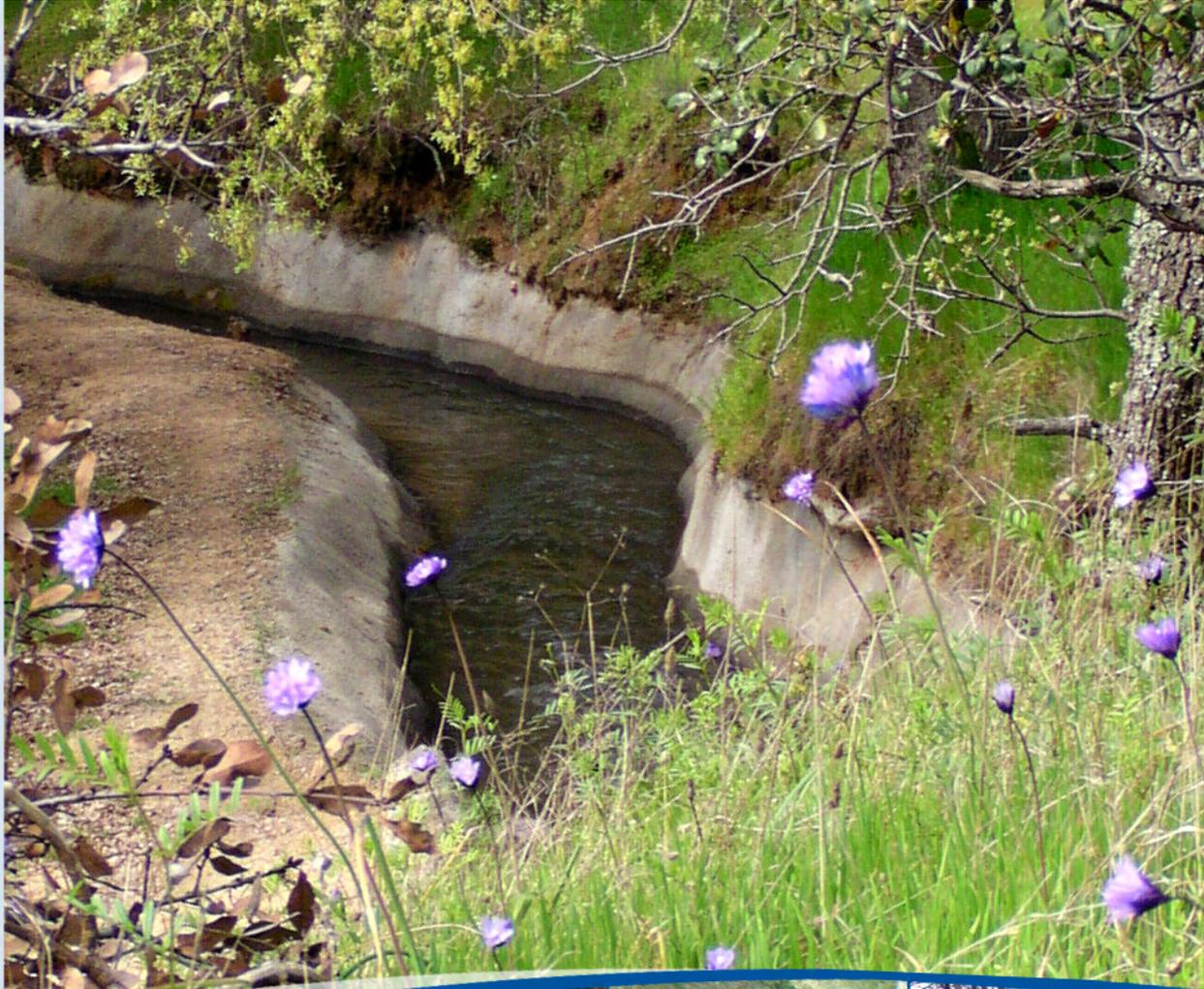


# Natural Resources Management Plan

for Raw Water Distribution System  
Operations and Maintenance Activities

Final Draft

April 2009



prepared by





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## ABBREVIATIONS AND ACRONYMS

°C	degrees Celsius
°F	degrees Fahrenheit
µg/L	micrograms per liter
315BDD	Boardman Canal near Laird Pump, downstream
315BDU	Boardman Canal near Laird Pump, upstream
ACL	Administrative Civil Liability
ANTC3B	Antelope Creek watershed at Antelope Creek at Midas Avenue
ANTCA	Antelope Canal
ANTCR	Antelope Canal Outlet Release
ANTSTUBCR	Antelope Stub Canal near Antelope Canal
ARPS	American River Pump Station
AUBRAV3	Auburn Ravine below Auburn Ravine Tunnel outlet
Basin Plan	Water Quality Control Plan for the Sacramento and San Joaquin Rivers
BAUGHMANCR	Baughman Canal Outlet Release
Bay-Delta	San Francisco Bay/Sacramento-San Joaquin Delta
BCTRIB1	Tributary to Miners Ravine from Baughman Canal
B-IBI	benthic index of biotic integrity
BMI	benthic macroinvertebrate
BMP	best management practice
BO	Biological Opinion
BOARDMANCR	Boardman Canal Outlet Release
Ca <sup>2+</sup>	calcium ion
CaCO <sub>3</sub>	calcium carbonate
CARP	County Aquatic Resources Program
CCC	Criteria Continuous Concentration
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
cfs	cubic feet per second

