.1 Groundwater Management Plans

In 1992, the California State Legislature enacted Assembly Bill (AB) 3030, and in 2002 the Legislature enacted Senate Bill (SB)1938. SB 1938 provides that the adoption of a groundwater management plan will be a prerequisite to obtaining funding assistance for groundwater projects from funds administered by DWR. These two pieces of legislation were incorporated into the State Water Code, Section 10753, to encourage local public agencies/water purveyors to voluntarily adopt formal plans to manage groundwater resources within their jurisdictions. **Table 3-4** provides a list of these groundwater management plans that separately covered the entire NASb. These existing groundwater management plans will be replaced with this GSP. Natomas Mutual Water Company has also prepared a groundwater management plan for its service area.

Table 3-4. Groundwater Management Plans

Groundwater Management Plan	AB3030	SB1938
SGA GMP 2014	x	x
Sutter County GMP 2012	x	x
WPC GMP 2007	x	x
SSWD GMP 2009	x	x

3.9.2 Water Forum Agreement

Representatives of water suppliers, local governments, citizens groups, environmental organizations, and businesses began the Water Forum in 1993 with the goal of developing a plan to ensure reliable long-term water supplies while protecting the lower American River. Following more than 6 years of analysis, professionally facilitated discussion, and negotiations, 40 diverse stakeholder groups signed the Water Forum Agreement (WFA) in April 2000 (Water Education Foundation, 2002). An Environmental Impact Report for the WFA was completed in October 1999. The WFA included the following co-equal objectives:

- Provide a reliable and safe water supply for the region’s economic health and planned development through the year 2030
- Preserve the fishery, wildlife, recreational, and aesthetic values of the lower American River

To achieve its objectives, WFA signatories approved an integrated package of seven elements:

- Increased surface water diversions
- Actions to meet customer needs while reducing diversion impacts in drier years

- Support for improved pattern of fishery flow releases from Folsom Reservoir
- Lower American River habitat management
- Water conservation
- Groundwater management
- Water Forum Successor Effort

The Water Forum effort continues today, with many successes and some ongoing challenges to meeting its objectives. Most importantly, a majority of the signatory stakeholder groups are still focused on supporting and achieving the WFA's objectives more than 20 years after its execution. While each of the elements of the WFA is critical to achieving its co-equal objectives, the groundwater management element is most relevant to local groundwater management efforts and to this GSP. The groundwater management element provides a framework for protecting and using groundwater in a sustainable manner. The WFA is currently being updated and will reflect the enactment of SGMA.

3.9.3 American River Basin Integrated Regional Water Management Plan

The greater Sacramento area has been involved in integrated water planning and implementation for two decades. In 2001, water suppliers in the Sacramento area formed the Regional Water Authority (RWA) as a joint powers authority to help implement elements of the Water Forum Agreement. RWA developed the first American River Basin Integrated Regional Water Management Plan (IRWMP) in 2006, with updates in 2013 and 2018. The IRWMP area includes SGA and West Placer GSAs.

Integrated Regional Water Management is an effective way to address complex water resources challenges and is driven by stakeholders that identify major water and related resource management issues and their proposed solutions. It maximizes economic and societal benefits in an equitable manner while maintaining the ecosystem critical to water resource sustainability.

The IRWMP identifies specific projects and implementation programs and agreements between different affected agencies to identify projects to put conjunctive use in place. The intended purpose of the IRWMP is to provide and encourage regional opportunities for water resources planning and project development.

3.9.4 North Sacramento Valley Integrated Regional Water Management Plan

The North Sacramento Valley IRWMP covers a large planning area and includes the Sutter County portion of the NASb and RD 1001, Sutter County, and portions of the SSWD GSA areas.

The IRWMP also includes specific projects and implementation programs and agreements between different affected agencies to identify projects to put conjunctive use in place.

3.9.5 Urban Water Management Plans

The Urban Water Management Planning (UWMP) Act was developed in response to the state's water shortages, droughts, and other factors. Every urban water supplier that provides over 3,000 AF of water annually or serves more than 3,000 urban connections is required to submit a UWMP. UWMP requirements include updating water shortage contingency plans, extended drought risk assessments, and energy intensity reporting. Required elements of an UWMP include a report on the progress that urban water suppliers are making in meeting their water use targets, current and projected water demands, current and projected water sources, water management actions to improve supply reliability, and an evaluation of the sufficiency of supplies to meet the forecasted demands under both normal and drought conditions. Entities within the NASb with UWMPs include:

- California American Water
- Carmichael Water District
- Citrus Heights Water District
- City of Folsom
- City of Lincoln
- City of Roseville
- City of Sacramento
- Fair Oaks Water District
- Nevada Irrigation District
- Orangevale Water Company
- Placer County Water Agency
- Rio Linda/Elverta Community Water District
- Sacramento County Water Agency
- Sacramento Suburban Water District

3.9.6 Agricultural Water Management Plans

The Water Conservation Act of 2009 (SB X7-7) requires agricultural water suppliers serving more than 25,000 irrigated acres (excluding recycled water deliveries) to adopt and submit to DWR an Agricultural Water Management Plan (AWMP). These plans must include reports on the implementation status of specific Efficient Water Management Practices that were required under SB X7-7.

Required components of the plans include:

- Annual water budget
- Identification of water management objectives to improve system efficiency
- Quantification of water use efficiency with all water uses being accounted for including; crop water use, agronomic use, environmental use, and recoverable surface flows
- A Drought Plan for periods of limited water supplies that describes actions for drought preparedness

Districts within the NASb which have adopted AWMPs are:

- SSWD
- Natomas Mutual Water Company
- Nevada Irrigation District

3.9.7 Salt/Nutrient Management Plan

In February 2009, the SWRCB adopted Resolution No. 2009-011, which established a statewide Recycled Water Policy. Central to this Policy was the requirement that local water and wastewater entities, together with local salt- and nutrient-contributing stakeholders, develop a Salt and Nutrient Management Plan for specified groundwater basins and subbasins in California. The plans include management strategies, plans for stormwater and recycled water use, a monitoring program, and an antidegradation analysis. In response, the Sacramento Valley Water Quality Coalition was formed to perform studies and to represent growers in the Sacramento Valley, including the NASb. The Coalition developed a Groundwater Quality Assessment Report (CH2MHill, 2016) and a Comprehensive Groundwater Quality Management Plan. The Groundwater Quality Management Plan presents a baseline picture of groundwater quality, establishes a framework under which salt and nutrient issues can be managed, and streamlines the permitting process of new recycled water projects while meeting water quality objectives and protecting beneficial uses. This plan excluded areas where rice is grown.

The California Rice Commission also prepared a Groundwater Quality Assessment Report (CH2MHill, 2013). Rice is primarily grown in eight Sacramento Valley counties (Butte, Colusa, Glenn, Placer, Sacramento, Sutter, Yolo, and Yuba). Rice lands overlie eleven Sacramento Valley Groundwater Basin, including the North American Subbasin. The California Rice Commission was issued rice-specific Waste Discharge Requirements (WDR) which requires groundwater trend monitoring and reporting at representative wells (one well is sampled in the NASb). Rice acreage has been identified as having a low vulnerability for nitrates.

3.9.8 Water Quality Control Plan for the Sacramento River Basin

The Central Valley Regional Water Quality Control Board (CVRWQCB) prepared a Water Quality Control Plan for the Sacramento River Basin and the San Joaquin River Basin (Basin Plan). The objective of the Basin Plan is to show how the quality of the surface water and groundwater in the Sacramento Region should be managed to provide the highest water quality reasonably possible. Water uses and water benefits vary depending upon the location in the basins. Water quality is an important factor in determining use and benefit. For example, drinking water must be of higher quality than the water used to irrigate pastures. Both are legitimate uses, but the quality requirements for irrigation are different from those for domestic use. The Basin Plan recognizes such variations.

The Basin Plan lists beneficial users, describes the water quality, which must be maintained to allow those uses, and contains an implementation plan, SWRCB, and CVRWQCB plans and policies to protect water quality, and statewide surveillance and monitoring as well as regional surveillance and monitoring programs.

Present and potential beneficial uses for inland waters in the basins are surface water and groundwater as municipal (water for community, military, or individual water supplies); agricultural; groundwater recharge; recreational water contact and non-contact; sport fishing; warm freshwater habitat; wildlife habitat; rare, threatened, or endangered species; and; spawning, reproduction, and/or early development of fish.

Water Quality Objectives for both groundwater (drinking water and irrigation) and surface water are provided.

3.10 Existing Water Resources Monitoring Programs

Existing management and monitoring plans in the NASb are described below. Some of the programs will be incorporated into the GSP monitoring network or were used to develop this GSP.

3.10.1 Groundwater Level Monitoring Programs and Networks

Historical groundwater level data measurements were made by DWR, SGA, local water districts, and the United States Geological Survey (USGS).

Groundwater level monitoring is being performed by designated monitoring entities in the NASb as part of the California Statewide Groundwater Elevation Monitoring (CASGEM) program. This network of groundwater level monitoring wells provides data that is the foundation for many groundwater management decisions. Designated monitoring entities include; SGA, Placer County, city of Roseville, SSWD, and Sutter County. DWR also continues to monitor groundwater levels in the Subbasin. The CASGEM groundwater level monitoring network and others are shown on **Figure 3-15**.

Appendix C provides the monitoring well construction details. Many of the wells are dedicated nested monitoring wells (small diameter wells that are screened opposite individual aquifers). The NASb GSAs rely upon these dedicated monitoring wells to assess the groundwater conditions in the basin since these wells are not affected by local pumping, as are the voluntary wells that are commonly active pumping wells. SSWD, RD 1001, and the Sutter County GSAs use more voluntary wells than dedicated monitoring wells.

Groundwater level monitoring is also performed as part of DWR and the Bureau of Reclamation's Water Transfer Program, which allows for three categories of transfers: 1) groundwater substitution, 2) cropland idling and crop shifting, and 3) reservoir storage releases. Groundwater substitution transfers make surface water available for transfer by reducing surface water diversions and replacing that water with groundwater pumping. The monitoring of groundwater levels is required as part of the transfer agreement. The monitoring networks developed for the water transfers include the groundwater production wells participating in the transfer and additional monitoring wells to assess the effects of the transfer. The monitoring frequency varies from weekly to monthly. Monitoring begins just prior to the start of water transfer pumping and continues until groundwater levels have recovered to their seasonal highs the following spring.

The USGS monitors thousands of wells across the nation. The extensive water data, which includes manual measurements of depth to groundwater in wells throughout California, are stored in the National Water Information System online database (https://waterdata.usgs.gov/nwis). The database stores historical observations of active and discontinued sites in addition to current conditions with measurements transmitted hourly. Groundwater level measurements at these wells are taken approximately once per quarter. The USGS actively monitors 10 well sites within the NASb.

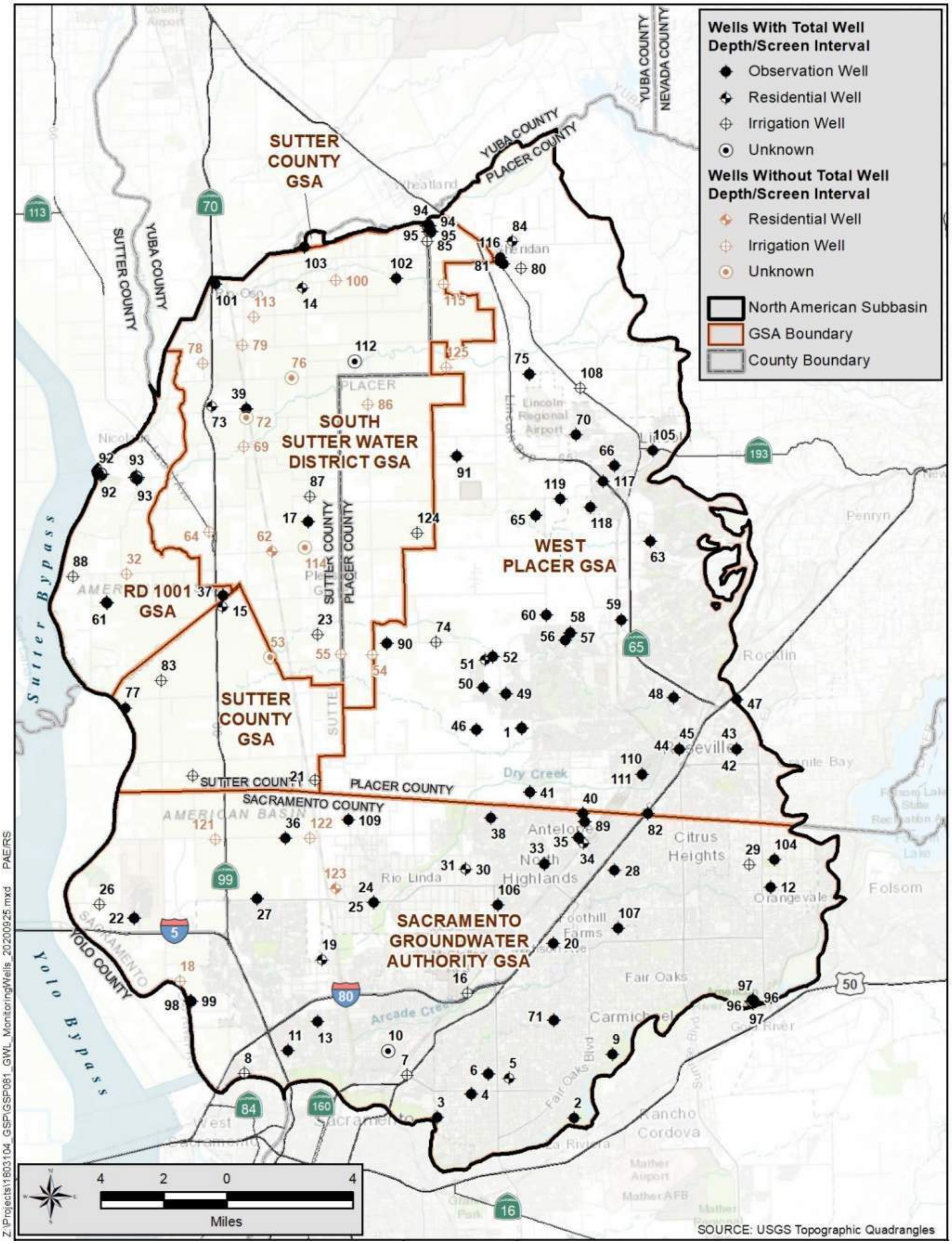


Figure 3-15. Groundwater Level Monitoring Network

3.10.2 Groundwater Quality Monitoring Programs and Network

Groundwater quality is monitored under several different programs and by different agencies, as described below:

- Municipal and community water purveyors collect water quality samples on a routine basis for compliance monitoring and reporting to the SWRCB's Division of Drinking Water.
- The USGS collects water quality data under the Groundwater Ambient Monitoring and Assessment (GAMA) and National Water Quality Assessment programs.
- The Irrigated Lands Regulatory Program required the development of a Salt Nutrient Management Plan and, more recently, the development of a Groundwater Trend Monitoring Work Plan to identify wells for sampling and a groundwater quality monitoring protocol. Plans were due by September 17, 2017.
- West Placer selectively monitors 16 dedicated monitoring wells on an annual basis to assess water quality trends in wells that are approaching or have exceeded the maximum contaminant levels (MCLs) and for select water quality constituents with pending MCLs.

Figure 3-16 shows the locations of the water quality monitoring wells used for the programs described above. **Appendix C** provides the water quality monitoring well construction details.

In addition to these monitoring programs, there are multiple sites groundwater quality samples are collected and analyzed as part of investigation or compliance monitoring programs through the Central Valley Regional Water Quality Control Board.

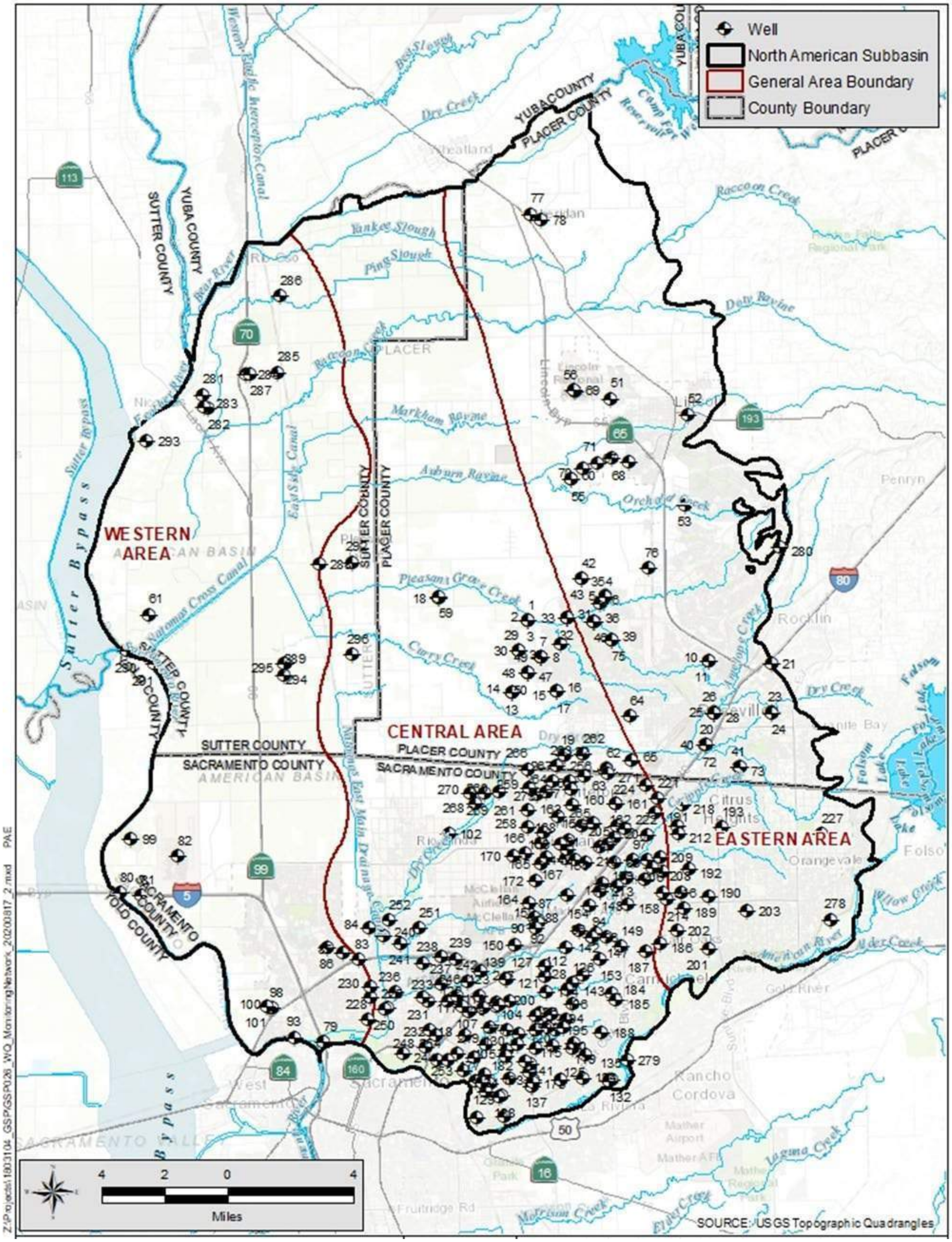


Figure 3-16. Groundwater Quality Monitoring Network

3.10.3 Surface Water Monitoring Networks

DWR, USGS, and Placer County maintain surface water gages along the rivers, creeks, and sloughs in the NASb with publicly available data online. Depending on the station, they may measure only the level of water (stage) or the discharge. **Figure 3-17** shows the location of these gages. This GSP uses the data collected by these agencies from some of these gages.

Surface water diversions into the Subbasin are also monitored by SSWD, NMWC, Pleasant Grove-Verona Mutual Water Company, Nevada Irrigation District, and Placer County Water Agency, cities of Sacramento and Roseville, San Juan Water District, and Carmichael Water District.

3.10.4 Precipitation Monitoring Network

Precipitation is measured at 29 stations located in the NASb, although many of the stations do not have a long period of record. **Figure 3-16** shows the location of these stations. This GSP uses the data collected by various agencies that maintain and report the data.

The closest station to the NASb with a long period of record, dating back into the 1880s, is the Sacramento 5ESE station, which is just south of the Subbasin but is likely representative due to its geographic location. The average precipitation, using the state climatologist definition of a recent representative period of years, water year 1988-89 through 2008-09 is 18.65 inches, at this location. **Figure 3-18** shows the precipitation by water year (October 1–September 30 of any given year).

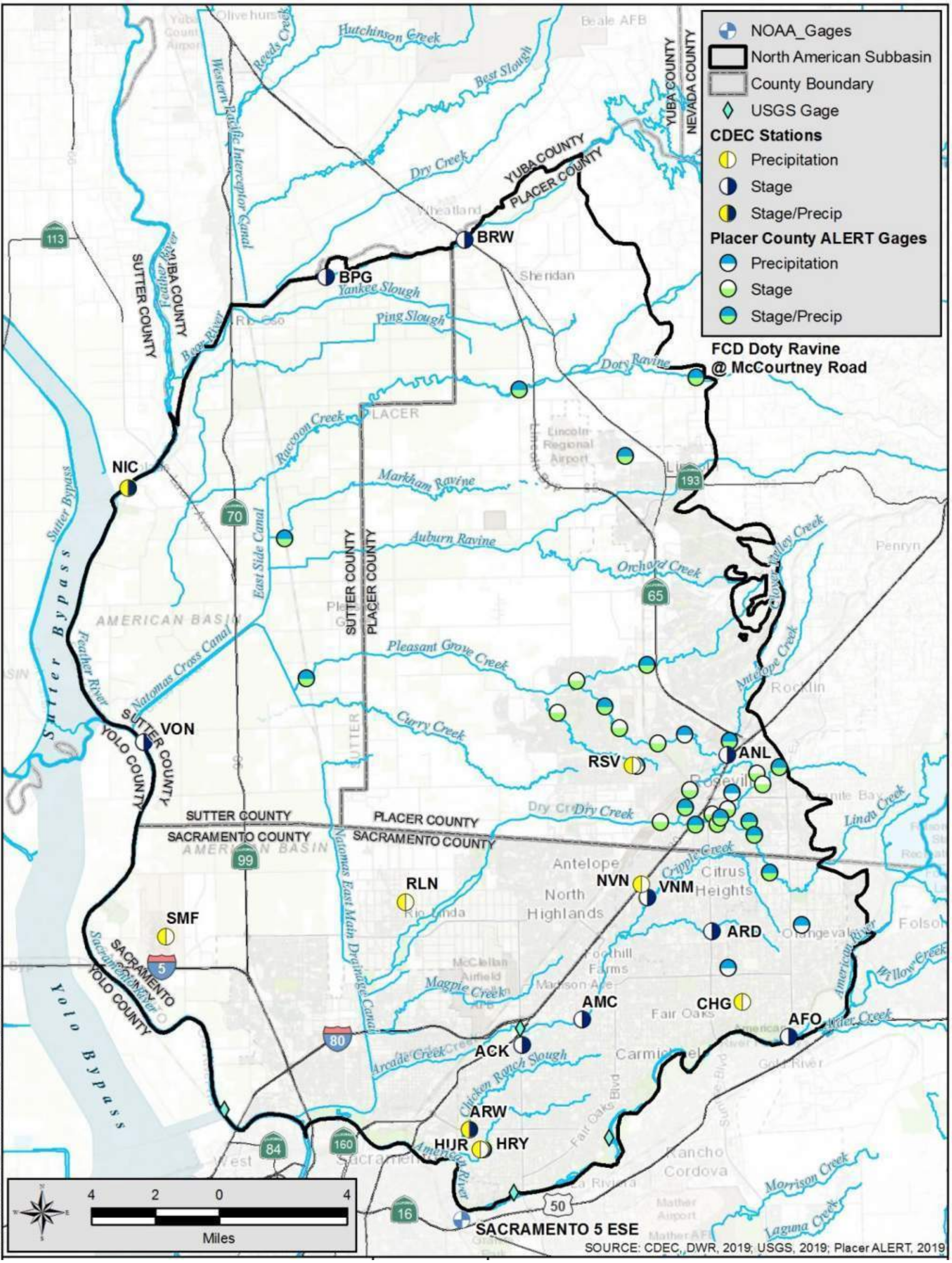


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Figure 3-17. River Gages and Precipitation Stations

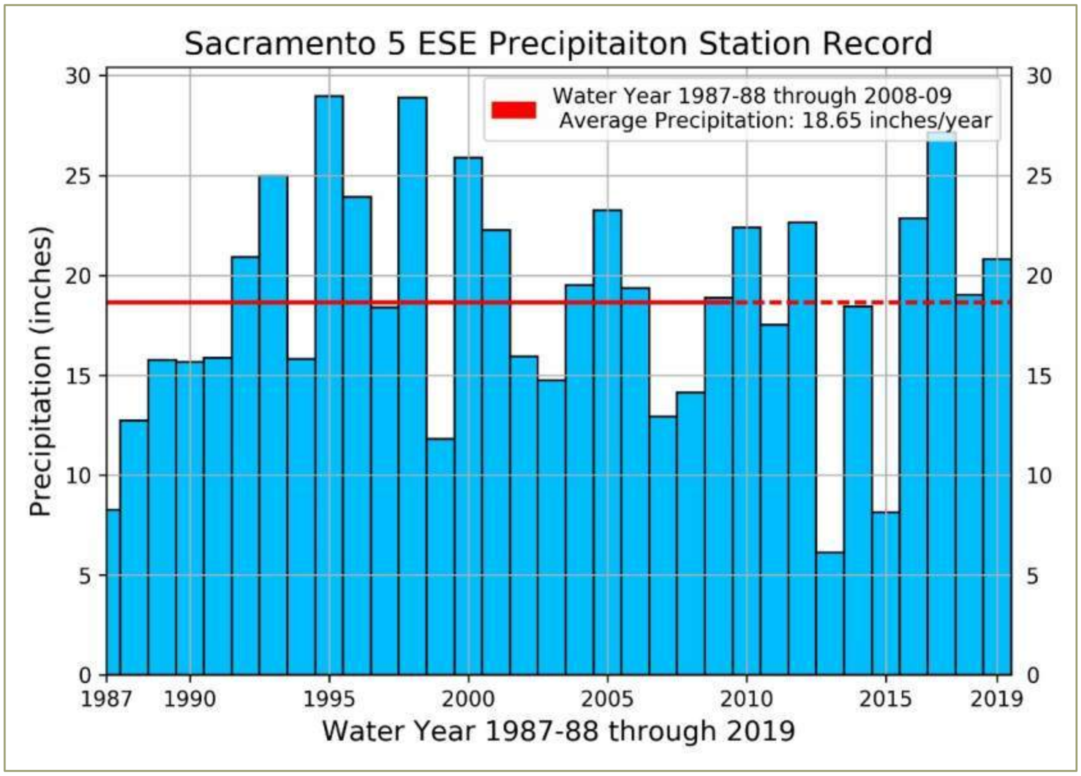


Figure 3-18. Water Year Precipitation

3.10.5 Subsidence Monitoring Network

DWR established a Sacramento Valley-wide benchmark network in 2008 and then resurveyed the benchmarks in 2017 to assess if and where subsidence occurred (DWR, 2018). DWR plans to resurvey this benchmark network about every 5 years or as funding is appropriated.

DWR constructed and monitors for subsidence at the Sutter extensometer (SUT Ext), located near the western edge of the Subbasin, near the Natomas Cross Canal at Highway 99 as shown on **Figure 3-19**. A nearby monitoring well SUT-P (11N04E04N005M) provides groundwater levels to assess if subsidence is related to changes in groundwater levels.

This GSP relies on data from these benchmarks and the extensometer and plans to incorporate them as part of the monitoring network for the NASb, as measured or coordinated by DWR. **Figure 3-19** shows the location of these benchmarks and the extensometer.

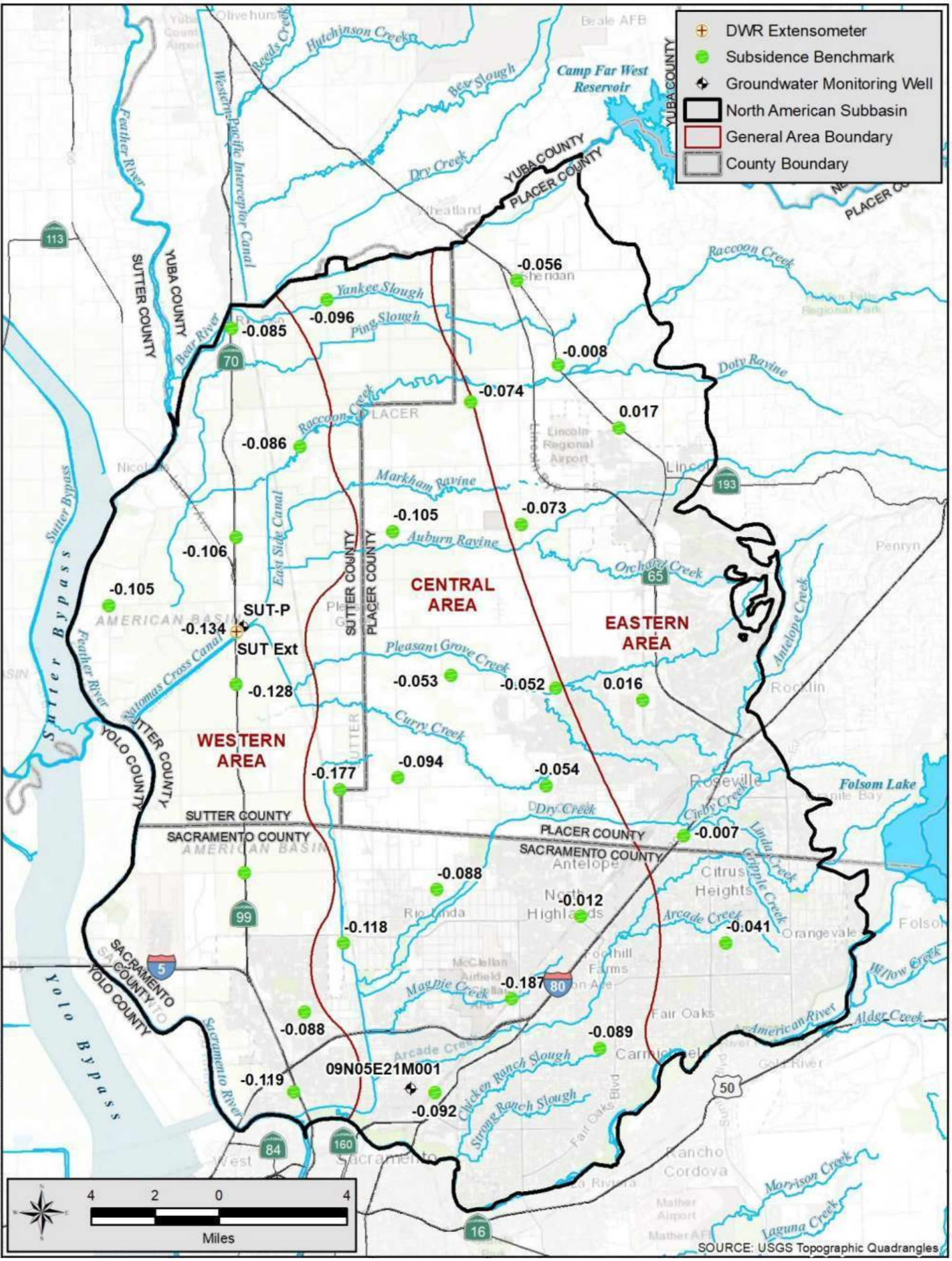


Figure 3-19. Subsidence Monitoring Network

3.11 Limits to Operational Flexibility

To Be Completed.

3.12 Conjunctive Use Programs

Conjunctive use is the planned, coordinated use of groundwater and surface water to optimize available water supplies. Surface water is used when it is available, and groundwater is used when surface water supplies are reduced or not available. The aquifer is utilized as a storage reservoir that can be recharged from precipitation, subsurface inflow, applied surface water, or injection wells. This stored water is then available when needed.

In 1993, the Water Forum began a process to ensure a reliable water supply for the Sacramento region, including work to develop conjunctive use projects in the area. This resulted in the formation of SGA in 1998. SGA focused the effort started by earlier agencies to manage groundwater in the Sacramento County portion of the NASb. Since the 1990s, SGA and its member agencies have managed groundwater and implemented conjunctive use projects, thereby reversing the decline of groundwater levels in the North Basin.

Currently, NASb member agencies, as a whole, meet water demands with a mixture of a little more than half surface water and a little less than half groundwater. To the extent practicable, the agencies maximize the use of surface water in wet years to maximize the amount of groundwater stored in the basin. The SGA and Regional Water Authority (with members agencies in the South American and Consumes subbasins and surrounding watersheds) members are committed to expanded conjunctive use operations and are investigating a variety of ways to recharge water into the available storage space in the NASb. Most of the recharge occurring through current conjunctive use is from in-lieu recharge (i.e., this is recharge that occurs naturally from rivers, streams, and surface percolation by simply reducing groundwater extractions).

The SGA has also embarked upon a Water Accounting Framework (WAF) that has been used by SGA member agencies in the Sacramento County portion of the Subbasin to ensure a safe and sustainable water supply for the greater Sacramento region by encouraging water purveyors to “bank” water in the basin, when available, for use during dry periods. This includes the establishment of a WAF that supports groundwater banking programs by setting forth rules for operating a model groundwater bank and monitoring the basin to ensure its sustainability as the program is implemented. Since 2007, SGA has maintained an accounting of groundwater “deposits” and “withdrawals” associated with implementing their conjunctive use program.

Well ahead of any formal type conjunctive use programs, SSWD was formed for the purpose of developing surface water supplies to offset the decline of groundwater levels. The first year of operation of Camp Far West Reservoir and associated facilities was 1964. The operation of these facilities was successful in reversing the decline of groundwater levels such that by 1970 the potential of drainage problems were identified if greater quantities of groundwater were not put to use.

Although not a formal program, water and irrigation districts and mutual water companies that provide surface water for agricultural use in the NASb also provide conjunctive use by increasing their deliveries of surface water during times of surplus, thereby reducing the amount of groundwater pumped by private well owners.

3.13 Land Use Plans

Land use management and planning authority is granted through the state of California and is derivative of a city's or county's general police power. This power allows cities and counties to establish land use and zoning laws that govern development. Agencies with land use authority in the NASb are the cities of Citrus Heights, Folsom, Lincoln, Rocklin, Roseville, and Sacramento along with counties of Placer, Sacramento, and Sutter. The cities of Roseville and Sacramento are considered charter cities, which provides them with additional constitutional freedoms to govern municipal affairs even if a conflict with state law exists.

General Plans and UWMPs have been developed by the cities of Citrus Heights, Folsom Lincoln, Roseville, and Sacramento along with Sutter, Placer, and Sacramento counties. Their planning horizons (out to 2030 or 2035) include the anticipated planned growth in the region.

Water purveyors also have a voice in land use planning, but not necessarily an authority. Because they provide water supply, any new development is required to prove adequate water supply will be made available to serve the project and, therefore, may affect land use. Proof of adequate water supplies is required under SB 610 and SB 221, which are intended to assist water suppliers, cities, and counties with integrating water and land use planning. SB 221 prohibits a city or county from approving a residential subdivision of more than 500 units unless there is written verification that sufficient water supply for 20 years is, or will be, available. SB 610 requires retail water agencies with responsibility under prescribed circumstances to prepare water supply assessments for the purpose of predicting and ensuring long-term (20-year) water supply reliability for those projects that are subject to the California Environmental Quality Act (CEQA).

It should be noted that California American Water and Golden State Water Company, although not public water agencies, have similar authority to the public water agencies for the determination of adequate water supplies for new developments.

Water supplies for new developments (*refer to* **Figure 3-6)** will be a mixture of surface water and groundwater. In Placer County, the development near and south of Pleasant Grove Creek will be provided with surface water. Those in the Lincoln area will be a mixture of surface water and groundwater. The early phases of the Sutter Pointe development in Sutter County will rely on groundwater and ultimate planned combination of groundwater and surface water to meet the needs of the community. Surface water would be obtained from NMWC. Planned development areas within Sacramento County will likely use groundwater as their initial sources of supply and ultimately plan to use both surface water and groundwater as their source of supply.

3.14 GSP Implementation Effects on Land Use

To be Completed.

3.15 GSP Implementation Effects on Water Supply

To Be Completed.

3.15.1 Urban Water Supply

To Be Completed.

3.15.2 Agricultural Water Supply

To Be Completed.

3.15.3 Potential Groundwater Dependent Ecosystems Water Supply

To Be Completed.

3.16 Well Permitting

DWR has responsibility for developing standards for wells for the protection of water quality under California Water Code Section 231. All counties and cities and water agencies, where appropriate, were required to adopt a well ordinance that meets or exceeds DWR's Water Resources Bulletin 74-81, "Water Standards: State of California" and Bulletin 74-90. Four agencies have well-permitting authority in the NASb for both new and replacement wells and well destruction.

- The **Placer County Water Well Construction Ordinance** provides the minimum requirements for construction, repair, and destruction of water wells, cathodic protection wells, and monitoring wells. Whoever wishes to drill a well within the county's boundaries, except for those within the city of Roseville, must first obtain a County Environmental Health permit. Placer County administers the well permitting program for the entire county, except for lands within the city of Roseville. Any wells planned within the city of Lincoln must first be approved by the city prior to the issuance of a County Environmental Health permit.

- **Roseville's Environmental Utilities Engineering Division** is the permitting agency for wells located within Roseville's city limits. To permit a well in Roseville, a Well Construction Application and Permit Form must be filed with the Environmental Utilities Department.

- The **Sacramento County Environmental Management Department (SCEMD)** approves permit applications for a new well or to deepen, reconstruct, recondition, or destroy a well. Any well that is constructed in Sacramento County must have a permit from the Environmental Management Department prior to the start of construction unless it is specifically exempted in the Sacramento County Code. The conditions and process for obtaining well permits are governed under Sacramento County Code, Title 6, Chapter 6.28.

    - Section 0.25 defined a "prohibition area" as that portion of the unincorporated territory of the county bounded on the east and south by the former McClellan Air Force Base, on the south by Sacramento city limits, on the west by Dry Creek Road, and on the north by I Street. No permits shall be issued for, and no person shall dig or drill a new water well within the prohibition area.

    - The permit requires that any applicant shall contact the CVRWQCB to assess the potential for groundwater contamination in the vicinity of the well and can require special sanitary seal requirements to prevent the spread of contaminants.

    - SCEMD also, when required, requests copies of CEQA documentation prior to the approval of the permits.

- **Sutter County Environmental Health Division (SCEHD)** is the well-permitting agency for Sutter County. One permit application is used for a new well or to deepen, reconstruct, recondition, or destroy a well. The permit application requires a site plan showing the location of the well and the accessor's parcel number. The design and construction of the well shall be in conformance with the California Department of Water Resources Bulletin 74-81, "Water Standards: State of California" as outlined in the County of Sutter Department of Public Works Improvement Standards (2005, rev. 2010).

All of the permitting agencies have requirements for well head protection including minimum well heights, well seals and concrete pads to surround the well and to promote drainage away for the wells.

None of the well permitting agencies coordinates with county or city land developers. There are no setbacks or special investigation requirements for construction of supply wells near the rivers or tributaries.

3.17 Land Use Plans Outside of the NASb

This GSP has not evaluated land use implementation plans outside the Subbasin and will be done by GSAs within other subbasins and documented in their GSPs.

