Miners Ravine is dominated by spotted bass, a predatory species. As described for Secret Ravine, introduced fishes, such as bass and sunfish, may opportunistically feed upon juvenile salmon and steelhead. Additional fish species that can be found in Miners Ravine (mostly in the lower reaches) are listed in **Table 3-17**.

Fish communities and associated aquatic habitat were assessed in the Miners Ravine by DFG in fall 2004 and spring 2005. Both IBI scores for Miners Ravine were relatively low compared to those of Auburn Ravine and Secret Ravine, with scores of approximately 53 out of 100 (Titus et al. 2005). The gross ecological health of Miners Ravine was rated "fair" based on its IBI score. This low score is due, in part, to the dominant presence of golden shiners (considered an environmentally tolerant species) in the upper reaches of Miners Ravine.

DCC conducted BMI investigations in Miners Ravine from 2000 to 2006 at sites upstream and downstream from the Placer County SMD No. 3 WWTP (DCC 2006). Results of these studies indicate more diversity and more sensitive macroinvertebrates in upstream reaches, and a high proportion of pollution-tolerant organisms farther downstream. Overall, the B-IBI scores at Miners Ravine were considered to be "poor," with a score of about 26 at Miners Ravine at Dick Cook Road, 30 at Miners Ravine downstream from Sierra College Boulevard, and 24 at Miners Ravine at its confluence with Secret Ravine (**Figure 3-103**). The lack of aquatic habitat complexity and high sediment loads in the ravine also contribute to low B-IBI scores. The Miners Ravine site downstream of Sierra College Boulevard was assessed by DCC in 2007, during which physical habitat exhibited fairly low slopes and very low-flow velocities, as well as the lowest percentage of riffle habitat compared to Auburn Ravine and Secret Ravine (**Table 3-14)**. Instream habitat was also the lowest of the three sites, and was measured at 5 out of 20, and channel alteration results exhibited the highest value, at 18 out of 20 (**Table 3-14**). Detailed results of BMI population, B-IBI, and physical habitat analyses for Miners Ravine below Sierra College Boulevard are provided in **Appendix A.**

3.3.2.3 Zone 5

As described earlier, portions of Auburn Ravine are designated as Critical Habitat for Central Valley steelhead (70 CFR 52488, September 2, 2005). Auburn Ravine, downstream from Highway 65, conveys water from the PCWA raw water distribution system to Zone 5 customers. The Zone 5 portion receives treated effluent from the City of Lincoln's WWTP. Rice farms contribute return flows in this area as well.

Spawning gravels in the Auburn Ravine contain high levels of sediment. High erosion within this portion of the ravine is likely due to grazing, other land-use practices, and channel instability. The reaches of Auburn Ravine within Zone 5 have predominantly sandy and fine sediment, which makes egg and larvae survival difficult. As a result, there is minimal spawning habitat available to salmonids in Zone 5.

Riparian habitat varies along the Zone 5 portion of Auburn Ravine. Within Zone 5, Auburn Ravine is characterized as having primarily low levels of shade (Placer County Planning Department 2005b).

Barriers to salmonid migration exist along the Zone 5 portion of Auburn Ravine. Auburn Ravine is seasonally dammed by South Sutter Irrigation District on behalf of PCWA at two locations: Moore Dam and Pleasant Grove Dam. Auburn Ravine flows at Moore Dam are diverted to Moore Canal. Further downstream, flows are diverted from Auburn Ravine at the Pleasant Grove Dam to the Pleasant Grove Canal.

3.3.3 Special Status Species

Threatened and Endangered Species Critical Habitat designations in the study area, as well as CNDDB records of occurrence, are shown in **Figures 3-104** to **3-107** (USFWS 2008, CNDDB 2008). **Table 3-18** summarizes known special status species occurrences within Zones 3, 1, and 5 (CNDDB 2008). PCWA canals, reservoirs, and conveyances in the study area cross a number of habitat types. Although these water bodies may traverse habitats that are used by special status species, O&M activities may not directly affect these habitats and/or species might not be present throughout the study area. Surveys should be conducted before O&M activities to determine which habitat types would be affected and whether special status species are present.

In addition to known species occurrences, a number of special status species have been identified as having the potential to occur. These are summarized in **Table 3-19**, along with their habitat preferences.

Special status species known to occur in the area that could be affected indirectly by impacts to hydrology, water quality, and/or sedimentation in Auburn Ravine, Clover Valley Creek, Antelope Creek, Secret Ravine, Miners Ravine, or connected downstream areas include Central Valley steelhead, fall-run Chinook salmon, western pond turtle, and foothill yellow-legged frog.