Cl <sup>-</sup>	chloride ion
CLVRC3	Clover Valley Creek at Midas Avenue
CLVRC3B	Clover Valley Creek near Argonaut Avenue
CLVRC6	Clover Valley Creek at Rawhide Road
CLVRESR	Clover Valley Reservoir Release to Clover Valley Creek and Antelope Canal
CMC	Criteria Maximum Concentration
CNDDB	California Natural Diversity Database
CNPS	California Native Plant Society
CO <sub>2</sub>	carbon dioxide
CTR	California Toxics Rule
CVCWA	Central Valley Clean Water Association
CWA	Clean Water Act
DCC	Dry Creek Conservancy
DFG	California Department of Fish and Game
DO	dissolved oxygen
DPR	Department of Pesticide Regulation
DWR	California Department of Water Resources
EFH	Essential Fish Habitat
EIR	environmental impact report
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
Fe <sup>2+</sup>	iron
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
FR	Federal Register
FRAP	California Department of Forestry and Fire Protection Fire and Resource Assessment Program
FRGCR	Ferguson Canal Outlet Release
FRGTRIB1	Tributary to Miners Ravine from Ferguson Canal
GIS	Geographic Information System
grams/year	grams per year

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HANSENR	Hansen Outlet Release
HCO <sub>3</sub> <sup>-</sup>	bicarbonate ion
HCP	Habitat Conservation Plan
IBI	index of biotic integrity
K <sup>+</sup>	potassium ion
MFP	Middle Fork Project
mg/L	milligrams per liter
Mg <sup>2+</sup>	magnesium ion
MgCl <sub>2</sub>	magnesium chloride
mgd	million gallons per day
MINERSRV3	Miners Ravine at North Sunrise Avenue
MINERSRV4	Miners Ravine at Auburn-Folsom Road
MINERSRV5	Miners Ravine at Moss Lane
MINERSRV6	Miners Ravine at Dick Cook Road
MINERSRV7	Miners Ravine at Lomida Lane
MND	Mitigated Negative Declaration
mS/cm	milliSiemens per centimeter
MS4	Municipal Separate Storm Sewer System Permits
msl	mean sea level
Na <sup>+</sup>	sodium ion
NaCl	sodium chloride
NCCP	Natural Community Conservation Plan
ND	Negative Declaration
ND	No Date
NEPA	National Environmental Policy Act
NID	Nevada Irrigation District
NMFS	National Marine Fisheries Service
NOP	notice of preparation
NPDES	National Pollutant Discharge Elimination System
NPPA	California Native Plant Protection Act

NRMP	Natural Resources Management Plan
NTR	National Toxics Rule
NTU	nephelometric turbidity unit
O&M	operations and maintenance
OEHHA	Office of Environmental Health Hazard Assessment
PCCP	Placer County Conservation Plan
PCFCWCD	Placer County Flood Control and Water Conservation District
PCWA	Placer County Water Agency
PG&E	Pacific Gas and Electric
PO <sub>4</sub>	orthophosphate
RWQCB	Regional Water Quality Control Board
SC	specific conductivity
SCWA	Sacramento County Water Agency
SECRETRV2	Secret Ravine at Roseville Parkway
SECRETRV3	Secret Ravine at Rocklin Road
SMD	Sewer Maintenance District
SO <sub>4</sub> <sup>2-</sup>	sulfate ion
SWMP	Stormwater Management Plan
SWPPP	Stormwater Pollution Prevention Plan
SWRCB	State Water Resources Control Board
TBEE	butoxyethyl ester
TDS	total dissolved solids
TSS	total suspended solids
USACE	U.S. Army Corps of Engineers
USC	United States Code
USDA-NRCS	U.S. Department of Agriculture Natural Resource Conservation Service
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
UV	ultraviolet
WDY	water delivery year

WHR	California Wildlife Habitat Relationship
WTP	water treatment plant
WWTP	wastewater treatment plant
YANKEECR	Yankee Hill Canal Outlet Release
YB	Yuba-Bear
YB145	Baughman Canal at the Head of Ferguson Canal
YB154	Boardman Canal at the Head of Turner Canal
YB69A	Boardman Canal at Lubeck Road
YB78	Boardman Canal at Powerhouse Road
YB81	Boardman Canal below Mammoth Reservoir
YB96	Boardman Canal below Lake Alta
YB145	Baughman Canal at the Head of Ferguson Canal
YB154	Boardman Canal at the Head of Turner Canal
YHTRIB2	Tributary to Secret Ravine from Yankee Hill Canal

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## CHAPTER 1.0 INTRODUCTION

Development of a Natural Resources Management Plan (NRMP) was initiated by Placer County Water Agency (PCWA) and the U.S. Army Corps of Engineers (USACE) for operations and maintenance (O&M) activities within PCWA's raw water distribution system. This NRMP describes natural resources conditions along the PCWA distribution system and in the region, regulatory requirements for system O&M, potential effects of O&M activities on natural resources conditions, and identifies best management practices (BMP) for PCWA O&M activities.