DRAFT

North American Subbasin Groundwater Sustainability Plan

Section 4

Prepared for:

Sacramento Groundwater Authority GSA
RD 1001 GSA
South Sutter Water District GSA
Sutter County GSA
West Placer GSA

Prepared by:

GEI Consultants
2868 Prospect Park Drive, Suite 400
Sacramento, CA 95670

November 4, 2020

Table of Contents

List of Figures

List of Tables

List of Appendices

4. Hydrogeologic Setting

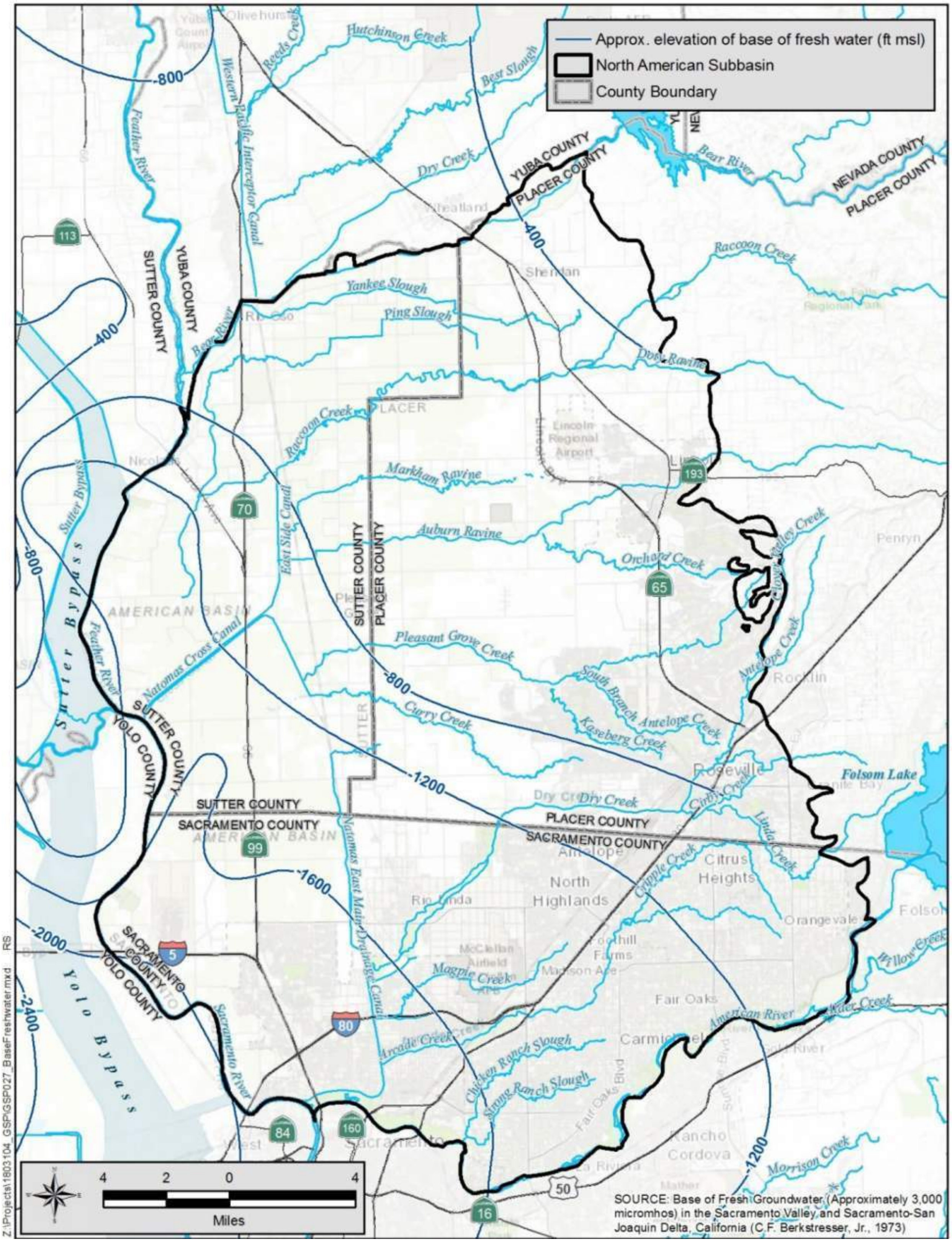
This section describes the geologic conditions that control how groundwater moves in the North American Subbasin (NASb or Subbasin), the Subbasin extent, recharge and discharge areas, general water quality, and defines the principal aquifers.

4.1 Basin Boundaries

The NASb lies in the eastern central portion of the Sacramento Valley Groundwater Basin. A subbasin designation indicates that aquifers beneath the NASb may extend into the adjacent South American, South Yuba, Sutter, and Yolo subbasins.

The NASb is surrounded on three sides by rivers and on one side by bedrock; the Bear River is its northern boundary, the Feather and Sacramento rivers are its western boundary, and the American River is its southern boundary. The eastern boundary, a roughly north-south line extending from the Bear River south to the American River, represents the approximate edge of the alluvial basin, where little or no groundwater flows into or out of the groundwater basin from the bedrock of the Sierra Nevada mountain range (Sierra Nevada) (DWR, 1997).

The bottom of the Subbasin is defined as either bedrock (igneous and metamorphic) that can be found cropping out in the foothills east portion of the Subbasin or the top of the marine sediments (base of fresh water). Fresh water is defined as water having salts that result in an electrical conductivity measurement of less than 3,000 micromhos (Berkstresser, 1973). The base of fresh water occurs near ground surface in the eastern portions of the Subbasin and deepens westward to more than 2,000 feet below mean sea level (msl) near the southwestern corner of the Subbasin. **Figure 4-1** shows the base of fresh water.



SOURCE: Base of Fresh Groundwater (Approximately 3,000 micromhos) in the Sacramento Valley and Sacramento-San Joaquin Delta, California (C.F. Berkstresser, Jr., 1973)

Figure 4-1. Base of Fresh water

4.2 Topography

The topography in the NASb is irregular in the eastern portion of the Subbasin whereas the western portion of the Subbasin is nearly flat. The elevation in the Subbasin ranges from about 20 to 300 feet above mean sea level (msl). In the eastern portion of the NASb, ground surface is characterized by low rolling dissected uplands. The western half of the Subbasin is nearly flat, with elevations ranging from 20 feet above msl near the Feather and Sacramento rivers to about 50 feet above msl in the central portion of the Subbasin. The lowest land elevations are located near the southwestern corner of the Subbasin, near the confluence of the Sacramento and American rivers. The topography of the Subbasin is shown in **Figure 4-2**.

4.3 Surface Water Bodies

There are no large lakes or reservoirs in the NASb. There are numerous lakes and reservoirs within the Bear and American watersheds that contribute water to the NASb. The lowest elevation reservoirs in the watershed are Folsom and Camp Far West, which control flows in the American River and the Bear River, respectively. There are numerous smaller reservoirs above both Folsom and Camp Far West reservoirs.

Below Folsom Reservoir and within the NASb is Lake Natomas, which is a small lake that ponds water and may provide some recharge to the Subbasin. Outside of the Subbasin and watershed, to the north, are Lake Oroville and Shasta reservoirs, which regulate flow to the Feather and Sacramento rivers, respectively. Flows in these rivers, especially during the summer months, are predominantly due to regulated releases through dams that created these reservoirs and lakes.

The Subbasin is drained by numerous creeks and ravines that are tributary to the American, Bear, Feather, and Sacramento rivers (**Figure 4-2)**. Most of the creeks and ravines drain either to the East Side Canal and Natomas Cross Canal or the Natomas East Main Drainage Canal. These canals were constructed to reclaim and provide flood protection for lands west of the canals.

Water in the tributaries is present due to rain (winter months), tailwater from Placer County Water Agency and Nevada Irrigation District canal systems, conveyance of transferred water, and treated water from wastewater treatment plants. In the western portion of the Subbasin, groundwater may discharge seasonally to drainage canals and the Feather and Sacramento rivers.

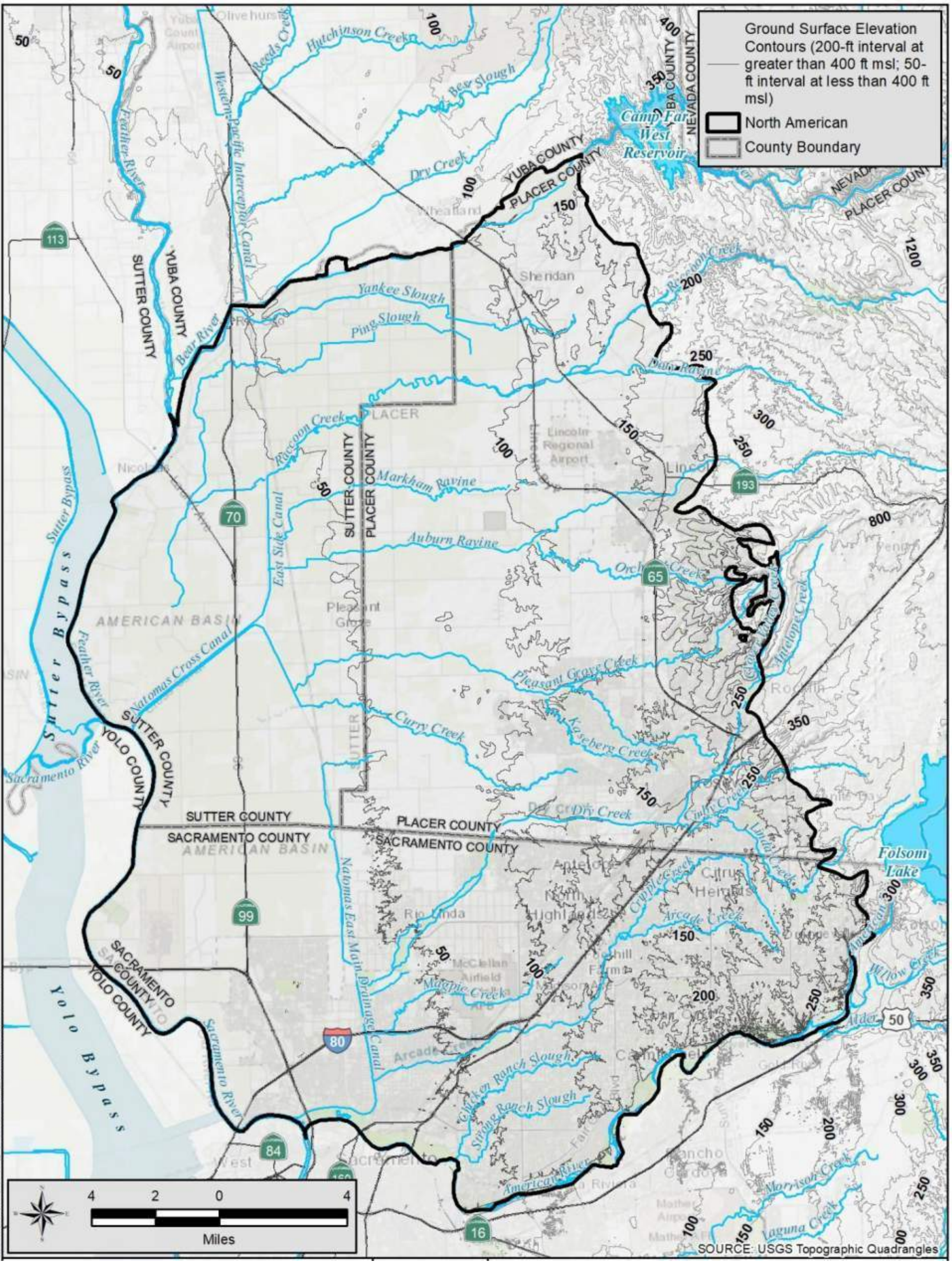


Figure 4-2. Topography

4.4 Soils

The NASb is covered by soils whose age, in general, corresponds with the relative age of the geologic units. The oldest soils lie along the eastern margin of the study area, with progressively younger soils toward the west. Most of the soils in the eastern three-fourths of the study area have well-developed profiles, usually with claypans and hardpans (U.S. Soil Conservation Service, 1980 and 1987). The dense subsoil in these areas may limit deep percolation of precipitation and applied irrigation water.

Soil permeability provides an initial indication of where recharge to the underlying aquifers may occur. Soil types and attributes have been mapped in the NASb by the U.S. Department of Agriculture's Natural Resources Conservation Service and are contained in a database (SSURGO, 2019). The Hydrologic Soils Grouping describes the soil's drainage characteristics. The groups range from Type A soils, which are well drained (high infiltration rates), Type B that are moderately drained, Type C that are poorly drained, and Type D soils that are very poorly drained (very slow infiltration rates). **Figure 4-3** shows the soil types by hydrologic groupings in the Subbasin. Much of the Subbasin is covered with poorly drained Type C and D soils. While these poor infiltration rate soils often inhibit flow to the subsurface, these soils classifications are generalizations of soil types and localized windows of connection to the underlying aquifers can exist, particularly when streams are incised through the soil profile. Most of the coarse-grained, well-drained soils occur along rivers and major stream channels and some along the eastern margins of the Subbasin.

While the Hydrologic Soils groups shown on **Figure 4-3** indicate the hydrologic characteristics of the soils, the Soil Agricultural Groundwater Banking Index (SAGBI), developed by researchers at UC Davis (O'Geen, et al., 2015), also considers factors that affect the suitability of active agricultural lands for groundwater recharge, including root zone residence time, topography, chemical limitations, and soil surface condition. The UC Davis researchers developed an index that ignores restrictive layers in the first 6 feet. This "modified SAGBI" is shown on **Figure 4-4** and assumes that tillage practices could break up the shallow restrictive layers. These kinds of tillage (or ripping) practices may already have been used in certain areas that may have greatly enhanced the soil's hydrologic characteristics and increased their permeability. **Figure 4-4** shows a much larger area of more permeable soils than shown on the SSURGO soils map in **Figure 4-3**. Note that the white/gray areas do not contain the data necessary to calculate the SAGBI.

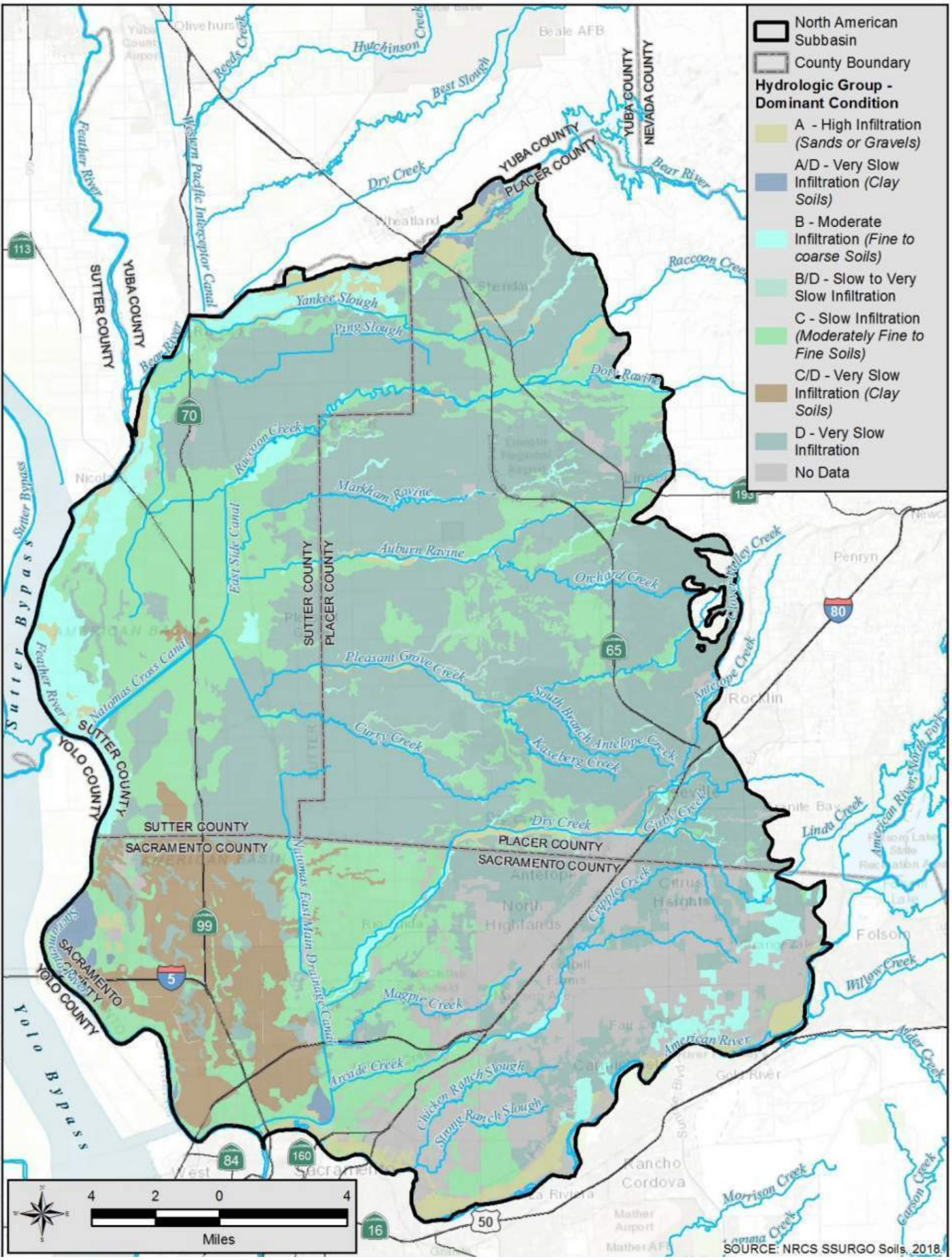
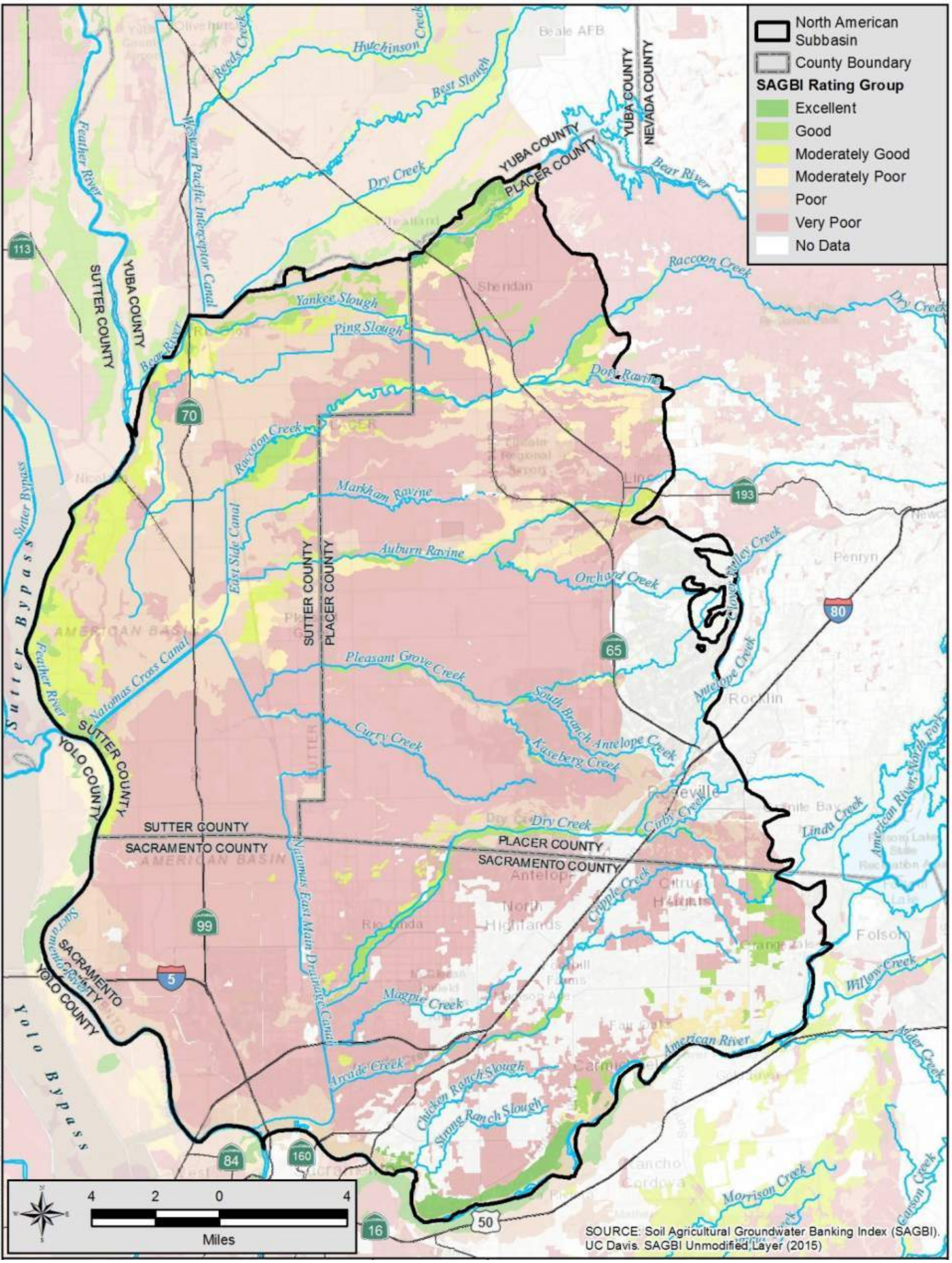


Figure 4-3. Hydrologic Soils Classification



SOURCE: Soil Agricultural Groundwater Banking Index (SAGBI), UC Davis. SAGBI Unmodified Layer (2015)

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Figure 4-4. SAGBI Soils

4.5 Regional Geology

The Sacramento Valley is a large depression bounded on the east by the Sierra Nevada, a block mountain range faulted upward on the east and dipping westward beneath the Sacramento Valley. The Sierra Nevada consists of metamorphic rocks intruded by igneous rocks. The Sacramento Valley is bounded on the west by the Coast Range mountains.

Younger river and creek-lain deposits comprise the major portion of the freshwater aquifer system in the Sacramento Valley. The sediments beneath the NASb depict a regional change in the environments, from one previously dominated by marine sedimentary processes to one with continental sedimentary processes. The Sacramento Valley, including the NASb, is filled with marine sedimentary rocks that contain ancient seawater and traps of natural gases. The Valley Springs and Ione formations were deposited during the conversion from marine to continental environments. These formations contain both fresh and brackish water (having salts that result in an electrical conductivity measurement of greater than 3,000 micromhos). Both formations are overlain by younger, continentally derived sediments that have been grouped into the Younger Alluvium and the Modesto, Riverbank, Turlock Lake, Laguna, and Mehrten formations. **Figure 4-5** shows the distribution of these sediments in the Subbasin at ground surface. These formations contain fresh, mostly potable water. Clear distinctions and confining layers that separate formations often do not exist and water movement between formations can occur.

4.6 Geologic Structure

During the deposition of sediments, the valley has been gently down-warped due to tectonic activities and consolidation of the sediments. Sediments generally dip toward the center of the valley at about a 4-degree dip. Therefore, near the eastern edge of the Subbasin, older sediments such as the Mehrten Formation are exposed at the ground surface while to the west these sediments occur as deep as 2,000 feet below ground surface.

Faults may affect groundwater flow by bringing geologic materials with different hydraulic properties into contact across the fault plane or by fracturing the sediments, which could either increase or decrease permeability. Faults might, therefore, act as a boundary or barrier affecting the lateral flow of groundwater between adjacent areas and could act as a conduit allowing vertical upward flow within the fault zone. There are no known active faults within the Subbasin (DWR, 1997), but there are older inactive faults that may affect groundwater quality. One of these older faults is the Willows Fault, which is a northwest-southeast trending reverse fault that dips 74 degrees to the east and extends from the Stockton area through the NASb and to the north end of the Sacramento Valley (Harwood and Helley, 1987). **Figure 4-5** shows the location of the fault. Displacement along the Willows Fault is approximately 1,600 feet and displaces older marine sediments up to the time of deposition of the Ione Formation (Harwood and Helley, 1987). It does not continue into the fresh water-bearing sediments and therefore is not a barrier to groundwater flow. Although the fault is not designated by the state as active, the fault does

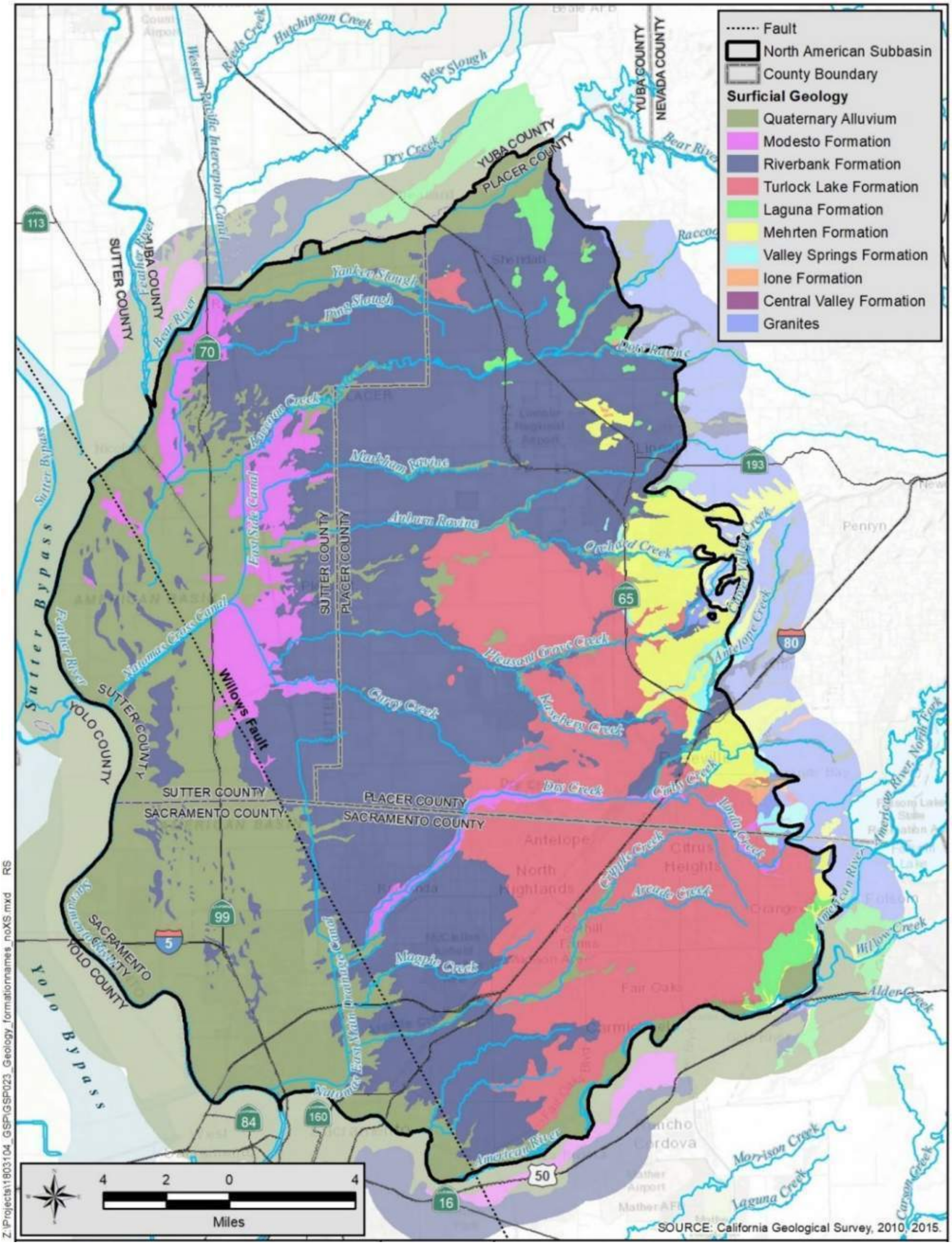

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Figure 4-5. Surface Geology

appear to have some movement. The slip rate on the Willows Fault is very small, estimated to be 0.00055 inches per year (McPherson and Garven, 1999, reference in DWR, 2014), but still suggests some activity.

4.7 Fresh Water-Bearing Formations

Fresh water-bearing sediments in the NASb from shallow/youngest to deepest/oldest sediments include the Quaternary Alluvium and the Modesto, Riverbank, Turlock Lake, Laguna, and Mehrten formations. These formations are of similar ages and have been grouped together for discussion purposes below. Surface outcrop formations are shown in **Figure 4-5**.

4.7.1 Quaternary Alluvium

Quaternary Alluvium is the youngest geologic unit (current to 10,000 years old) in the Subbasin. Laterally extensive outcrops of the Quaternary Alluvium deposits occur along the American, Bear, Feather, and Sacramento rivers. The alluvium is separated into three types: those associated with stream channels, with flood basins, and with alluvial fans (sediments deposited by streams as they emerge onto the valley floor).

The stream channel deposits originate in the channels of active streams and as overbank deposits of those streams, terraces, and local dredge tailings. Alluvium consists of sand, gravel, silt, and minor clay. The most extensive deposits occur along the American, Bear, Feather, and Sacramento rivers. Near the junction of the Bear and Feather rivers, coarse-grained sediments are present at depths up to 140 feet. However, the deeper sediments probably belong to the Modesto and Riverbank formations. Along the Bear River, the thickness of the alluvium is estimated to be 25 to 60 feet thick (Olmstead and Davis, 1961). The alluvium is also exposed along the smaller streams draining the Subbasin and is probably only a few tens of feet thick.

Flood basin deposits consist primarily of poorly drained silts and clays, although local lenses of sand and gravel may occur from the deposition of migrating ancestral river channels. The thickness of each of these units may be up to 100 feet (Olmstead and Davis, 1961). Flood basin deposits crop out on the western margin of the Subbasin, immediately east of the Sacramento River.

Alluvial fan deposits are derived from the Sierra Nevada and are generally coarse-grained. They are present along the eastern edge of the Sacramento Valley where they overlie the Mehrten, Ione, and Valley Springs formations.

4.7.2 Modesto and Riverbank Formations

The Pleistocene-age (10,000 to 2 million years) Modesto and Riverbank formations are the most widely exposed geologic units in the study area. They unconformably overlie the Turlock Lake, Laguna, and Mehrten formations and the metamorphic and igneous rocks near the eastern margin of the Subbasin. The Modesto and Riverbank formations were derived from similar parent rocks and are indistinguishable (lithologically) in the subsurface, composed of mixtures of silt, sand, gravel, and clay that are very heterogeneous both laterally and vertically. The combined thickness of these two formations can be up to 75 feet. These two formations are moderately permeable but include highly permeable coarse zones (Olmstead and Davis 1961).

4.7.3 Turlock Lake and Laguna Formations

Underlying the Modesto and Riverbank formations are the early Pleistocene-age (2 to 10 million years) Turlock Lake Formation and Pliocene-age Laguna Formation. The Turlock Lake and Laguna formations unconformably overlie the Mehrten Formation. The units underlie dissected uplands along the eastern margin of the study area and dip westward beneath the land surface toward the axis of the valley. The exposures of the Laguna Formation are small and discontinuous, generally less than a few square miles in area, and limited to the northeastern corner of the NASb. The Turlock Lake Formation is exposed on ground surface in a wide band near the southeastern corner of the NASb.

The Turlock Lake and Laguna formations are lithologically indistinguishable. They are differentiated in outcrop by the presence of a preserved clay soil horizon in the Turlock Lake Formation (Helley and Harwood, 1985). The Turlock Lake and Laguna formations consist of a heterogeneous mixture of tan to brown interbedded silt, clay, and sand. Gravel lenses are scarce and, where present, are poorly sorted and have low permeability. Pebbles and cobbles of quartz and metamorphic rocks generally dominate the gravels (DWR, 1974; Olmstead and Davis, 1961). The combined thickness of the two units is probably less than 200 feet.

Due to the predominantly fine-grained character of these two formations, wells completed in them reportedly have low to moderate yields, usually less than 1,000 gallons per minute.

4.7.4 Mehrten Formation

The Mehrten Formation crops out along the southeastern Sacramento and Northern San Joaquin valleys and within the NASb. It is exposed only on the eastern side of the Subbasin near the City of Lincoln and south toward the City of Roseville and has been penetrated by wells as far west as the town of Nicolaus. The Mehrten Formation was deposited on an irregular eroded surface (unconformable) of marine sediments of the Valley Springs and Ione formations (Olmstead and Davis, 1961).

Depending on location, the Mehrten Formation is between 200 and 1,200 feet thick (DWR, 2003). It is thinnest in the eastern portion of the NASb and thickens towards the west. The thickness of the Mehrten Formation in the Sacramento Valley is about 200 feet where exposed and ranges between 400 and 500 feet in thickness in the subsurface (Page, 1986). Black sands are characteristic of the Mehrten Formation.

Two distinct units in the Mehrten Formation have been described in the Sacramento Valley—an upper unit composed of unconsolidated black sands interbedded with blue-to-brown clay, and a lower unit composed of hard, angular rock fragments in a fine grained matric (breccia), which is sometimes reported by well drillers as “lava” (DWR, 1978; Page, 1986). This breccia may act as a confining layer in the subsurface. The volcanic source material is from the Sierra Nevada.

Wells completed in the sand and gravel units have reported pumping capacities of over 3,000 gallons per minute.

4.8 Non-Water or Non-Fresh Water Bearing Formations

Non-water or non-fresh water bearing formations in the NASb include the Tertiary-age Ione and Valley Springs formations and the Paleocene to Eocene Central Valley Formation. These strata are underlain by crystalline igneous and metamorphic basement rock like those exposed in the foothills east of the Subbasin. The Ione and Valley Springs formations exist beneath the Mehrten Formation and are thought to be a transitional system that contains a mixture of saline and fresh groundwater.

4.8.1 Valley Springs Formation

The Valley Springs Formation is a sequence of mostly fluvial sediments that unconformably overlies the Ione Formation, and is composed of sandy clay, sand, rhyolitic ash, and siliceous gravel (Davis and Hall, 1959). Well-log information and outcrop exposure in the Sacramento Valley indicated that the Valley Springs Formation is estimated to be up to 200 feet thick (Piper and others, 1939; DWR, 1978). Fine ash and clay in the Valley Springs Formation limit the quantity of water produced by wells (Page and Balding, 1973). The Valley Springs Formation is exposed along Antelope Creek and in the community of Granite Bay.

4.8.2 Ione Formation

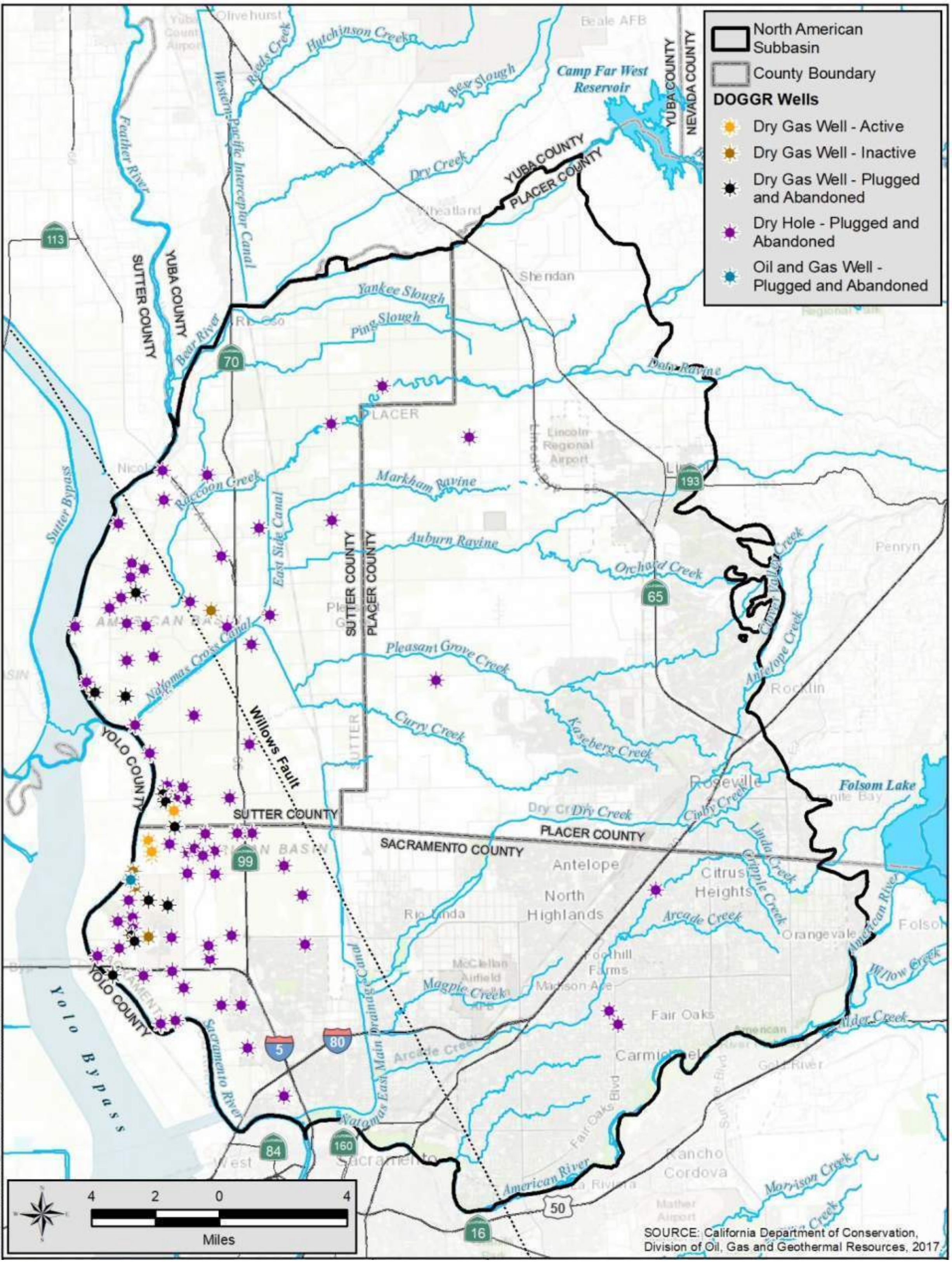
The Ione Formation was deposited on eroded surfaces (unconformably) of the Central Valley Formation and crystalline and metamorphic rocks near the eastern portion of the Subbasin. The formation is near the surface in most of the Placer County portion of the Subbasin generally east of Highway 65 and the foothills. The western extent of the Ione Formation is characterized by shallow marine deposition in the remnants of the inland sea, while the eastern extent of the formation is characterized by non-marine deltaic deposition (Redwine, 1984; Springhorn, 2008). It is exposed in the clay pit area near the city of Lincoln. The thickness of the formation varies because the top is eroded. The formation is about 200 to 300 feet thick in the vicinity of the city of Roseville, 500 to 600 feet thick in the vicinity of the city of Lincoln and thickens to about 1,000 feet at the western margin of Placer County. There are also small exposures in the Granite Bay area.

Clean sands of the Ione Formation are partially and erratically flushed by fresh waters in the area between the foothills and Highway 65. However, there is very little movement of groundwater in this formation, and due to low yields and poor water quality, it is not considered an economical source of groundwater for irrigation. Owing to the degree of consolidation and clay content, the Ione Formation yields a limited quantity of water to wells (DWR, 1978; Page, 1986).

4.8.3 Central Valley Formation

Overlapping the granite and metamorphic crystalline bedrock are the Upper Cretaceous marine sedimentary rocks that compose the Central Valley Formation. The strata form a wedge thickening generally westward beneath the Subbasin. Water contained in these sediments is generally saline and of very low yield to wells. The total thickness of the Central Valley Formation near the eastern portion of the Subbasin where it overlaps on the bedrock is only a few hundred feet thick, but it increases to several thousand feet thick near the western boundary of the Subbasin.

The Central Valley Formation and other marine formations contain economic quantities of natural gases. Several small gas fields are located primarily along the western border of the Subbasin, near the Willows Fault. Drilling and operation of natural gas wells are highly regulated by the California Geologic Energy Management Division (commonly known as “CalGEM”), formerly known as Division of Oil, Gas, and Geothermal Resources, which was formed in 1913. However, exploration holes and abandoned wells drilled prior to 1913 and not properly sealed could affect freshwater quality. At this time, no water quality problems in the Subbasin can be directly attributed to these holes or wells. **Figure 4-6** shows the locations of the natural gas wells in the Subbasin, illustrating potential areas where old exploration holes may have been improperly abandoned but could provide vertical conduits for brackish water to intrude the freshwater aquifers.



SOURCE: California Department of Conservation, Division of Oil, Gas and Geothermal Resources, 2017.