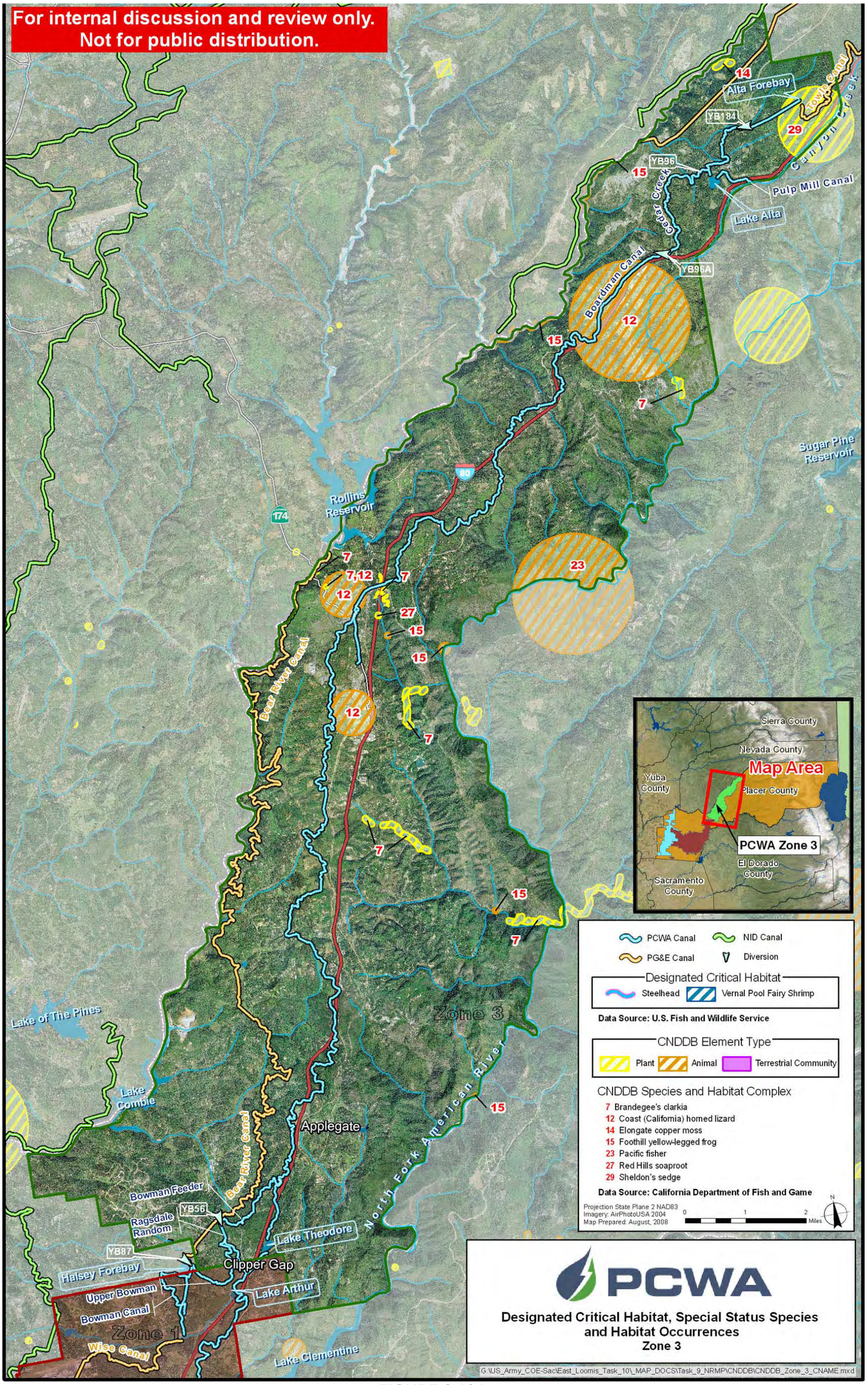

FIGURE 3-104
ZONE 3 DESIGNATED CRITICAL HABITAT, CALIFORNIA NATURAL DIVERSITY DATABASE SPECIAL STATUS SPECIES OCCURRENCES, AND HABITAT COMPLEXES