### 1.1 STUDY AREA LOCATION AND DESCRIPTION

The study area for the NRMP includes the PCWA raw water distribution system, shown in **Figure 1-1**, and natural resources in the region that may be affected by PCWA O&M activities conducted within the raw water distribution system. This includes areas adjacent to canals and reservoirs, as well as drainages and streams used for conveyance of water to PCWA customers, and streams that may receive flow contributions from the canal system through regulated or unregulated releases from canal outlets. Streams in the study area include Canyon Creek, Auburn Ravine, Clover Valley Creek, Antelope Creek, Secret Ravine, and Miners Ravine.

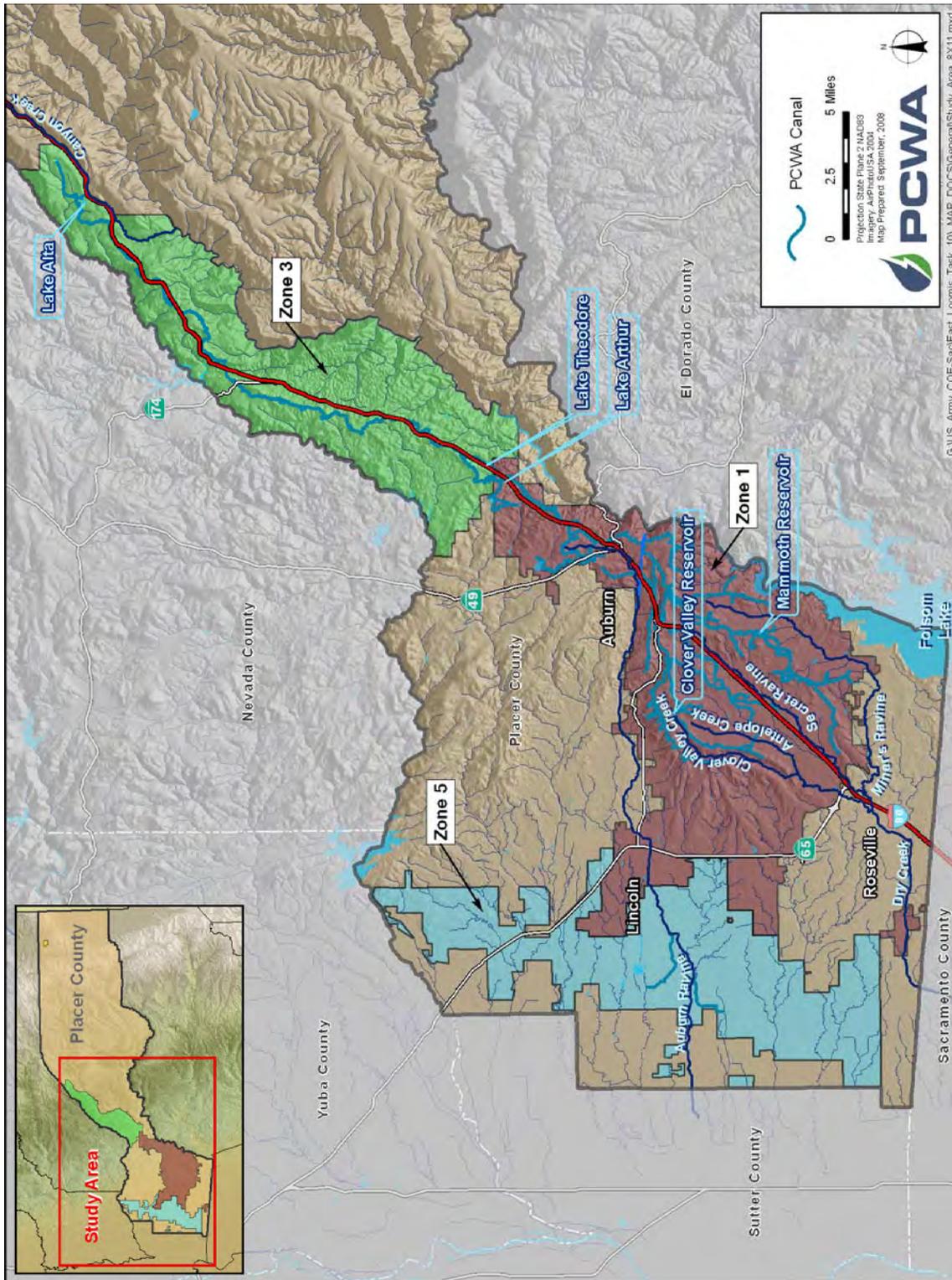
### 1.2 PURPOSE

The purpose of the NRMP is to provide a clear understanding of the regulatory setting for the canal system and receiving waters, and to identify how PCWA canal system O&M activities may affect natural resources conditions within and near the PCWA service area. This plan is intended to help PCWA staff identify BMPs that may assist in minimizing the effects of O&M activities on natural resources conditions.