Figure 4-6. Natural Gas Wells

4.8.4 Basement Rocks

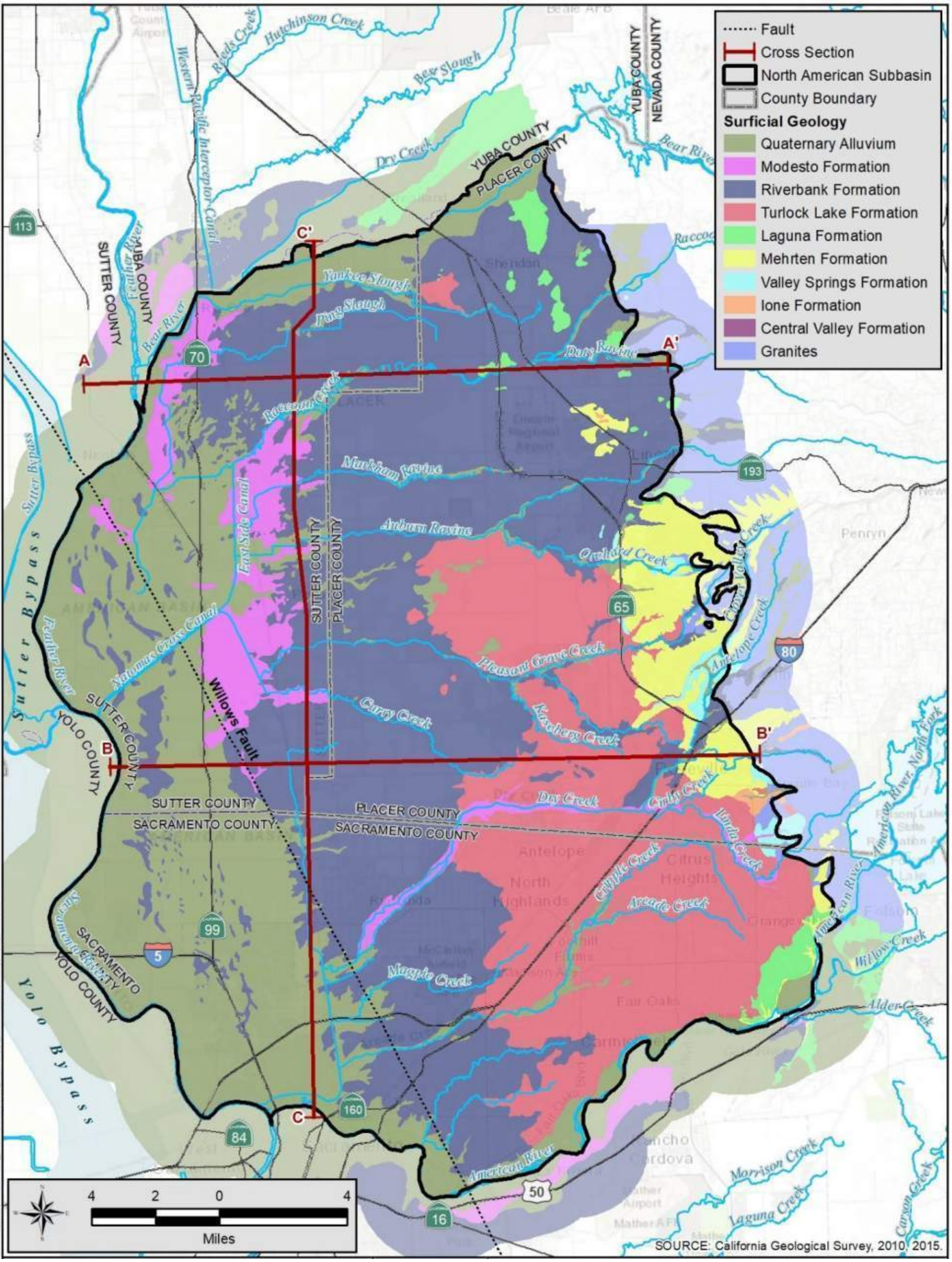
All of the formations and sediments mentioned above are underlain by igneous and metamorphic rocks, potentially similar to those exposed in the Coast Ranges and in the Sierra Nevada. Along the eastern margin of the Subbasin where the Ione and Central Valley formations are present at shallow depths, generally north of the city of Lincoln, domestic and agricultural well owners have constructed wells into the basement rocks, due to the low yielding and poor-quality water in the marine sediments, to obtain fresh water.

4.9 Regional Geologic Sections

Three geologic sections were created for this Groundwater Sustainability Plan (GSP) using previous sections developed by DWR (1997) and are straight lines through the Subbasin as shown on **Figure 4-7**. The coarse-grained sediments (sands and gravels) that are aquifers were deposited as stream or river channels that meandered through the Subbasin in a sinusoidal (snake like) pattern and therefore a straight profile may not show their full extent or their inter-connectedness. **Figure 4-8** illustrates these channel deposits and how they wander and may be stacked upon each other (DWR, 1974).

Geologic sections of the Subbasin exist from multiple sources, but historical sections did not cross the entire Subbasin. The longest and most detailed sections were prepared by DWR (1997). The DWR sections were used as a starting point and modified to extend across the entire Subbasin for this GSP effort. Lithologic information from well logs was normalized and digitized to generally conform with the Unified Soil Classification System. Lithology and well screens from dedicated groundwater monitoring wells, constructed after the DWR sections were created, were also added to the geologic sections for this GSP effort. The profiles are presented to illustrate the subsurface relationships and distribution of the formations and coarse-grained sediments that constitute principal aquifers. The profile locations are shown on **Figure 4-7**. **Figures 4-9, 4-10, and 4-11** illustrate the subsurface with sediment types, saturated sediments, and the base of fresh water. These figures were created from the well driller's reports attached in **Appendix D**.

The profiles show the general contact between the Mehrten Formation and younger formations. The profiles also show different dips of the aquifers respecting the unconformities previously documented.



SOURCE: California Geological Survey, 2010, 2015.

Figure 4-7. Geologic Section Locations

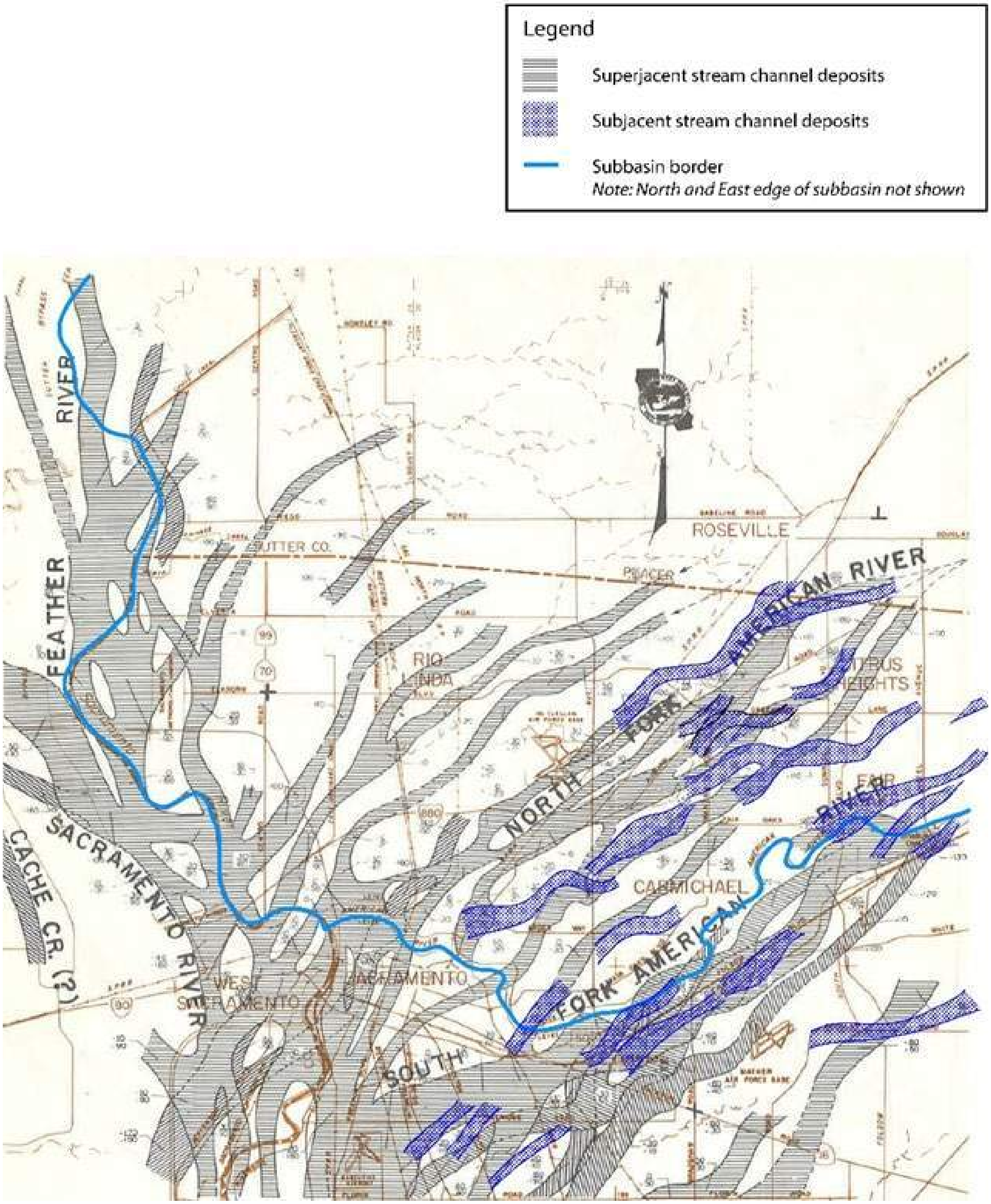


Figure 4-8. Stream Channel Deposits

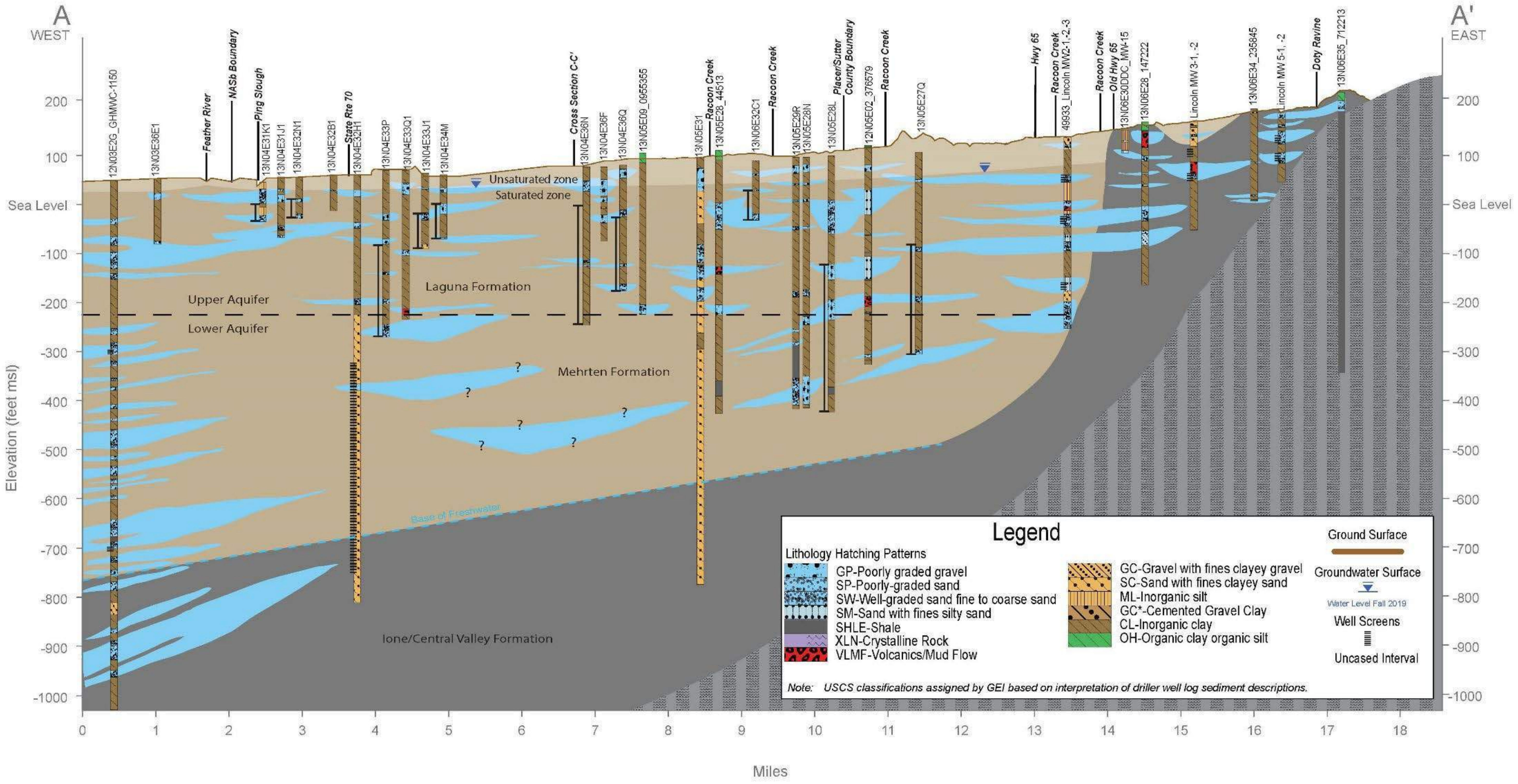
4.9.1 Section A-A'

Figure 4-9 shows Geologic Section A-A', a regional east-west profile through the northern portion of the Subbasin. Section A-A' generally runs parallel to the direction of groundwater flow.

Section A-A’ shows that the eastern area generally has clays and silts (shown in brown color), low permeability sediments near surface, and permeable sediments (sands and gravels shown in light blue) throughout the depth profile. Continuous layers of sand and gravels are not identified likely due the sinusoidal nature of the river channels associated with these types of sediments.

In the western portion of the Subbasin, fine-grained sediments are more prevalent and, supported by groundwater levels and water quality information, suggest that the shallow aquifer is unconfined and separate from the deeper semi-confined to confined aquifers in the Mehrten Formation.

Cross sections A-A' and B-B' show the general shape of the groundwater gradient at the northern end of the Subbasin where water levels are highest in the east and decrease to the west. The Ione Formation, or the base of fresh water, is at or near surface in the eastern portions of the Subbasin and has multiple permeable sediment layers that could contribute brackish water to the fresh-water-bearing aquifers in the Laguna and Mehrten formations. The top of the Ione Formation and the base of fresh water is relatively shallow in this portion of the Subbasin.



Source: DWR, 1995. Modified by GEI 2019. Berkstresser, 1973.

Figure 4-9. Geologic Section A-A'

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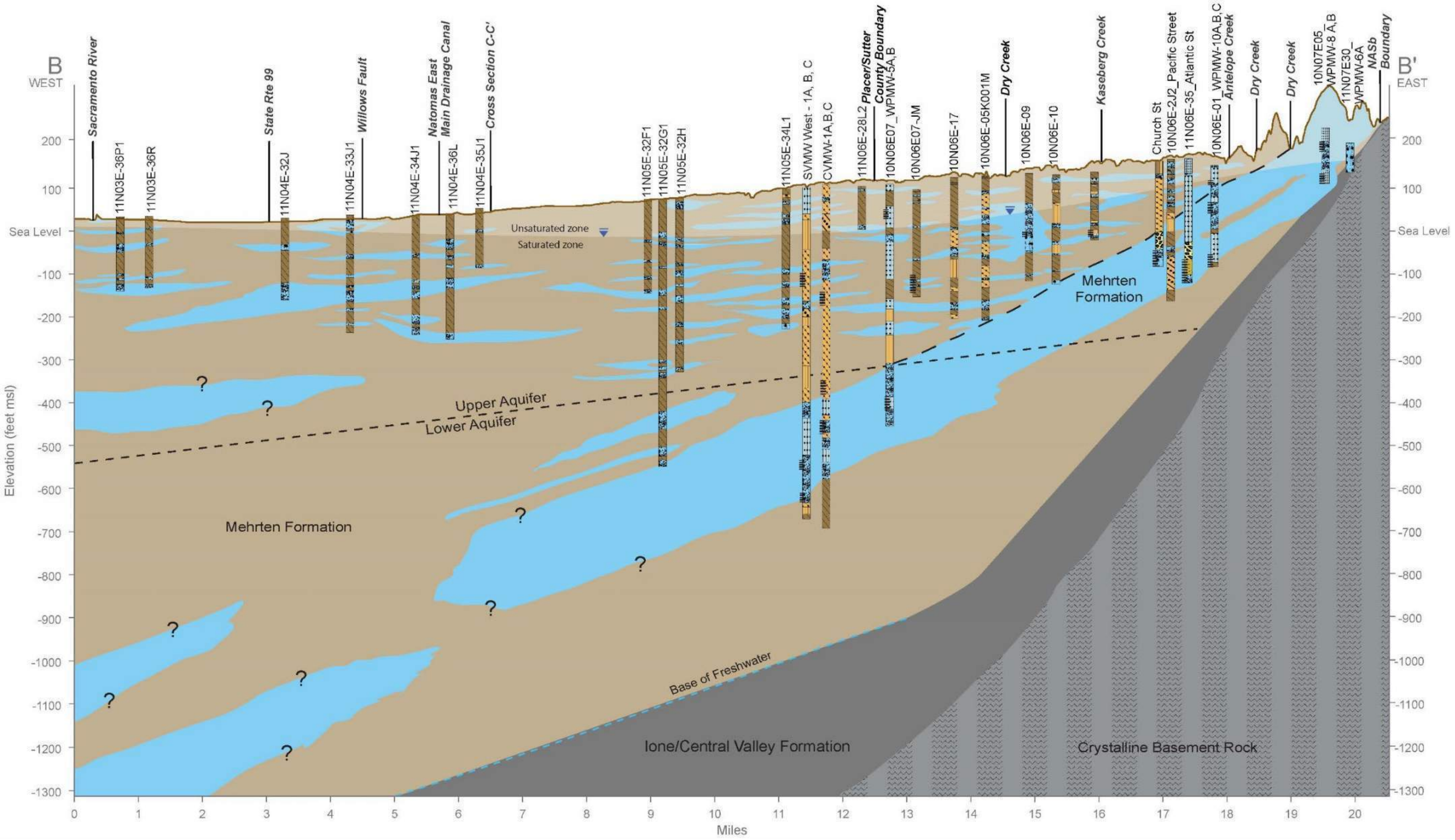
4.9.1 Section B-B'

Figure 4-10 shows Geologic Section B-B', an east-west profile located near the Sacramento, Placer, and Sutter County lines. Section B-B' generally runs parallel to the direction of groundwater flow.

Section B-B' shows the layering of Laguna, Mehrten, and Ione formations. The Mehrten Formation and its permeable sand and gravel are exposed at ground surface in the eastern portion of the Subbasin, near the city of Roseville, and can be traced to the west indicating this area can allow surface water to recharge the aquifers to the west. Toward the west, the Mehrten Formation thickens and deepens.

Section B-B' shows the groundwater levels across the central area of the Subbasin. Water levels are highest in the east, where recharge from the Sierra Nevada originates. To the west, water levels are depressed at the center of the Subbasin and are shallower further to the west. The base of fresh water is much deeper in this area than to the north as is shown on Section A-A'.



Source: DWR, 1995. Modified by GEI 2019. Berkstresser, 1973.

Figure 4-10. Geologic Section B-B'

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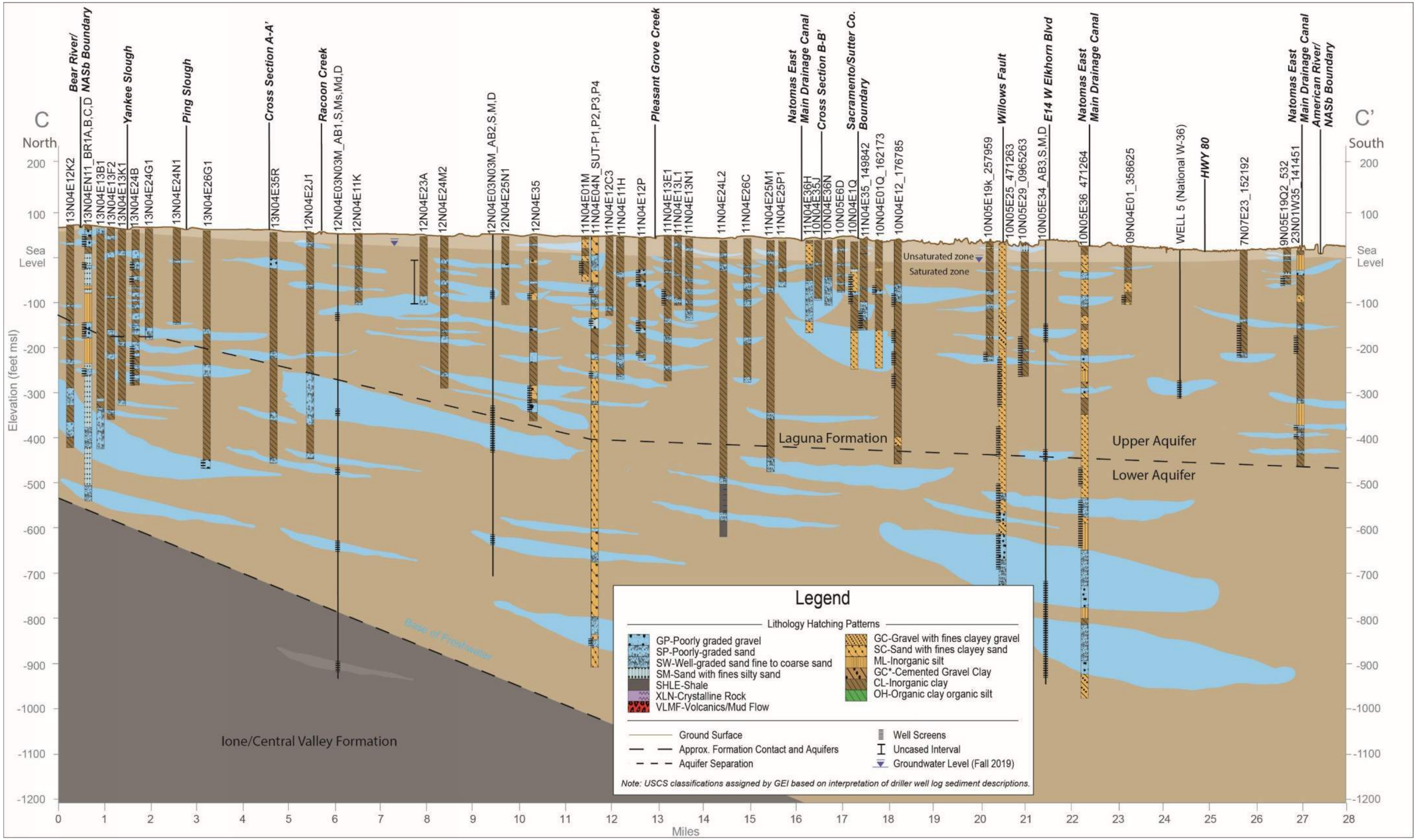
4.9.1 Section C-C'

Figure 4-11 shows Geologic Section C-C', a north-south profile that extends the length of the Subbasin. Section C-C' is generally perpendicular to the direction of the deposition of the sediments (bedding dip).

Fine-grained sediments appear to be more prevalent in the northern portion of the Subbasin, while more interconnected aquifers exist along the southern portions of the section. The base of fresh water is shallower in the northern portions of the Subbasin and dips steeply to the south before projecting below the depth profile.



Source: DWR, 1995. Modified by GEI 2019. Berkstresser, 1973.

Figure 4-11. Geologic Section C-C'

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4.9.2 Geotechnical Investigations Sections

In addition to these regional geologic sections, geotechnical investigations (to depths of up to 140 feet) have been performed along portions of the American, Bear, Feather, and Sacramento River levees. These studies provided subsurface information to design levee improvements to reduce seeps that could de-stabilize the levees during flood events. Profiles (geologic sections) were developed as part of these investigations. The investigations show sediment types where groundwater and surface water interactions occur, and where the Sacramento River (bathymetric elevations) has cut partially or entirely through coarse-grained sediments that are part of the shallow aquifer. They also show where man-made slurry walls were constructed that have reduced or eliminated this connectedness and where they are planned to be built. **Figure 4-12** shows the areas where slurry walls have been constructed. **Appendix E** provides these geologic profiles along the rivers. The sections do not contain a breakout of the geologic formations but, in general, dependent upon the location, would include Alluvium, Flood Basin Deposits, and Modesto and Riverbank formations.

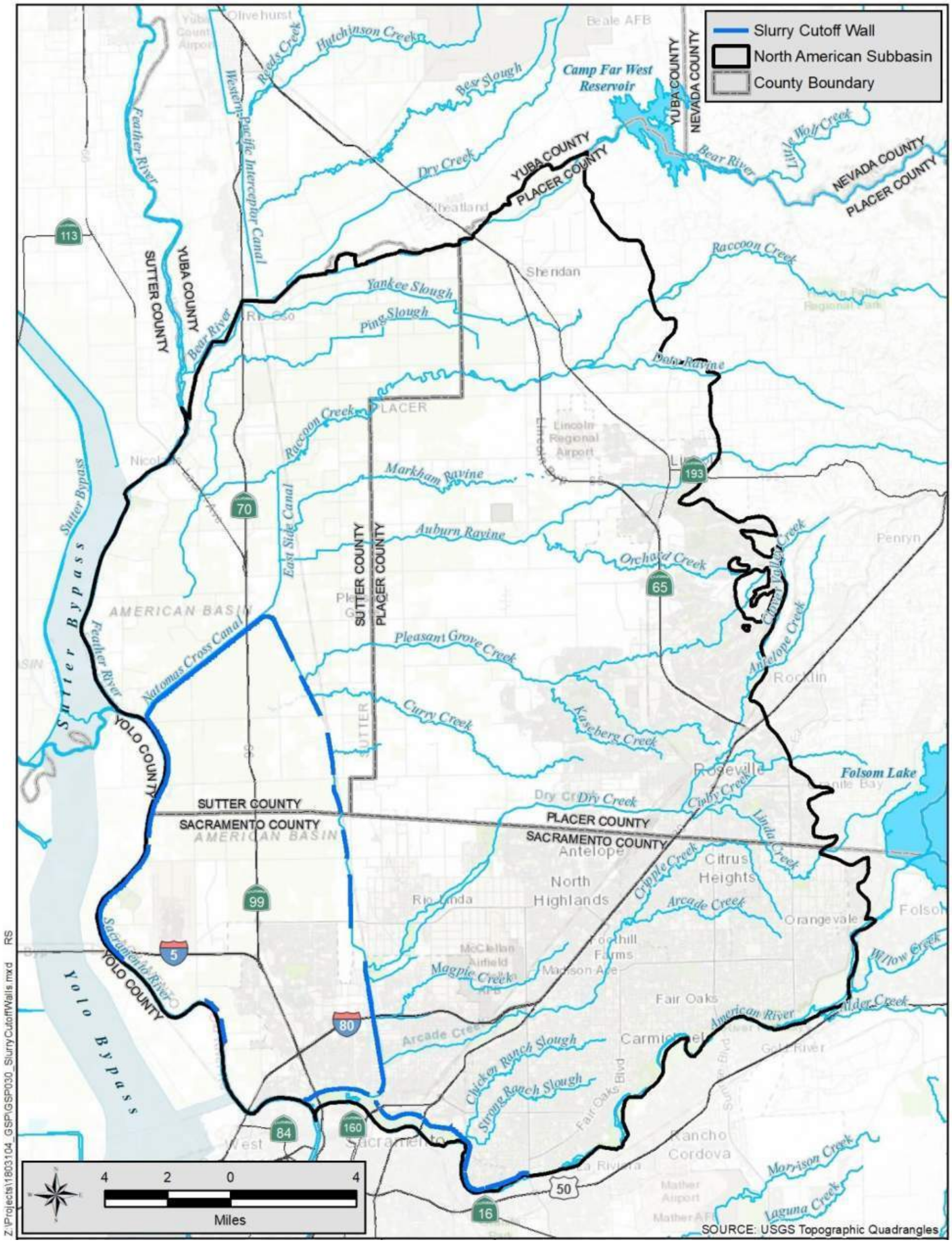

Figure 4-12. Detailed Geologic Sections - Slurry Cut Off Walls

4.10 General Water Quality

Most of the groundwater in the Subbasin can be grouped into two general types based on which minerals[1] are present at highest concentrations. If no one anion or cation are predominant, multiple names may be listed. Water Type 1 is a magnesium-calcium bicarbonate and is present in the shallowest aquifer zones sampled with one exception. Water Type 2 is a sodium bicarbonate water and is typically found at the intermediate depths (up to about 850 feet). Type 1 resembles Type 2 except that the percentage of cations changes (sodium is becoming more dominant). **Figure 4-13** shows the distribution of the water types in the Subbasin. The relative percentages of anions are similar for both water types. This may support the idea of cation exchange as a major factor in the evolution of chemistry of the groundwater (DWR, 1997).

Monitoring wells have been installed to provide information on discrete changes in water chemistry with depth. Although the data are limited, there appears to be a trend in the water chemistry with depth (DWR, 1997) changing from calcium-dominated water to magnesium and from bicarbonate to sodium with depth.

In the deepest monitored zone (well AB-1 deep, located in South Sutter Water District's corporate yard), the chemistry changes significantly and is characterized as sodium chloride water. The chemistry of well AB-1 deep (screened below the base of fresh water) is considered to be water that was deposited at the time of deposition of the sediments (connate water) in the Sacramento Valley. This well has groundwater with an electrical conductivity of about 1,800 micromohs per centimeter and is considered to be brackish water. Because of the regional southwestern dip of formations in the area these waters are closer to ground surface in the eastern portions of the Subbasin. Sodium chloride water is known to occur near the Bear River and Highway 65 where the Ione Formation is near the ground surface (**Figure 4-13**). Water quality evaluations in the eastern portions of the Subbasin, north of the city of Lincoln, have not been able to distinguish any significant effects of connate water discharging to freshwater (GEI, 2019).

There are multiple wells with chloride as the predominant anion, which suggests there may be mixing of connate water with fresh water (DWR, 1997). **Figure 4-14** shows the types of water in some of the monitoring wells in the Subbasin. Sodium chloride water may also be present due to evaporation of water as seen in some localized areas.

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[1] cations which are calcium, magnesium, and sodium; and anions which are bicarbonate, sulfate, and chloride

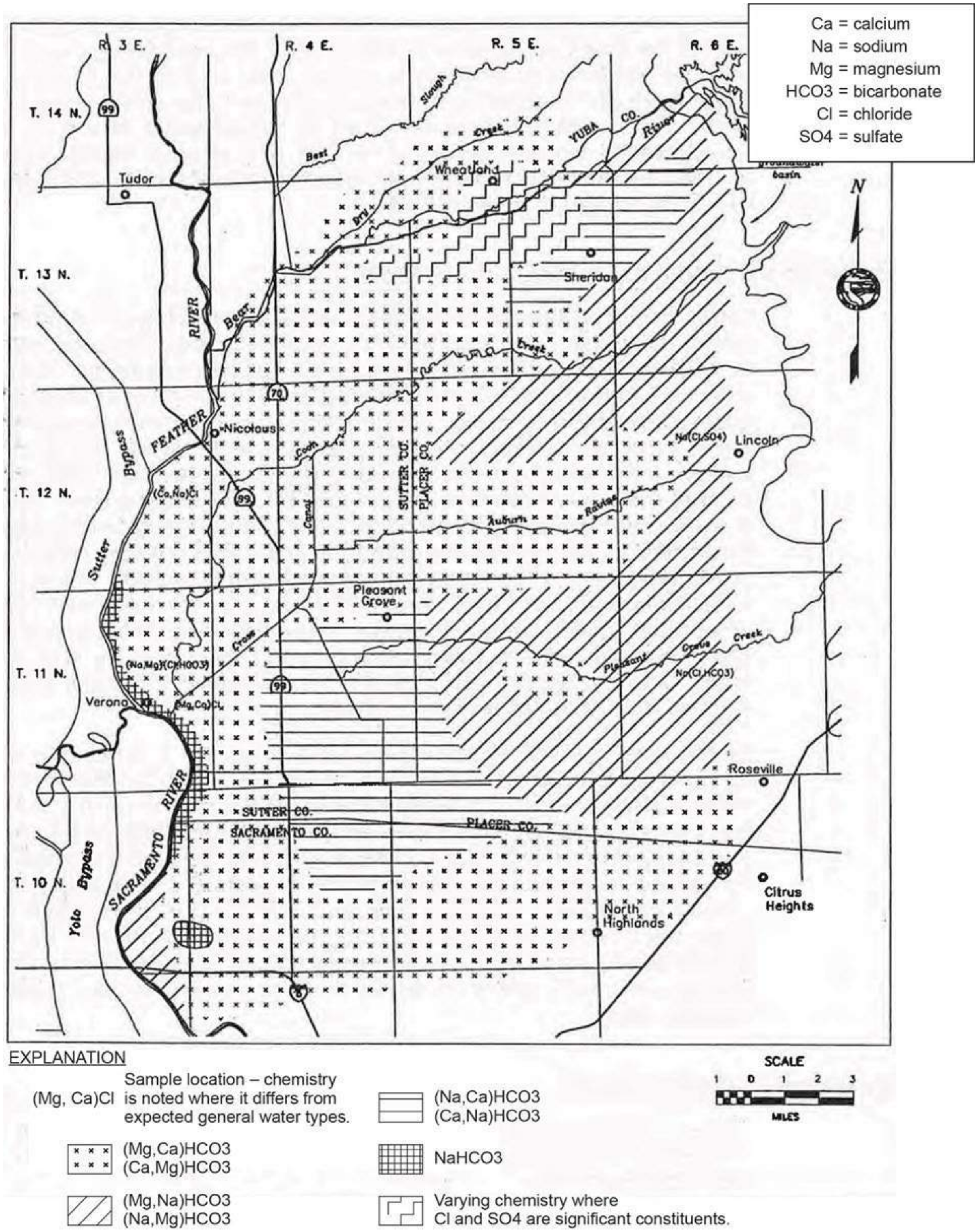

Figure 4-13. General Water Quality Types and Distribution

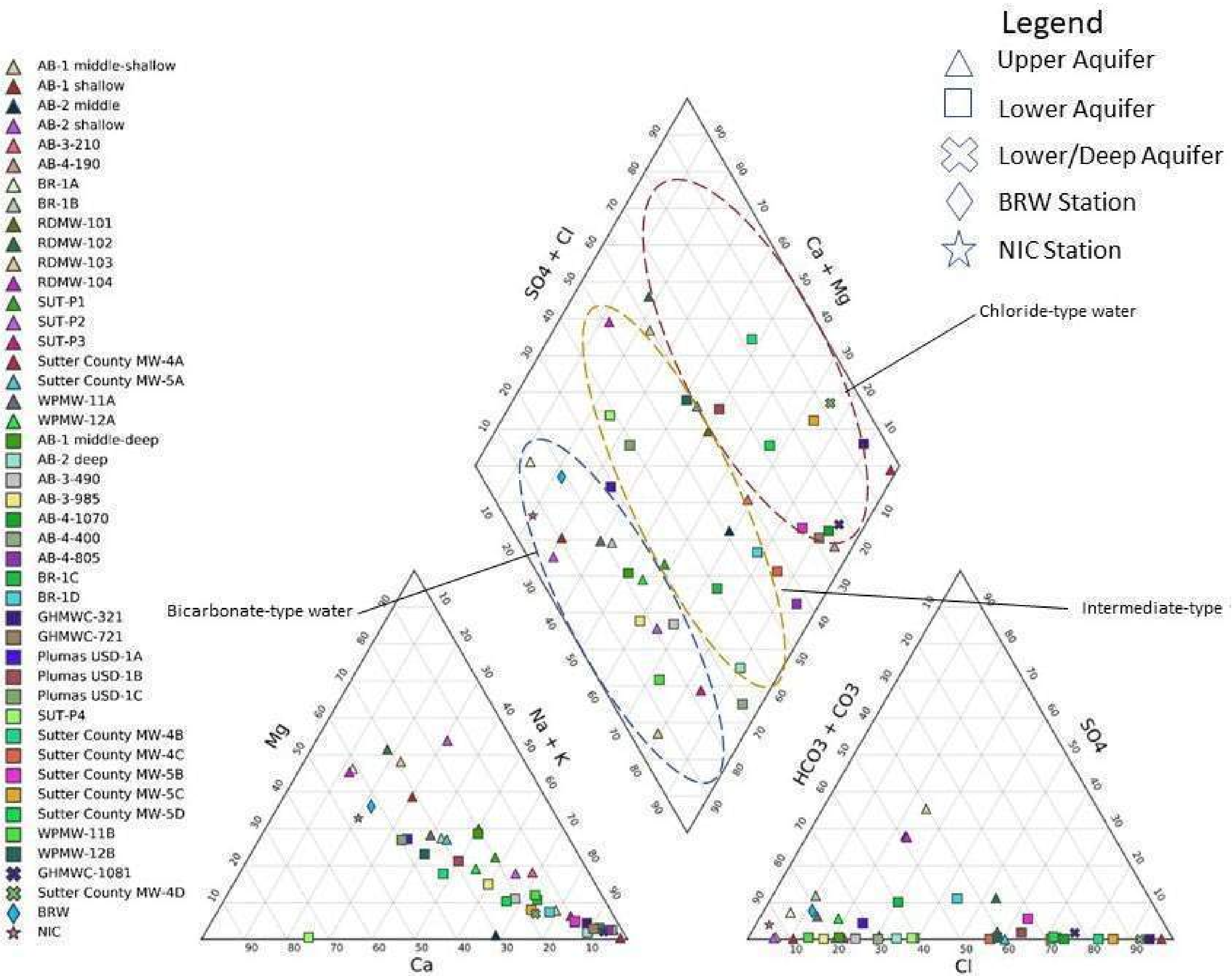

Figure 4-14. General Water Quality Types

4.11 Principal Aquifers

All sediments, to some extent, contain groundwater in the pores between particles. Near ground surface sediment pores are filled with mostly air but have some moisture. This moisture will gradually migrate down to the groundwater surface where the sediment pores will be entirely filled with water. At times there are low permeability sediment layers with a limited horizontal extent, where the moisture accumulates and fully fills the sediment pores, but the underlying sediments and pores are not filled with water. These occurrences are called Davis a water and do not constitute a principal aquifer. At the edges of these low permeability sediments, the water may then resume its vertical path to the groundwater surface. Aquifers are those coarse-grained sediment layers whose pores are completely filled with water and can be managed.

The aquifers underlying NASb are composed of cobbles, gravel, and sand, which are interspersed with deposits of silt and clay. Those interspersed layers are deposited in stream channels, alluvial fans, or floodplains by rivers draining the Sierra Nevada and the upper Sacramento Valley. DWR's Bulletin 118-3 describes the aquifers as "…a number of now-buried stream channel deposits. These deposits, which are composed of permeable sand and gravel, are enclosed by less permeable silt and clay. This has resulted in a network of meandering tabular aquifers." A graphic interpretation of the location of those ancestral channels is shown on **Figure 4-8** (DWR, 1974) for portions of the NASb. This complex system of intertwined and interbedded, fine and coarse-grained sediments interconnects shallow and deeper aquifers (DWR, 1997).

The geologic units described above were grouped and separated into two aquifers, an upper and lower aquifer system, by DWR in its evaluation of a proposed conjunctive use program in the NASb in the mid-1990s (DWR, 1997). The upper aquifer was defined as the upper 200 to 300 feet of the aquifer system. The lower aquifer was defined as extending from about 200 to 300 feet below ground surface to the base of fresh water. "The division between the two aquifers is inexact, due to the difficulty in accurately determining the formation contacts." The aquifer systems were, in part, defined by differences in groundwater levels. Since this was over 20 years ago, the geologic and groundwater information was re-evaluated to assess whether the aquifers should be divided into one or two principal aquifers. **Table 4-1** provides a summary of criteria used to determine if there is enough evidence to define two principal aquifers for the purposes of this GSP. Details of this analysis are provided in **Appendix F**. In addition to the hydrogeologic evidence a comparison of adjacent subbasin definitions of principal aquifers was made.

Table 4-1. Criteria Evaluated for Two Principal Aquifers

Criteria	Two Principal Aquifers?			Comments / Evidence
	Yes	No	Maybe	
Depth and Extent of Confining Bed		X		No regionally extensive clay layer defined.
Groundwater Level Difference				
• *Vertical Head Difference*			X	Up to 20 feet difference in western portion suggesting semi-confined to confined conditions but similar in eastern portion, suggesting unconfined.
• *Response to Stress Difference*		X		Similar trends in both aquifers but slight lag time in Lower aquifer.
• *Groundwater Contour Difference*			X	Similar groundwater flow directions. Lower aquifer not showing influence from rivers.
Aquifer Hydraulic Characteristics	-	-	-	No high-quality, multi-well aquifer tests available.
Water Quality Difference		X		Nothing distinct within NASb, Yuba, or Sutter subbasins.
Adjacent Subbasins Approach				
• *Yuba*		X		GSP submitted
• *South American*		X		Alternative Submittal
• *Yolo*	-	-	-	Unknown
• *Sutter*	X			Alternative Submittal

There is not enough evidence to define multiple principal aquifers in the NASb; therefore, for this GSP, only one principal aquifer is present in the Subbasin. This definition corresponds with adjacent subbasins both north and south of the NASb.

4.12 Groundwater Recharge and Discharge Areas

Groundwater recharge occurs throughout the Subbasin in varying amounts based on the SAGBI hydrologic classification for soils, *refer to* **Figure 4-4**. The soil's ability to allow water to migrate to the aquifers is significantly reduced if the soils have been covered by impermeable surfaces such as roads and houses. In some cases, although the soils may be classified as being more permeable, recharge may be limited due to underlying low permeability sediments (clays), especially along the rivers and creeks.

4.12.1 Recharge Areas Inside of the Subbasin

Recharge areas in the Subbasin have been defined based on the soils' hydrologic classifications along with a variety of techniques including water quality, isotopes, well logs indicating coarse-grained sediments are present near ground surface, and crop types. Overall, no geologic sediments are impermeable, so some recharge occurs in all areas that are not covered by impermeable surfaces such as asphalt or concrete. This is particularly important in agricultural areas where even though there are low permeability soils, in excess of a hundred thousand acres of land that have applied or ponded water throughout the growing season that aggregate to a large volume of recharge.

Investigations conducted along the river levees provide detailed profiles that allow for assessment of where coarse-grained sediments are present and where they are connected to the rivers (*see* **Appendix E**). **Figure 4-15** shows the combination of these studies, referenced sources, and recharge areas, including reaches of the rivers and some creeks. **Figure 4-15** also shows a rather broad potential recharge area, between the eastern edge of the Subbasin and a dashed line approximating the western edge where water could infiltrate from ground surface through coarse-grained soils and sediments directly into the underlying aquifers. Generally, the rate of movement is ten times higher when water moves horizontally along aquifer beds rather than percolating vertically through the sediments. As shown, this is a broad band parallel to the eastern side of the Subbasin.