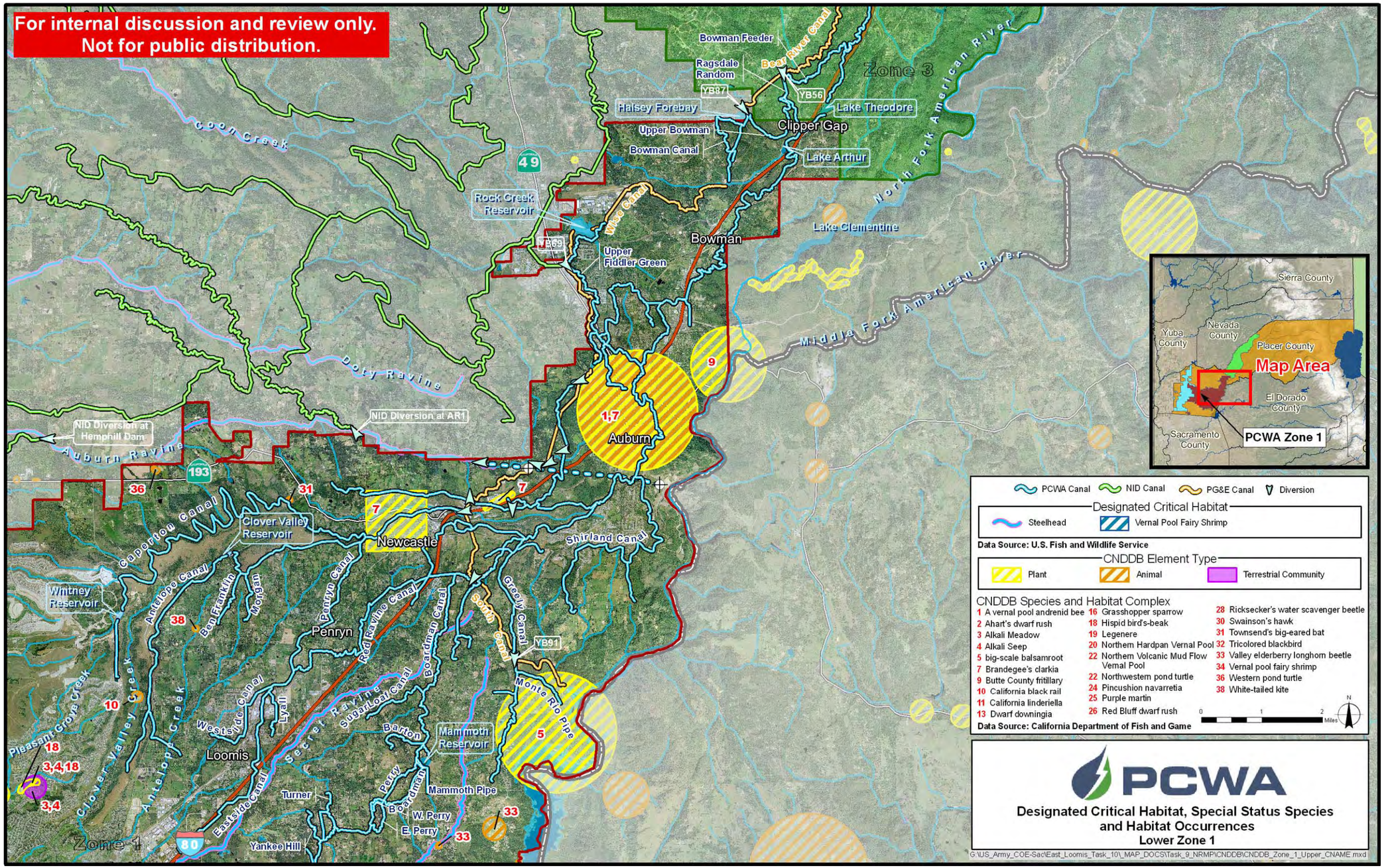

FIGURE 3-105
UPPER ZONE 1 DESIGNATED CRITICAL HABITAT, CALIFORNIA NATURAL DIVERSITY DATABASE SPECIAL STATUS SPECIES OCCURRENCES, AND HABITAT COMPLEXES