### 1.3 REPORT ORGANIZATION

This plan includes the following topics:

- Background, study area location, descriptions, authorization, purpose, scope, and report organization (**Chapter 1**)
- Description of the PCWA raw water distribution system, and systemwide O&M activities (**Chapter 2**)
- Description of the physical and biological resources in the study area (**Chapter 3**)
- Description of the regulatory requirements potentially related to O&M activities (**Chapter 4**)



**FIGURE 1-1  
STUDY AREA**

- Description of the potential effects of systemwide operations on natural resources conditions, regulatory framework for operations activities, and potential BMPs to minimize effects of operations activities on natural resources in the study area (**Chapter 5**)
- Description of the potential effects of maintenance activities on natural resources conditions, regulatory framework for maintenance activities, and potential BMPs to minimize effects of maintenance activities on natural resources in the study area (**Chapter 6**)
- Description of the potential effects of interrelated PCWA O&M activities on natural resources conditions, regulatory framework for interrelated PCWA O&M activities, and potential BMPs to minimize effects of interrelated activities on natural resources in the study area (**Chapter 7**)
- A list of the sources used in preparing this report (**Chapter 8**)

This plan is augmented by the following appendices:

- Appendix A – Benthic Macroinvertebrate Data Report
- Appendix B – Water Quality Conditions for Systemwide Operations
- Appendix C – Water Quality Conditions During Maintenance Activities

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## **CHAPTER 2.0 PCWA RAW WATER DISTRIBUTION SYSTEM**

The PCWA water system was established in 1968. Water is marketed through various water contracts and five zones. Currently, PCWA supplies wholesale and retail water to a resident population and employment base of more than 1 million people. A significant amount of raw water irrigates pastures, orchards, rice fields, farms, ranches, golf courses, and is used for other uses. PCWA retails treated water to customers residing in Alta, Colfax, Auburn, Loomis, Rocklin, small portions of Roseville, Penryn, Newcastle, and in the vast unincorporated areas of western Placer County. PCWA also wholesales treated water to the City of Lincoln and several smaller special districts that then retail it to their customers. Raw water is sold to the City of Roseville, San Juan Water District (for the Granite Bay area), and special districts such as the Sacramento Suburban Water District (Sacramento Suburban, formerly Northridge Water District) that provide their own treatment and then retail water to their customers.

The following sections describe sources of PCWA's water supply, PCWA's raw water distribution system, operations of the system, and maintenance activities.

### **2.1 WATER SOURCES**

PCWA's raw water distribution system is physically tied to Pacific Gas and Electric's (PG&E) Drum-Spaulding Project, through multiple power generation facilities, reservoirs, and water purchase points (buy points). PCWA holds water rights up to about 40 cubic feet per second (cfs) on Canyon Creek. Additional raw water supplies are pumped from the American River and delivered to customers in the lower Zone 1 and/or Zone 5 service areas. The following sections describe PCWA's water supply sources.

#### **2.1.1 PG&E Drum-Spaulding Project**

PG&E's Drum-Spaulding Project supply originates from the upper Yuba River Basin, augmented by Bowman Lake and Lake Spaulding on the South Yuba River and Rollins Reservoir on the Bear River. The water supply is conveyed primarily via the Drum, Bear River, and Upper Boardman canals. PG&E operates the Drum-Spaulding Project mainly for hydropower purposes. The majority of raw water deliveries to PCWA depend wholly on PG&E operations.

The 1968 PCWA-PG&E Water Supply Contract, as amended in 1996, provides for a maximum annual supply of 100,400 acre-feet of Zone 1 water at specified prices to be delivered through designated points at a total combined delivery rate not in excess of 244.8 cfs. PCWA also has a separate water supply contract with PG&E for an additional 25,000 acre-feet of water for PCWA's Zone 3 service area. PCWA is responsible for supplying reasonably adequate storage to meet the minimum essential requirements of its customers during any interruptions of service from PG&E, and PG&E is not liable for the insufficiency or interruption of water during droughts or as a result of certain natural or human causes.

The PG&E supply is purchased and delivered through the PG&E Towle, Bear River, Wise, and South canals at authorized buy points (points of delivery).

### **2.1.2 Middle Fork Project and American River Pump Station**

The Middle Fork Project (MFP) is a multipurpose project designed to conserve and control waters of the Middle Fork American River, the Rubicon River, and certain tributaries for irrigation, domestic, commercial, and recreational purposes, and for the generation of electricity.

Principal MFP features include two storage reservoirs (French Meadows and Hell Hole), five diversion dams, five hydroelectric power plants, diversion and water transmission facilities, five tunnels, and related facilities. Through its MFP storage rights, PCWA has physical control of more water than it has the right to consumptively divert.

The authorized diversion points for the PCWA MFP supply are at the Auburn Dam site on the North Fork American River and Folsom Lake. When the MFP was constructed in the 1960s, the Auburn Ravine Tunnel and a 50-cfs pumping plant on the North Fork American River were installed to enable PCWA to pump water from the American River. Modifications to the Auburn Ravine Tunnel and removal of the pumping plant occurred later in anticipation of the construction of the Auburn Dam. The current facility at Auburn Dam site is a permanent pumping station installed by the U.S. Department of Interior, Bureau of Reclamation.