4.12.2 Recharge Areas Outside of the Subbasin

Aquifers in the NASb extend beyond the Subbasin boundary and into adjacent subbasins. Dependent upon the groundwater gradients, groundwater may flow into or leave the Subbasin. Therefore, recharge to the NASb may occur from adjacent subbasins or even beyond these subbasins. The recharge areas in adjacent subbasins will be identified in their respective GSPs, once completed.

4.12.3 Groundwater Discharge Areas

Groundwater discharge occurs along some of the creeks, canals, and rivers. The conditions may change seasonally from recharge to discharge conditions. **Figure 4-15** shows these potential areas, which are typically along the rivers as they represent topographic lows where the groundwater surface may intersect the ground surface.

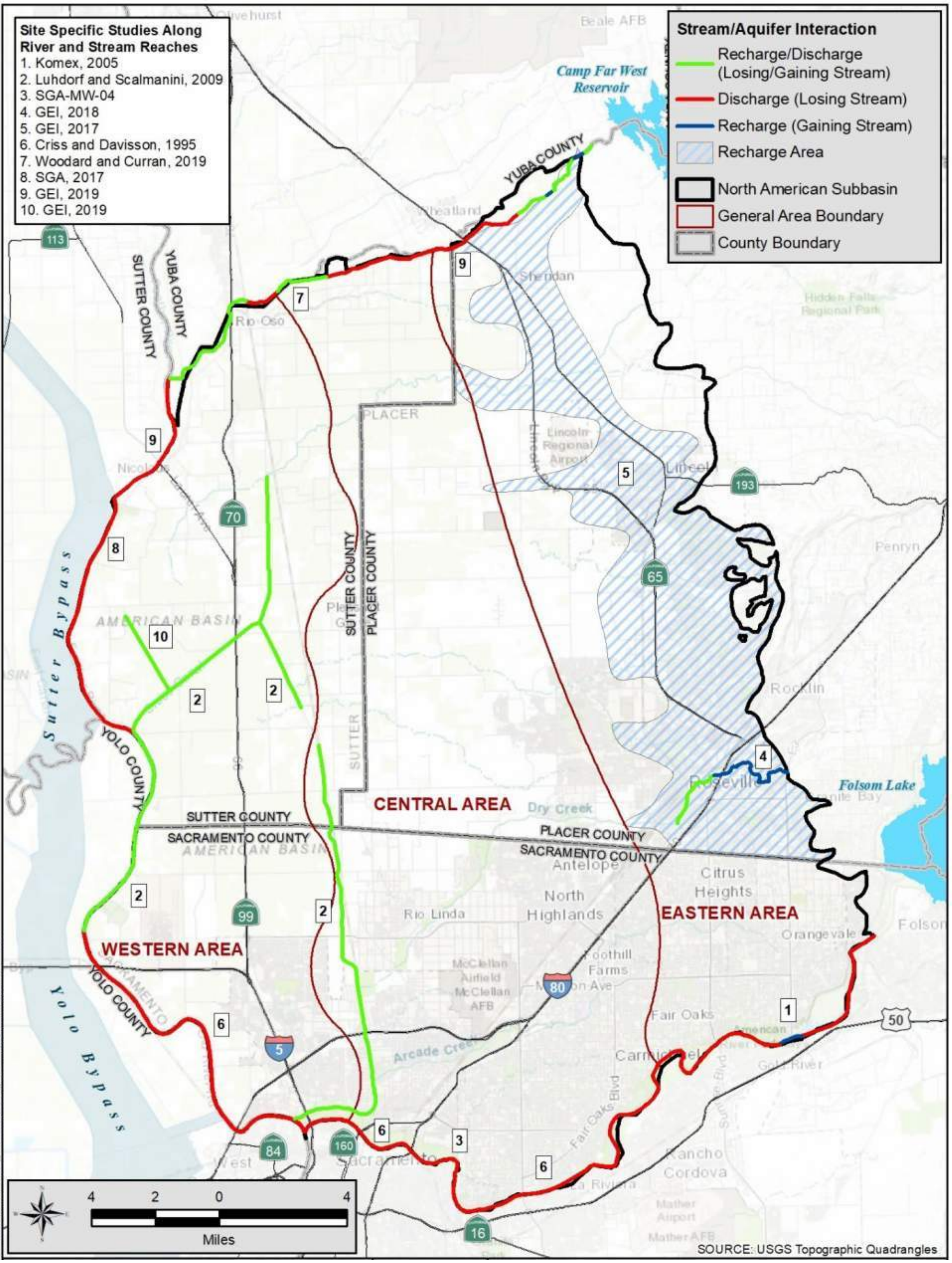

Figure 4-15. Recharge and Discharge Areas

4.13 Imported Water Supplies

For purposes of this GSP, imported water is defined as water that is brought in from areas outside of the Subbasin or its watershed. Diversions are defined as water that is diverted from rivers or tributaries within and adjacent to the Subbasin. For example, even though water in the Sacramento River may have originated from as far away as Lake Shasta, water diverted from the river is not considered to be imported because the river is adjacent to the Subbasin. The Subbasin does not have imported water other than water imported from the Yuba watershed into the Nevada Irrigation District and Placer County Water Agency service areas.

4.14 Data Gaps

The hydrogeologic conditions in the NASb have been investigated and documented since 1912 and continue through the present. Most of the recent improvements to data gathering have been construction of new monitoring wells to replace voluntary wells to improve the quality of groundwater levels. At this time, there are no data gaps that would affect the ability to sustainably manage the Subbasin within the next 5 years.

DRAFT

North American Subbasin Groundwater Sustainability Plan

Section 5

Prepared for:

Sacramento Groundwater Authority GSA
RD 1001 GSA
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November 4, 2020

Table of Contents

List of Figures

List of Tables

Appendices

5. Groundwater Conditions

This section provides a description of historical and current groundwater conditions in the Subbasin. The North American Subbasin (NASb or Subbasin) can be divided into three areas (Eastern, Central, and Western) from a water resources standpoint based on the differences in groundwater conditions. Groundwater conditions between areas vary for several reasons, the primary reason being the extent to which surface water is available. In order to understand how and why conditions vary, it is helpful to consider the historical development of water resources in the basin.

5.1 General

Current groundwater conditions are the result of both historical and current availability of surface water. Historically, where surface water was not available groundwater was used for agricultural, industrial, and urban growth.

In the Eastern and Western areas of the Subbasin, surface water has been available and delivered for agricultural and urban development. Today, both the Eastern and Western areas of the Subbasin continue to be served primarily with surface water, with some urban areas (city of Sacramento) in the Western area being served both groundwater and surface water. As a result of surface water availability, groundwater levels in the Eastern and Western areas of the Subbasin have remained relatively stable.

In the Central area of the Subbasin, a groundwater pumping depression (a lowering of groundwater levels as a result of pumping) developed by the mid-1960s. This was largely due to widespread agricultural and urban development and the lack of available surface water to this part of the basin. The pumping depression started in Sutter County, moving to the east and south.

Agricultural development in the 1950s relied exclusively on groundwater to meet crop demands and resulted in groundwater level declines through 1960. As a result of these declining water levels SSWD constructed Camp Far West Reservoir in 1964 and began supplying a portion of the crop demands with surface water. This action reversed the overall decline in water levels.

Demand on groundwater in the Central area also increased markedly around the 1950s as military and industrial facilities, such as McClellan Air Force Base (AFB), were established accompanied by rapid suburban development. Groundwater wells provided water for the industrial and urban development. Falling groundwater levels moved the Sacramento County Board of Supervisors to take management actions and initiated the Water Forum Agreement and Sacramento Groundwater Authority (SGA).

Since the 1990s, water suppliers in the northern Sacramento County portion of the Central area implemented conjunctive use projects, thereby reversing the decline of groundwater levels, but the pumping depression still remains in the Central area of the Subbasin and extends into Placer and Sutter counties.

5.2 Groundwater Levels

Groundwater levels are used to track the use and recharge of groundwater in the Subbasin to avoid long-term lowering of groundwater levels. Historically, when downward trending groundwater levels have been observed in the Subbasin, management actions have been taken.

Groundwater levels are recorded at more than 160 wells in the Subbasin and reported to the California Statewide Groundwater Elevation Monitoring Program (CASGEM) system. Groundwater levels were historically measured twice per year (spring and fall), but the frequency of the measurement in some wells has been increased to monthly or more frequently where wells have been instrumented with continuous recorders (transducers). Wells that were only measured a few times or where measurements were discontinued many years ago were not evaluated to establish groundwater conditions.

Figure 5-1 shows the location of 91 wells in the Subbasin evaluated to illustrate the groundwater conditions for this GSP. All of these wells have long-term records or are dedicated monitoring wells with shorter-term records. The dedicated monitoring wells with shorter-term records are used in place of CASGEM “voluntary wells” (privately owned domestic or agricultural wells) where groundwater levels may be affected by pumping at the well or construction details are not available. Due to the number of wells and the long CASGEM identification numbers, each well was provided with a unique number (**Figure 5-1**). A table correlating the unique numbers to CASGEM identification numbers is provided in **Appendix G** with well construction details and the DWR-defined aquifer being monitored. **Appendices G through I** contain time-series groundwater level measurements (hydrographs) for wells by the Western, Central, and Eastern areas.

The following sections include a description of the depth to groundwater and trends by area. **Figure 5-2** shows the depth to groundwater in the Subbasin. **Figure 5-3** shows representative time series graphs of groundwater levels (hydrographs) to show general trends in groundwater levels for each of the areas.

5.2.1 Western Area

The Western area of the Subbasin is bounded by the Feather and Sacramento rivers on the west and approximately by the Sutter/Placer County Line and Natomas East Main Drainage Canal on the east (**Figure 5-1)**. The Western area is served almost exclusively by surface water. In general, groundwater levels in this area are stable and have historically been near the surface.

Groundwater levels in the Western area in shallow wells typically range from near ground surface to 20 feet below ground surface (bgs) (**Figure 5-2**). The shallow groundwater levels are due to the area being at the topographic bottom of the Subbasin and potentially from the adjacent rivers. Groundwater levels in deep wells in this area have slightly deeper groundwater levels, ranging from about 15 to 40 feet bgs.

Figure 5-3 shows the trends in groundwater levels. All of the hydrographs, with consistent date ranges (1950 to present) and vertical scales. Each individual hydrograph is presented for the three areas (Western, Central, and Eastern) on a single page in **Appendices G through I**. The wells typically experience only seasonal fluctuations. During the most recent drought, 2012 through 2016, groundwater was relied upon more heavily and the groundwater levels responded to pumping, but then recovered after the drought. **Appendix G** provides hydrographs for wells in this area.

All sediments, to some extent, contain groundwater in the pores between particles. Near ground surface sediment pores are filled with mostly air but have some moisture. This moisture will gradually migrate down to the groundwater surface where the sediment pores will be entirely filled with water. At times there are low permeability sediment layers with a limited horizontal extent, where the moisture accumulates and fully fills the sediment pores, but the underlying sediments and pores are not filled with water. These occurrences are called perched water and do not constitute a principal aquifer. Perched groundwater has not been documented in this area.

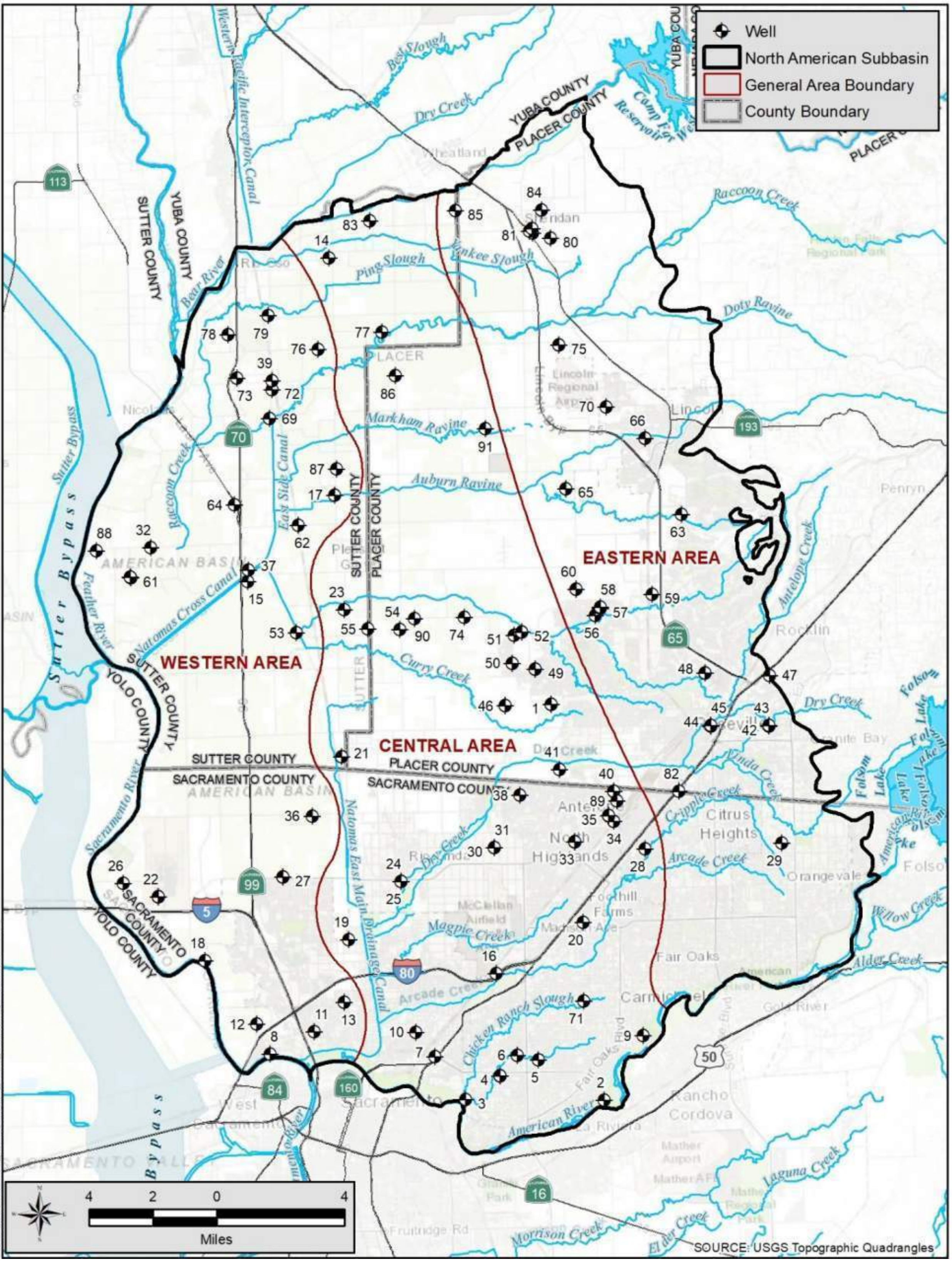

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Figure 5-1. Groundwater Level Monitoring Wells

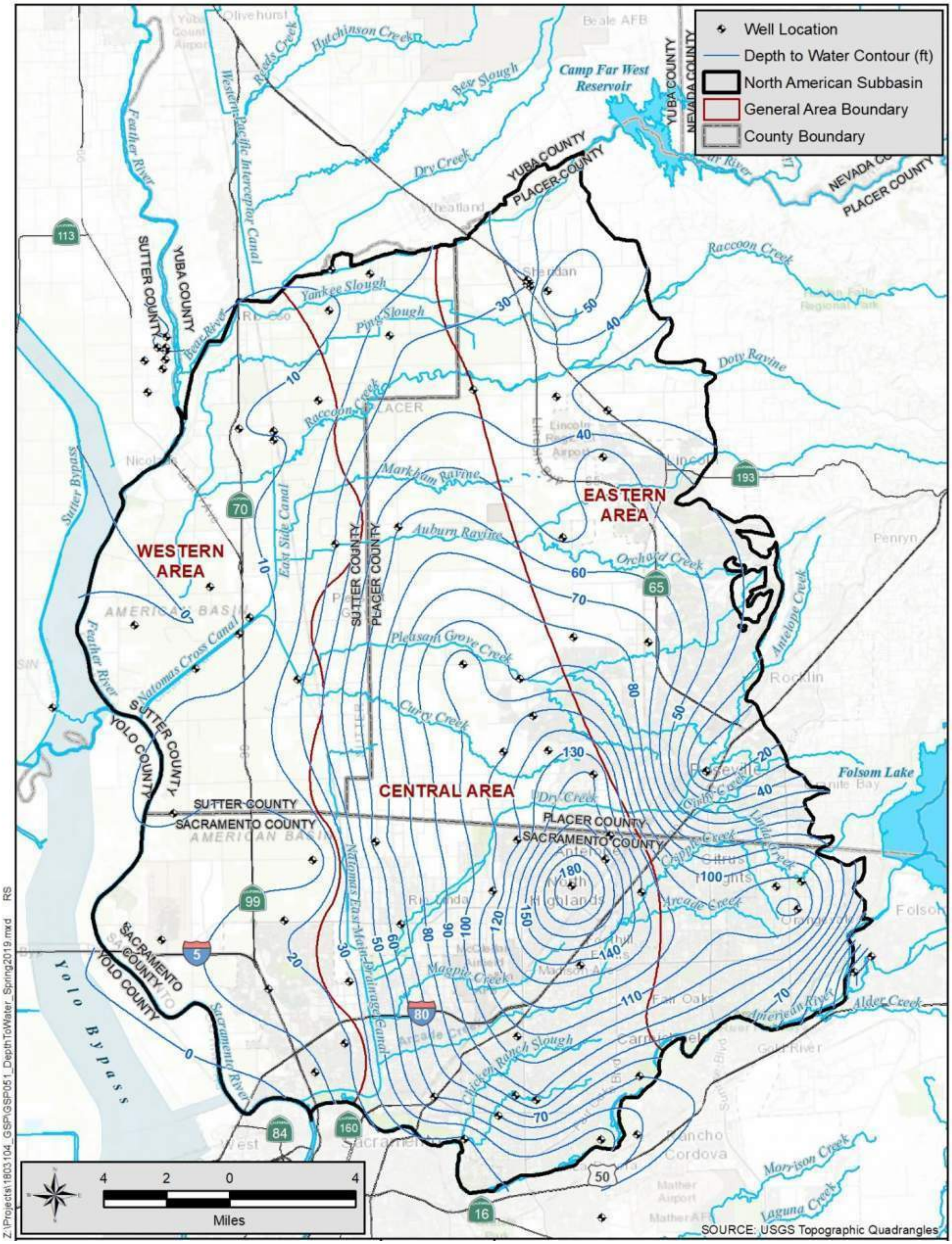

Figure 5-2. Depth to Groundwater – Spring 2019

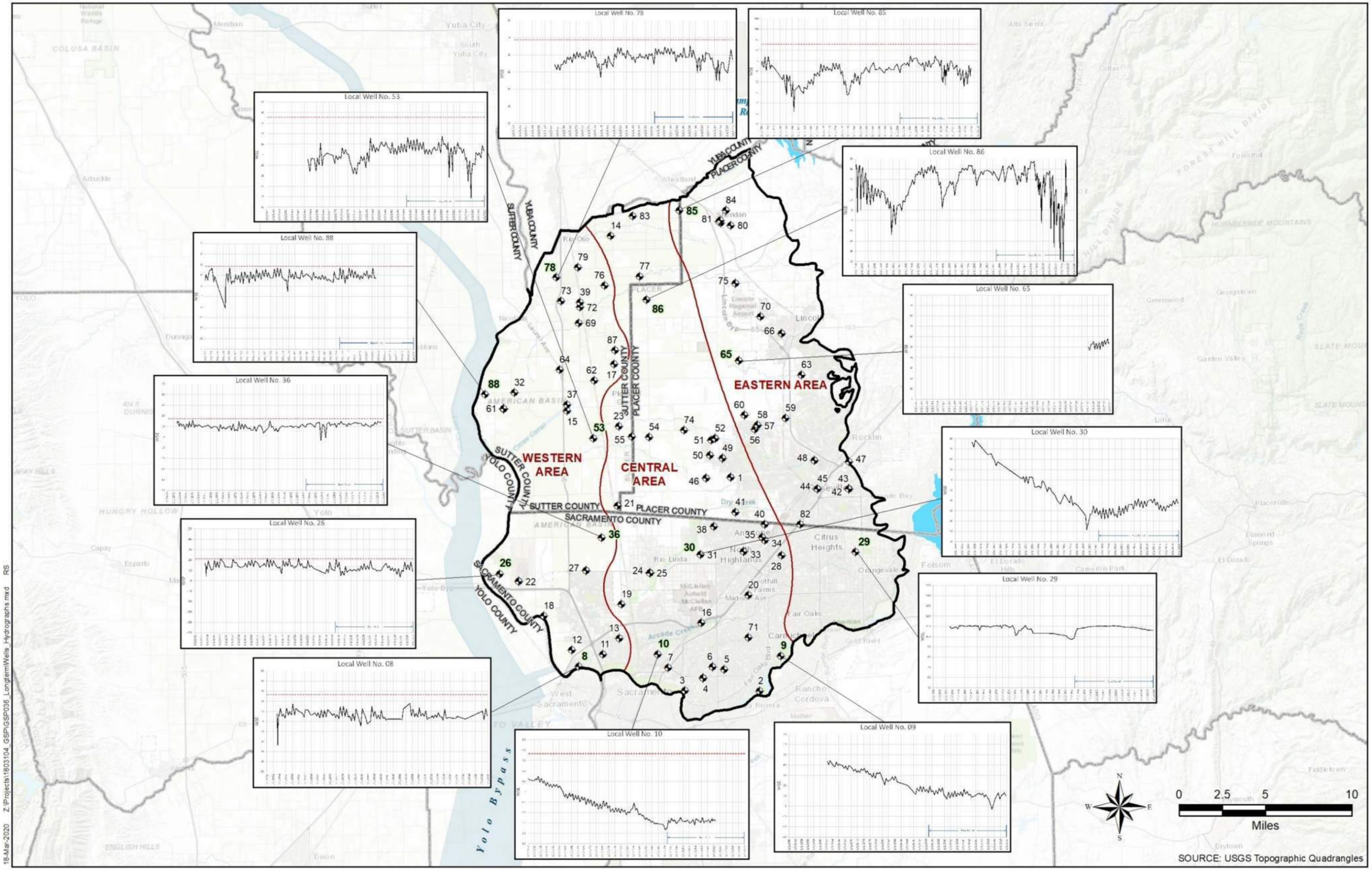

Figure 5-3. Representative Groundwater Level Hydrographs

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5.2.2 Central Area

The Central area of the Subbasin is bounded generally on the west by the Sutter/Placer County Line and the Natomas East Main Drainage Canal and extends east to about Citrus Heights and the city of Lincoln (*refer to* **Figure 5-1**). **Appendix H** provides hydrographs for the Central area. This area historically relied predominantly on groundwater. Groundwater levels in this area have shown a wide range of fluctuations but since the mid-1990s are relatively stable and sometimes rising. Currently the groundwater levels are between 0 and 15 feet bgs near the American and Bear rivers with as much as 150 feet bgs within the Sacramento County portion of the area (*refer to* **Figure 5-2**).

Two groundwater level trend patterns are present in the northern (Placer and Sutter counties) and southern (Sacramento County) portions of the Central area (*refer to* **Figure 5-3**).

In the Placer and Sutter counties portion of the Central area, groundwater levels declined by about 30 to 40 feet between the early 1950s and 1960s, until Camp Far West Reservoir was completed in 1964 (MBK, 2016). Groundwater levels rose in response to decreased groundwater use but still vary in response to climatic conditions when surface water availability decreases and groundwater pumping increases. Seasonal fluctuations in this portion of the Central area are greater than those seen in Sacramento County.

In the Sacramento County portion of the Central area, groundwater levels declined at a rate of nearly 1.5 feet per year from around the 1950s through the mid-1990s, with groundwater levels being lowered by up to 60 feet. Groundwater levels stabilized in the mid-1990s due, in substantial part, to expanded conjunctive-use operations, making surface water available to this area. Groundwater levels have continued to rise overall since that time, with slight declines from 2007 through 2009 when dry conditions were experienced throughout California. During the most recent drought conditions of 2010 to 2016 groundwater levels rose due to conservation efforts.

Perched water can be present in the Central and Eastern areas. Perched water was observed during the construction of a nested well monitoring (*refer to* **Figure 5-**1, map well number 91) at a depth of 4 feet bgs, while the depth-to-water in the monitoring well 91 was 70 feet bgs. Several contamination site investigations within the Roseville area also show perched groundwater levels.

5.2.3 Eastern Area

The Eastern area extends roughly from Citrus Heights and the city of Lincoln east to the edge of the Subbasin. There are only a few wells in the Eastern area with long-term historic measurements because this area primarily utilizes surface water. **Appendix I** provides hydrographs for the Eastern area. With urbanization of the area and development of groundwater management organizations, over 40 monitoring wells have been constructed since 2003.

The depth to groundwater in the Eastern area ranges from about 5 to 70 feet bgs and groundwater levels are generally stable (*refer to* **Figures 5-2 and 5-3**).

Perched groundwater is present locally in the Eastern area. Perched water has been found in MW-1 (Local Well No. 65) at multiple locations within the city of Roseville, generally in the area north and south of Dry Creek (GEI, 2018). Perched water may also be present in the area north of Lincoln and east of old Highway 65 on top of the Ione Formation (GEI, 2019).

5.3 Historic Groundwater Contours

Groundwater contours reflect the historical groundwater use in the Subbasin. In general, groundwater conditions from the early 1900s through the 1950s essentially remained unchanged because there was little groundwater use. From the 1950s through the 1990s pumping created a depression. After 1990 the groundwater levels stabilized or rebounded. Snapshots of the changes in groundwater contours during these periods are provided in **Figures 5-4 and 5-5**.

Contours representing little to no use of groundwater in the Subbasin were developed for the early 1900s (Bryan, 1923), as shown on **Figure 5-4**. The contours show groundwater entering the Subbasin from the east moving toward the west. The Eastern area of the Subbasin has depths to groundwater greater than 50 feet bgs while the Western area has groundwater levels of about 15 feet bgs, similar to current conditions.

Groundwater contours did not change until about 1960 when a small depression, due to pumping, began to form near the junction of the Sutter/Placer/Sacramento County lines and extended up to Pleasant Grove (DWR, 1997). By 1970, the pumping depression was established as shown on **Figure 5-5** (from MWH, 2005). Gradually over the years the depth of the central pumping depression became deeper and shifted to the east and south, extending from Placer County to almost the American River. By 1995, the pumping depression reached its maximum depth, to more than 40 feet below mean sea level, as shown on **Figure 5-5**. Between 1995 and 2004, groundwater elevations stabilized, as shown on **Figure 5-5**. This stabilization is likely due to groundwater management activities stemming from the Water Forum Agreement and by implementing the Sacramento Suburban Water District in-lieu groundwater recharge program.

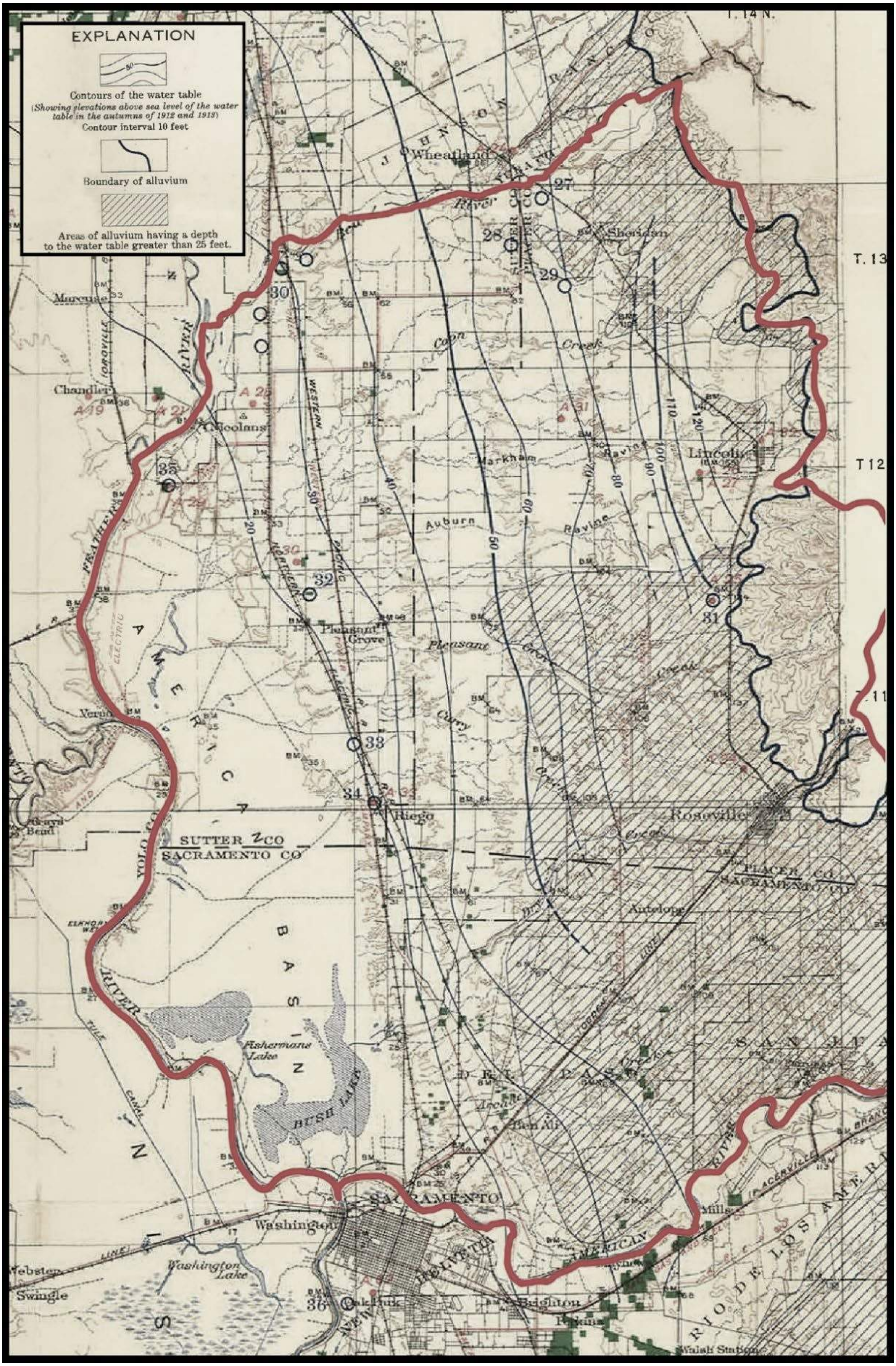

Figure 5-4. Groundwater Contours – Early 1900s

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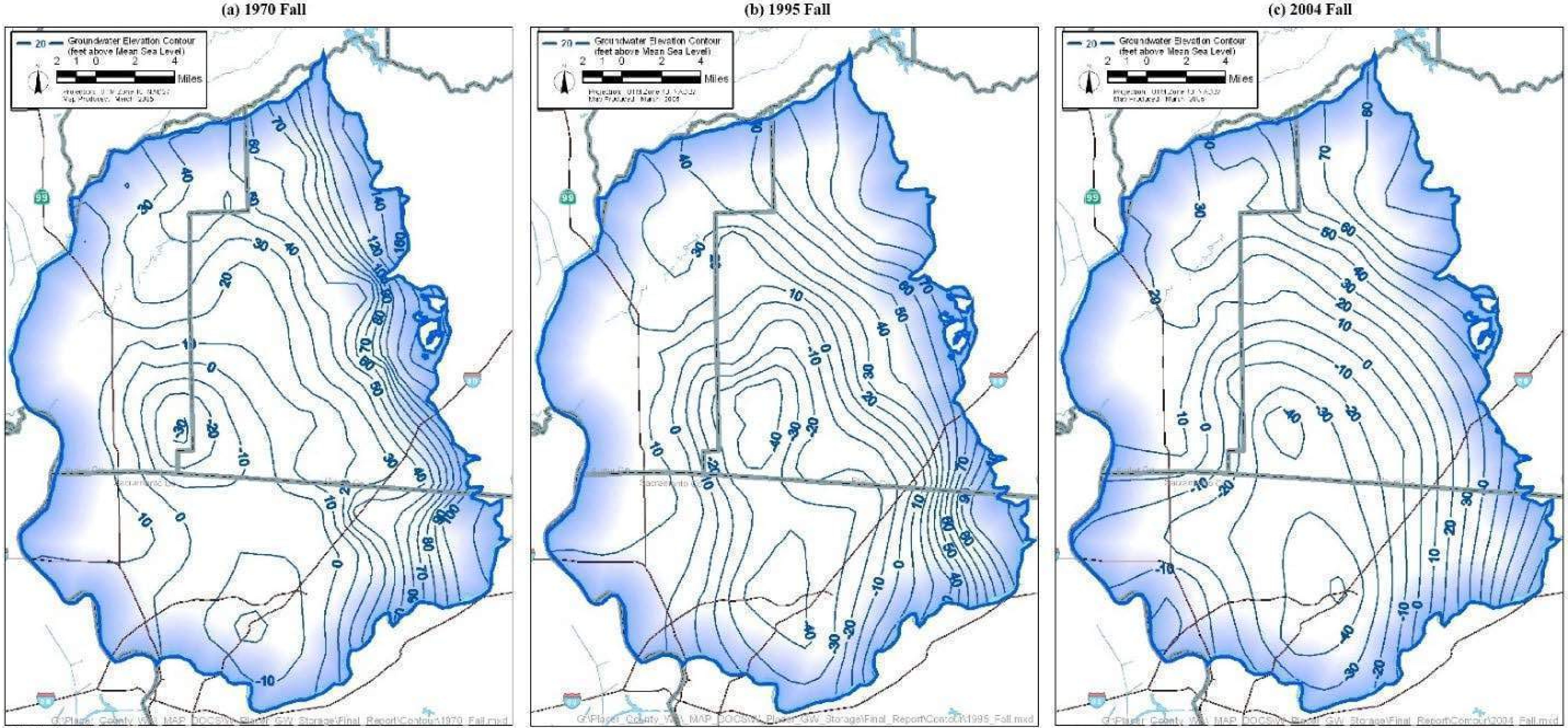

(Data Source: DWR CDEC)

Figure 5-5. Groundwater Contours – 1970 through 2004

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5.4 Current Groundwater Contours

Current groundwater surface elevation contours were developed to show the seasonal high and low water levels, groundwater flow directions, and regional pumping effects. These contours were based on Spring and Fall of 2019 groundwater levels using shallow wells (less than 300 feet total depth) as shown on **Figures 5-6 and 5-7,** respectively**.**

The current groundwater contours show a pumping depression in the center of the Subbasin that is about 20 feet below mean sea level. Groundwater flows radially toward this depression, from the fringes of the Subbasin toward the center. The depression extends from the American River but stops before reaching the Bear and Feather rivers. The depression extends westward toward the Sacramento River. This depression was created when groundwater pumping exceeded the natural recharge. The depression has been stabilized, with groundwater levels remaining similar or rising, by reducing pumping so that it is equal to or less than recharge. When a long-term pumping depression such as this one is created, sediments that previously contained groundwater are dewatered and there is groundwater-in-storage depletion. This condition is beneficial for management of the Subbasin by allowing for conjunctive use.

In the northern portions of the NASb, near Bear River, the groundwater flow direction is perpendicular to the river, the contours do not show that the aquifer is receiving significant recharge from the river, and there is little inflow from the South Yuba Subbasin. Near the Feather and Sacramento rivers, the groundwater flow direction is parallel to the rivers, suggesting there is recharge from the rivers and potentially subsurface inflow from adjacent subbasins (Yolo and Sutter). Slight changes in the contours along the eastern side of the basin suggest recharge is occurring along the upper reaches of Dry Creek, Auburn Ravine, and Racoon Creek. The groundwater contours concur with the assessment of groundwater recharge and discharge areas discussed presented in **Section 4.0**. The contours, along with the depths-to-water, provide an indication of areas where groundwater and surface water may be interconnected.

The groundwater gradients near the pumping depression are similar except from the east where they are steeper, potentially due to groundwater recharge effects. **Table 5-1** provides the gradients for Fall 2019.

Table 5-1. Groundwater Gradients Toward the Central Area

Groundwater Gradients (ft/ft)			
West	**East**	**North**	**South**
0.001	0.06	0.001	0.002

The current seasonal changes in groundwater levels were assessed for Spring and Fall of 2019, a wet water year. Changes in groundwater levels in the upper aquifer vary across the Subbasin. In the upper aquifer the seasonal changes from spring to fall range from about +2 to -14 feet. These seasonal changes do not account for pumping levels at individual wells and may be greater in exceptionally dry years when reliance on groundwater is greater due to the reduction of surface water supplies.

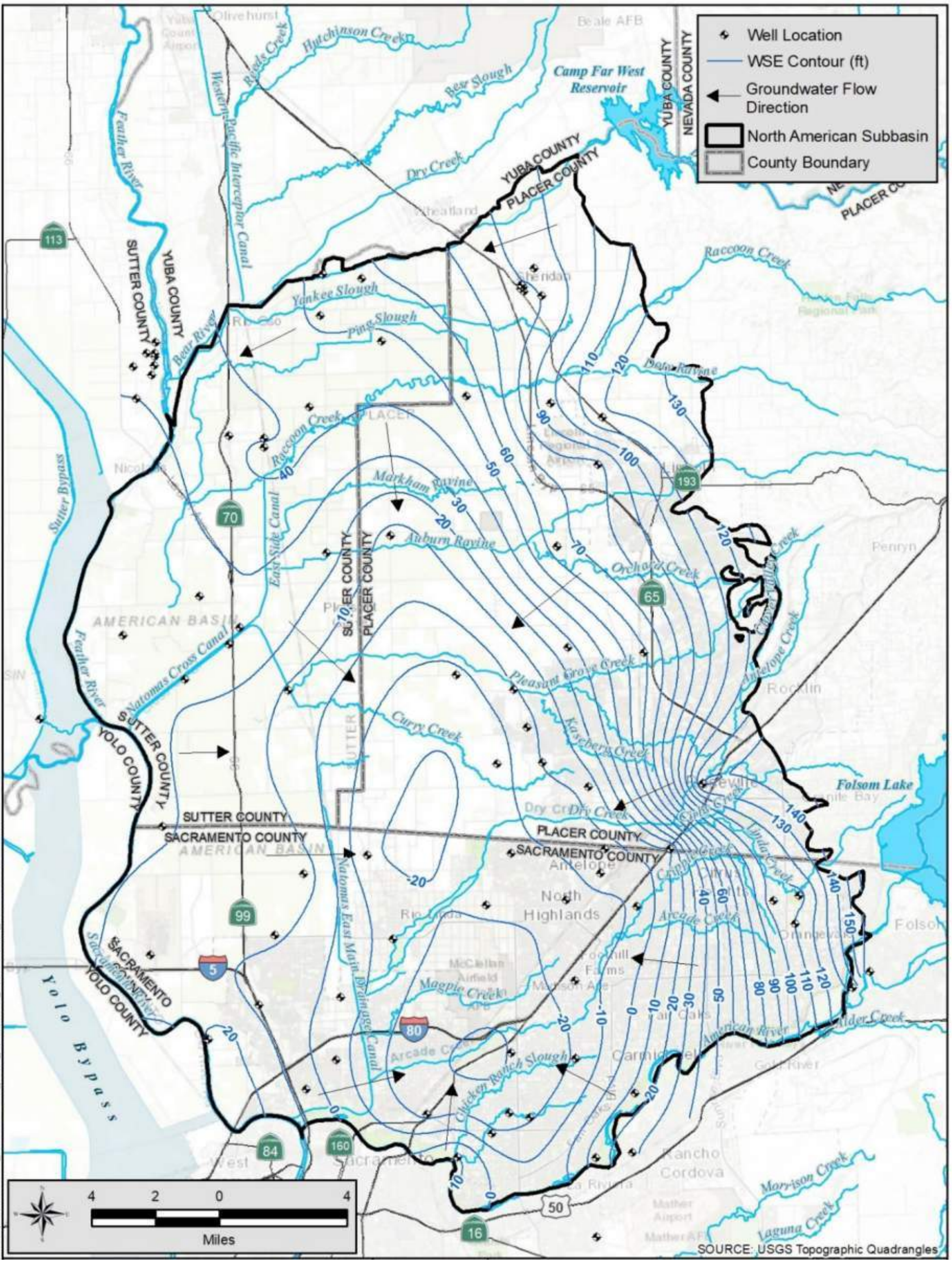
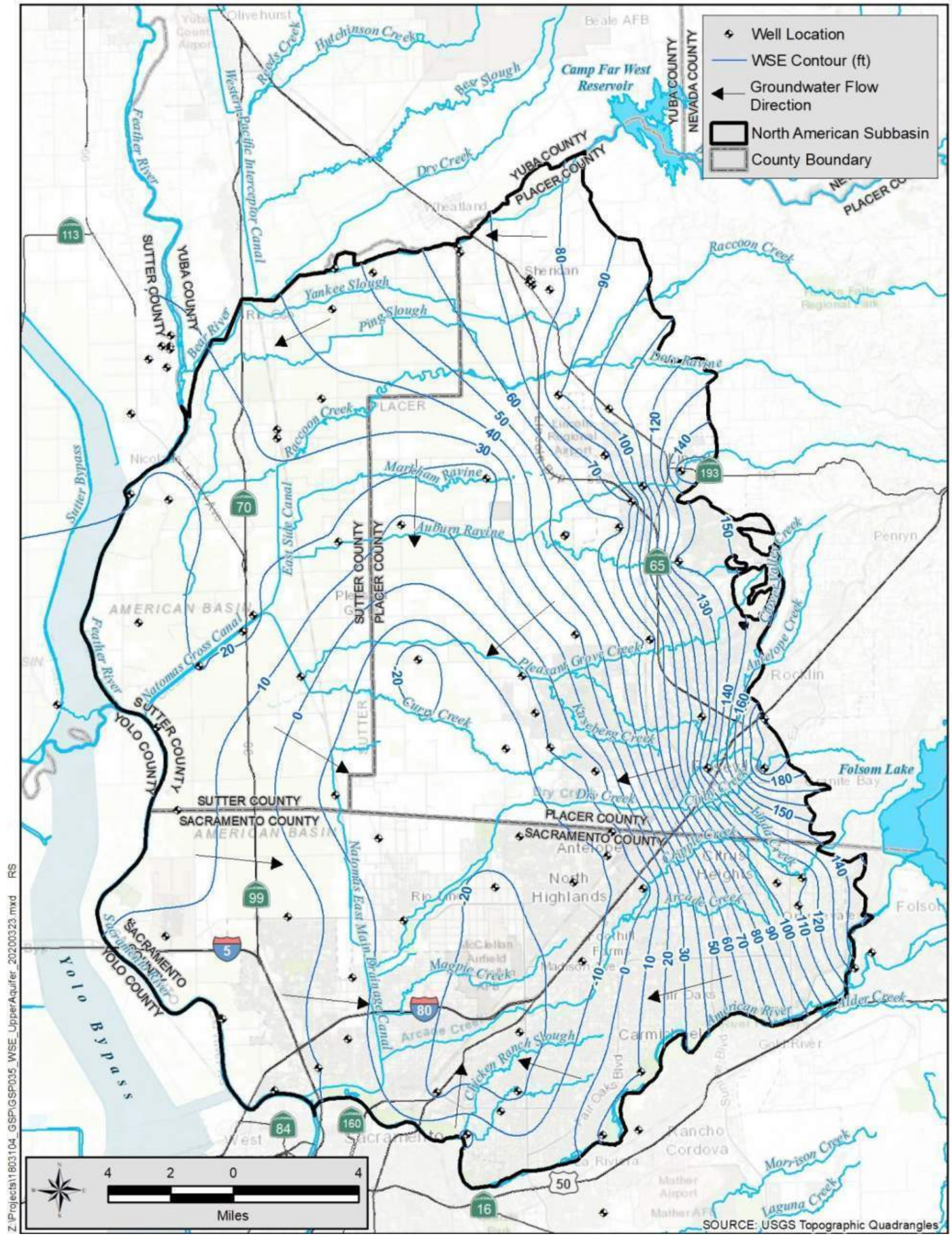


Figure 5-6. Groundwater Contours – Spring 2019



SOURCE: USGS Topographic Quadrangles

Figure 5-7. Groundwater Contours – Fall 2019

5.5 Hydraulic Gradients Between Aquifers

Since the mid-1970s dedicated monitoring wells have been constructed to monitor discrete intervals within the aquifer. When multiple monitoring wells are constructed in the same hole they are referred to as nested wells. Monitoring wells that are closely located but monitor different discrete intervals are called clustered wells. Nested and clustered monitoring wells were used to evaluate vertical groundwater gradients at varying depths of the aquifers, as sorted by the formation in which the aquifer occurs. There are 31 nested and clustered monitoring well locations in the Subbasin with up to five multiple completion monitoring wells at each location (**Figure 5-8**). **Appendix J** contains the hydrographs for each set of nested or clustered wells. In some cases, the nested or clustered wells are all in the same aquifer or a monitoring well has been constructed below the base of fresh water into the marine formations (Well 39), potentially the Central Valley Formation.