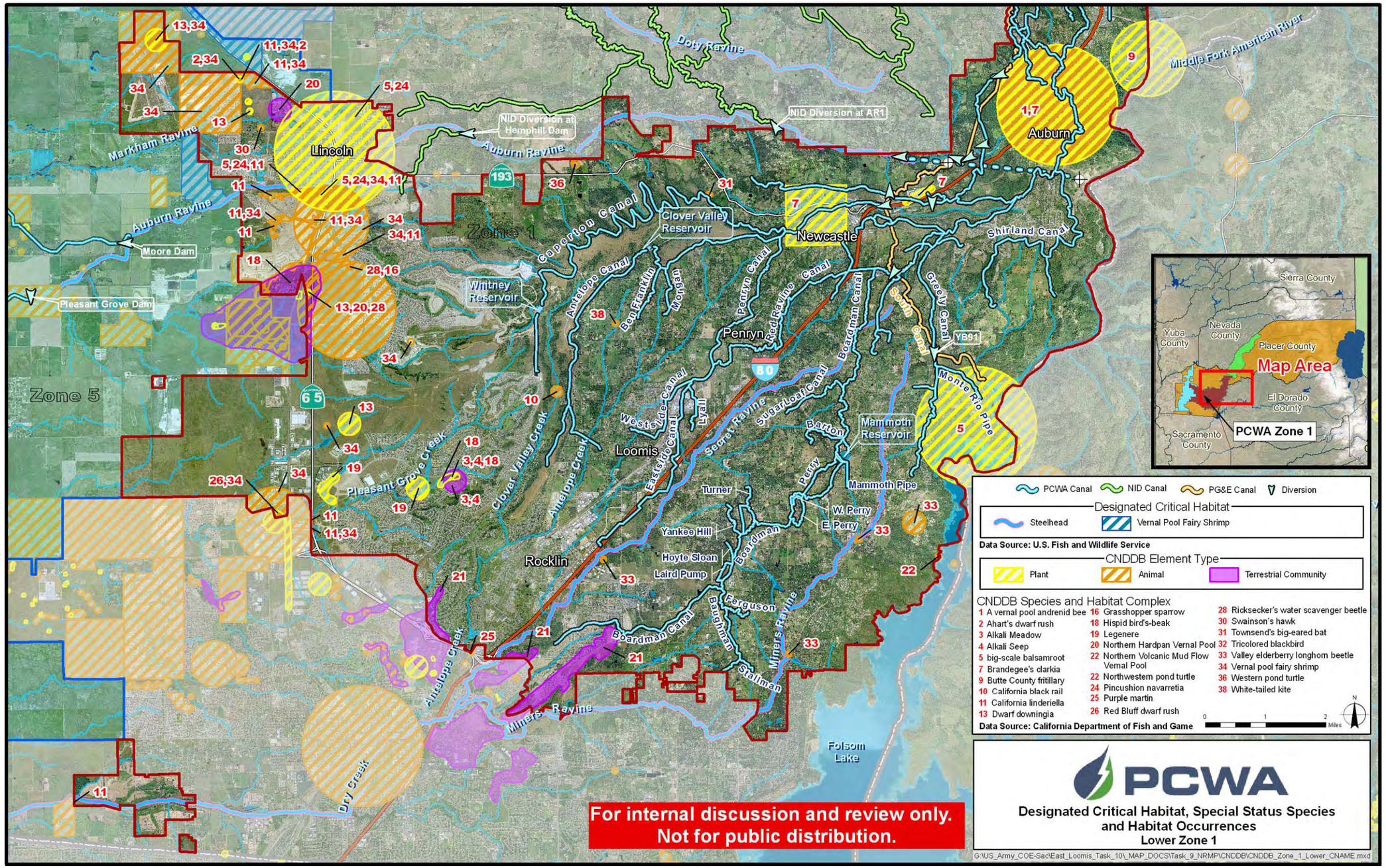

FIGURE 3-106
LOWER ZONE 1 DESIGNATED CRITICAL HABITAT, CALIFORNIA NATURAL DIVERSITY DATABASE SPECIAL STATUS SPECIES OCCURRENCES, AND HABITAT COMPLEXES

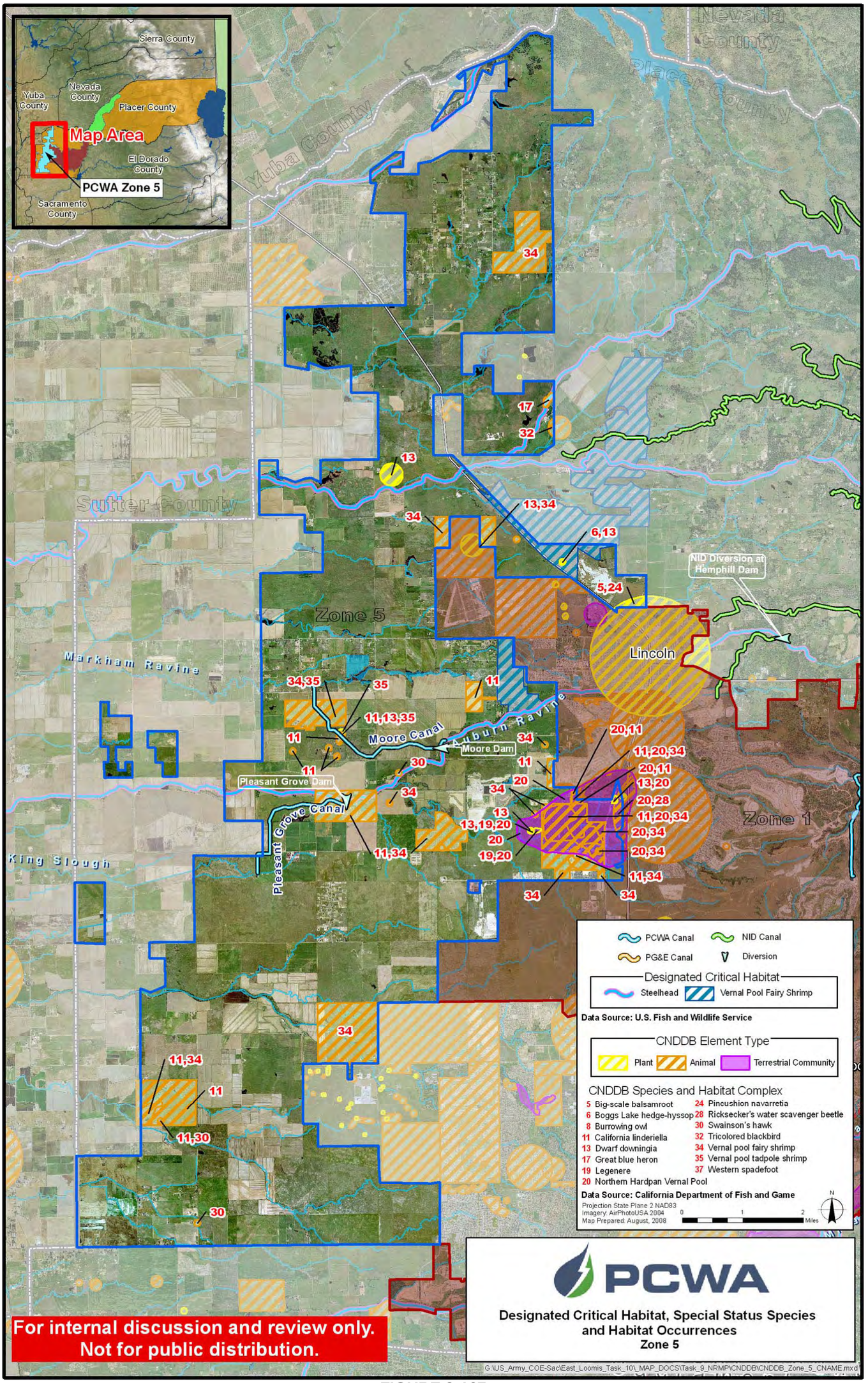

FIGURE 3-107
ZONE 5 DESIGNATED CRITICAL HABITAT, CALIFORNIA NATURAL DIVERSITY DATABASE SPECIAL STATUS SPECIES OCCURRENCES, AND HABITAT COMPLEXES