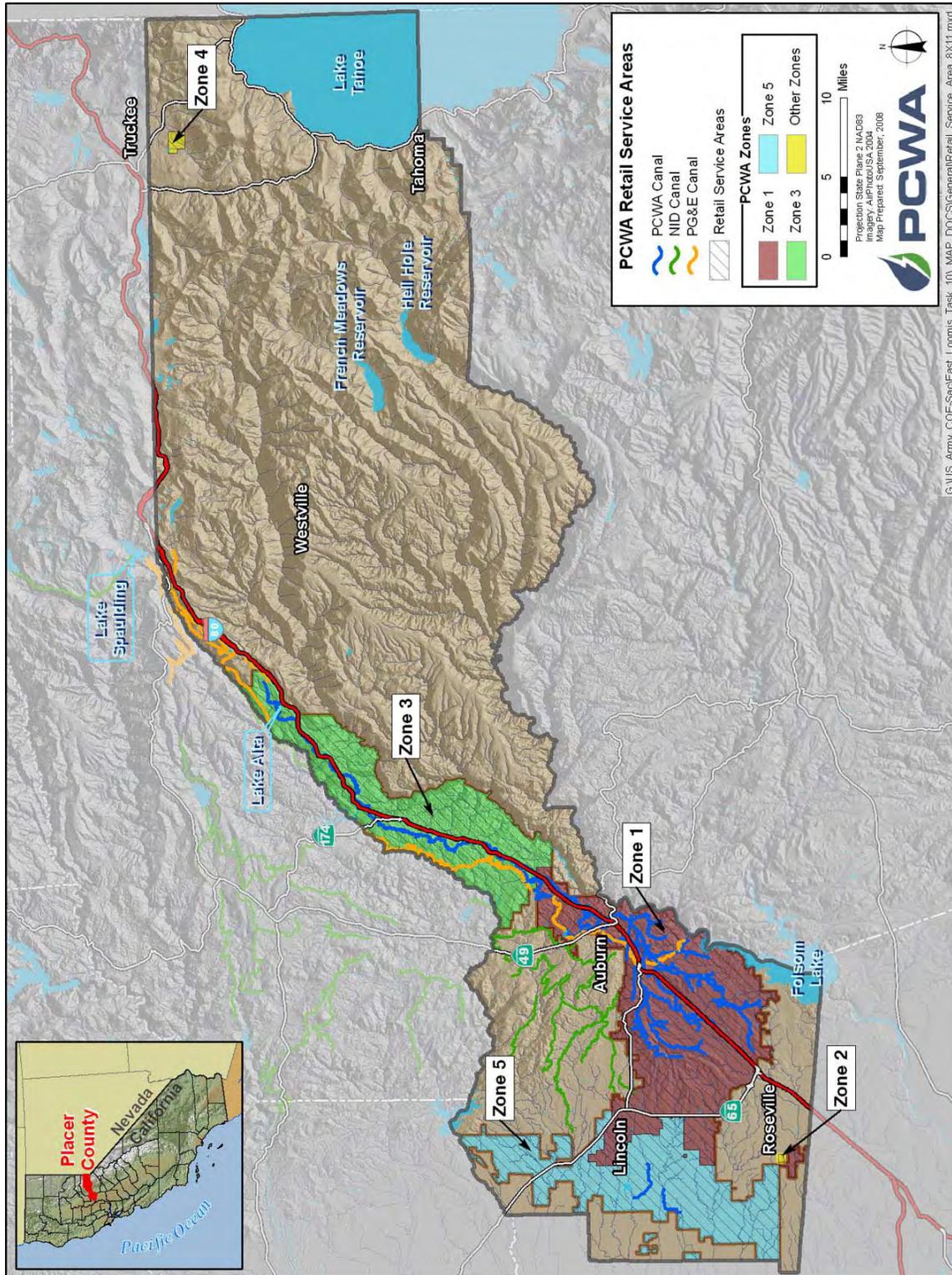
The permanent American River Pump Station (ARPS) is used to pump water from the North Fork of the American River into the Auburn Ravine Tunnel. The Auburn Ravine Tunnel discharges into the Auburn Ravine, a natural water course, to deliver raw water to the agricultural customers in the Zone 5 service area. The ARPS has a design capacity of 100 cfs, equivalent to an annual supply of 35,000 acre-feet. Water can be pumped out of the Auburn Ravine Tunnel into the PG&E South Canal through the Auburn Ravine Tunnel Pump Station (up to 100 cfs). This pumped water is mainly used to supply the Foothill Water Treatment Plant (WTP) with raw water during the annual PG&E Bear River canal maintenance, usually beginning in mid-October. Pumped water in excess of the Foothill WTP needs can be diverted for use at the PG&E buy points below Wise Powerhouse. Additional pump facilities are planned for the Auburn Ravine Tunnel Pump Station that will pump water from the Auburn Ravine Tunnel to supply the future Ophir WTP.

## **2.2 PCWA CANAL SYSTEM**

The PCWA canal system contains approximately 165 miles of canals and ditches that carry about 65,000 acre-feet annually to meet the irrigation water demands of about 4,000 customers. The canals also convey raw water to water treatment plants within PCWA service areas.

Approximately 51 miles of the entire canal system are lined with gunite, concrete, and/or are contained in pipelines. The remaining canal sections are unlined.