Generally, the aquifer in the Tulare Lake and Laguna formations has been found to exhibit unconfined aquifer characteristics. Confinement has been found to increase with depth and to the west in the deeper portions of the aquifer (DWR, 1997). The deeper portions of the aquifer (Mehrten Formation) typically exhibit delayed responses to pumping and recharge effects imposed in the shallower portions of the aquifer, confirming hydraulic interconnection.

Figure 5-8 provides a graphic representation of vertical groundwater gradients (heads) between the shallower and deeper portions of the aquifer (in Fall 2019), just after high groundwater use in the summer months, when the difference in groundwater levels should be the greatest:

- In the Western area, the vertical gradients are all downward and the greatest groundwater level differences in the Subbasin, downward by 23 feet, occurs at AB-4. The head differences are less near the rivers and greater toward the east. The head differences in this area are likely due to the deeper portion of the aquifer being more confined allowing for greater differences in groundwater levels.
- In the Central area, the vertical gradients are not consistent and have both upward and downward heads, ranging from about +7 to -7 feet. This suggests unconfined to semi-confined conditions, with depth in the aquifer may be present.
- In the Eastern area, the groundwater head differences are small suggesting unconfined conditions.

Although there are head differences, hydrographs show that groundwater levels in the different depths of the aquifer have similar trends, indicating the interconnectedness and a similar recharge area.

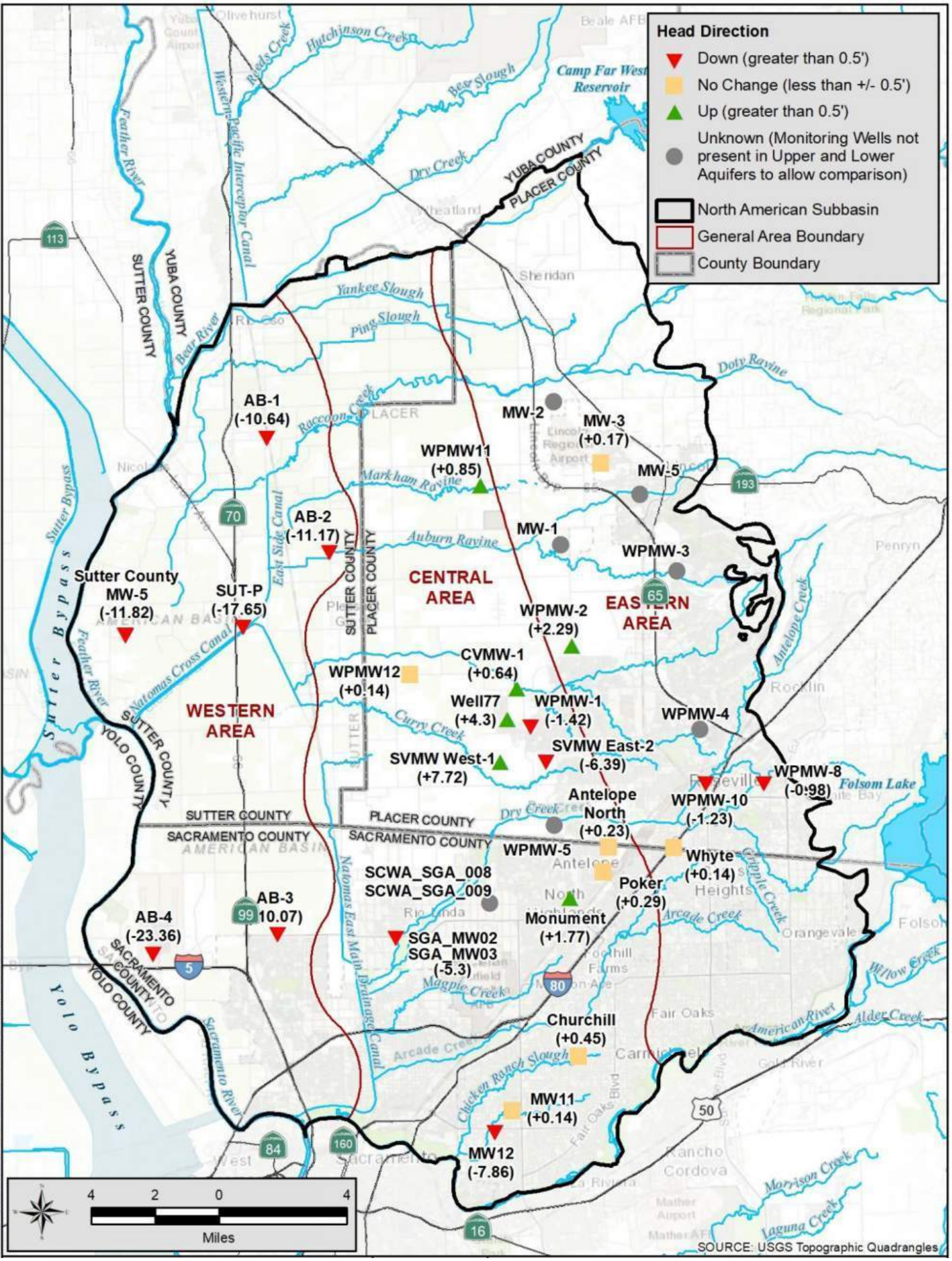


Figure 5-8. Vertical Gradients Upper to Lower Aquifers – Fall 2019

5.6 Hydraulic Gradients Between Fresh and Non-Fresh Water Formations

Three of the deeper nested monitoring wells (map numbers 48, 63, 66, or wells MW5-2, WPMW-3B, and WPMW-4B) were constructed into the Ione Formation in the Eastern area of the Subbasin. These wells consistently have higher heads in the marine Ione Formation than in the other aquifers, indicating an upward head and suggesting the groundwater in the Ione Formation could discharge to the fresh-water aquifers. **Appendix K** provides these hydrographs which show the head differences are up to 70 feet upward.

One monitoring well (map number 39, AB-1 deep) was constructed below the base of fresh water, potentially into the Valley Springs or Central Valley Formation, in the Western area of the Subbasin. Groundwater levels (piezometric) in the formation in comparison to the fresh-water aquifers change seasonally, apparently due to pumping influences. During the winter months groundwater levels in the fresh water-bearing aquifers are higher than in the formation. During the summer months the groundwater levels are higher in the formation than in the fresh water. During the summer months the water in the formation could up-well into the fresh water-bearing formations. Historically, prior to 2006, the head differences during the summer months were only a few feet but since then up to 15 feet of head differences have occurred. The greater head differences suggest an increase in groundwater pumping occurred locally in this area.

5.7 Change in Groundwater Storage

The amount of groundwater in storage changes annually and seasonally depending on the amount or groundwater use and recharge. The change in storage provides an indication of how much groundwater is in storage for dry years when there is more reliance on groundwater. The change in groundwater storage and following graphics were estimated for the entire NASb using the calibrated groundwater model. The model includes actual groundwater pumping from municipal water purveyors and estimated groundwater pumping for agricultural areas from the NASb.

Figure 5-9 shows both the annual and cumulative changes in groundwater in storage in the entire Subbasin for water years 1995 through 2018 (spring to spring) from the groundwater flow model. The estimated and annual pumping for each water year and the water year type is also shown on **Figure 5-9**. The cumulative change in storage during this period, which included the recent drought, increased on average by about 14,000 acre-feet per year.

Figure to be Completed.

Figure 5-9. Annual and Cumulative Change in Storage

5.8 Groundwater Quality

Generally, the quality of groundwater in the Subbasin is suitable for nearly all uses, with the exception of contamination plumes and localized, naturally occurring and human caused quality issues, which may affect the supply, beneficial uses, and potential management of groundwater in the Subbasin. Over the years, specific elements have been identified that have exceeded standards for their intended use. This section describes the distribution, concentration and trends of these elements along with human caused water quality issues.

5.8.1 Elements of Concern

While there are over 50 elements (general mineral and metals) with established drinking water and agricultural standards, only a few elements have been identified as being of concern, occurring at elevated levels that warrant evaluation and tracking to assess their occurrence and distribution. The concentration and depth of the elements varies widely over the NASb and at any given location. Various studies have been performed and each has evaluated similar elements, and a few have evaluated additional elements. A Groundwater Quality Vulnerability Assessment of the SGA portion of the Subbasin identified seven elements (arsenic, chromium (total and hexavalent), iron, manganese, nitrate, total dissolved solids, and radon) that provide a general condition of the groundwater quality (SGA, 2011). It should be noted that some of these naturally occurring elements may be from human activities. This GSP evaluates six of these seven elements (not radon), which were also identified and analyzed in other studies, plus boron because its presence can affect agriculture.

The groundwater quality presented in this GSP was developed using information from the California State Water Resources Control Board (SWRCB) Division of Drinking Water (DDW), which maintains a database of public water systems' water quality analyses. DDW requires each public water system to analyze water quality for over 300 elements at intervals ranging from weekly to every 3 years. Because large portions of Placer and Sutter counties are agricultural, public water systems are scarce within those areas. Therefore, data from the DDW was supplemented with data from one well (well number 61, *refer to* **Figure 3-15**) monitored for the Irrigated Lands Regulatory Program Sacramento Valley Water Quality Coalition Groundwater Quality Trend Monitoring program and data from domestic wells used by the USGS for their *Groundwater Quality Data in the Southern Sacramento Valley, California, 2005 – Results from the California Groundwater Ambient Monitoring and Assessment (GAMA) Program* and water quality from local programs.

Figures 5-10 through 5-16 show the most recent analyses and distribution of the selected elements in the Subbasin. The analyses dates range from 1967 to 2019. These figures also show where monitoring wells are located that could be used to supplement the data set. **Appendix L** provides a detailed list of the water quality analysis and wells used to create the figures. **Table 5-2** provides a list of the elements, the number of samples analyzed, their minimum and maximum concentrations, and the average and percent of samples exceeding the MCL or Notification Level.

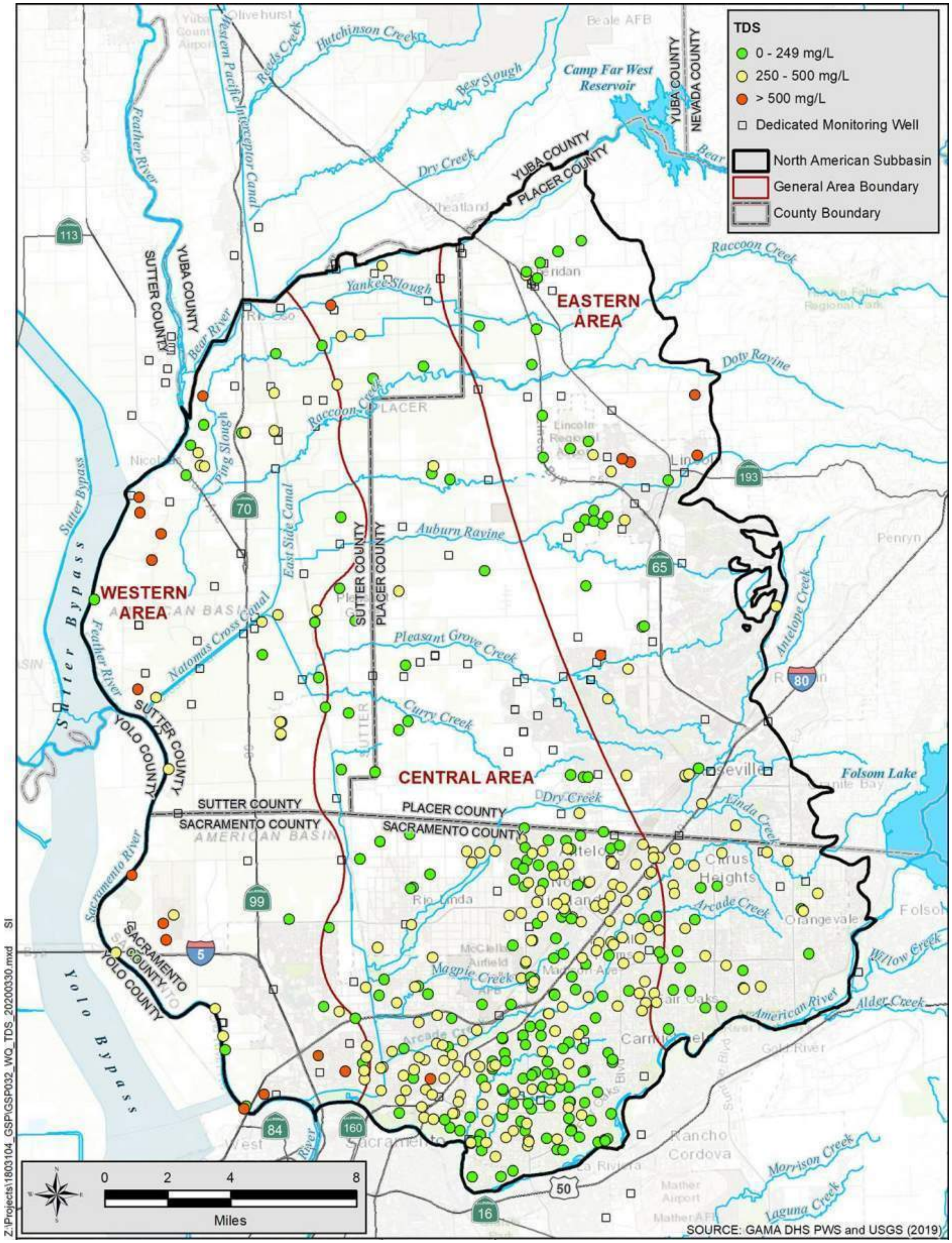


Figure 5-10. Distribution of TDS Concentrations

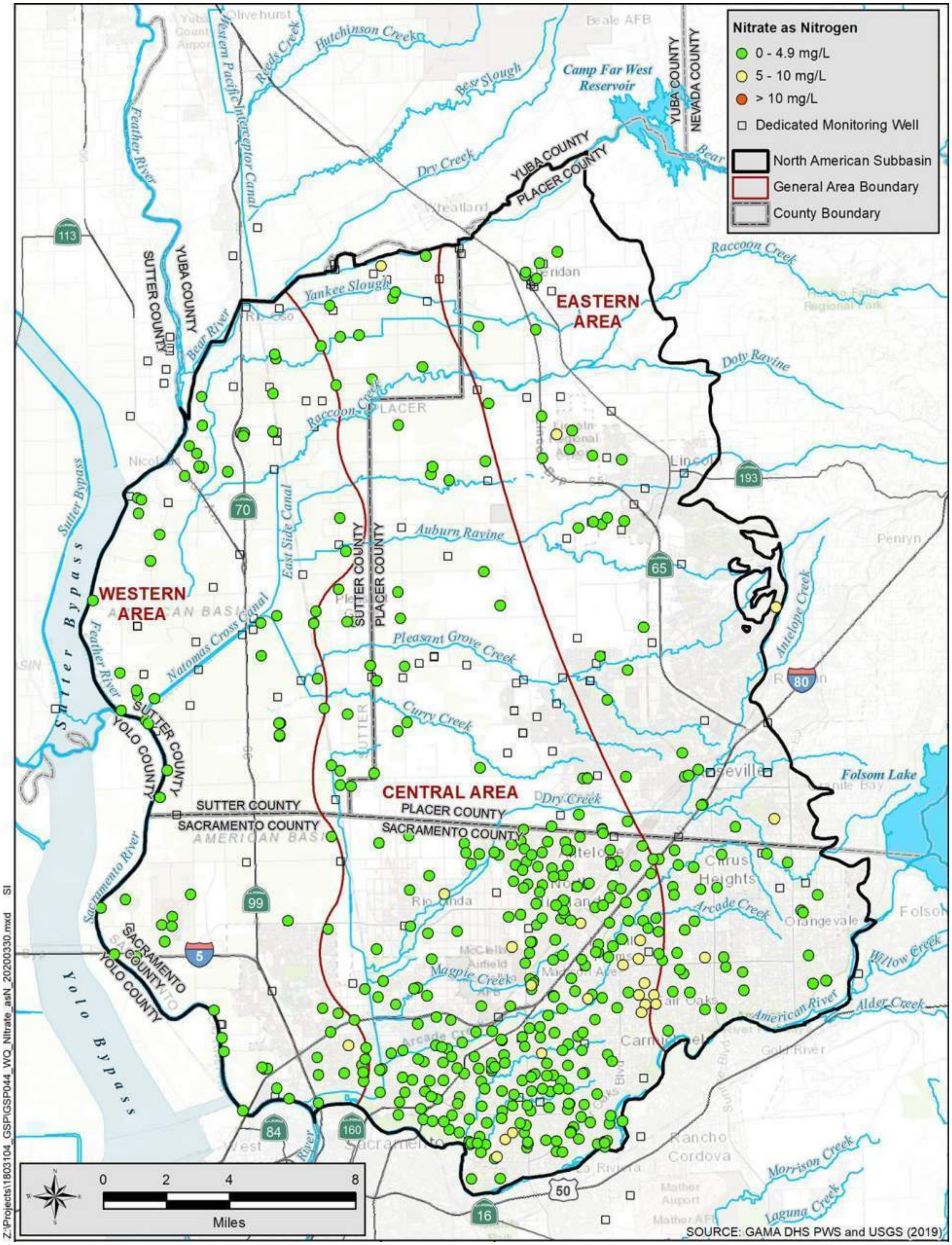


Figure 5-11. Distribution of Nitrate as Nitrogen Concentrations

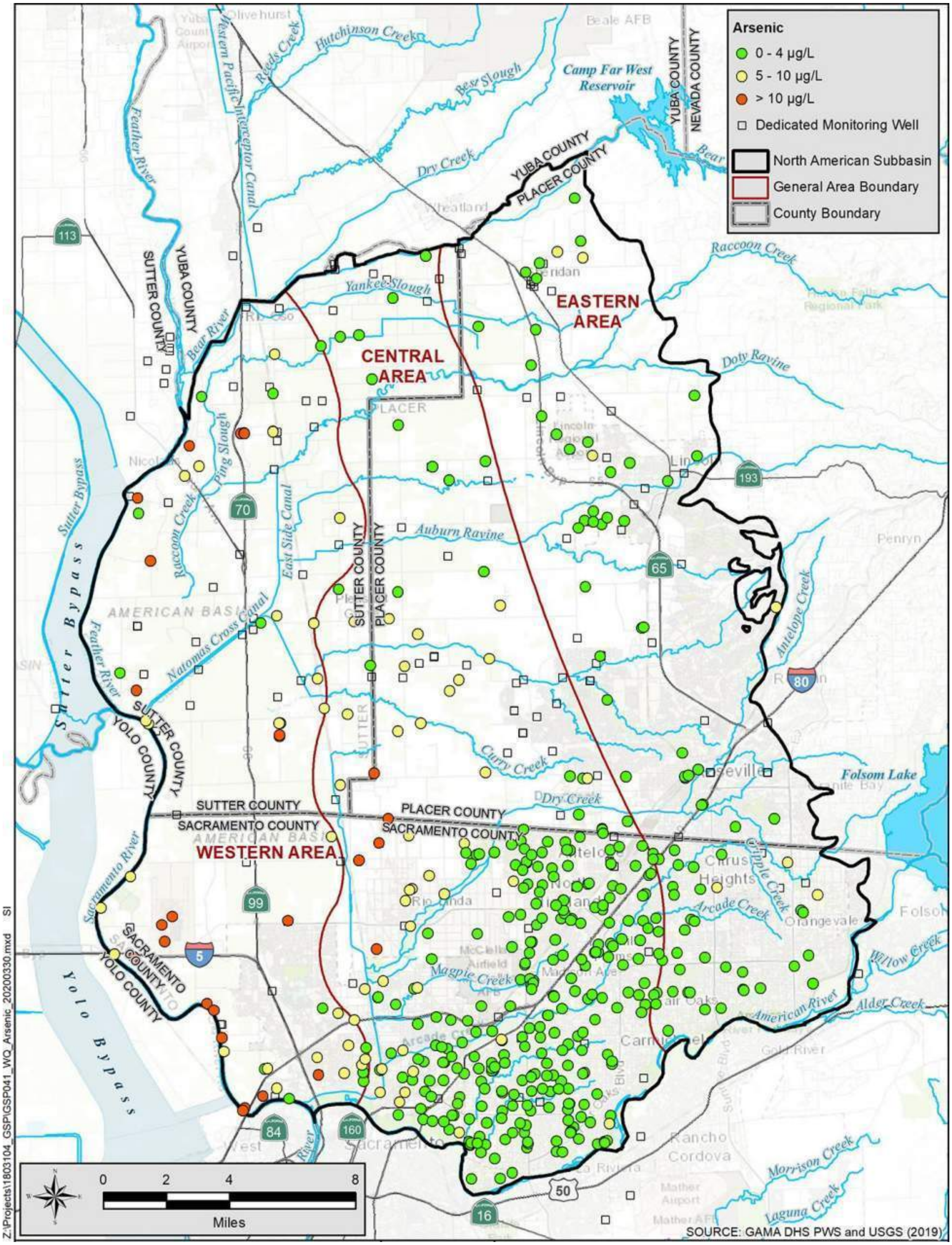
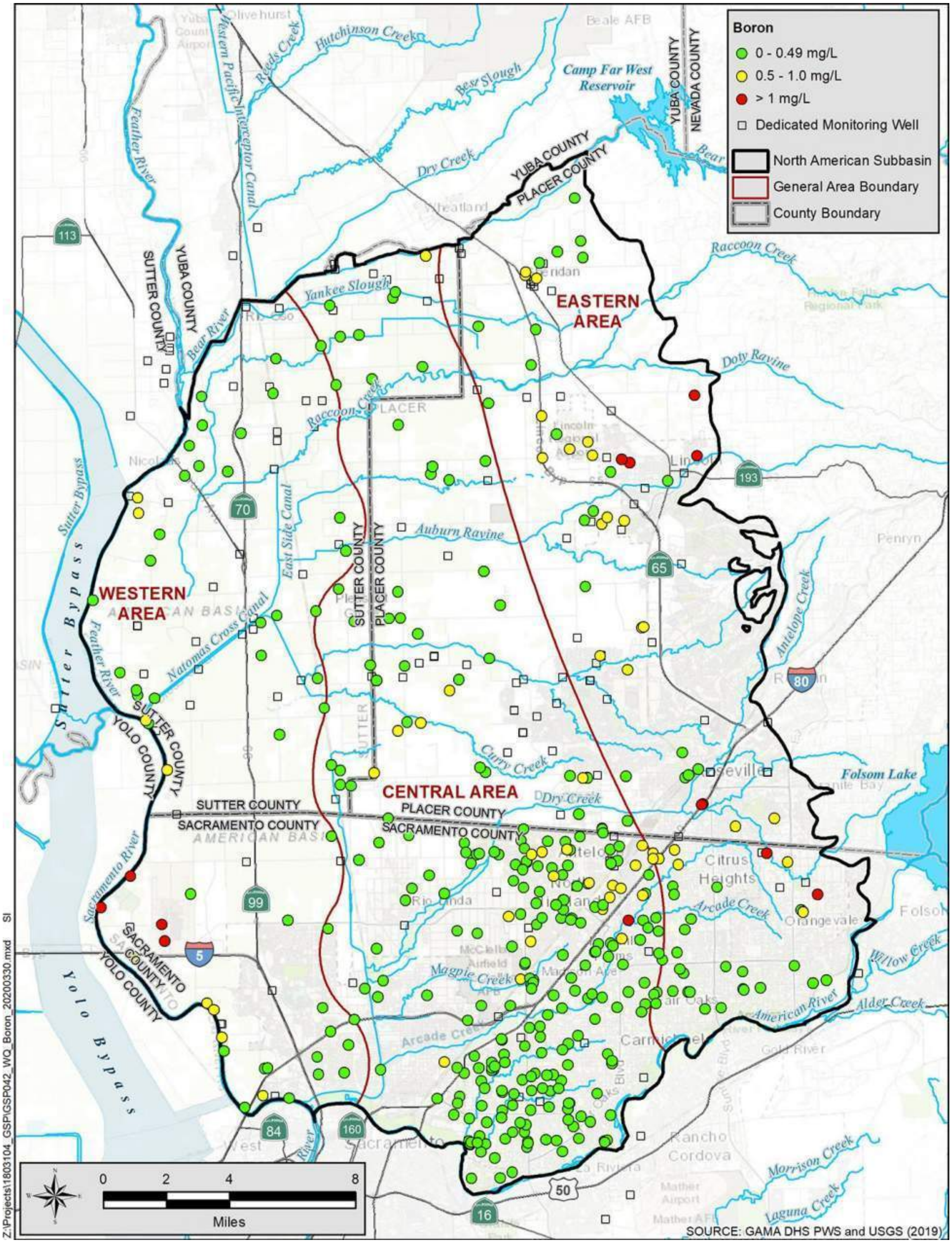
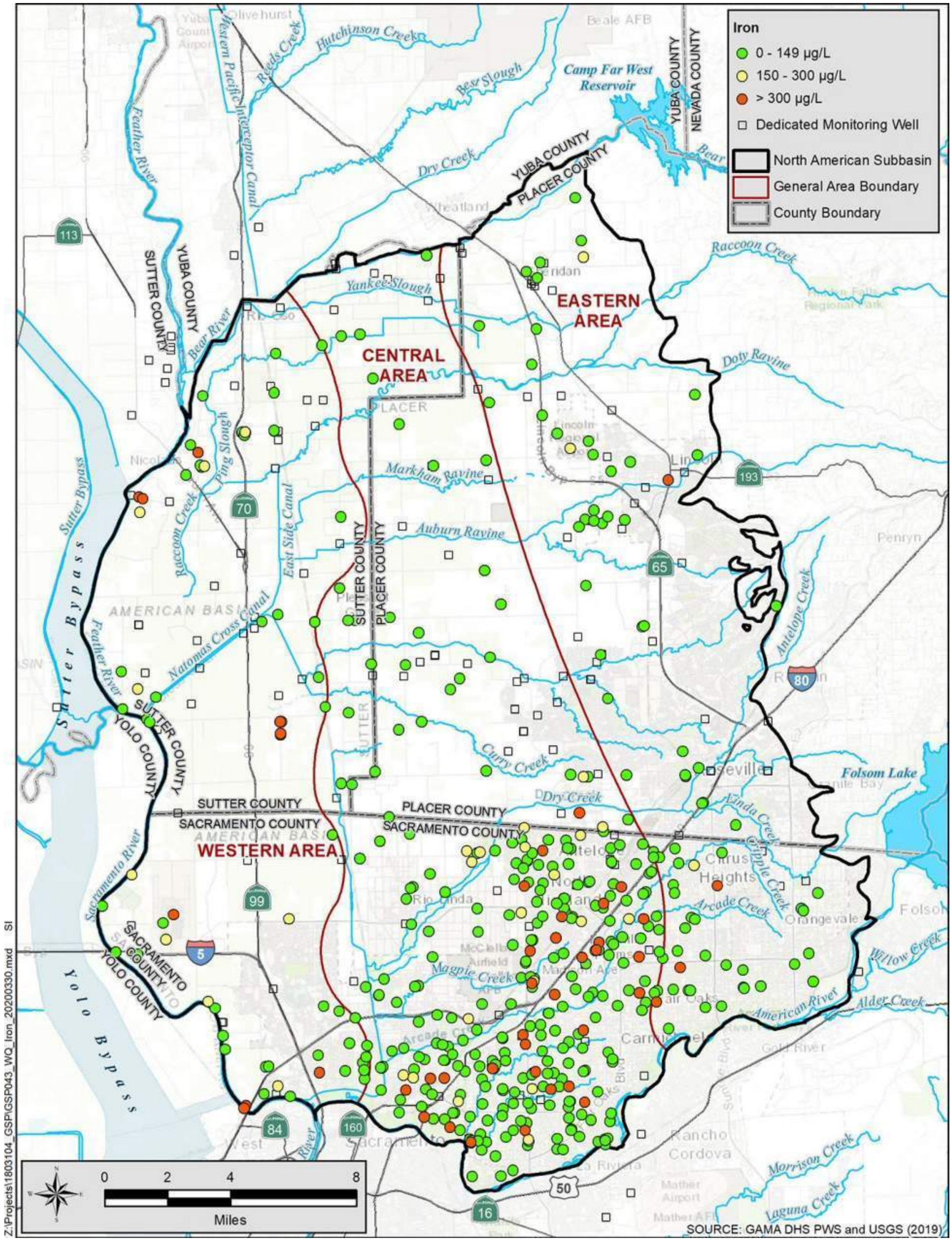


Figure 5-12. Distribution of Arsenic Concentrations



SOURCE: GAMA DHS PWS and USGS (2019)

Figure 5-13. Distribution of Boron Concentrations



SOURCE: GAMA DHS PWS and USGS (2019)

Figure 5-14. Distribution of Iron Concentrations

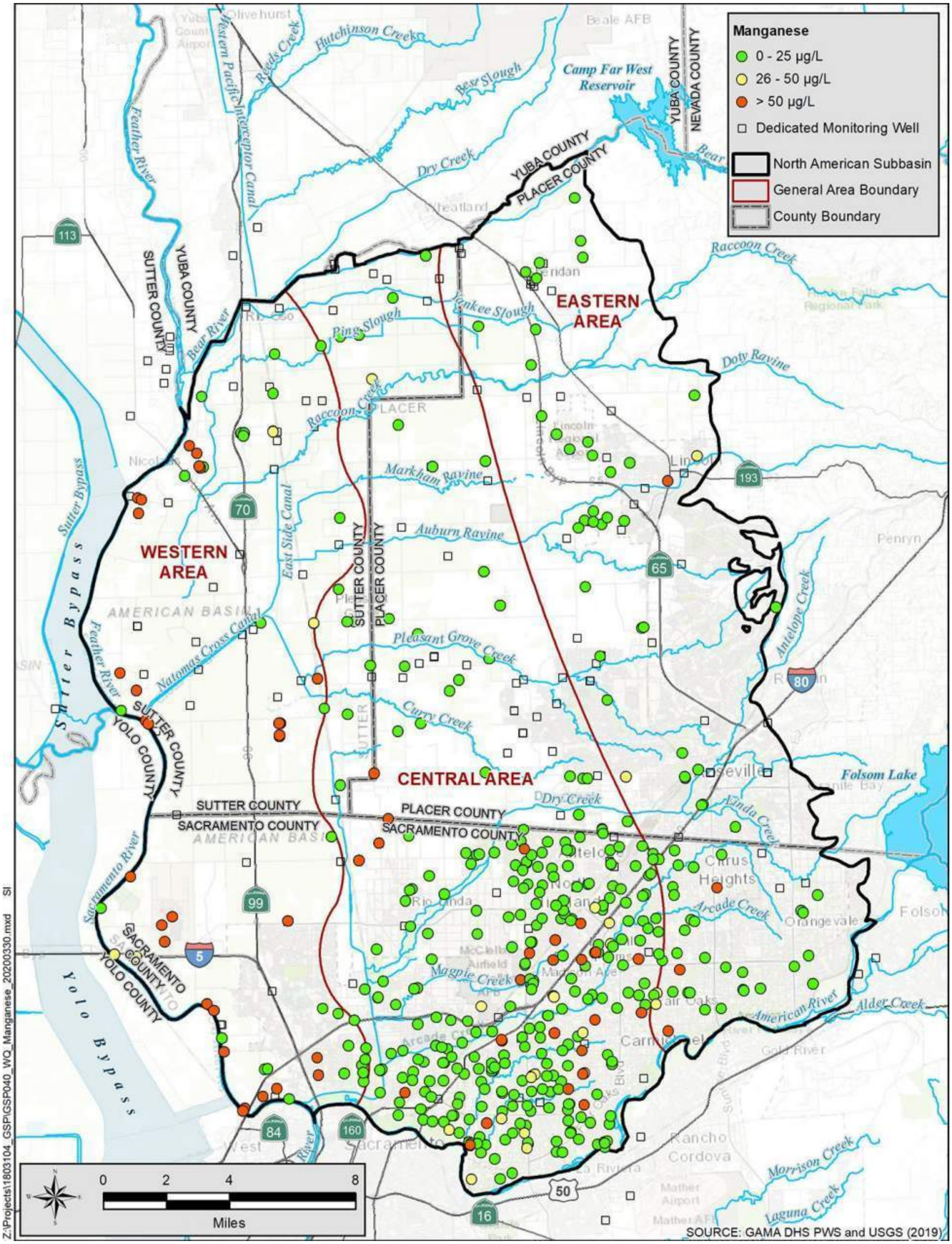


Figure 5-15. Distribution of Manganese Concentrations

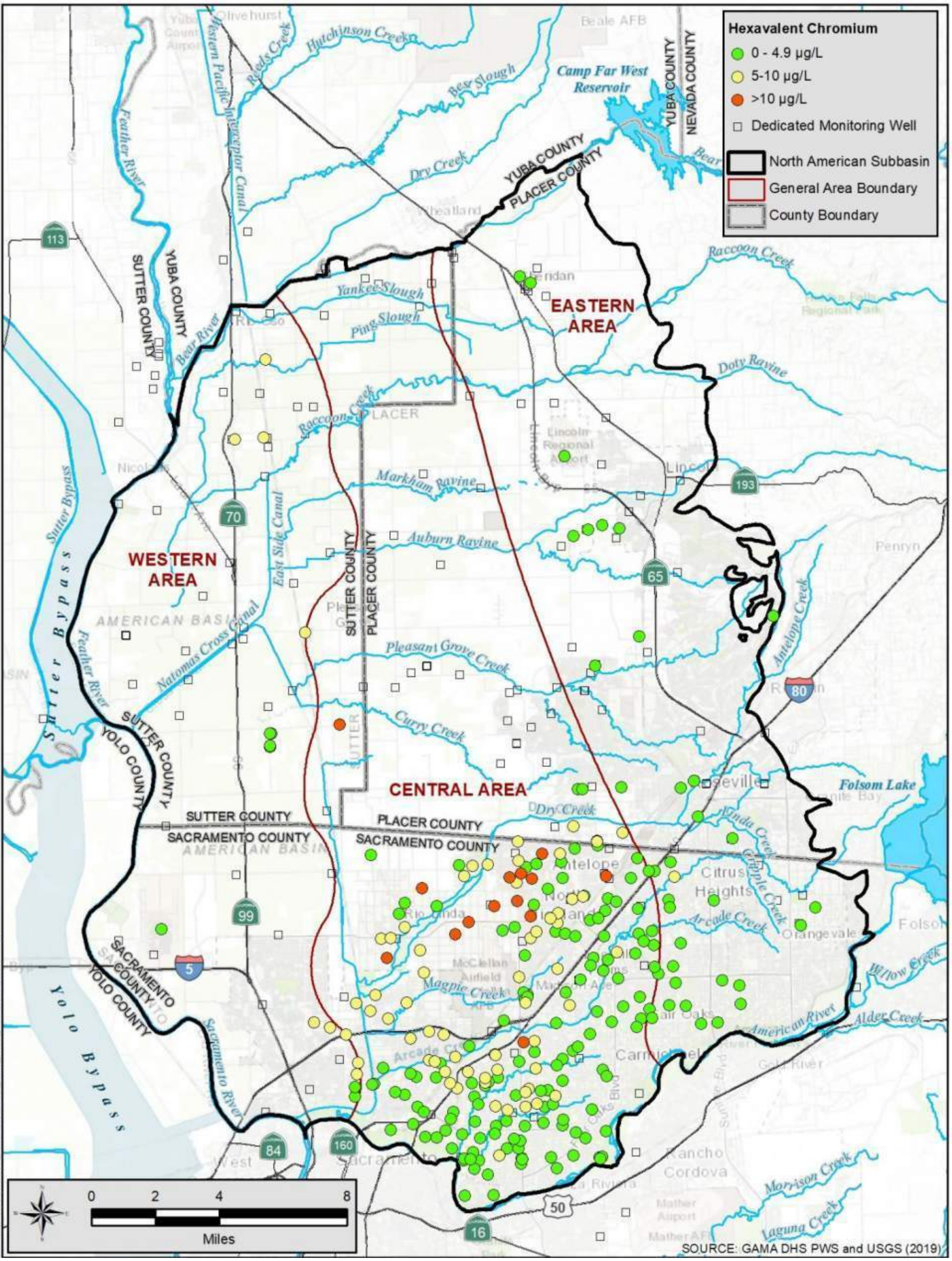


Figure 5-16. Distribution of Hexavalent Chromium Concentrations

Table 5-2. General Water Quality Summary

Element	Units	MCL or Notification Level	Number of wells with analytical results	Minimum Concentration[4]	Maximum Concentration	Average	Number of wells with most recent analysis exceeding MCL	Range of analysis (years)
Arsenic	ug/L	10	482	<2.0	78.1	4.09	29	1967-2019
Boron	mg/L	1[1]	410	<0.1	6.8	0.2	14	1969-2018
Hexavalent Chromium	ug/L	10[2]	252	<0.05	14	4.17	-	2001-2019
Iron	mg/L	0.3	488	<0.03	5.5	0.16	44	1957-2019
Manganese	mg/L	0.05	488	<0.01	3.6	0.05	62	1970-2019
Nitrate as Nitrogen	mg/L	10	494	<0.023	10	1.7	0	1964-2019
TDS	mg/L	500[3]	451	97	1,360	268.7	22	1969-2019

Notes: 1 = Notification level, no MCL
2 = No MCL, previous MCL shown
3 = Secondary standard, recommended level shown
4 = Reporting limit, may vary with historic analysis

Water quality in each of the areas varies and some elements with elevated levels are only present in a one or more areas while not in others. These findings align with previous studies in the Subbasin. Where concentrations are elevated, wells are often constructed into different aquifers where the water quality is better. In summary:

- In the Western area, elevated concentrations of arsenic, boron, and TDS and are present near the Feather and Sacramento rivers. Studies in the area show variable water quality in the aquifers. Poor-quality water is present in the adjacent Sutter Subbasin. It is unknown if the poor-quality water is present in the Yolo Subbasin.
- In the Central area, elevated levels of arsenic and hexavalent chromium are generally found in the western portion of this area, in the vicinity of Rio Linda/Elverta (SGA, 2011) with scattered occurrences elsewhere in the Subbasin. The areas of biggest concern for hexavalent chromium appear to be north of Interstate 80 near the communities of Rio Linda, Antelope, and North Highlands.
- In the Eastern area, scattered locations near Sheridan, Lincoln, and Roseville have elevated boron and TDS levels. High TDS concentrations are commonly associated with sodium chloride types of water and may be related to connate water from the marine Ione Formation. The effects of the Ione Formation water in this area appear to be of limited extent. Sodium chloride types of water are also present in deeper wells in the Subbasin near or below the base of fresh water, which could affect the fresh water-bearing aquifers.