TABLE 3-18
KNOWN SPECIAL STATUS SPECIES OCCURRENCES IN ZONES 1, 3, AND 5 (CNDDB 2008)

Common Name	Scientific Name	Federal Status	State Status	CNPS List	Habitat	Occurrence	Notes
Wildlife							
Hardhead	*Mylopharodon conocephalus*	--	WL		Undisturbed areas of larger middle-and low-elevation streams	Zones 1 and 5	
Central Valley steelhead	*Oncorhynchus mykiss*	T	T		Riverine (not known to occur in canals)	Zones 1 and 5	
Fall-run Chinook salmon	*Oncorhynchus tshawytscha*	SC	SSC		Riverine (not known to occur in canals)	Zones 1 and 5	
vernal pool fairy shrimp	*Branchinecta lynchi*	T	--		vernal pools	Zones 1 and 5	
vernal pool tadpole shrimp	*Lepidurus packardi*	E	--		vernal pools	Zone 5	
California linderiella	*Linderiella occidentalis*	--	--		vernal pools	Zones 1 and 5	
valley elderberry longhorn beetle	*Desmocerus californicus dimorphus*	T	--		valley foothill riparian and oak savanna in elderberry shrubs	Zone 1	
A vernal pool andrenid bee	*Andrena subapasta*	--	--		vernal pools	Zone 1	
Ricksecker's water scavenger beetle	*Hydrochara rickseckeri*	--	--		vernal pools, wetlands	Zones 1 and 5	
coast (California) horned lizard	*Phrynosoma coronatum* (frontale population)	--	SSC		various habitats, including annual grassland, shrubland, forested habitats, and wetlands	Zone 3	lays eggs May-June
western pond turtle	*Actinemys marmorata*	--	SSC		annual grassland, wetland, forested, river, streams, lake and river margins	Zone 1	

TABLE 3-18
KNOWN SPECIAL STATUS SPECIES OCCURRENCES IN ZONES 1, 3, AND 5 (CNDDB 2008) (CONTINUED)

Common Name	Scientific Name	Federal Status	State Status	CNPS List	Habitat	Occurrence	Notes
Wildlife (continued)							
Foothill yellow-legged frog	*Rana boylii*	--	SSC		forest and shrubland with slow-moving stream/river	Zone 3	breeds in water March-May
western spadefoot	*Spea hammondii*	--	SSC		annual grassland, wetland, lake and river margins	Zone 5	
burrowing owl	*Athene cunicularia*	--	SSC		agricultural, annual grassland, oak woodland	Zone 5	
grasshopper sparrow	*Ammodramus savannarum*	--	SSC		Annual grassland, oak woodland	Zone 1	
great blue heron	*Ardea herodias*	--	--		wetlands, agricultural	Zone 5	
purple martin	*Progne subis*	--	SSC		Annual grassland, oak woodland, urban	Zone 1	
white-tailed kite	*Elanus leucurus*	--	FP		annual grassland, agricultural, open woodlands	Zone 1	
California black rail	*Laterallus jamaicensis coturniculus*	--	T, FP		fresh emergent wetland	Zone 1	
tricolored blackbird	*Agelaius tricolor*	--	SSC		agricultural, wetland, annual grassland, urban	Zones 1 and 5	
Swainson's hawk	*Buteo swainsoni*	--	T		agricultural, annual grassland, forested	Zones 1 and 5	Nesting period is generally March 1 to August 15

TABLE 3-18
KNOWN SPECIAL STATUS SPECIES OCCURRENCES IN ZONES 1, 3, AND 5 (CNDDB 2008) (CONTINUED)

Common Name	Scientific Name	Federal Status	State Status	CNPS List	Habitat	Occurrence	Notes
Plants							
Townsend's big-eared bat	*Corynorhinus townsendii*	--	SSC		woodlands, urban areas, requires roosting areas (caves, mines, etc.)	Zone 1	
Pacific fisher	*Martes pennanti (pacifica)*	C	SSC		mature coniferous and riparian forest	Zone 3	
Boggs Lake hedge-hyssop	*Gratiola heterosepala*	--	E	1B	vernal pools, marshes and swamps	Zone 5	blooms April-August
Red Bluff dwarf rush	*Juncus leiospermus var. leiospermus*	--	--	1B	vernal pools	Zone 1	blooms March-May
Ahart's dwarf rush	*Juncus leiospermus var. ahartii*	--	--	1B	vernal pools, wetlands	Zone 1	blooms March-May
big-scale balsamroot	*Balsamorhiza macrolepis var. macrolepis*	--	--	1B	chaparral, woodland, grasslands	Zones 1 and 5	blooms March-June
Brandegee's clarkia	*Clarkia biloba ssp. brandegeeae*	--	--	1B	chaparral, forest, disturbed areas	Zones 1 and 3	blooms May-July
Butte County fritillary	*Fritillaria eastwoodiae*	--	--	3	chaparral, woodland, montane coniferous forest	Zone 1	blooms March-May
dwarf downingia	*Downingia pusilla*	--	--	2	vernal pools, marshes and swamps	Zones 1 and 5	blooms March-May
elongate copper moss	*Mielichhoferia elongate*	--	--	2	woodlands, moist rocky areas	Zone 3	
hispid bird's-beak	*Cordylanthus mollis ssp. hispidus*	--	--	1B	wetlands	Zone 1	blooms June-September
legenere	*Legenere limosa*	--	--	1B	vernal pools, wetlands, drainages	Zones 1 and 5	blooms May-September