PCWA has established five retail zones for water delivery within Placer County (**Figure 2-1**):



**FIGURE 2-1**  
**PCWA RETAIL SERVICE AREA ZONES**

- Zone 3 is a water system acquired from PG&E in 1982 that serves the areas along the Interstate 80 corridor extending from Alta to Bowman.
- Zone 1 was created in 1968 to finance the purchase of PG&E's Lower Drum Division Water System. This system provided water service to the communities of Auburn, Bowman, Ophir, Newcastle, Penryn, Loomis, Rocklin, and Lincoln and included five WTPs and associated storage and distribution systems. Zone 1 encompasses approximately 125 square miles. Today, Zone 1 includes territory under the land-use authorities of the Cities of Auburn, Rocklin, Lincoln, a portion of the City of Roseville, the Town of Loomis, and Placer County. Zone 1 is further broken up into Upper Zone 1 and Lower Zone 1 to delineate the higher elevation service areas of Auburn and Bowman from the remaining lower elevation areas.
- Zone 5 was created in 1999 and assumed the boundaries of Placer County Zone 29. It was created to reduce reliance on groundwater supplies by providing surface water for commercial agriculture in the westernmost section of Placer County. Zone 5 is served entirely by raw surface water supplies.
- Zone 2 was created in 1979 and provides retail water service to a small residential development of 47 units located southwest of the City of Roseville. Before 2003, Zone 2 was supplied groundwater by two wells. Zone 2 was connected to the City of Roseville's water supply pipeline in 2003, and now receives water supplies conveyed from Zone 1. Zone 2 is under the land-use authority of Placer County.
- Zone 4 was created in 1996 and is located in the unincorporated Martis Valley portion of eastern Placer County. Zone 4 is served entirely by groundwater.

Since Zone 2 is served by pipeline from Zone 1, and Zone 4 is served entirely by groundwater; these zones are not described or discussed further in this management plan. The remaining zones, described below, receive raw surface water supplies through open canals and pipes, which are mainly gravity fed, and which run from Alta to western Placer County.

### 2.2.1 Zone 3

PCWA's Zone 3, shown in **Figure 2-2**, is located at the northeastern end of the canal system. The Zone 3 water system consists of a series of ditches, canals, and pipelines that extend approximately 35 miles above PCWA's Lake Theodore to PG&E's Alta Powerhouse. PCWA acquired these facilities from PG&E in 1982. The Boardman Canal is the main conveyance facility in the Zone 3 system.

### 2.2.2 Zone 1

**Figures 2-3** and **2-4** show PCWA's Zone 1 service area. In addition to the PCWA supplies entering Zone 1 from Zone 3, PCWA obtains water supplies to meet customer demands in Zone 1 through purchases from PG&E just above Halsey forebay, and from Rock Creek Reservoir, Wise Canal, and South Canal. A portion of the raw water supply conveyed through Zone 1 is delivered to the Auburn, Bowman, Foothill, and Sunset WTPs for treatment and delivery to retail treated water customers, and the City of Lincoln, a wholesale treated water customer. Water for Zone 5 can be purchased at the designated PG&E buy point Yuba-Bear (YB) 136, below Wise Powerhouse, and diverted into Auburn Ravine for use by customers.

Raw water customers throughout the Zone 1 area are predominantly serviced through the Boardman, Caperton, Antelope, and Dutch Ravine canals, and numerous other canals fed from the Boardman Canal, including the Fiddler-Green, Greeley, Banvard, Sugarloaf, Red Ravine, Barton, Perry, and several other canals. The Dutch Ravine Canal, which receives flows from PG&E's South Canal, may either convey raw water to customers below in Zone 1, or during rare instances, supplement flows in Auburn Ravine for deliveries to raw water customers in the Zone 5 service area. The Auburn Ravine area within lower Zone 1 is shown in greater detail in **Figure 2-5**.

PCWA operates two regulating reservoirs within Zone 1 to manage deliveries to raw water customers. The Clover Valley Reservoir, which receives water flows from the Antelope Canal, releases water to the lower Antelope Canal, as well as the Antelope Stub Canal. Mammoth Reservoir receives water flows from the Boardman Canal, and releases to the Boardman Canal downstream. Several canals receive water flows from the Boardman Canal downstream from Mammoth Reservoir and make deliveries to raw water customers, including the Turner, Yankee Hill, Ferguson, Stallman, and Baughman canals.

The terminus of PCWA's raw water canal system in Zone 1 is the end of the Boardman Canal, located in northeastern Roseville.