Nitrate concentrations are typically below the MCL for drinking water in all three areas; however, nitrate concentrations are trending upward in most of the Subbasin. Elevated levels of boron appear to be present in most areas with some concentrated areas in the Western area south of Highway 5 and in the SGA area. Elevated iron and manganese levels (Figures 5-14 and 5-15) could be encountered in any of the three areas. Elevated levels of hexavalent chromium appear to be more concentrated in the SGA area, but this is due to SGA having a greater number of wells with analysis.

5.8.2 Groundwater Quality Trends

Groundwater quality trends are evaluated to assess trends and where management actions may be required to reduce future degradation and keep the water potable. Water quality sampling for elements of concern in the Subbasin has been conducted for over 40 years as part of state and federal efforts to evaluate water quality throughout the state and nation and where future studies may be needed to maintain potable water supplies. Although many of the elements are naturally occurring, human activities may add elements and produce upward trends. In general, water quality trends in the NASb are not showing rising concentrations and are remaining in a consistent range with a few exceptions.

5.8.2.1 Previous Analyses

Water quality trends for TDS (a primary indicator of naturally occurring water quality) and nitrates (a primary indicator of human activities) were analyzed in historical reports and concluded the following trends.

In the SGA area, a Water Quality Vulnerability Assessment in 2011 using just public water supply wells found:

- TDS trends are, for the most part, stable and not increasing (SGA, 2014)
- In 19 wells, nitrate concentrations were rising somewhat over the period of record (earliest records in the database are generally from the mid-1980s or later) (SGA, 2014). In 10 wells, nitrate concentrations were trending downward. SGA concluded that there was no discernible overall trend in the data at that time. Regardless, SGA concluded there were no trends that would constitute a health concern with respect to nitrates in the SGA area.

In the WPGSA area:

- TDS levels are generally stable or decreasing but are increasing at one water supply well (GEI, 2020)
- Nitrate trends were not evaluated

A Groundwater Assessment Report for most of the Sacramento Valley was performed as part of the Irrigated Lands Regulatory Program, which used all wells in the GAMA data files (CH2MHill, 2014). This report provides water quality covering the SGA, West Placer, SSWD, RD 1001 and Sutter GSA areas. It used a modified Mann-Kendall statistical approach. In the NASb:

- TDS levels trends were consistent
- Nitrate concentrations are increasing at seven out of 20 wells, in the agricultural areas of west Placer County and Sutter County.

A Groundwater Assessment Report for rice areas in the Sacramento Valley, including in part some portion of all of the GSAs, was also performed as part of the Irrigated Lands Regulatory Program. No rigorous trend analysis was performed but graphs were provided for some wells. This analysis only used 12 wells in the NASb (CH2MHill, 2013). In the NASb:

- TDS levels concentrations were very consistent
- Data was only sufficient at one well to evaluate nitrate trends (decreasing)

5.8.2.2 Current Analyses

Groundwater quality trends for this GSP were developed using data from public water supply wells, and USGS and DWR wells were used to develop the water quality distribution (*refer to* **Figures 5-10 through 5-16**). A statistical trend analysis of the data was performed using the Mann-Kendall method when a well had more than five samples for a given element. This method is a non-parametric (for example, does not assume a distribution in the data) test for identifying trends in time-series data. **Appendix M** provides the analysis and trend graphs for each constituent**. Figures 5-17 through 5-23** show the trends for each element. **Table 5-3** provides a summary of the analysis.

Table 5-3. Water Quality Trend Summary

Element	Units	Number of Wells with Greater Than Five Samples	Increasing Trends	Decreasing or Flat Trends
Arsenic	ug/L	245	7	238
Boron	mg/L	71	3	68
Hexavalent Chromium	mg/L	115	1	114
Iron	mg/L	241	9	232
Manganese	mg/L	241	2	239
Nitrate as Nitrogen	mg/L	316	69	247
TDS	mg/L	267	8	259

Similar to historical assessments, this GSP finds that groundwater quality is stable with only local areas experiencing increasing trends. Although nitrate has the greatest number of wells with upward trends and these upward trends are present in all areas, nitrate concentrations are well below the safe drinking water standard throughout the Subbasin. The nitrate is likely present due to historical agricultural fertilization practices, septic systems, and leaky sewers.

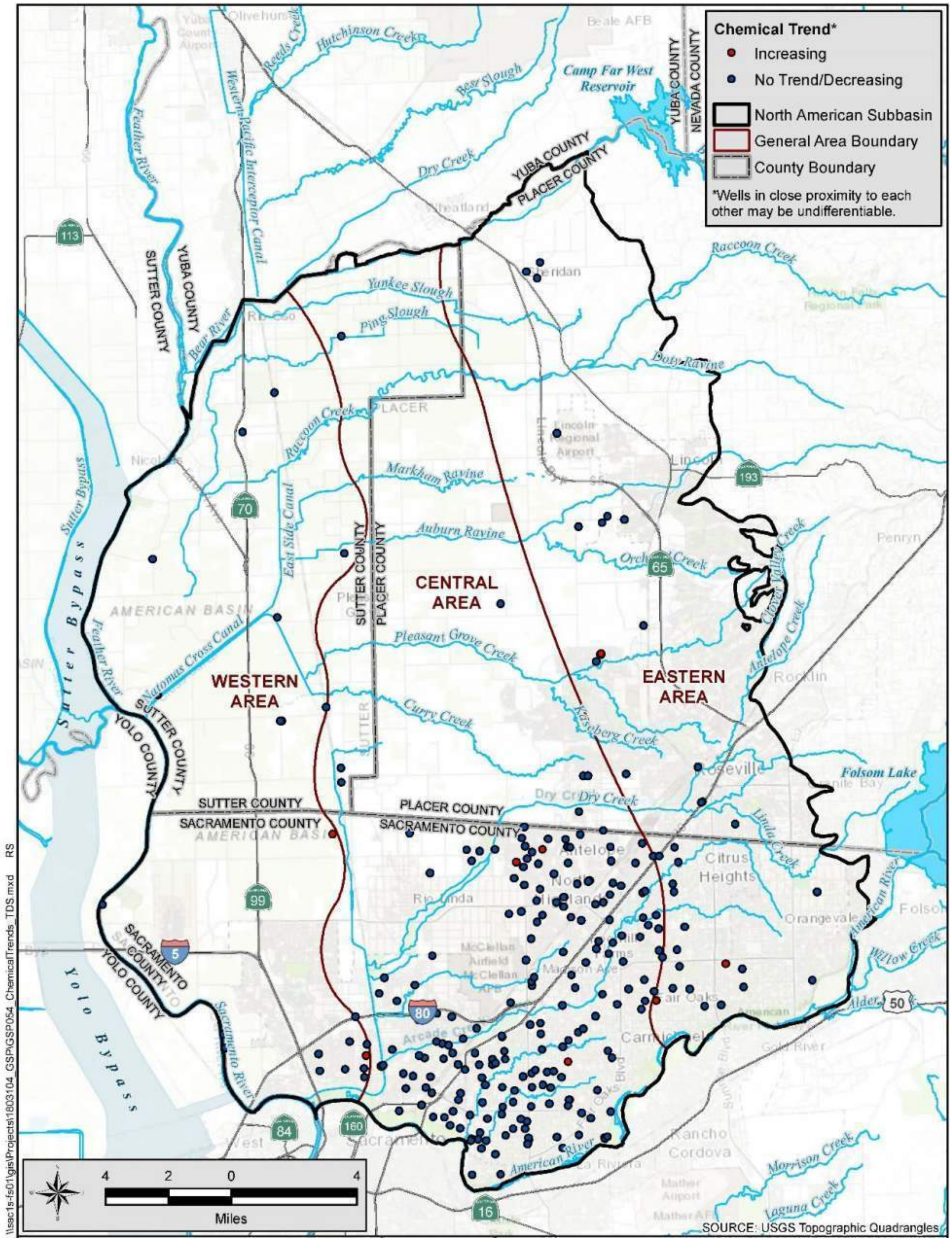


Figure 5-17. Distribution of TDS Trends

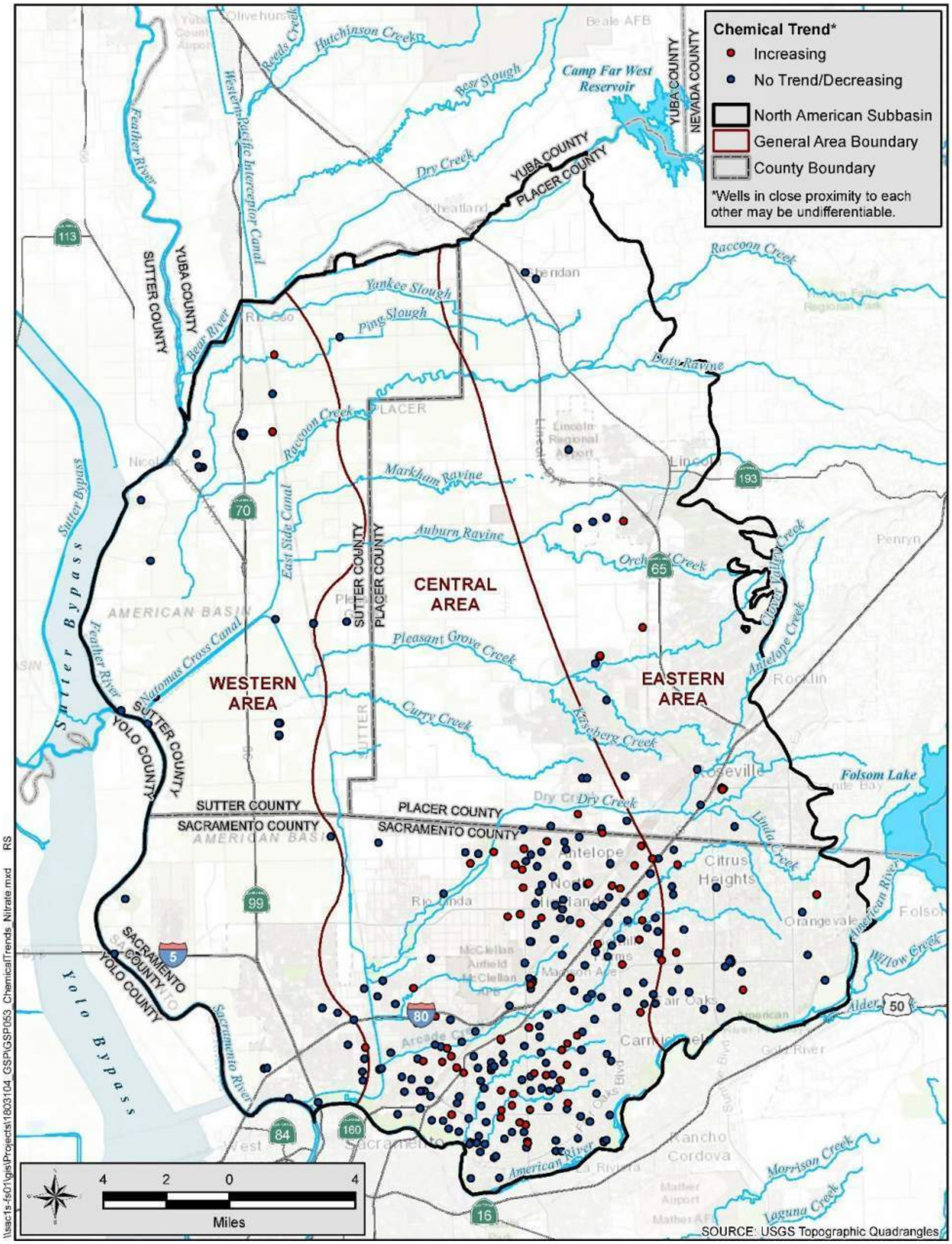
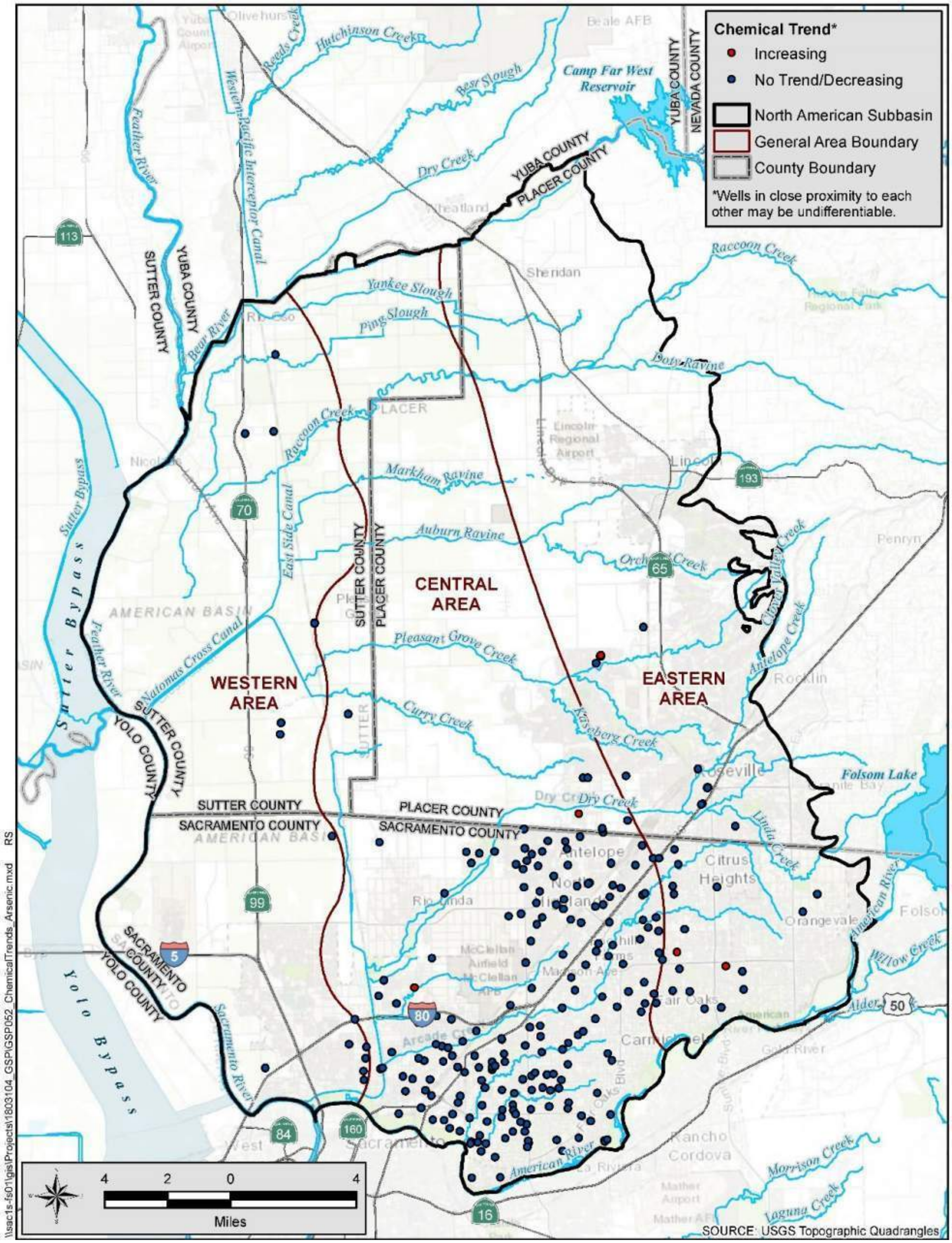


Figure 5-18. Distribution of Nitrate as Nitrogen Trends



SOURCE: USGS Topographic Quadrangles

Figure 5-19. Distribution of Arsenic Trends

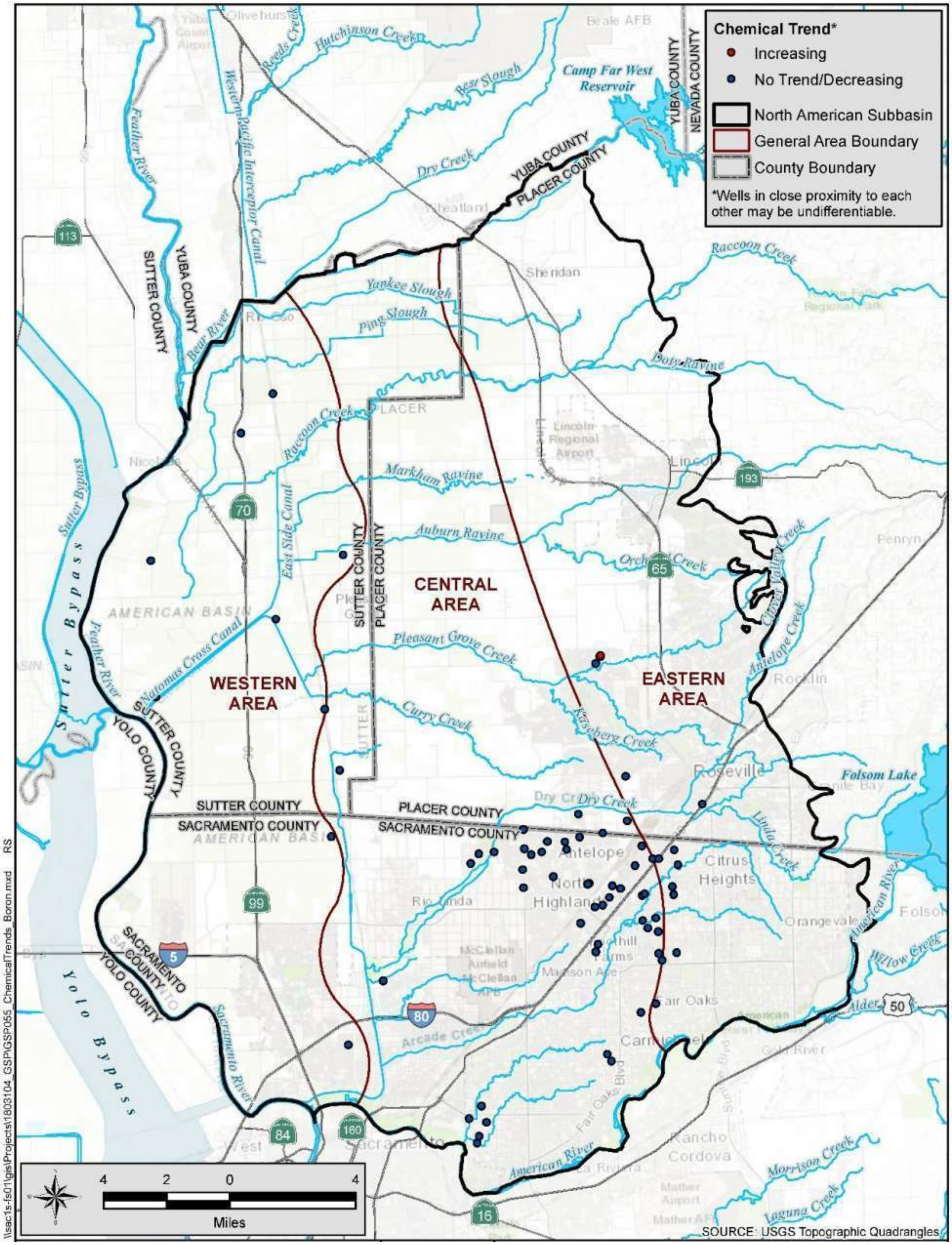


Figure 5-20. Distribution of Boron Trends

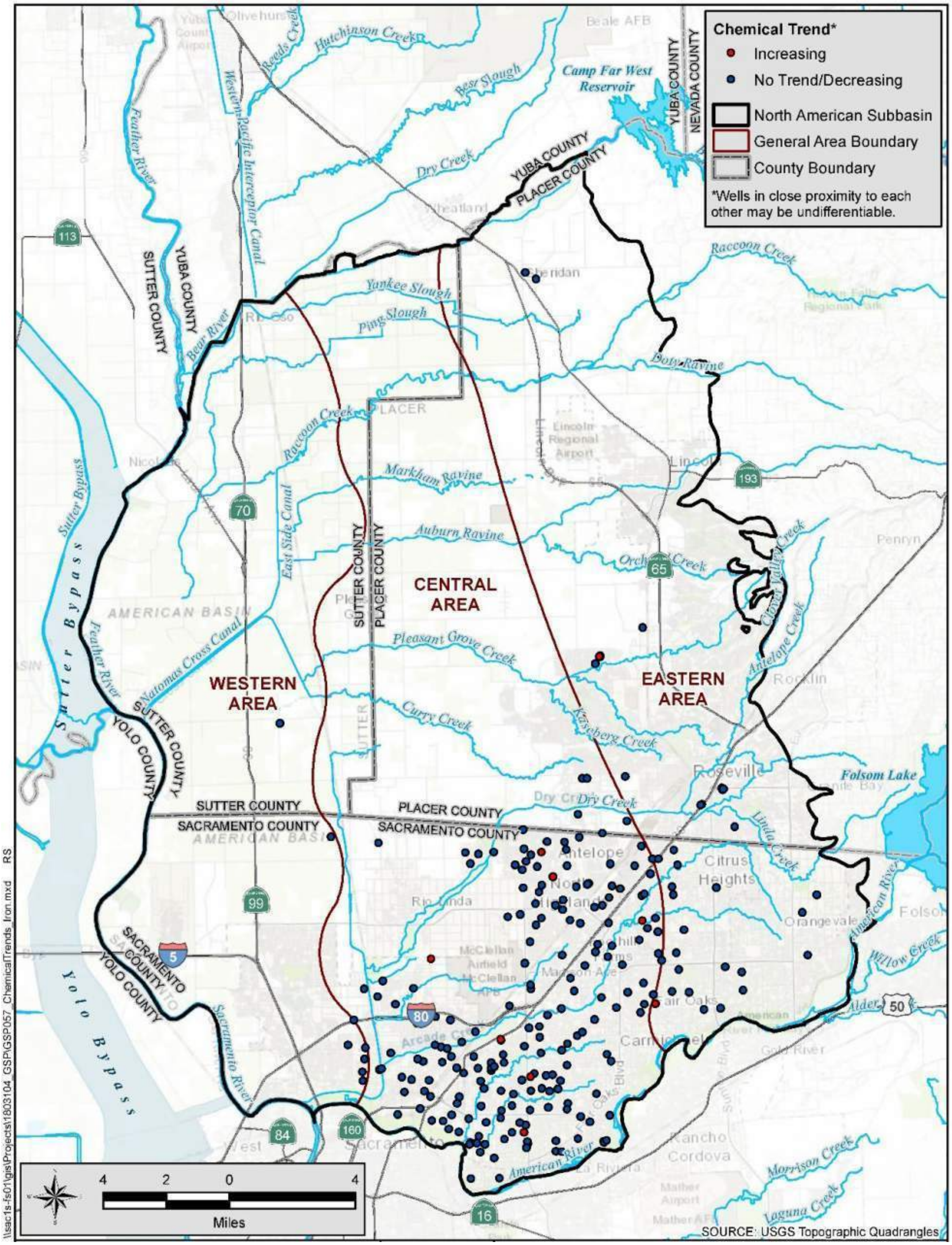


Figure 5-21. Distribution of Iron Trends

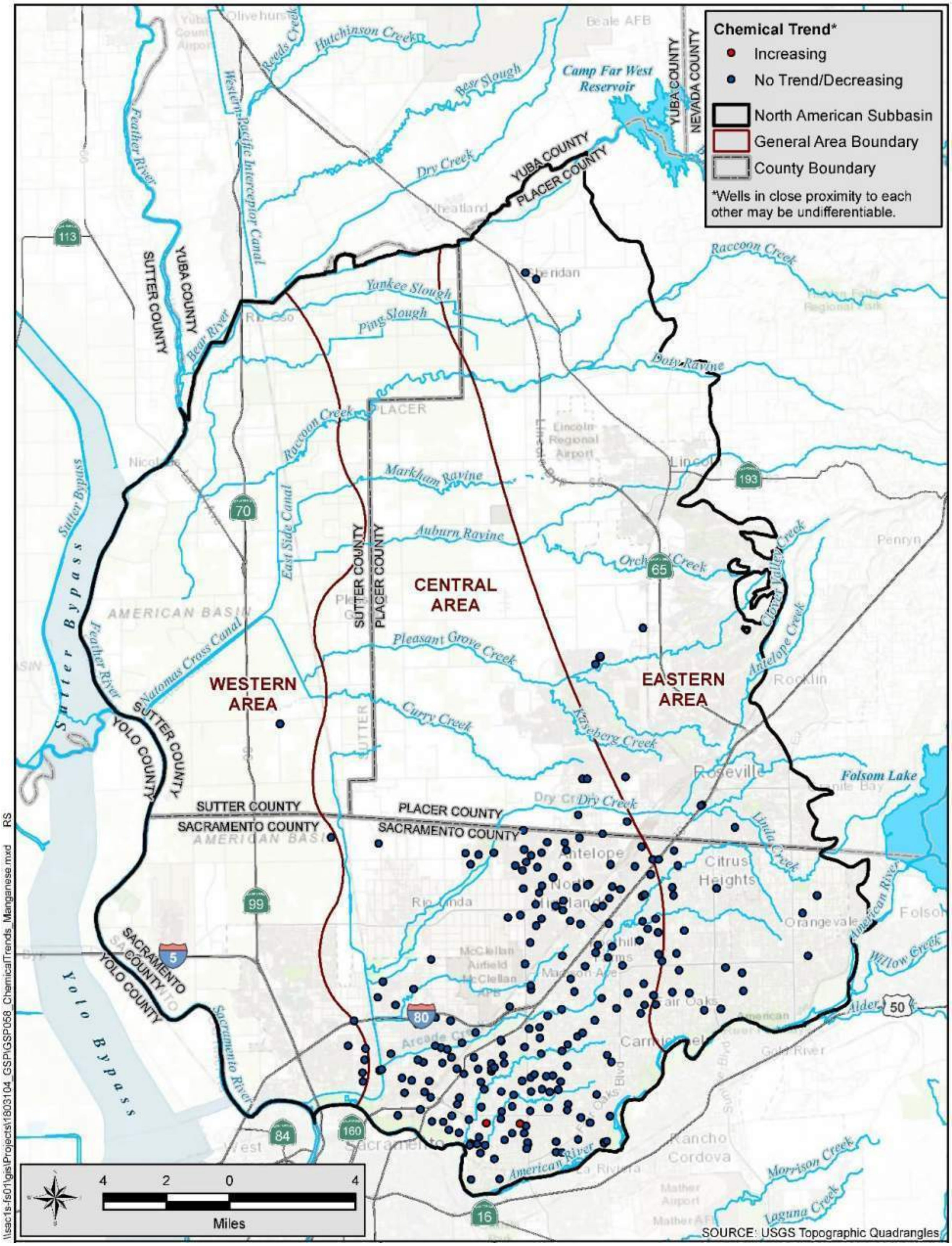


Figure 5-22. Distribution of Manganese Trend

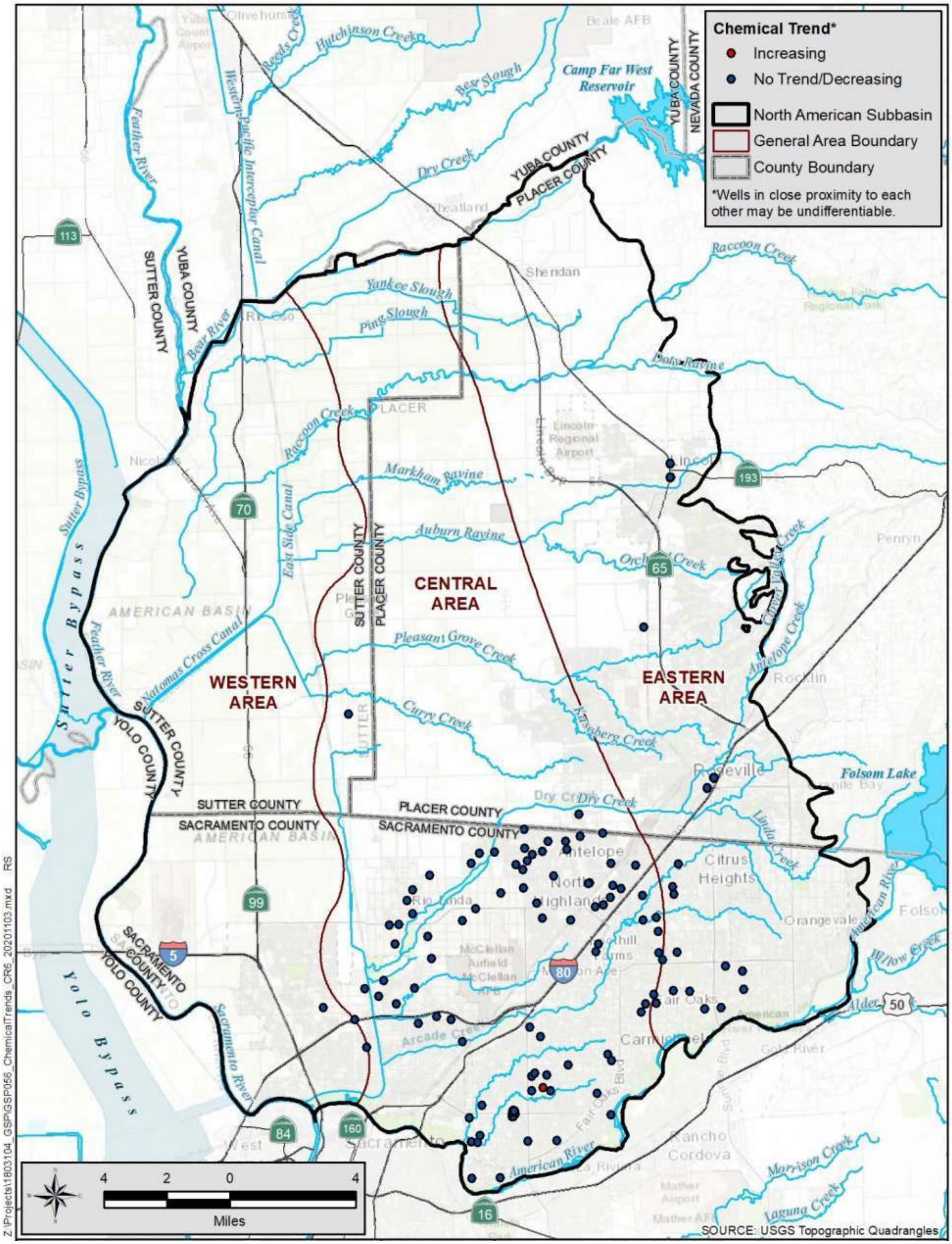


Figure 5-23. Distribution of Hexavalent Chromium Trend

5.8.3 Groundwater Contamination Sites and Plumes

In the NASb there are a few large and known groundwater contamination sites that could affect supply and beneficial uses of groundwater in the Subbasin. The most significant of these sites are the former McClellan AFB and the Aerojet Superfund Site (outside of the Subbasin). **Figure 5-24** shows the extent of the plumes at these sites. Cleanup activities, as overseen by U.S. Environmental Protection Agency, SWRCB, and the California Department of Toxic Substances Control, have been in progress for multiple years and contaminants appear to be contained.

At the former McClellan AFB, one of the cleanup methods in use is air-sparging, which injects air up to depths of 106 feet bgs and requires groundwater levels to remain below this depth for the clean-up to be effective. McClellan AFB resides within the Central area of the NASb and is part of the reason the pumping depression remains in this area. Their groundwater cleanup program is well established; mandated by Comprehensive Environmental Response, Compensation, and Liability Act and is not discretionary; and their pumping is relatively small, on the order of 2,000 acre-feet per year and will likely remain the same for years if not decades.

Although the Aerojet site is in the South American Subbasin, a contaminant plume (including perchlorate, trichloroethene or TCE, tetrachloroethene or PCE, and N-Nitrosodimethylamine or NDMA) extends north from Aerojet, under the American River, and into the NASb into the communities of Carmichael and Fair Oaks. The plumes are being remediated by Aerojet by pumping and treating the water to remove the contaminants.

There are other localized areas of groundwater contamination in the Subbasin that are generally smaller in size and the extent of contamination is typically localized near the properties and is being remediated (*refer to* **Figure 5-10)**.

Near Interstate 80 and the Sacramento and Placer counties boundaries (Roseville, Citrus Heights, and Lincoln Oaks areas), PCE contamination is present but the extent of the plume has not been defined. Currently, there are no active cleanup activities, even though concentrations in groundwater are detected above the MCL.

The Union Pacific Railroad site is located near Roseville Road and Vernon Street in Roseville. The primary constituents of concern are total petroleum hydrocarbons (including diesel, oil, and gasoline), volatile organic compounds (TCE, PCE, and others), semi-volatile organic compounds, dissolved arsenic, nickel and lead. Groundwater contamination assessment and remediation is in progress.

There are over 100 small sites that may present threats to local groundwater quality just in the SGA area. These sites may have leaking underground storage tanks, improperly stored pesticides, leaking dry-cleaning solvents, or other point sources of contamination (SGA, 2011). While the threat from many of these sites can be mitigated, the aggregate impact from undetected point-source contamination of groundwater quality in the basin cannot be determined.

Remedial activities are occurring at two landfills in West Placer County along with cleanup activities of nitrate and perchlorate at the Alpha Explosives facility.

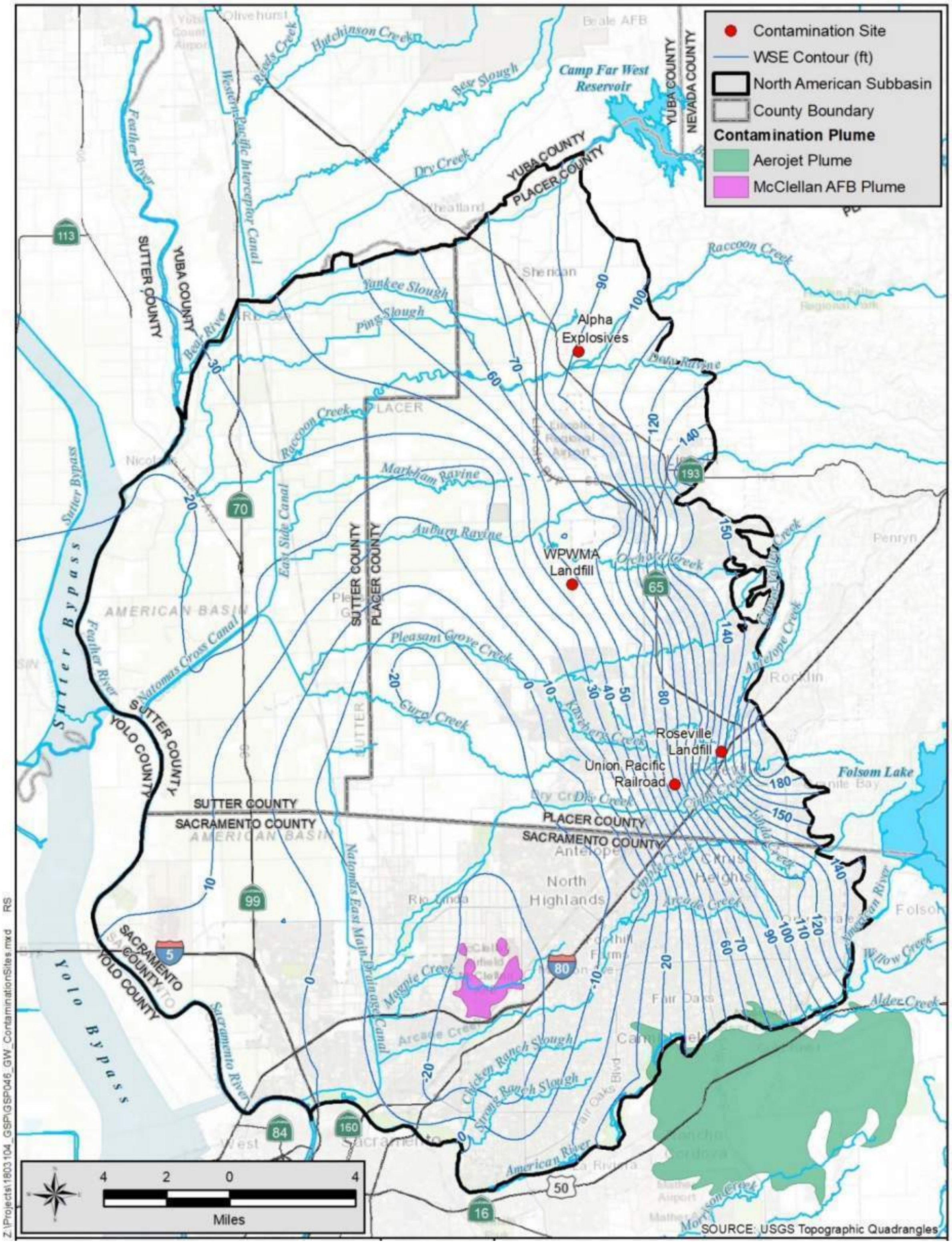


Figure 5-24. Groundwater Contamination Sites and Plumes

5.9 Seawater Intrusion

The NASb is more than 80 miles inland from the Pacific Ocean. However, tidal action and Delta outflow work to create a long and gradual salinity gradient from the ocean up the Sacramento River. Before Shasta Dam was constructed in 1943, seawater (defined as chloride concentration greater than 1,000 mg/L or about 5% seawater) had intruded up-river beyond Courtland (DWR, 1995), about 20 miles from the NASb. Since 1943, seawater intrusion into the river has remained below Isleton, about 40 miles from the NASb. Therefore, seawater intrusion unlikely to occur in the vicinity or in the Subbasin.

5.10 Land Subsidence

Substantial land subsidence could interfere with storm water drainage, canal delivery systems and transportation infrastructure. Subsidence monitoring in the NASb consists of one extensometer and benchmark surveys. Historically, benchmark surveys showed about 0.3 foot of subsidence due to groundwater levels declining by about 30 feet from the 1950s through 1970s or about 0.01 foot of land subsidence per foot of groundwater level decline (MWH, 2002); **Figure 5-25** shows this correlation. The location of the well that was used for this correlation is shown on **Figure 5-26**.

In 1994, DWR constructed the Sutter extensometer (SUT-Ext) and a nested monitoring well (SUT-P) in the Western area of the Subbasin, as shown on **Figure 5-26**. **Figure 5-27** shows the changes in ground surface as they relate to the maximum change in groundwater levels at this location. Since 1994, the groundwater levels have remained stable, with Fall lows only changing by about 20 feet between 1994 and 2019, a 26-year period. The ground surface shows elastic response and potentially some inelastic subsidence of up to 0.04 foot (about 1half inch). The inelastic response during this time period is less than that predicted from earlier benchmark survey data.

DWR performed a regional subsidence assessment by surveying benchmarks in the Sacramento Valley in 2008 and then again in 2017. **Figure 5-26** shows subsidence throughout the Subbasin over this 10-year period (DWR, 2018). The least amount of change has occurred in the Eastern area of the Subbasin with the greatest changes, 0.177 foot or 2 inches, in the south-Central and Western areas of the Subbasin. With any type of survey, there is some amount of error and uncertainty, which for this survey was approximately 0.17 foot Therefore, any change less than 0.17 foot is not considered statistically significant (DWR, 2018). This uncertainty helps explain an inconsistency between the data from the DWR benchmark survey data report and the extensometer data, the report indicating 0.134 foot of subsidence whereas the more accurate extensometer only shows about 0.04 foot, so the subsidence in the Western portion may be less.