TABLE 3-18
KNOWN SPECIAL STATUS SPECIES OCCURRENCES IN ZONES 1, 3, AND 5 (CNDDB 2008) (CONTINUED)

Common Name	Scientific Name	Federal Status	State Status	CNPS List	Habitat	Occurrence	Notes
Plants (continued)							
pincushion navarretia	*Navarretia myersii ssp. myersii*	--	--	1B	wetlands, vernal pools	Zones 1 and 5	blooms in May
Red Hills soaproot	*Chlorogalum grandiflorum*	--	--	1B	chaparral, woodland on serpentine or gabboric soils	Zone 3	blooms May-June
Sheldon's sedge	*Carex sheldonii*	--	--	2	coniferous forest, wetlands, riparian scrub	Zone 3	blooms May-August
Habitats							
Alkali Meadow						Zone 1	
Alkali Seep						Zone 1	
Northern Hardpan Vernal Pool						Zones 1 and 5	
Northern Volcanic Mud Flow Vernal Pool						Zone 1	

Key:
Federal Status:
C = Candidate
E = Endangered
SC = Species of Concern
T = Threatened
State Status:
E = Endangered
FP = Fully Protected
R = Rare
SSC = Species of Special Concern
T = Threatened
WL = Watch List
California Native Plant Society
1B = List 1B species: rare, threatened, or endangered in California and elsewhere
2 = List 2 Species: rare, threatened, or endangered in California but more common elsewhere
3 = plant that need more information to determine their status

TABLE 3-19
SPECIAL STATUS SPECIES POTENTIALLY OCCURRING IN ZONES 1, 3, AND 5*

Common Name	Scientific Name	Federal Status	State Status	CNPS List	Habitat	Potential Occurrence	Notes
California red-legged frog	*Rana aurora draytonii*	T	SSC		valley foothill riparian, wetland, lake and river margins with permanent deep water	Zones 1, 3, 5	breeds in water November-March
giant garter snake	*Thamnophis gigas*	T	T		marshes, wetlands, canals, rice field	Zones 1 and 5	fs
Western yellow-billed cuckoo	*Coccyzus americanus occidentalis*	C	E		dense riparian forest	Zone 5	
Stebbins' morning glory	*Calystegia stebbinsii*	E	E	1B	chaparral or woodland on gabbroic or serpentinite soils	Zone 1	blooms May-June
Pine Hill ceanothus	*Ceanothus roderickii*	E	R	1B	chaparral or woodland on gabbroic or serpentinite soils	Zone 1	blooms May-June
El Dorado bedstraw	*Galium californicum ssp. Sierrae*	E	R	1B	chaparral or forestland on gabbroic soils	Zone 1	blooms May-June
Layne's ragwort	*Packera layneae*	T	R	1B	chaparral or woodland on gabbroic or serpentinite soils	Zone 1	blooms April-July
Jepson's onion	*Allium jepsonii*	--	--	1B	chaparral or forestland on gabbroic or volcanic soils	Zones 1 and 3	blooms April-August
dubious pea	*Lathyrus sulphureus var. argillaceus*	--	--	3	chaparral or forest	Zones 1 and 3	blooms April-May
oval-leaved viburnum	*Viburnum ellipticum*	--	--	2	chaparral or forest	Zones 1 and 3	blooms May-June

TABLE 3-19
SPECIAL STATUS SPECIES POTENTIALLY OCCURRING IN ZONES 1, 3, AND 5* (CONTINUED)

Common Name	Scientific Name	Federal Status	State Status	CNPS List	Habitat	Potential Occurrence	Notes
red-anthered rush	*Juncus marginatus var. marginatus*	--	--	2	marshes and swamps at elevation over 2,400	Zone 3	blooms in July
brownish beaked-rush	*Rhynchospora capitellata*	--	--	2	coniferous forest, wetlands	Zone 3	blooms July-August
Scadden Flat checkerbloom	*Sidalcea stipularis*	--	E	1B	marshes and swamps	Zone 3	blooms July-August
Bisbee Peak rush-rose	*Helianthemum suffrutescens*	--	--	3	chaparral (often serpentinite, gabbroic, or lone soil)	Zone 1	blooms April-June
El Dorado County mule ears	*Wyethia reticulata*	--	--	1B	chaparral, woodland, montane coniferous forest on clay or gabbroic soils	Zone 1	blooms May-July