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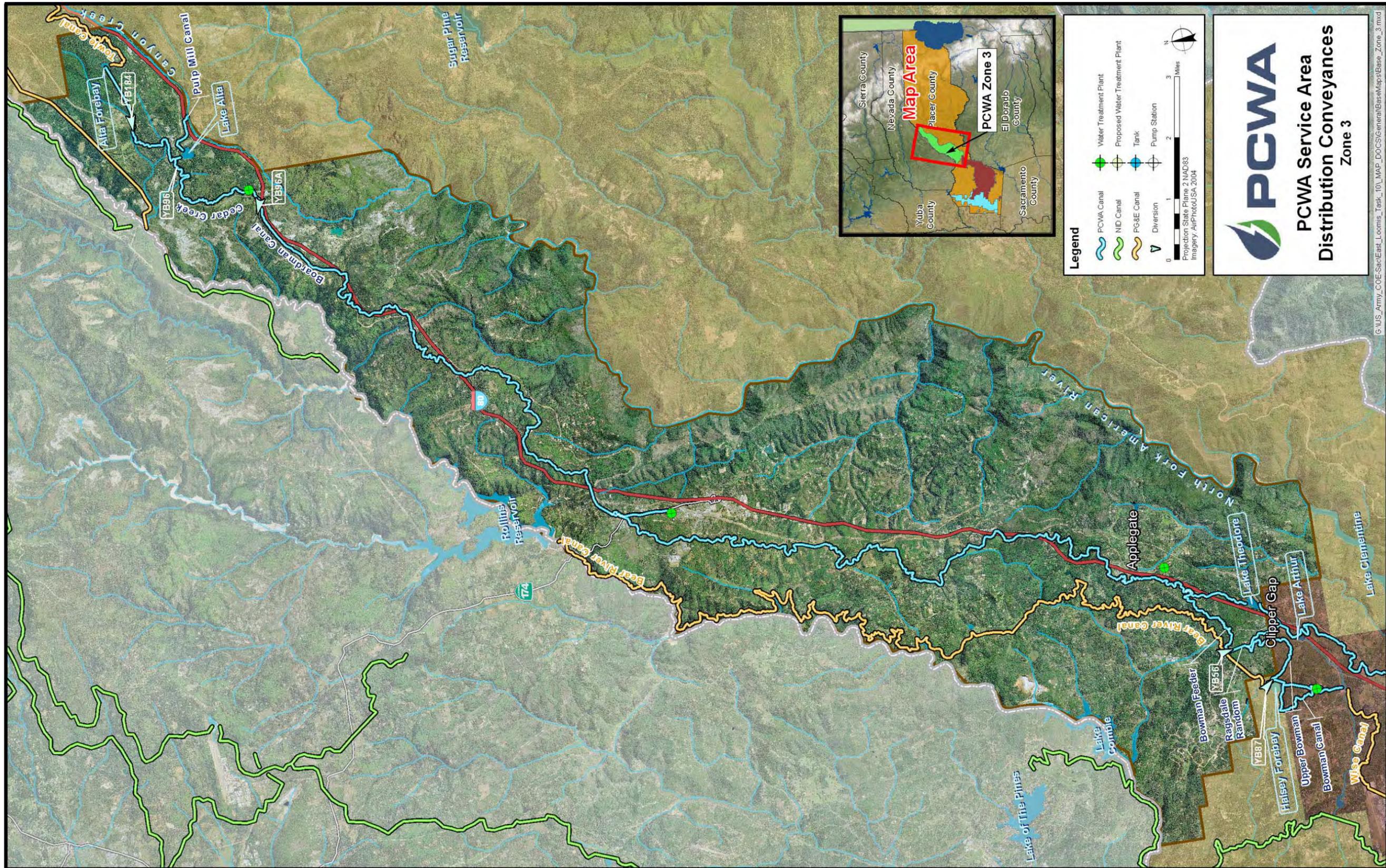
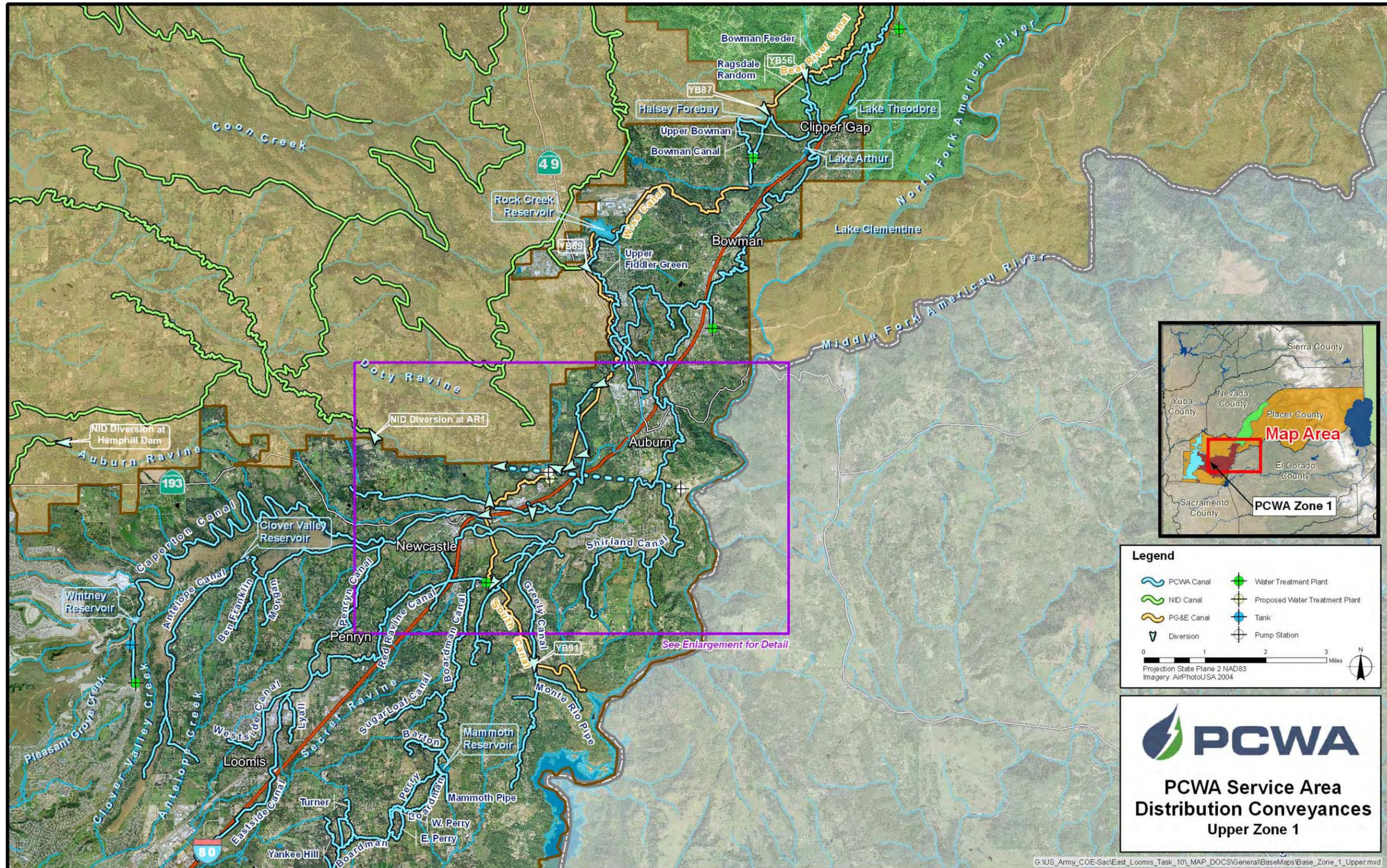