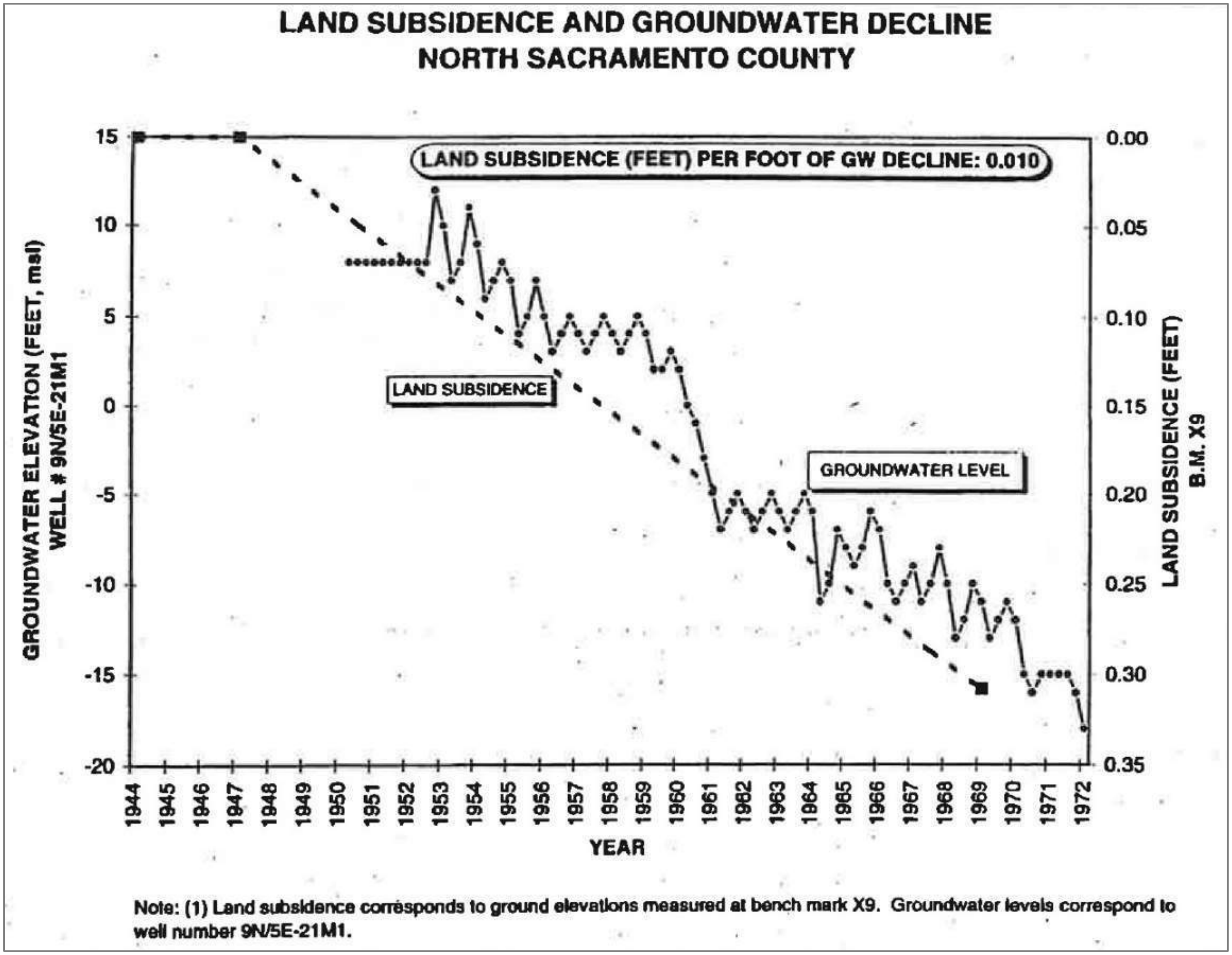


Figure 5-25. Land Subsidence and Groundwater Level Decline Correlation

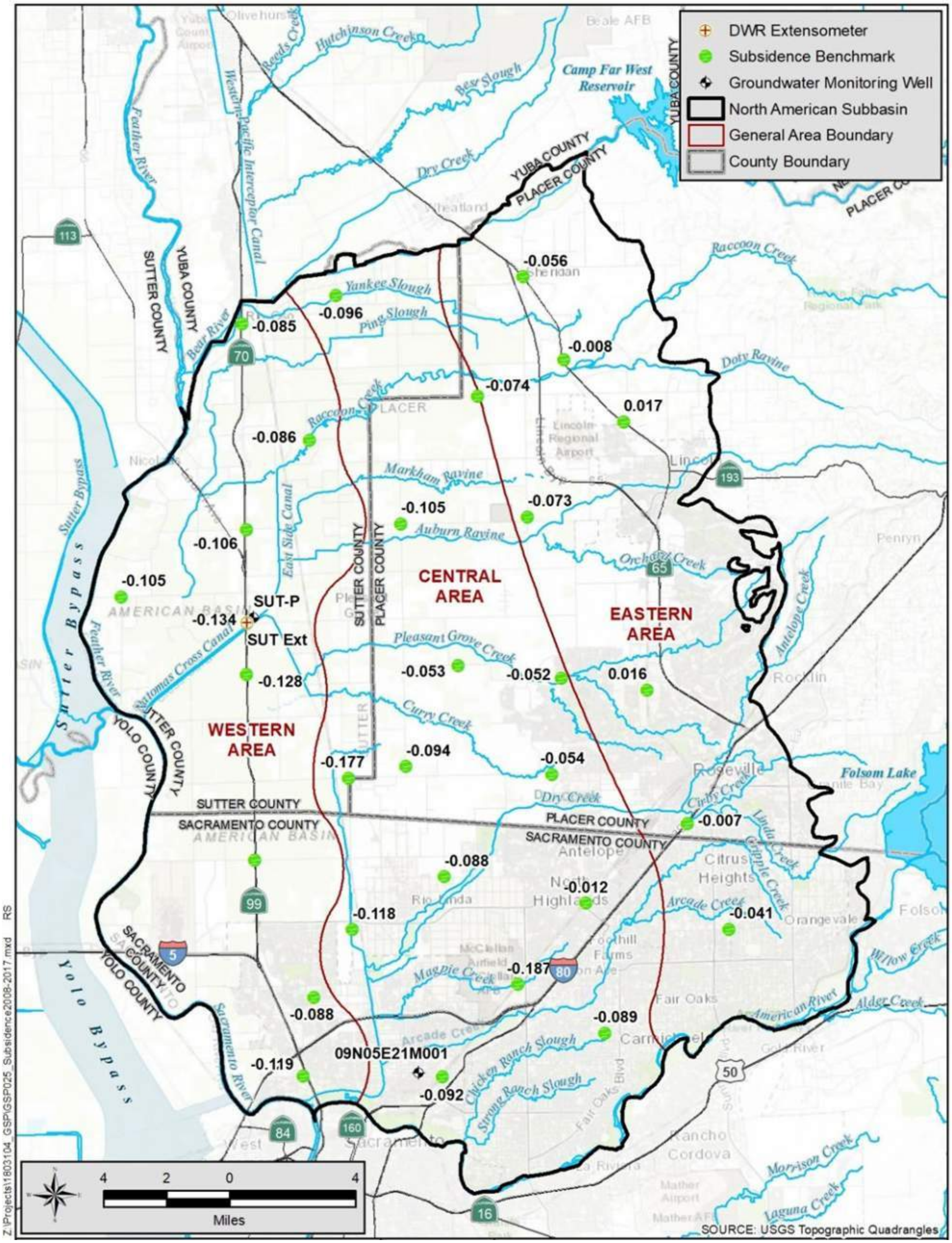


Figure 5-26. Benchmark Differences 2008-2017 (in Feet)

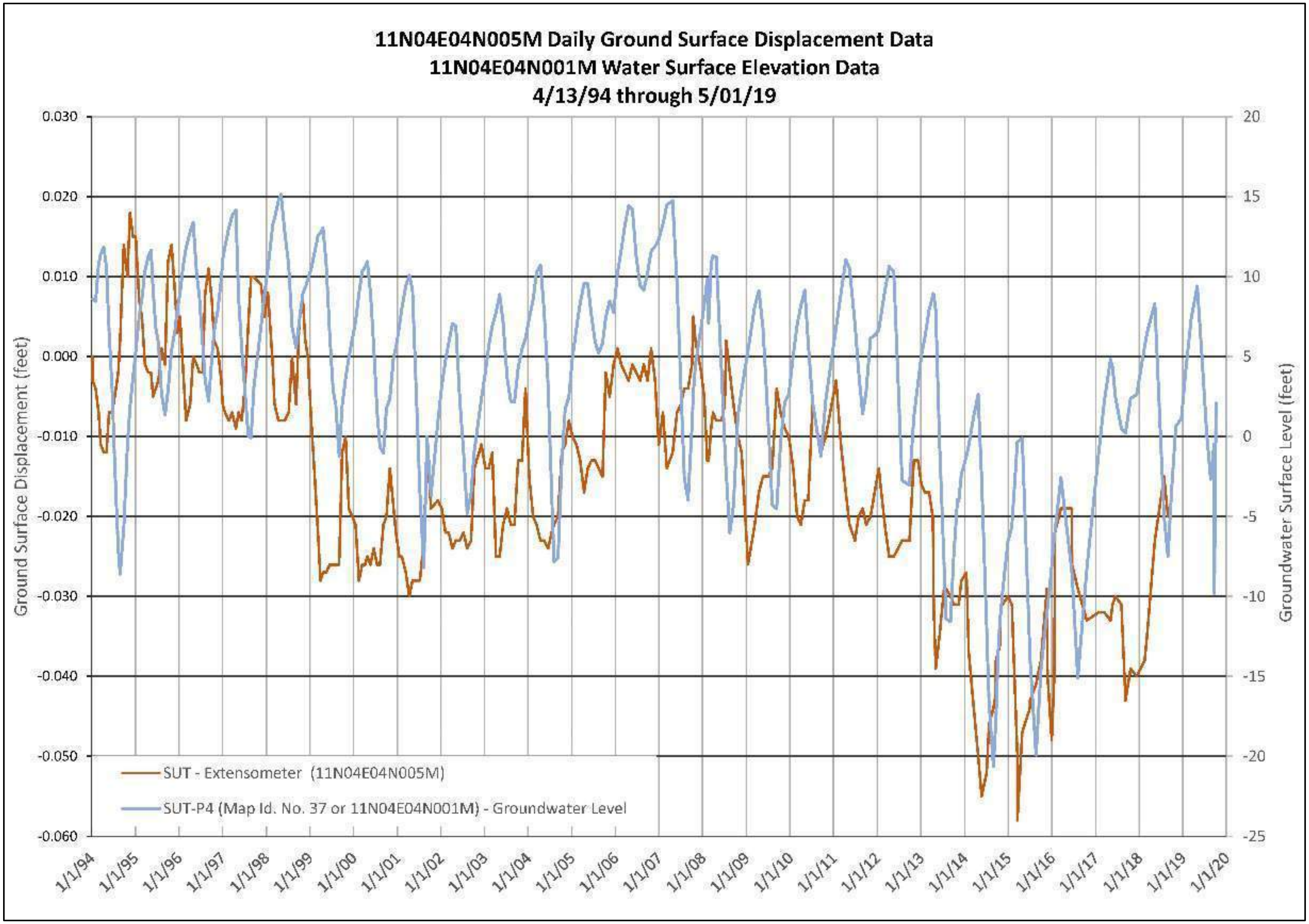


Figure 5-27. Extensometer versus Groundwater Levels

5.11 Interconnected Surface Water

Lowering of groundwater levels regionally or by local pumping of groundwater could deplete surface water (to an extreme case of the rivers or creeks going dry) and affect habitat and species dependent on surface water. Interconnected surface water refers to surface water that is hydraulically connected at any point by a continuous saturated zone to the underlying aquifer and the overlying surface water is not completely depleted (DWR, 2016). In other words, all of the sediment pores in the area are filled with water, from ground surface to the groundwater table. The depth-to-water map provides an initial indication of whether the rivers and creeks are interconnected or disconnected. For purposes of this GSP the rivers and creeks were assumed to be interconnected when the depth to water is less than 30 feet bgs (*see* **Appendix O** for description of methods used to determine depth to groundwater) and are subject to future refinements. In general, surface water and groundwater are interconnected along portions of the American, Bear, Feather, and Sacramento rivers.

Monitoring wells have been constructed in the Subbasin at various locations along the rivers and creeks to evaluate the interconnectedness of surface water and groundwater from a groundwater level and in some cases supported by water quality (stable isotopes; *refer to* **Figure 5-1** for monitoring well locations). Monitoring wells were also constructed along the Sacramento River to evaluate the levees and the effects of installation of man-made slurry walls. **Appendix N** contains the hydrographs from the wells along with surface water elevations and additional hydrographs from the levee studies.

Two patterns emerge from evaluating the groundwater levels hydrographs and interconnectedness interpretations – groundwater levels that respond to changes in surface water (interconnected) and those that do not (disconnected). For example, at monitoring wells 94 and 95 (RDMW-103 and -104), groundwater levels do not respond to changes in water levels in Bear River and the stable isotopes indicate the groundwater is from local origin and not higher elevation water as in the river. The conclusion was the river is not interconnected with groundwater at this location. Conversely, along the Feather River, at RDMW-101, the groundwater levels track similarly to water levels in the river and the stable isotopes show the influence of surface water in the groundwater (GEI, 2020). These monitoring wells with these proven relationships are in areas where the depth to water is less than 20 feet of ground surface.

With this documented relationship, groundwater levels in the monitoring wells adjacent to the rivers and creeks were evaluated for interconnectedness. **Figure 5-28** shows the locations where the hydrographs show the rivers and creeks are interconnected.

- In the Western area, groundwater is connected with the Sacramento and Feather rivers. Even within short distances this condition may change, as shown along the Sacramento River in the studies performed for SAFCA (*see* Kleinfelder report in **Appendix N**).

- In the Central area, as described in **Section 5.2**, most groundwater levels are over 100 feet bgs and there is no continuous saturated zone as proven along lower Dry Creek at WPMW-5A (Local Well No. 41) where the shallow monitoring well was constructed into the first sand and gravel layer is dry. The newly constructed WMPW-11A (Local Well No. 91), which is adjacent to Markham Ravine, also encountered groundwater during hand-auguring at about 4 feet bgs while the depth to groundwater at this location is over 70 feet bgs indicating a continuous saturated interval is not present (disconnected from the underlying aquifers). Along portions of the American and Bear rivers, the groundwater is interconnected with the rivers.
- In the Eastern area, there is interconnection along upper portions of Dry Creek and its tributaries, potentially along Auburn Ravine as it enters the Subbasin and Racoon Creek west of Highway 65 as indicated by shallow depths to water. Studies along the upper reaches of Racoon Creek, generally east of Highway 65, show the area is underlain by the Ione Formation and, due to its low permeability, would tend to perch water. Therefore, the surface water is not connected to the principal aquifer. East of Highway 65, near Racoon Creek, groundwater levels decrease rapidly so the creek is not interconnected with groundwater. Groundwater levels are interconnected along the American River but for only a short extent near Lake Natomas and potentially a short distance along the Bear River east of RDMW-103.

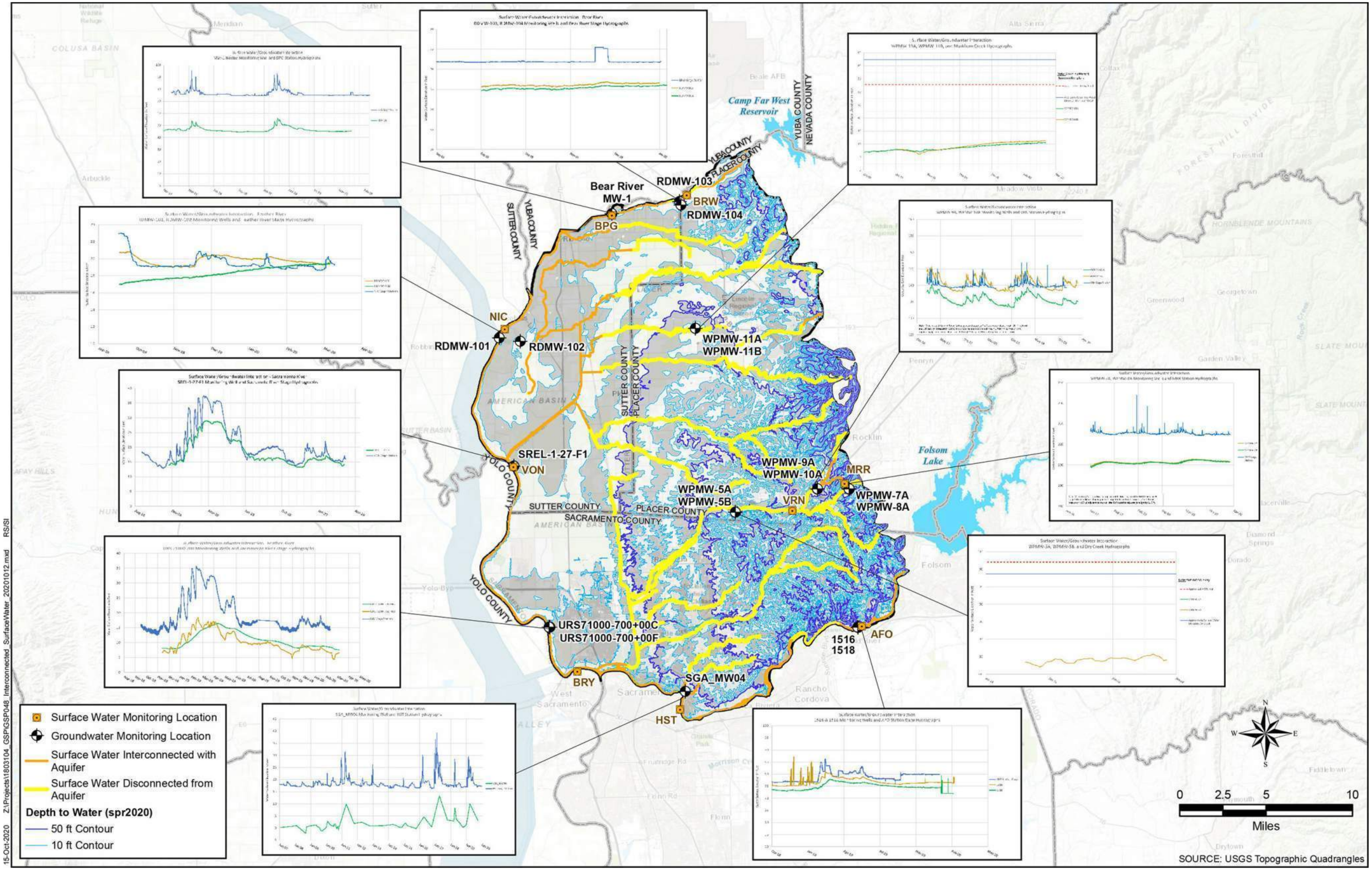


Figure 5-28. Interconnected Surface Water

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5.12 Groundwater-Dependent Ecosystems

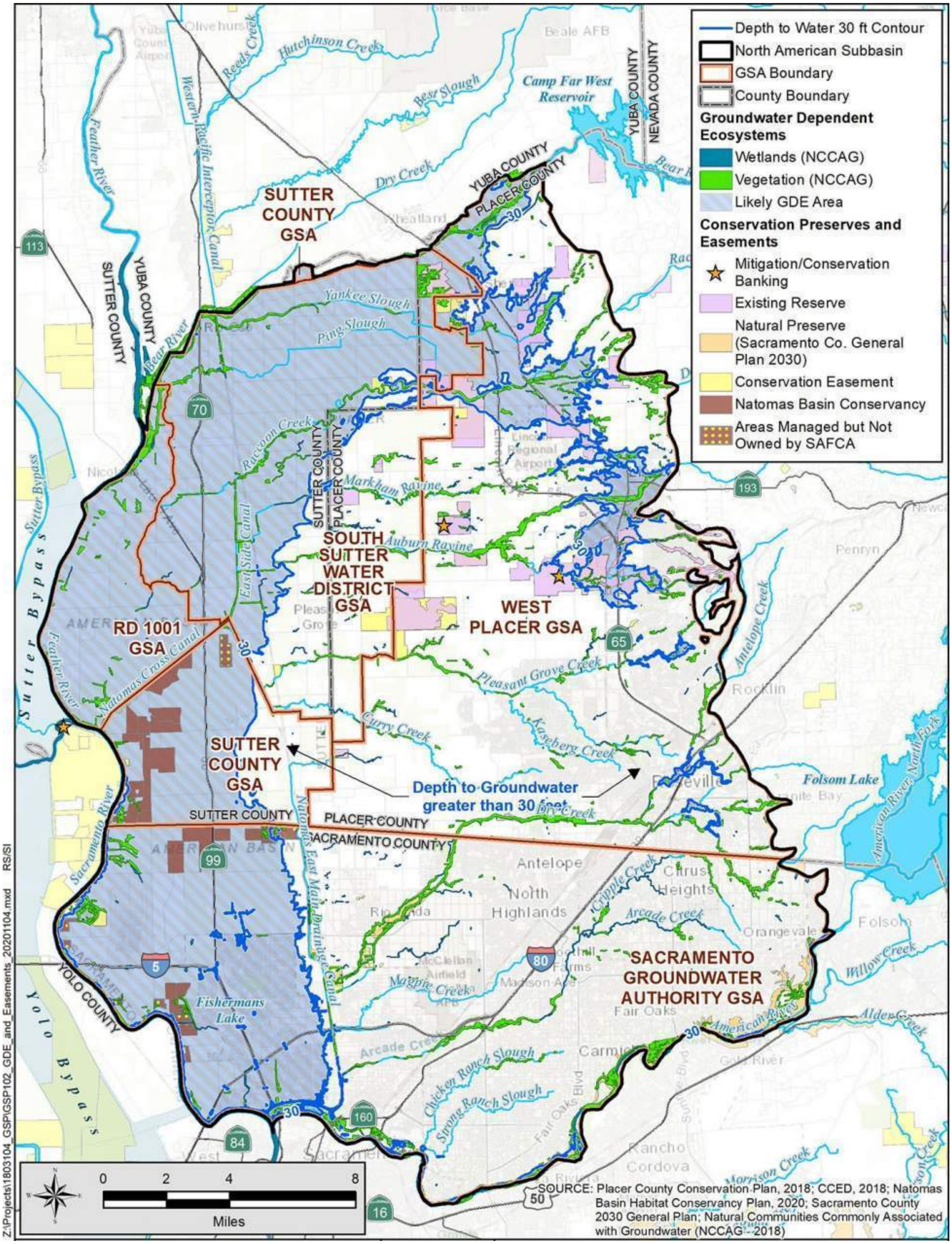
The Natural Communities Commonly Associated with Groundwater dataset (NCCAG, 2018) was used to provide the locations of potential groundwater dependent ecosystems (GDEs). Likely GDEs were developed by plotting the depth to groundwater developed from shallow monitoring wells, those with screen intervals between 20 and 300 feet bgs along, with ground surface elevations from National Elevation Dataset and invert elevations in the rivers and sloughs. Water surface elevations were then subtracted from ground surface elevations to obtain the depth to water throughout the Subbasin. **Figure 5-29** shows the depth to groundwater contours along with potential GDEs. Areas where groundwater levels are less than 30 feet below ground surface are areas where likely GDEs are present. **Appendix O** contains a detailed description of this approach.

5.13 Data Gaps

The groundwater conditions in the NASb have been investigated and documented since 1912 through present. Most of the recent improvements to data gathering were construction of new monitoring wells to replace voluntary wells to improve the quality of groundwater level data. At this time there are no data gaps in the groundwater conditions that would affect the ability to sustainably manage the Subbasin within the next 5 years.

Information that would improve the overall knowledge of groundwater conditions in the Subbasin are:

- **Water Quality** – continued water quality sampling should provide enough water quality data to further assess water quality trends in the northern portions of the Subbasin.
- **Aquifers Assessment** – groundwater levels in the aquifers are stable as shown by the hydrographs but warrant further assessment in the Western area because groundwater levels in deeper nested monitoring wells in the Mehrten Formation are up to 23 feet deeper than groundwater levels in the Laguna Formation as seen in most monitoring wells in the Central and Eastern areas.
  Further evaluation should include the following:
    - groundwater pumping in adjacent Subbasins in the deeper aquifers
    - relation of the Willows Fault to the affected aquifers
    - use of new geophysical tools to map the extent of aquifers (statewide program proposed by DWR)
- **Interconnected Surface Water –** confirmation of areas likely to be interconnected.



SOURCE: Placer County Conservation Plan, 2018; CCED, 2018; Natomas Basin Habitat Conservancy Plan, 2020; Sacramento County 2030 General Plan; Natural Communities Commonly Associated with Groundwater (NCCAG - 2018)

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Figure 5-29. Likely Groundwater Dependent Ecosystems

Public Draft

H

Appendix H - 2021 Water Shortage Contingency Plan

(Public Draft Version)

Public Draft

Placer County Water Agency (PCWA) Water Shortage Contingency Plan

8.1 Water Supply Reliability Analysis – Western Water System

Through its Western Water System, PCWA currently provides approximately 125,000 acre-feet of water annually, either directly or indirectly, to over 60,000 individual homes, businesses, and irrigation customers, serving a total population of over 150,000.

The area served by the Western Water System extends from the community of Alta on the east, down the interstate 80 corridor, to the Sutter and Sacramento county lines on the west and south. The service area includes treated water deliveries from PCWA water treatment plants to the communities of Alta, Monte Vista, Applegate, Colfax, Auburn, Loomis, Rocklin and Lincoln and much of the surrounding unincorporated communities and areas. In addition to treated water service, PCWA provides untreated water through its extensive canal system to individual customers. PCWA also delivers untreated wholesale water to the City of Roseville (Roseville), Sacramento Suburban Water District (SSWD), San Juan Water District (SJWD), and several other small water districts, the amounts and populations of which are not included in the totals summarized above.

The Western Water System has two primary sources of surface water that are currently in use: Pacific Gas and Electric (PG&E) contract supplies from the Yuba and Bear Rivers delivered through PG&E's Drum-Spaulding Hydroelectric Project (Drum-Spaulding) into a network of distribution canals at various locations that are owned and operated by PCWA and (2) PCWA's Middle Fork Hydroelectric Project (MFP) water rights that can be delivered through a pump station on the American River near Auburn into the Auburn Ravine Tunnel. In addition to these primary supplies, PCWA has a small amount of Pre-1914 water rights including one on Canyon Creek as well as a contract with the US Bureau of Reclamation for Central Valley Project water. PCWA also has access to groundwater, along with several emergency intertie connections with other purveyors.

PCWA's canal system is the backbone of its Western Water System, taking gravity water delivery from PG&E at various locations, and delivering water to PCWA water treatment plants, the treatment plants of several other public and private water purveyors, and delivering irrigation water to over 4,200 customers along the canal system and through Auburn Ravine to western Placer County.

The American River supply has only recently been developed as a reliable source; the American River Pump Station was constructed in 2007 to facilitate continued planned urban developments as PCWA reaches its maximum allowed delivery rate under its PG&E water supply contract. The design delivery rate from the American River is about 190 cubic feet per second (cfs), which is intended to provide about 35,500 acre-feet annually into the Western Water System.

In 2020 approximately 74 thousand acre-feet (TAF) (58%) was used for irrigation purposes serving approximately 4,200 customers and 53 TAF (42%) was delivered as treated water for municipal and industrial purposes.

Dry Year Supply Reliability

Upon review of historic PG&E delivery records, as well as modeling studies done on the Middle Fork Project, the following table summarizes PCWA’s water supply. The criteria of unimpaired flow into Folsom Lake was used to determine single and multiple dry year scenarios.

Table 1 – PCWA Water Supply

Normal

Supply Source	2025	2030	2035	2040	Buildout	% Reduction
MFP	120,000	120,000	120,000	120,000	120,000	0%
CVP	0	35,000	35,000	35,000	35,000	0%
PG&E	125,400	125,400	125,400	125,400	125,400	0%
Pre 1914 Approp.	3,400	3,400	3,400	3,400	3,400	0%
Recycled Water	0	2,500	5,000	7,000	9,000	0%
Groundwater	2,000	4,000	4,000	5,000	5,000	0%
Total Supply	**250,800**	**290,300**	**292,800**	**295,800**	**297,800**	

Single Dry Year (1977)

Supply Source	2025	2030	2035	2040	Buildout	% Reduction
MFP	120,000	120,000	120,000	120,000	120,000	0%
CVP	0	17,500	17,500	17,500	17,500	50%
PG&E	62,700	62,700	62,700	62,700	62,700	50%
Pre 1914 Approp.	850	850	850	850	850	75%
Recycled Water	0	2,500	5,000	7,000	9,000	0%
Groundwater	2,000	4,000	4,000	5,000	5,000	0%
Total Supply	**185,550**	**207,550**	**210,050**	**213,050**	**215,050**	

Multiple Dry Years (DRA Years 1-5 would be same) 1988-1992

Supply Source	2025	2030	2035	2040	Buildout	% Reduction
MFP	120,000	120,000	120,000	120,000	120,000	0%
CVP	0	26,250	26,250	26,250	26,250	25%
PG&E	125,400	125,400	125,400	125,400	125,400	0%
Pre 1914 Approp.	1,700	1,700	1,700	1,700	1,700	50%
Recycled Water	0	2,500	5,000	7,000	9,000	0%
Groundwater	2,000	4,000	4,000	5,000	5,000	
Total Supply	**249,100**	**279,850**	**282,350**	**285,350**	**287,350**	

In most cases of reduced allocation from PG&E, the combination of these supplies can be distributed in a manner that all customers in the water system can be expected to conserve the same percentage relative to normal year deliveries. In extreme dry years, approaching 50% cutback from PG&E, customers on the canal system may need to conserve a greater percentage due to limitations in infrastructure delivering Middle Fork Project water into the canal system.

8.2 Annual Water Supply and Demand Assessment Procedures

OVERVIEW

By July 1 of each year, each water purveyor with 3,000 or more service connections, or delivering 3,000 acre-feet or more of treated water, is required to complete and submit an Annual Water Supply and Demand Assessment to the California Department of Water Resources as required in AB 1414, Section 10632.1, that assesses the current year's water supply and demands, and the expected water supply and demand as if the following year will be categorized as dry. This assessment will be used to determine if a supply shortage exists and if actions need to be implemented to reduce demands.

Backup documentation for the annual submission will include details of each PCWA water supply source and projected total water demands. The assessment presented to the PCWA Board of Directors for information and/or action (if necessary) and the annual submittal to the State will be a high-level summary of the analysis.

Typically, two reports will be given to the PCWA Board by, or on behalf of, the Director of Resource Management prior to the annual submittal. Following the March 1 snow survey, a Water Supply Conditions Update will be given to the PCWA Board to provide current precipitation, snowpack, and storage conditions for the Middle Fork and Drum-Spaulding Projects. A second and similar report may be given following the April 1 survey. Early April has historically been the period of peak snowpack accumulation with a majority of the year's precipitation having already occurred. Water supply conditions for the remainder of the year are well known around this time.

PG&E contracted water supply allocations are determined and reported to PCWA in early May. PCWA's retail and wholesale water demand projections are updated in early May and the information is used to determine if there is an excess or shortage of water supply available for the summer and fall demands. By June 1 of each year, PCWA will prepare the Annual Water Supply and Demand Assessment that details the current year's water supply availability based on the water supply information described above and the demands described in the Urban Water Management Plan. The assessment will be presented to the Board in late May or early June.

Also, by June 1 of each year, PCWA will prepare an annual Water Shortage Assessment Report summarizing the water supply and demands estimates from the assessment, including information on any anticipated shortages, and if necessary, the shortage response actions, compliance and enforcement actions, and communication actions to be implemented consistent with this Water Shortage Contingency Plan.

Supply and Demand Assessment Timeline

Start Date	Finish Date	Activity	Responsible Party	Key Evaluation Criteria
Jan 1	May 1	Assess current year unconstrained wholesale and retail demand from PCWA system	Engineering	UWMP forecast data, major changes in development and/or unanticipated demand changes from UWMP forecast
Jan 1	April 15	Obtain Zone 5 Agricultural Demands and determine preliminary availability	Customer Services/Resource Management	Zone 5 Untreated Demand
Jan 1	May 1	Assess current year unconstrained wholesale demand of MFP supply	Resource Management	Wholesale requests (Roseville, SJWD, SSWD)
Jan 1	May 1	Identify planned MFP outages	Power/Drinking Water Operations	PG&E Outages, Maintenance/Ops outages
Jan 1	May 1	Identify planned outages (PG&E canals, ARPS, ORPS)	Field/ Drinking Water Operations /Engineering	Dates and durations of outages
Jan 1	May 1	Identify any infrastructure limitations	Engineering/Operations /Power	Affected assets, dates, and duration of outage
Jan 1	May 1	Determine annual allocations of PG&E and MFP supplies	Resource Management	Snowpack, surface water allocation, reservoir levels
Jan 1	Mid May	Conduct initial supply and demand assessment; identify shortages	Resource Management	Supply and demand amounts identified above
Mid May	Late May	If shortage exists determine recommend response level from WSCP	Engineering/Customer Services	WSCP Action levels
Mid May	Late May	Prepare final assessment and presentation	Resource Management	None
First Board Meeting in June	First Board Meeting in June	Receive presentation on and Supply and Demand Assessment and take action (if necessary)	Board	None
Mid-June	TBD	Implement WSCP actions, communications, and protocols	PCWA Staff	None
Mid-June	Late June	Finalize Supply and Demand Assessment and submit	Resource Management	None

Data Sources

There are many sources of data used to monitor hydrologic and water supply conditions and to estimate potential water supply availability to meet PCWA annual demands.

Customer Demands

- Historical treatment plant production
- Customer billing data
- Historical wholesale deliveries

Water Supply Conditions

- Precipitation
    - California Data Exchange Center (CDEC)
    - California Nevada River Forecast Center (CNRFC)
- Snowpack
    - DWR California Cooperative Snow Surveys
    - Snow Sensors (CDEC, American River Hydrologic Observatory)
    - Remote sensing and models (CNRFC, SNODAS)
- Reservoir Storage
    - PCWA, PG&E, and NID monitored reservoirs
    - CDEC
- Runoff Projections
    - PCWA Proprietary Runoff Forecasting Model
    - CNRFC
    - DWR B120

Weather Forecasts

- Energy Marketing Staff
- National Weather Service

PCWA Water System Capabilities and Constraints

Canal System

The PCWA untreated water conveyance system consists of 170 miles of earthen and lined canals, with flumes and pipelines where needed, beginning in the community of Alta, flowing southwest, generally following Interstate 80, and ending near the western edge of Placer County in Roseville.

The canal system is contractually separated by water supply agreements with PG&E into two service zones. Zone 3 begins at the PG&E Alta Forebay, continuing southwest until just below PCWA's Lake Theodore north of Auburn. Zone 1 begins at Lake Theodore, continuing southwest to Roseville.

PCWA purchases water at several connections to the PG&E canal system called "Buy Points" individually identified as an "YB Point", positioned at key locations between Alta and the end of PG&E's South Canal. The maximum flow rate that PCWA can receive from all PG&E combined Zone 1 YB points is 244.8 cfs. The current maximum PG&E flow rate into Zone 3 due to canal system constraints below Lake Alta is 35 cfs, however future upgrades to the zone 3 canal system are being designed for a capacity of 50 cfs.

Water can also enter the canal system from accretion flows into the canals, Pre-1914 water rights, and return flows from PCWA untreated water customers (water that is delivered to customers and flows back into the canal). Middle Fork Project water can also be pumped out of the North Fork of the American River at the PCWA American River Pump Station, into a 3-mile tunnel (Auburn Tunnel) under the City of Auburn to a valved outlet into Auburn Ravine, where the water is purchased by customers west of the City of Lincoln.

The tunnel outlet can be closed, and the Middle Fork Water pumped out of the tunnel at the Ophir Pump Station into the PG&E South Canal, or to the Foothill and Ophir (future) Water Treatment Plants.

Pre-1914 Water Rights

Four Pre-1914 water rights were included with the purchase of portions of the PG&E canal system. These Pre-1914 water rights are on natural water courses which are also used to convey water purchased from PG&E to a downstream PCWA canal or diversion. Two of the Pre-1914 water rights diversions are near the headwaters of North and South Fork Dry Creeks. A third Pre-1914 water right is on an un-named tributary to the Auburn Ravine.

The last Pre-1914 water right is in Zone 3 near Alta. Natural flows, up to 40 cfs, can be diverted into the PCWA Pulp Mill Canal for use in either Zone 3 or Zone 1. One cfs is diverted back into Canyon Creek by PG&E as a required stream maintenance flow upstream of the PCWA diversion point. PG&E can also deliver water to PCWA at this diversion point when performing maintenance on their Towle Canal, several miles upstream of this location.

Nevada Irrigation District Water to Foothill WTP

The Nevada Irrigation District (NID) shares capacity in South Canal with PG&E to transport and release water into Auburn Ravine at YB 132 and YB 259, both below PG&E's Wise Powerhouse.

Until NID constructs and puts into operation a water treatment plant for their service area in the City of Lincoln, NID wheels water through PCWA and the City of Lincoln to its service area. NID uses a portion of their capacity in the South Canal to deliver NID untreated water to PCWA's Foothill Water Treatment Plant without affecting the maximum PCWA Zone 1 flow diversion of 244.8 cfs. This water is treated at the Foothill WTP and delivered to the City of Lincoln through the Lincoln Metering Station near the PCWA Sunset Water Treatment Plant. The City of Lincoln then delivers this treated water to the NID service area.

Middle Fork Project

PCWA owns and operates the Middle Fork Hydroelectric Project (MFP), a FERC licensed hydroelectric and water storage project on the Middle Fork American and Rubicon Rivers. PCWA's relicensing effort resulted in a new license being issued on June 8, 2020 for a 40-year term. Electricity is generated year-round, with water being diverted to storage between November 1 and July 1 each year.

There are five water right permits associated with the Middle Fork Project. Three of the Permits are for hydroelectric generation and two permits are for M&I consumptive use.

For this document, only the M&I consumptive permits are relevant. These permits allow PCWA to divert up 120,000-acre feet of water per year from the MFP. Consumptive use of this water is used following a voluntary agreement with several water purveyors, called the Water Forum Agreement, that divert water from the Lower American River. Following the Water Forum Agreement, PCWA has agreed to pump up to 35,500-acre feet of water at the American River Pump Station until further environmental analysis can be completed. MFP water is not currently fully utilized and is needed to meet the needs of future PCWA growth/development. https://www.waterforum.org/stakeholders/agreement/

Folsom Reservoir

In addition to pumping MFP water from the American River Pump Station, MFP water is also diverted out of Folsom Reservoir by the Los Logos Homeowners Association, the City of Roseville, the San Juan Water District, the Sacramento Suburban Water District, and for PCWA out of County water sales. PCWA does not currently own or control facilities that can convey Middle Fork Project or Central Valley Project water from Folsom Reservoir to the PCWA service area but anticipates future diversions of MFP and CVP supplies from the reservoir.

Treated Water

PCWA owns and operates eight water treatment plants between Alta and Rocklin, produces approximately 42,000-acre feet of potable water each year. Treated water is distributed in over 615 miles of pressurized pipe and delivered to various retail and wholesale customers.

PCWA also has several treated water interties with neighboring water agencies: NID, San Juan Water District, the City of Lincoln, and the City of Roseville. Some these connections are one way due to pressure differences, while other connections can flow water in either direction with the use of pumps or pressure reducing valves.

Base PCWA Water Supply

Refer to Table 1 under Section 8.1 for PCWA water supply summary.

Projecting Water Supply Availability

PCWA has ample storage supplies through its PG&E contracts from the Drum-Spaulding Hydroelectric Project and water rights from its own MFP. These combined supplies provide more than enough supply to meet all of PCWA's demands, including multiple dry years. Actual water supply availability from each source is dependent on annual hydrologic conditions and regulatory storage and release requirements. As a result of California's

Mediterranean climate, the amount of annual precipitation and snowpack ranges widely from year to year. Historically, the region will begin to experience precipitation events in October following the dry summer months. October is the beginning of the Water Year which runs from October through September of the following year. Hydrologic forecasts, and thereby runoff projections have the greatest range of outcomes and the lowest confidence at the beginning of the water year. By late April, the majority of the years precipitation and snowfall will have already been observed as the climate transitions into the drier and warmer spring and summer months. The range of hydrologic projections begin to converge and confidence in water supply forecasts for determining how much water is available for consumptive demands for the remainder of the calendar year is greatly improved.

Middle Fork Project

On a monthly basis, PCWA's Energy Marketing Department produces an ensemble of operating plans for the Middle Fork Project that accounts for varying hydrologic and runoff projections, regulatory commitments required by the license to operate the MFP from the Federal Energy Regulatory Commission (FERC), consumptive demands, and use of surplus discretionary water for optimized hydropower production.