Notes:
* Excludes those species known to occur that are listed in Table 3-12

Key:
Federal Status:
C = Candidate
E = Endangered
T = Threatened
State Status:
E = Endangered
FP = Fully Protected
R = Rare
SSC = Species of Special Concern
T = Threatened
California Native Plant Society
1B = List 1B species: rare, threatened, or endangered in California and elsewhere
2 = List 2 Species: rare, threatened, or endangered in California but more common elsewhere
3 = plant that need more information to determine their status

Auburn Ravine, Secret Ravine and Miners Ravine are federally designated Critical Habitat for Central Valley steelhead. Secret Ravine and Miners Ravine and are recognized by DFG and NMFS as the primary production areas in the Dry Creek drainage for Central Valley steelhead and fall-run Chinook salmon (DFG 2001). These ravines appear to be especially important for spawning and rearing of these anadromous fishes (DFG 2001).

Major life stages of fall-run Chinook salmon and Central Valley steelhead in the Auburn Ravine and Dry Creek watershed during a water year (October through September) are shown in **Figure 3-108**.

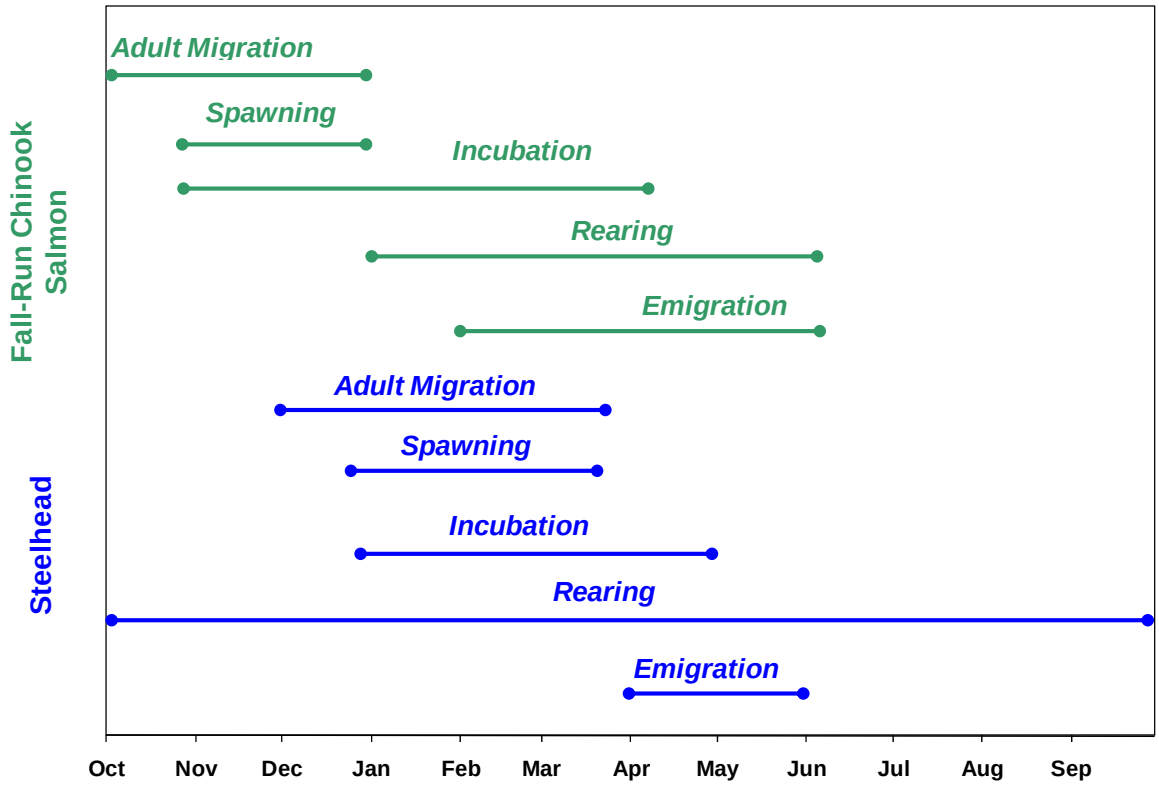

FIGURE 3-108
MAJOR LIFE STAGES OF FALL-RUN CHINOOK AND CENTRAL VALLEY STEELHEAD IN AUBURN RAVINE AND DRY CREEK WATERSHED DURING A WATER YEAR

The timing of migration of adult fall-run Chinook salmon is determined primarily by flows and water temperatures, and migration can occur in the Auburn Ravine and Dry Creek watershed anywhere from October through December. Spawning usually occurs from November through December. From January to mid-April, fry emerge (incubation), and rearing occurs from January to June. Smolts tend to emigrate from the watershed during February through June, peaking in March to May (DFG 2003, Placer and Sacramento Counties 2003).

Central Valley steelhead migration occurs from December through March. Spawning depends on flows and water temperatures, but typically occurs from January through March. Steelhead

incubation typically occurs between January and mid-April. Steelhead rearing can occur year-round. Juvenile emigration takes place from late March through May (DFG 2003, Placer and Sacramento Counties 2003).