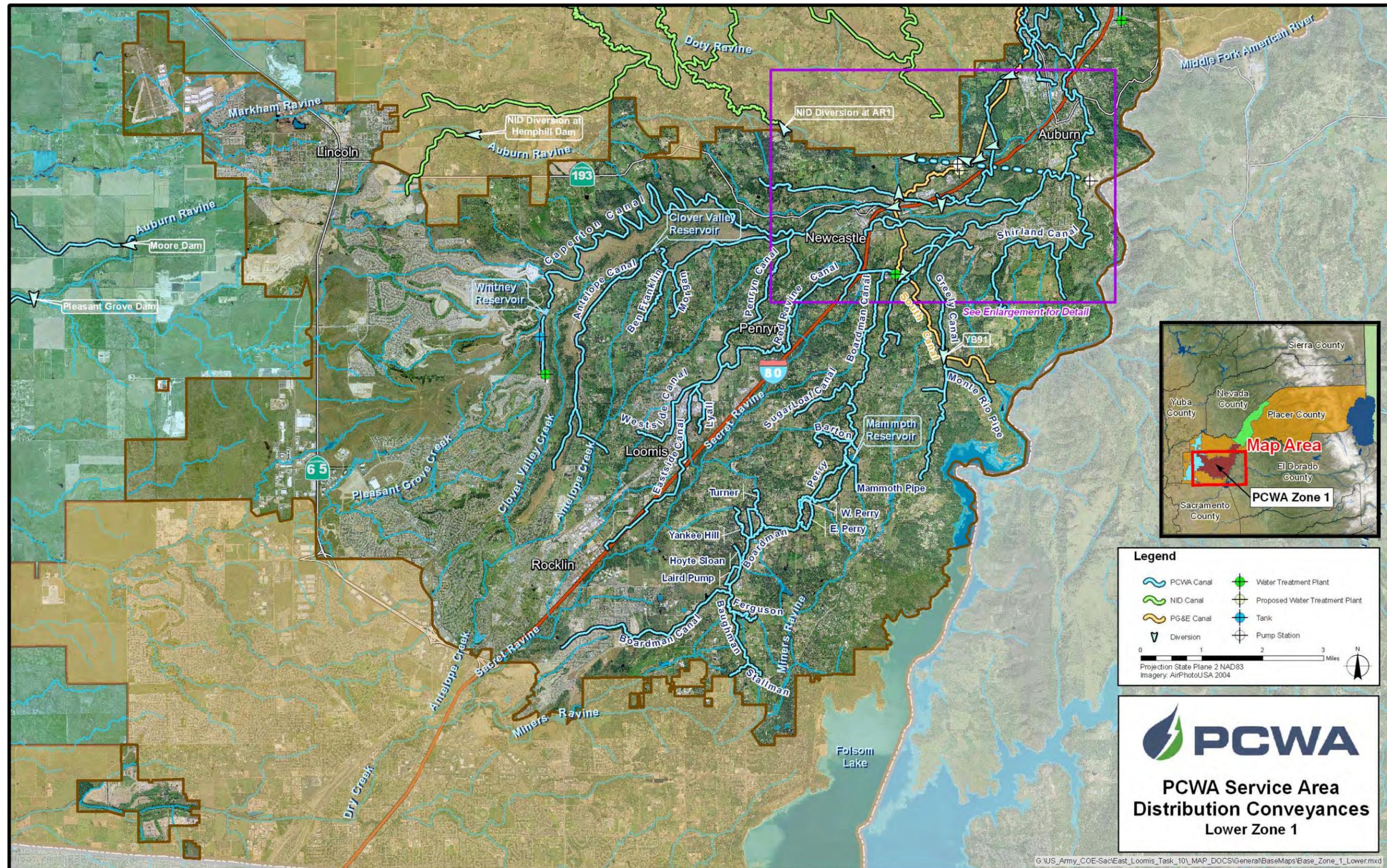
FIGURE 2-2  
PCWA ZONE 3 SERVICE AREA AND DISTRIBUTION CONVEYANCES

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**FIGURE 2-3**  
**PCWA UPPER ZONE 1 SERVICE AREA AND DISTRIBUTION CONVEYANCES**

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**FIGURE 2-4**  
**PCWA LOWER ZONE 1 SERVICE AREA AND DISTRIBUTION CONVEYANCES**