Unimpaired runoff projections for French Meadows Reservoir, Hell Hole Reservoir, and other tributaries in the watershed are produced and provided to PCWA by the California-Nevada River Forecast Center (CNRFC). The CNRFC is a branch of the National Weather Service and provides detailed hydrologic forecasts throughout the nation. The Energy Marketing staff collaborate with CNRFC staff who are dedicated to the American River Basin to validate and calibrate the hydrologic runoff model. Additionally, the Energy Marketing staff monitor conditions in the basin from various Meteorological (MET) stations and participate in the monthly California Cooperative Snow Surveys by measuring snowpack conditions at four snow courses in the MFP watershed.

PCWA's FERC License dictates the minimum amount of water that needs to be maintained in the river reaches below the MFP storage reservoirs for environmental and recreational purposes. These minimum release requirements vary by water year type. The water year type is determined in April and May following the release of the Department of Water Resources Bulletin 120 (B120) water supply report. There are six water year type classifications varying from Critically Dry to Wet and are based on the median projection of unimpaired inflow into Folsom Reservoir (UIFR)

Drum-Spaulding Project

Like PCWA, PG&E staff regularly produce an ensemble of operating plans for the Drum-Spaulding Project to determine water supply availability. Both PCWA and the Nevada Irrigation District have water supply contracts from PG&E for water from the Drum-Spaulding project and participate in weekly discussions of coordinated operations.

Following the May 1 snow surveys, PG&E makes a determination of water supply availability for the remainder of the year and provides PCWA with a water supply allocation Only in extremely dry water years has the Drum-Spaulding allocation been reduced. Should there be a reduction in allocation, there is currently excess capacity from the other water supply sources to meet total demands.

Central Valley Project

The Central Valley Project (CVP) supply allocation amounts are based on an estimate of water available for delivery to CVP water users and reflects current reservoir storages, precipitation, and snowpack in the Central Valley and Sierra Nevada. Initial water supply allocations are typically reported in February and updated periodically until a final allocation is reported in May or June.

Projecting Unconstrained Demand

PCWA will utilize the 5-year demand forecast included in the 2020 Urban Water Management Plan to estimate retail and wholesale demands. If significant changes in development, operations, or other factors that influence demand are identified, these forecasts will be updated.

PCWA provides MFP Water Rights water via wholesale water supply contracts annually to the City of Roseville, San Juan Water District and Sacramento Suburban Water District) (collectively referred to herein as "wholesale agencies") at Folsom Reservoir, a Point of Diversion and Re-Diversion under PCWA's MFP Water Rights (13856 & 13858).

All three contracts are relatively similar in terms, containing maximum entitlement volumes. The City of Roseville up to 30,000 AF, the San Juan Water District up to 25,000 AF and Sacramento Suburban Water District up to 29,000 AF. While the City of Roseville and San Juan Water District supplies are available every year, Sacramento Suburban Water District supplies are only available in wetter years to facilitate groundwater recharge when the March through November Unimpaired Inflow to Folsom Reservoir (UIFR) is more than 1.6 MAF.

Consistent with contract terms, each wholesale agency provides PCWA with an annual diversion schedule containing the projected monthly diversion volumes for each calendar year. Because wholesale agency demands for MFP wholesale water are typically realized after March, the wholesale agencies provide their annual delivery schedules to PCWA consistent with the requirements of their respective Warren Act Contracts (WAC). The WAC are agreements executed by each respective wholesale agency and the U.S. Bureau of Reclamation (USBR) governing the storage and conveyance of Non-Project water (e.g., PCWA's MFP water) through Folsom Reservoir, a CVP facility. For the purposes of scheduling Non-Project water, the "year" is defined in each respective WAC as March 1 through the February of the following calendar year.

As such, PCWA receives wholesale agency delivery schedules around March 1 for the year as defined in these WAC. These schedules are used to plan deliveries from the MFP to Folsom Reservoir. In addition, each wholesale agency provides PCWA and the USBR with a monthly diversion report consistent with the terms of their WAC, which reports for actual monthly diversion volumes as well as adjustments to the requested volumes in the coming months to account for any projected changes in demand. The process is iterative and can change from month to month. At the end of the calendar year, diversion volumes are finalized, and reconciliations are made if warranted.

Planned Water Use for Current Year Considering Dry Subsequent Year

With the exception of groundwater and water supply from the Middle Fork Project, PCWA does not have large storage reservoirs to store water for future years. Water supply availability is determined on an annual basis. The Middle Fork Project is operated to an annual carryover storage that provides enough stored water for multiple dry years including any potential shortages from other water supply sources.

8.3 Six Standard Water Shortage Levels

Water Shortage Actions - General

One of the keys to understanding how to respond to the loss of a significant amount of water is to first understand what is possible in terms of the use of the Middle Fork Project supply. Middle Fork Project water can be pumped from the American River into the Auburn Ravine Tunnel and from the tunnel up to the ground surface near Ophir, where it can be delivered to PCWA's Dutch Ravine Canal or the Foothill and Sunset water treatment plants. Middle Fork Project water would be able to supply the treatment plants with enough water to meet all lower Zone 1 treated water demands of about 34 TAF, which represents approximately 83% of treated water use in the Western Water System. Middle Fork Project water has a more limited ability to supply the canal customers of the Western Water System. The Ophir Road pipeline, which connects this supply to the Dutch Ravine Canal, can deliver 20 TAF of water to this portion of the canal system. This represents approximately 23% of canal water use in the Western Water System.

Based upon these physical delivery characteristics and the large difference between treated and untreated demands dependent upon the reduced PG&E supply, more severe cuts in delivery may be necessary for customers in the untreated systems than in the treated water systems during periods of extreme drought, such as a 50% cutback in PG&E supplies. Additionally, state law and practical necessity dictate that public health and safety be prioritized over irrigation and agriculture in very serious water shortage conditions. Public health and safety needs rely on the treated water systems and include fire protection, sanitation, hospitals, schools, and other critical needs.

Actions taken to conserve water in the untreated systems are different than those taken in the treated water systems. Specifics of these actions are described for the canal systems and treated water systems as follows.

Water Shortage Actions – Treated Water Systems

Regardless of water supply availability or service conditions, the Board of Directors reserves the right to set water conservation goals and modify stage declarations as necessary, based on the impact to the local conditions, or statewide water shortage conditions to align with regional or state water conservation policies, agreements, declarations or legal requirements. The Board of Director's shall determine, based on present water conditions and any lawful directive of the State, the treated water shortage stage applicable to PCWA for the coming year. To promote the efficient use of water, PCWA has adopted inclining block consumptive water rates for residential and commercial treated water retail customers. When a water shortage stage is declared by PCWA's Board of Directors, resale water suppliers, to which PCWA provides water, are advised to implement conservation measures comparable to those adopted by PCWA, to achieve the same level conservation. All wasteful practices or unreasonable uses of water, whether willful or negligent, are always prohibited regardless of water supply.

PCWA’s Water Shortage Contingency Plan consists of six stages of varying conservation actions and use restrictions intended to meet target demands. Implementation of the stages is cumulative; meaning that implementation of a higher stage shall also include implementation of previous stages. These actions shall be used as a starting point to meet targets and shall be monitored, as described later in this plan. For each stage, the water reduction for customers shall be as follows:

Stage 1 - (“Heighten Water Use Efficiency”) Shall achieve a reduction up to 10% relative to the full allocation of water. Full allocation of water, which is total supply available to PCWA, may be used to determine allowable water use for each customer in this stage and compliance with the following stages.

Stage 2 - (“Water Conservation”) Shall achieve a reduction of up to 20% relative to the full allocation of water.

Stage 3- (“Water Warning”) – Shall achieve a reduction of up to 30% relative to the full allocation of water.

Stage 4- (“Water Alert”) – Shall achieve a reduction of up to 40% relative to the full allocation of water.

Stage 5- (“Water Crisis”) – Shall achieve a reduction of up to 50% relative to the full allocation of water.

Stage 6- (“Water Emergency”) – Shall achieve a reduction of greater than 50% relative to the full allocation of water.

Table 8-1 summarizes the water storage stages and shortage response actions. The shortage response actions are discussed further in Section 8.4.

Water Shortage Contingency Plan Levels (DWR Table 8-1)		
Shortage Level	**Percent Shortage Range**	**Shortage Response Actions** (*Narrative description)*
1	Up to 10%	Actions are voluntary and will be reinforced through local and regional public education and awareness measures. Actions include customers fixing leaking fixtures and covering pools with covers.
2	Up to 20%	Actions, which are mandatory, include limiting landscape watering to certain time of day and number of days; prohibiting washing down of impervious surfaces; and prohibiting non-essential flushing of mains and fire hydrants.
3	Up to 30%	Actions, which are mandatory, include limiting landscape watering to certain number of days; limiting construction water use; and requiring Commercial, Industrial, and Institutional properties to implement appropriate water efficiency measures for business types.
4	Up to 40%	Actions, which are mandatory, include limiting landscape watering to certain number of days; prohibiting irrigation of ornamental turf on public street medians with potable water and other irrigation activities; requiring car washing to occur at commercial carwash.
5	Up to 50%	Actions, which are mandatory, include water use for public health and safety purposes only and prohibiting irrigation of turf.
6	>50%	Actions, which are mandatory, include water use for public health and safety purposes only. Customer rationing may be implemented.
NOTES: Additional details on water shortages actions are provided in the following section.		

8.4 Shortage Response Actions

8.4.1 Supply Augmentation

PCWA has several interties/connections with neighboring treated water systems including Nevada Irrigation District (4), San Juan Water District (3), City of Lincoln (2) and the City of Roseville (4). These interties can be called upon in times of emergency and/or extended outages due to maintenance or construction projects but typically would not be called upon for extended periods of time. The interties could be utilized in two different ways. First, water can be transferred from the neighboring agencies. Some of these transfers may require the manual assembly and operations of a pump, others are already equipped with pumps. Second, per our various supply contracts, we can request of wholesale customers, California-American Water Company and the City of Lincoln, to transfer demands to their groundwater systems. In addition, PCWA can utilize their two existing wells in Zone 1 for backup supply.

Because of the numerous scenarios that could trigger water shortage actions, the fact that our neighboring agencies could be affected by the same scenarios, and the limitations involved with the various interties, an augmented supply cannot be reliably quantified.

PCWA currently has no long-term new water supply development projects planned in the near future.

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			
	Transfers		Transfers with neighboring agencies - Nevada Irrigation District, San Juan Water District, City of Lincoln and the City of Roseville through interties.
	Other Actions (describe)		Through contracts with treated water wholesale customers (Cal Am and City of Lincoln), PCWA can request these customers transfer to their groundwater supply.
NOTES:			

8.4.2 Demand Reduction

Stage 1 "Heighten Water Use Efficiency" – 10% Conservation -The following best practices are voluntary and will be reinforced through local and regional public education and awareness measures that may be funded in part by PCWA.

1. Wash only full loads when washing dishes or clothes.
2. Use pool covers to minimize evaporation.
3. Upgrade to water efficient indoor and outdoor fixtures when possible.
4. Fix leaks or faulty sprinklers within 72 hours of occurrence or time of discovery.
5. Decorative water features must recirculate and shall be leak proof.
6. Water shall be confined to the customer's property and shall not be allowed to run off to adjoining property, roadside, non-irrigated areas, private and public walkways, roadways, parking lots, ditch or gutter or any other impervious service. Care shall be taken not to water past the point of soil saturation.
7. No landscape watering shall occur during rain/snow events or within 48 hours after a ¼" or more of rainfall/snowfall.
8. Automatic shut-off devices shall be installed on any hose or filling apparatus in use.
9. Unauthorized use of hydrants shall be prohibited. Authorization for use must be obtained from PCWA.
10. Commercial, industrial, institutional equipment must be properly maintained and in proper working order.
11. Hotels and motels shall provide guests with the option of choosing not to have towels and linens laundered. The hotel or motel shall prominently display notice of this option in each bathroom using clear and easily understood language.
12. Restaurants shall serve water to customers only upon request.
13. All new landscaping shall, at a minimum, adhere to the specifications outlined in the State's Model Water Efficient Landscape Ordinance adopted by the California Department of Water Resources or specifications of any land use jurisdiction in effect. Link to ordinance here: Model Water Efficient Landscape Ordinance.

Stage 2 – "Water Conservation", up to 20% Conservation - In addition to the above, the following actions are mandatory during Stage 2.

1. Resale water suppliers to which PCWA provides water are advised to implement conservation measures comparable to those adopted by PCWA, to achieve the same level conservation. Coordinated messaging will be important to achieve regional requirements imposed by the state.
2. Landscapes shall only be watered between the hours of 7:00 p.m. and 7:00 a.m. to reduce evaporation. Plant containers, trees, shrubs, and vegetable gardens may be watered outside of this watering timeframe if using only drip irrigation, hand watering, or smart controller systems.

3. Turf watering shall be limited to a maximum of three days per week during the months of July, August, and September, a maximum of two days per week in April, May, June, October and November, and shall not be watered during the remaining winter months unless PCWA notifies customers that watering is allowed due to unseasonably and extended dry conditions. Plant containers, trees, shrubs and vegetable gardens may be watered any day when using drip irrigation, hand watering or smart controller systems.
4. Washing down impervious surfaces such as driveways and sidewalks shall be prohibited unless necessary for public health and safety purposes.
5. Non-essential flushing of mains and fire hydrants shall be prohibited.

Stage 3, "Water Alert," up to 30% Conservation - In addition to all the above, the following actions are mandatory:

1. Decorative water features, such as fountains shall be drained and kept dry.
2. A construction water use plan shall be submitted that mitigates the use of water for purposes such as dust control.
3. The installation of new landscaping for existing homes shall be limited to low water use trees, shrubs and groundcover. Landscapes shall be watered with high efficiency nozzles using a smart controller or rain sensor on a typical controller. The installation of new turf or hydro seed for existing homes shall be prohibited unless watered using drip or micro spray systems. Customers who had installed new turf or hydro seed prior to the prohibition may apply for a waiver to irrigate during an establishment period.
4. Turf watering shall be limited to a maximum of two days per week April through November and the remaining winter months unless PCWA notifies customers that watering is allowed due to unseasonably and extended dry conditions. Plant containers, trees, shrubs and vegetable gardens may be watered any day when using drip irrigation or hand watering.
5. Commercial, Industrial, and Institutional properties, such as campuses, golf courses, and cemeteries shall implement sector appropriate water efficiency measures to achieve a water usage reduction consistent with the objective of this stage.

Stage 4, "Water Warning," up to 40% Conservation - In addition to all the above, the following actions are mandatory:

1. Existing pools shall not be emptied and refilled unless required for public health and safety purposes.
2. No new landscape installations or renovations shall be permitted.
3. Waivers granted previously for turf or hydro seed watering during an establishment period shall be revoked.
4. Wholesale customers to utilize reclaimed water for dust control, earthwork, or road construction as permits allow and as available.

5. Turf watering shall be limited to a maximum of one day per week April through November and shall not be watered during the remaining winter months unless PCWA notifies customers that watering is allowed due to unseasonably and extended dry conditions. Plant containers, trees, shrubs and vegetable gardens may be watered any day when using drip irrigation, hand watering or smart controller systems.
6. Car washing shall only be permitted using a commercial carwash that recirculates water and use high pressure/low volume wash systems.
7. Irrigation of ornamental turf on public street medians with potable water shall be prohibited.

Stage 5, "Water Crisis, "up to 50% Conservation - In addition to all the above, the following actions are mandatory:

1. Water use for public health and safety purposes only.
2. Turf shall not be watered.

Stage 6, "Water Emergency," 50% and Greater Conservation - In addition to all the above, the following actions are mandatory:

1. Water use for public health and safety purposes only. Customer rationing may be implemented.

PCWA's demand reduction actions were combined into DWR's defined demand reduction actions for each shortage level. These combined demand reduction actions and estimated reduction are presented in the following table.

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 to you.*	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? *(Yes or No)*
1	CII - Lodging establishment must offer opt out of linen service	0-1%		No
1	CII - Other CII restriction or prohibition	0-1%		No
1	Decrease Line Flushing	0-1%		No
1	Expand Public Information Campaign	0-1%		No

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 to you.*	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? *(Yes or No)*
1	Landscape - Other landscape restriction or prohibition	0-6%		No
1	Landscape - Restrict or prohibit runoff from landscape irrigation	0-5%		No
1	Other - Customers must repair leaks, breaks, and malfunctions in a timely manner	0-2%		No
1	Other - Require automatic shut of hoses	0-1%		No
1	Water Features - Restrict water use for decorative water features, such as fountains	0-1%		No
1	Pools and Spas - Require covers for pools and spas	0-1%		No
1	CII - Restaurants may only serve water upon request	0-1%		No
2	Decrease Line Flushing	5-15%		No
2	Landscape - Limit landscape irrigation to specific times	5-10%		No
2	Landscape - Limit landscape irrigation to specific days	5-10%		No
2	Other - Prohibit use of potable water for washing hard surfaces	0-1%		No
2	Other	0-10%		No
3	CII - Other CII restriction or prohibition	0-5%		No
3	Landscape - Limit landscape irrigation to specific days	10-25%		No
3	Landscape - Other landscape restriction or prohibition	0-1%		No

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 to you.*	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? *(Yes or No)*
3	Other - Prohibit use of potable water for construction and dust control	0-1%		No
3	Other water feature or swimming pool restriction	0-1%		No
4	Landscape - Limit landscape irrigation to specific days	5-20%		No
4	Landscape - Other landscape restriction or prohibition	0-3%		No
4	Other - Prohibit vehicle washing except at facilities using recycled or recirculating water	0-1%		No
4	Other water feature or swimming pool restriction	0-1%		No
4	Other	0-1%		No
5	Landscape - Other landscape restriction or prohibition	0-50%	Water use for public health and safety purposes only.	Yes
6	Landscape - Other landscape restriction or prohibition	0-70%	Water use for public health and safety purposes only. Customer rationing may be implemented.	Yes
NOTES:				

8.4.3 Operational Changes

Operational changes to address a short-term water shortage may be implemented based on the severity of the reduction goal. Changes may include: non-essential flushing of mains and fire hydrants shall be prohibited, expand public information campaign, include target information on customer bills, modify staff schedules for expanded water waste patrol.

8.4.4 Additional Mandatory Restrictions

Water Shortage Actions – Irrigation Canal Systems

The actions taken to conserve water in the canal systems are more operational in nature on the part of PCWA and may include changing the sizes of the orifices through which water is delivered to customers and/or instituting “rolling” or alternating canal outages. Changes in customer water use practices will be necessary to work within the water delivered under shortage conditions. Canal operations staff can work with customers in groups along a specific canal or, in select cases, as individuals to meet the necessary level of conservation.

In a water shortage emergency, the PCWA Board of Directors will have declared a necessary level of conservation for the canal system. In the same action as declaring a level of conservation, more specific details on how to implement these generalized operational procedures will also be adopted, giving canal operations staff and customers guidelines on how to work cooperatively to meet conservation needs. In the 2014 water year, a 20% level of conservation was sought, operations staff worked to minimize losses in the delivery system, orifices were resized to reduce their peak delivery rate by 10%, rolling outages were used in some cases, but minimized, and the achieved level of conservation was 35%.

PCWA Resolution 14-12 is an example of a resolution that could be used to include more specifics on operational procedures for the canal systems Water Shortage Contingency Plan. This resolution is written for a 20% level of conservation but could be modified for a higher level of conservation if needed.

8.4.5 Emergency Response Plan

PCWA has prepared an Emergency Response Plan. The Emergency Response Plan provides general procedures for responding to catastrophic supply interruption (i.e., infrastructure failure).

PCWA’s water systems are susceptible to interruption in water supply due to catastrophic events. In particular, fire, landslides, major pipeline failures, power outages, and earthquakes are risks to PCWA water supply infrastructure.

Water supplied by PG&E is delivered through a canal system that traverses hillsides and crosses valleys using raised flumes and pipelines. PCWA has established a Renewal and Replacement Program to replace aging infrastructure along the canal system; however, this program is phased over a long period of time. The remaining supplies are delivered through pumping stations that have back-up power, with the exception of the American River and Ophir Road Pump Stations.

PCWA currently has a project anticipated to be completed in 2021 that will provide 2.5 megawatt generators at these sites for this purpose. These generators will allow for these pump stations to run at approximately 50% of their capacity. Additional generators will be added in the future to address future demands when necessary.

8.4.6 Seismic Risk Assessment and Mitigation Plan

Water Code Section 10632.5 requires the participating agencies to assess seismic risk to water supplies as part of their WSCP. The code also requires a mitigation plan for managing seismic risks.

In lieu of conducting their own seismic risk assessment, which can be a lengthy process, suppliers can comply with the Water Code requirement by submitting the relevant local hazard mitigation plan or multi-hazard mitigation plan.

Placer County, the county which PCWA serves water, prepared a Local Hazard Mitigation Plan (LHMP) in March 2016. Placer County is currently in the process of updating The LHMP was not available at the time of this WSCP. The 2016 LHMP is available on the Placer County's website at https://www.placer.ca.gov/1381/Local-Hazard-Mitigation-Plan. The LHMP contains an annex (Annex O) that details hazard mitigation planning elements specific to PCWA, including seismic risk assessment and mitigation strategies.

8.4.7 Shortage Response Action Effectiveness

PCWA has estimated the effectiveness of shortage response actions in terms of reducing the gap between expected supplies and demands. These estimates were developed using industry resources and observations from recent operating history at PCWA. These estimates are included in DWR Tables 8-2 and 8-3 above.

8.5 Communications Protocols

Part I: Introduction

PCWA conducts an ongoing program of public information to keep customers, the general public, other agencies, and the news media current on water-efficiency efforts during normal supply conditions. In the event of a water shortage, clear and effective communications becomes critical. As a part of the larger WSCP, the Communication Plan provides the following information:

- Ways customers can save water
- Water saving goals
- Why water saving measures are in effect
- What PCWA is doing to ensure water reliability during a time of shortage

Part II: Audiences

PCWA will need to communicate with a number of different stakeholders as part of the WSCP. In general, stakeholders include, but are not limited to:

- Retail treated water customers
- Retail raw water customers
- Wholesale partners
- Local municipalities
- Public officials including PCWA Board of Directors

- Land use agencies
- Business/civic leaders
- Community-based service organizations
- Local nurseries, irrigation supply stores, and landscape companies
- Placer County Master Gardeners
- Associations (Regional Water Authority, California Municipal Utilities Association, Association of California Water Agencies, Save Our Water Campaign)

Part III: Objectives

Communication objectives throughout differing stages identified in the WSCP include the following:

- Encourage and incentivize water use efficiency as a "way of life" throughout Placer County.
- Raise awareness about externalities affecting water supply and water use including drought conditions, regulatory actions, and other factors.
- Educate stakeholders on PCWA's efforts and initiatives to maintain a reliable water supply now and into the future.
- Prepare stakeholders for implementation and potential escalation or de-escalation of WSCP when conditions warrant.
- Maintain credibility through constant communication, with a particular focus on showing appreciation for water saving efforts and minimizing confusion about water restrictions in effect.
- Successfully exit WSCP emphasizing effectiveness and value of water saving measures and investments in water supply reliability.

Part IV: Communication under normal water supply conditions

Under normal water supply conditions, PCWA will engage in standard communication and outreach activities to promote water-use efficiency. Communication can be delivered through the following platforms:

- Media relations (press releases, interviews, etc.)
- Social media (Twitter, Facebook, YouTube)
- PCWA website
- Newsletters (print and electronic)
- Community events
- Regional partnerships

As a member of the Sacramento Regional Water Authority (RWA), PCWA also has access and input to regional messaging on water supply conditions and water saving practices. This includes the BeWaterSmart website (Bewatersmart.org), and other water-efficiency programs implemented by RWA.

Part V: Stage Strategies

Stage 1 Strategies ("Heighten Water Use Efficiency")

Under a Stage 1 declaration, the WSCP calls for a **10 percent reduction** in water use. The following strategies have been shown to be effective in previous water conservation campaigns and should be considered in Stage 1.

- Increase distribution of educational material to help customers understand importance of and how to reduce water use.
- Highlight opportunities where PCWA can assist customers increase water use efficiency such as rebates for water efficient appliances.
- Develop targeted outreach material for businesses and local municipalities to reduce water use.
- Continue partnering with regional associations to present unified message on the importance of using water efficiently.

Stage 2 Strategies ("Water Conservation")

Under a Stage 2 declaration, the WSCP calls for a 20 percent reduction in water use. Specific strategies employed in Stage 2 will be done in addition to those strategies outlined in Stage 1 and may include the following:

- Direct mailings to all retail treated and untreated water customers requesting a 20 percent reduction in water use.
- Coordinate water conservation messaging and outreach with pertinent Placer County officials and agencies, including Agricultural Commissioner and Resource Conservation District.
- Provide area Chambers of Commerce appropriate conservation messaging to convey to members.
- Develop materials for business that have high water use. This includes, but is not limited to, signage for hotels and motels offering guests the option to not to have towels and linens laundered; and signage for restaurants stating that water is served only upon request.
- Engage wholesale customers on strategies to reduce water use.
- Provide local elected leaders and officials with pertinent information to share with constituents.

Stage 3 ("Water Warning") & Stage 4 ("Water Alert") Strategies

Under a Stage 3 or Stage 4 declaration, the WSCP calls for a water use reduction of 30 or 40 percent reduction, respectively. Specific strategies employed in Stage 3 and Stage 4 will be in addition to strategies outlined in previous stages and may include the following:

- Develop and implement a high-visibility campaign using platforms such as
    - Billboards
    - Radio
    - Local access television
    - News conference, preferably with regional partners
- Implement stringent landscape watering guidelines for customers
    - Under Stage 4, limit landscape watering to one day per week
- Coordinate with large commercial, industrial, and institutional (CII) properties, such campuses, golf courses, parks, and cemeteries to implement sector-appropriate water efficiency measures.
    - Under Stage 4, limit landscape watering on above CII properties to one day per week
- Consider using public opinion polls to determine effectiveness of messaging strategies.
- Provide updated communications to stakeholders to raise immediate awareness for increased water-savings and available assistance.

Stage 5 ("Water Crisis") & Stage 6 ("Water Emergency") Strategies

Under a Stage 5 or Stage 6 declaration, the WSCP calls for a water use reduction of 50 or 60 percent reduction, respectively. Specific strategies employed in Stage 5 and Stage 6 will be in addition to strategies outlined in previous stages and may include the following:

- Prohibit all landscape watering on residential and CII properties.
- In coordination with local governments, prioritize water deliveries for public health and safety measures.
    - Under Stage 6, customer rationing may be implemented.
- Suspend canal operations so water can be treated and used for public health and safety purposes.

8.6 Compliance and Enforcement

Prohibitions and Penalties for Excessive Use

The goal of PCWA is to achieve voluntary compliance from our customers. PCWA will take reasonable measures to assure that customers have information available to promptly and efficiently address water use issues. Where voluntary compliance cannot be achieved through initial contacts and warnings, then appropriate administrative penalties and further action are required and therefore, enforcement of the Water Shortage Contingency Plan. These penaltiesand actions will also be enforced for excessive residential water use during a drought as indicated in the Water Code Division 1, Chapter 3.3 Section 365.

Violations of mandatory actions shall be addressed as described in PCWA's Rules, Regulations, Rates and Charges Governing the Distribution and Use of Water, updated January 1, 2021, as follows:

Per Sec. 40208 of the Rules and Regulations - PROHIBITION AGAINST WASTE OF WATER. Customers are required to operate and maintain their facilities in a suitable condition to prevent waste of water. If PCWA determines that a customer is wasting water, that customer may be subject to a Water Waste Charge as set forth in Section 40921; or to termination of service or a reduction in the amount of water that the customer is allowed to purchase as set forth in Section 41005; or both.

Sec. 40921 - WATER WASTE CHARGE. Ref: Section No. 40208/41005

Charge	***Occurrence***	***Action***
--------	(first)	written notification
--------	(second)	written warning
$75.00	(third)	2nd written warning
$75.00	(fourth)	service terminates - lock meter / lock canal service

This cost is intended to recover staff costs to monitor and enforce prohibitions against water waste.

Sec. 41005 - TERMINATION OF WATER SERVICE, OTHER THAN AS PROVIDED IN SECTION 41004, FOR NONPAYMENT. The Agency may terminate water service for causes provided herein and after notification as provided herein.

a) Water service may be terminated immediately without notice for any situation which presents an immediate health or safety hazard to the public water system. The water service shall be locked and remain inactive until corrective action has been approved by the Agency. The Agency shall attempt to contact the customer by telephone and shall mail a letter to the customer as soon as reasonably possible to set forth the reasons for the termination. Conditions that create a basis for the immediate termination of water service shall include, but are not limited to, the following items:

   1. Direct or indirect connection between the public water system and a sewer line.
   2. Unprotected direct or indirect connection between the public water system and a system or equipment containing contaminants.
   3. Unprotected direct or indirect connection between the treated water system and any other water source.

b) Water service may be terminated for failure of the customer to operate or maintain their facilities in a suitable condition so as to prevent waste of water.

   1. UNTREATED WATER CUSTOMERS

      If a customer is found to be taking delivery of an amount of water that exceeds the consumptive needs of their property such that there is persistent runoff into local drainage or storm drain systems, such excess water delivery shall be deemed a waste and unreasonable use of the Agency's water resources and the customer shall be subject to Water Waste Charges, as set forth in Section 40921 herein, and a reduction in the amount of water that the customer may purchase.

      Following written notification of a water waste occurrence, the customer may choose to modify their facilities, or work with the Agency to reconfigure their

Service Box such that water is delivered only on an “as-needed” basis or may voluntarily reduce the amount of water purchased.

If a customer fails to eliminate persistent water waste within a reasonable amount of time, the Agency may permanently reduce the size of the customer’s delivery orifice until such waste is eliminated.

2. TREATED WATER CUSTOMER

   The Agency shall notify customers and actual users of waste and unreasonable use of water if there is persistent and excessive discharge of water from a customer’s property. Such notifications shall result in imposition of a Water Waste Charge as set forth in Section 40921. If water waste continues or if the Agency finds that all or most of the delivered water results in discharge from the customer’s or actual users’ property or area of use, the Agency may terminate service to the property.

c) Water Service may be terminated for repeated tampering with Agency facilities or unauthorized taking of water or the taking of water in excess of the amount paid for.

d) During extreme water shortages, if voluntary conservation measures are not sufficient to prevent a water shortage emergency, the Agency may institute additional mandatory conservation measures, up to and including temporary suspension of water service.

e) Any violation by the customer of any rules and regulations of the Agency governing water service.

f) Notice Requirements. Except in health emergency situations described in Section 41004 c) 3), at least 10 days before terminating service, the Agency shall provide the customer with a written notice specifying the reason for the proposed termination and informing the customer of the procedure to discuss the proposed termination with the General Manager. The General Manager has the authority to review disputes, rectify errors, and settle controversies pertaining to such proposed termination of service. The Agency’s contact information shall be provided in a notice of termination given to a customer.

g) At the Agency’s discretion, in lieu of termination of service, the Agency may install a flow restrictor on a treated water service, restricting flow to a half gallon per minute.

8.7 Legal Authorities

The following provisions of the Placer County Water Agency Act provide PCWA with the legal authority to implement and enforce the response actions set forth in this Water Shortage Contingency Plan. The Rules and Regulations contained in this Plan were adopted pursuant to the foregoing legal authorities.

Section 4 provides PCWA with the authority “to do any and every lawful act necessary in order that sufficient water may be available for any present or future beneficial use or uses of the lands or inhabitants within the agency . . .” (Stats.1957, c. 1234, p. 2522, §4.).

> Section 4.3 provides PCWA with the authority "to conserve and reclaim water for present and future use within the agency . . ." (Stats. 1957, c. 1234, p. 2522, §4.3.)
>
> Section 5(c) provides PCWA with the authority to "[t]o establish rules and regulations to protect the public health in the operation of the works, to provide for the sale, distribution and use of water and the services and facilities of the works . . ." (Stats. 1957, c. 1234, p. 2525, §5, as amended Stats. 1959, c. 8l5, p. 2824, §9; Stats. 1965, c. 972, p. 2589, §l.)

PCWA shall declare a water shortage emergency in accordance with Chapter 3 (commencing with Section 350) of Division 1.

> Water Code Section Division 1, Section 350
>
> Declaration of water shortage emergency condition. The governing body of a distributor of a public water supply, whether publicly or privately owned and including a mutual water company, shall declare a water shortage emergency condition to prevail within the area served by such distributor whenever it finds and determines that the ordinary demands and requirements of water consumers cannot be satisfied without depleting the water supply of the distributor to the extent that there would be insufficient water for human consumption, sanitation, and fire protection.

PCWA shall coordinate with any city or the County of Placer for the possible proclamation of a local emergency, as defined in Section 8558 of the Government Code (California Emergency Services Act). The following is a list of individuals and land jurisdictions who would be contacted as previously discussed under section 8.5 *(contact information for the following has been redacted for public version)*:

Aly Zimmerman	City of Rocklin
Sean Rabe	Town of Loomis
Jon Donlevy	City of Auburn
Wes Heathcock	City of Colfax
Todd Leopold	Placer County CEO
Ann Edwards	Sacramento County CEO
Jennifer Hanson	City of Lincoln
Dominick Casey	City of Roseville

8.8 Financial Consequences of WSCP

Analysis of Revenue and Expenditures during Shortages

There are three primary objectives during a water shortage, 1) reduce water use 2) maintain adequate resources to meet revenue requirements 3) ensure customers are properly notified and educated. Portions of PCWA's operating revenue is derived from volumetric based water rates, hence, during a water shortage with reduced water use, PCWA's revenue would decrease. PCWA's water rates have been designed within the legal framework and industry standards to support and optimize a blend of various objectives, including conservation and revenue stability. Based on the 2017 Water Cost of Service and Rate Study, PCWA implemented a new water rate structure and design that was effective January 1, 2018 that shifted the Water System revenue components for Treated Retail from 45% fixed and 55% commodity (volumetric), to 60% fixed and 40% commodity. This adjustment aligned revenue more closely to the PCWA's cost structure, which also provides additional fixed revenue in years of water shortages.

Also, depending on the root cause of a water shortage, unbudgeted and unforeseen expenses would most likely be incurred. A drought induced water shortage would result in additional expenses for public outreach, conservation enforcement and various other associated costs. An infrastructure failure induced water shortage would incur similar costs as a drought situation, plus other costs such as construction of alternate source facilities or alternative supply transmission costs, such as pumping which can be very expensive.

For example, if there is water available, PCWA has the ability to access water in the American River through double lift pumping. Based on the current energy prices, if the pumps were operated to achieve maximum flows, it could cost up to an additional $1.6 million annually and would pump an amount equal to approximately 90% of peak demand in a certain service area. However, these costs can vary significantly depending on demand and are partially offset by a reduction in costs for purchased water. In a water shortage caused by an infrastructure failure, pumping costs would most likely be the most significant expense. Other non-capital expenses can vary substantially from $0 to $50,000 or more per month depending on the nature, magnitude, and duration of the water shortage.

Mitigation Actions

PCWA has established reserves to supplement resource needs during a water shortage. These reserves would be available to fund anticipated operating costs, as well as unanticipated operating and other costs. This is an alternative to implementing water shortage or drought pricing. Based on designation/reserve policies, over the years, PCWA has accumulated monies for a variety of unanticipated, unforeseen or planned needs, whether those needs are operating or capital related. Based on PCWA policy, PCWA has funded reserve accounts that could be used as needed. The policy identifies events or conditions, which would prompt the use of these funds. PCWA has established an Operating Reserve for unanticipated, unforeseen or planned variations in operating expenses or revenues. As of December 31, 2020, the Operating Reserve portion of the Water Division Reserves totaled just over $17.5 million.

PCWA's 2020 Operating Budget for the Water Division was $42.2 million. On December 31, 2020, the overall funded reserves for this Division was $67.2 million, respectively, including the Operating Reserve amount mentioned previously. In the event of a water shortage that results in a decline in revenue, PCWA's Board of Directors could consider the use of these reserves to meet necessary resource requirements as the use of reserves requires Board approval. Although PCWA has funded reserves as an alternative to drought pricing, that practice could change and if so, PCWA would follow the Proposition 218 notification process and other rate adjustment regulations to implement water shortage or drought rates.

Capital expenditures, including projects and capitalized expenses associated with the capital program are expected to be fully funded by fixed R&R rate revenue. However, during a water shortage, Renewal and Replacement (R&R) revenue may be used to supplement operating revenue and capital projects deferred as an alternative to, or in addition to the use of Reserves.

The Table below summarizes the WSCP potential financial implications and shortage response actions that align with the defined shortage levels as defined in Water Code Section 10632 (a)(3) & (4).

2020 WSCP Mandated Shortage Levels and Potential Financial Implications for Treated Retail

	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5	Stage 6
Shortage Level	< 10%	10% - 20%	20% - 30%	30% - 40%	40% - 50%	> 50%
Potential Water Revenue Reduction:	$0 - $1,700,000	$1,700,000 - $3,300,000	$3,300,000 - $5,000,000	$5,000,000 - $6,600,000	$6,600,000 - $8,200,000	> $8,200,000
Percent of Total Annual Water System Revenue	0% -4%	4% - 8%	8% - 12%	12% - 16%	16% - 20%	>20%
Increase in Expenses:						
Customer Service Expenses*	20,000	35,000	45,000	60,000	75,000	100,000
Pumping Expenses	350,000	650,000	1,000,000	1,200,000	1,400,000	1,600,000
Other Operating Expenses	50,000	120,000	250,000	350,000	450,000	600,000
Decrease in Expenses:						
O&M Expenses: Water Operations Savings (existing water purchase contract)	50,000	250,000	500,000	750,000	1,000,000	1,250,000
Net Potential Expense Increase:	$370,000	$555,000	$795,000	$860,000	$925,000	$1,050,000
Mitigation (Response) Actions:	1) Reduce O&M Expenses	1) Reduce O&M Expenses 2) Potentially Defer Capital Projects	1) Reduce O&M Expenses 2) Defer Capital Projects and/or 3) Utilize Reserves	1) Reduce O&M Expenses 2) Defer Capital Projects and/or 3) Utilize Reserves	1) Reduce O&M Expenses 2) Defer Capital Projects and/or 3) Utilize Reserves	1) Reduce O&M Expenses 2) Defer Capital Projects and/or 3) Utilize Reserves
Communications Protocols:	Customer Outreach: *PCWA website / social media *Flyers mailed to customers	Customer Outreach: *PCWA website / social media *Flyers mailed to customers	Customer Outreach: *PCWA website / social media *Flyers mailed to customers	Customer Outreach: *PCWA website / social media *Flyers mailed to customers	Customer Outreach: *PCWA website / social media *Flyers mailed to customers	Customer Outreach: *PCWA website / social media *Flyers mailed to customers

** Customer Service Expenses include costs associated with increased staff costs for customer outreach, tracking and reporting, and enforcing compliance with the WSCP and Chapter 3.3 (commencing with Section 365) of Division 1*

8.9 Monitoring and reporting

Stage Implementation and Monitoring Procedures

PCWA maintains a draft water shortage contingency resolution that is adopted during water shortages. Legal requirements, including public notices and hearings, shall be followed in adopting any resolution. However, PCWA staff may implement operational changes in the canal systems and request voluntary actions by treated water customers on an interim basis to meet public health and safety needs as detailed above until such a resolution can be adopted.

In a water shortage, and particularly that resulting from failure of infrastructure, critical roles shall be established and appointed by the General Manager. These roles may include, but are not limited to Incident Commander, Operations Manager, and Public Information Officer.

Other supporting roles that should be considered are engineering, mapping, customer service, information service, and public outreach. Other more detailed instructions may be found in the PCWA's Emergency Response Plan.

Under normal water supply conditions, Field Services and Technical Services operations staff record water production figures daily. Totals are reported monthly and incorporated into a water supply report.

Based upon shortage level staff would prepare a monthly production target to coincide with the level of % reduction sought. During a water shortage, monthly production is compared to the target production to verify that the reduction goal is being met. Appropriate monthly reports are forwarded to the department heads and General Manager's office. Appropriate monthly reports are also included in the Board of Directors meeting materials.

8.10 WSCP Refinement Procedures

In all stages, if targets are not met, PCWA staff may implement further actions as long as they fall within the limits set by the resolution adopted by the Board of Directors in response to the shortage. Actions needed in excess of these limits, or reductions in actions, must be approved by the Board of Directors.

8.11 Special Water Feature Distinction

Decorative water features that are not pools or spas will be defined as artificial ponds, lakes, waterfalls, fountains, or non-pool or non-spa water features.

8.12 Plan Adoption, Submittal and Availability

Prior to adoption of this WSCP, PCWA held a public adoption hearing on May 20, 2021. Before the hearing, PCWA made a draft of the WSCP available for public inspection at PCWA's office and on the PCWA website. General notice of the public adoption hearing was provided through publication of the hearing date and time and posting of the hearing at PCWA's office.

A copy of the adopted WSCP will be provided to Placer County and cities within PCWA service area no later than 30 days after its adoption. The adopted WSCP will also be on PCWA's website.

After the adoption of the WSCP by PCWA Board of Directors, PCWA will submit all required documentation to DWR.

If an update to the WSCP is required, the adoption, submittal and availability procedures outline above should be followed.

Public Draft

I

Appendix I – Adoption Documentation

(Will Be Provided After Adoption)

Public Draft