Substrate composition refers to the suitability of a particular sized gravel substrate (USDA 1979). Fine substrate, such as silt and suspended solids, can clog fish gills or reduce feeding, and migrating salmon will avoid or cease migration in waters with high silt loads or high turbidity. Excessive sediment loads can also decrease the fish spawning capacity of streams by clogging gravel redds.

Important habitat elements for anadromous salmonids include cover, substrate composition, and water quality and quantity (USDA 1979). Cover for fish can consist of overhanging vegetation, undercut banks, submerged vegetation, large submerged objects (i.e., logs and rocks), and water depth and turbulence. Adequate cover is most important to anadromous salmonids during rearing because they are most susceptible to predation from other fish and terrestrial animals during this time (USDA 1979).

One of the primary water quality parameters that affect fish habitat conditions is water temperature. Salmonids are cold water fish with optimum temperature requirements at different life stages. There is some debate in scientific literature on the definitive temperature range requirements for various life cycle phases of salmon and steelhead. Temperature targets for the life cycle stages of steelhead and Chinook salmon in the study area consistent with values reported in scientific literature are shown in **Table 3-15**.

Adequate water depth and streamflow are necessary for fish passage. Migration can be hampered by too little streamflow and resulting shallow water (USDA 1979). To allow for fish passage, minimum streamflows must be met. In addition, low streamflows can often result in warmer waters.

CHAPTER 4.0
REGULATORY REQUIREMENTS FOR PCWA CANAL SYSTEM OPERATIONS AND MAINTENANCE ACTIVITIES

This chapter summarizes the regulatory requirements for PCWA canal system O&M activities.

4.1 FEDERAL REGULATIONS

The following sections describe Federal regulatory requirements associated with O&M activities carried out by PCWA.

4.1.1 Clean Water Act

Growing public awareness and concern for controlling water pollution led to enactment of the Federal Water Pollution Control Act Amendments of 1972. As amended in 1977, this law became commonly known as the Clean Water Act (CWA) (33 U.S.C. §1251 et seq.). The CWA is the primary Federal law that protects the quality of the nation's surface waters. The Act established the basic structure for regulating discharges of pollutants into the "waters of the United States." Waters of the United States and their lateral limits are defined in CFR Title 33, Part 328.3(a), to include the following:

1. All waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide.
2. All interstate waters including interstate wetlands.
3. All other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, the use, degradation or destruction of which could affect interstate or foreign commerce including any such waters:
    i. Which are or could be used by interstate or foreign travelers for recreational or other purposes; or
    ii. From which fish or shellfish are or could be taken and sold in interstate or foreign commerce; or
    iii. Which are used or could be used for industrial purpose by industries in interstate commerce.
4. All impoundments of waters otherwise defined as waters of the United States under the definition.
5. Tributaries of waters identified in paragraphs (a)(1)-(4) of this section.
6. The territorial seas.

7. Wetlands adjacent to waters (other than waters that are themselves wetlands) identified in paragraphs (a)(1)-(6) of this section. Waste treatment systems, including treatment ponds or lagoons designed to meet the requirements of CWA (other than cooling ponds as defined in 40 CFR 123.11(m) which also meet the criteria of this definition) are not waters of the United States.
8. Waters of the United States do not include prior converted cropland. Notwithstanding the determination of an area's status as prior converted cropland by any other federal agency, for the purposes of the CWA, the final authority regarding CWA jurisdiction remains with the U.S. Environmental Protection Agency (EPA).

Considering this definition of waters of the United States, essentially all natural water bodies are included under the definition of waters of the United States. In addition, several artificial or disturbed water bodies have the potential to fall under this definition, such as:

- Reservoirs
- Farm or stock ponds fed by direct rainfall or impoundment of a stream (not by pumped water)
- Artificial wetlands that receive water without artificial controls (i.e., pumps, valves, or gates)
- Farmed wetlands

Some water bodies that may be excluded from this definition include the following (Cylinder et al., 2004):

- Irrigation ditches that are not considered tributaries of waters of the United States
- Drainage ditches excavated in uplands
- Temporary sediment basins on construction sites
- Reflecting pools
- Wastewater systems, including treatment ponds and lagoons
- Ponds and wetlands created as part of an ongoing mining operation (unless created as mitigation for past impacts)
- Isolated ponds and wetlands that do not have a nexus to interstate commerce

As mentioned above, artificial channels that convey only irrigation water usually are not included under the definition of waters of the United States, unless they connect directly to jurisdictional waters of the United States. However, if the PCWA canal system is deemed

"Waters of the United States" by USACE, Section 404 and all associated regulations under the CWA are applicable.

The CWA authorizes the EPA to set national standards and restrictions on quantities, discharge rates, and concentrations of pollutants discharged into the waters of the United States. Many actions that result in the discharge of pollutants into the waters of the United States require a permit as authorized by sections of the CWA. The permit process is the CWA's primary regulatory tool.

4.1.1.1 Section 303

Under Section 303(c)(2)(B) of the CWA, states must adopt numeric criteria for the priority toxic pollutants listed under Section 307(a) if those pollutants could be reasonably expected to interfere with the designated uses of states' waters. The EPA requires numeric water quality criteria for priority toxic pollutants and other water quality standards provisions to be applied to waters in California. Today's final rule promulgates (1) ambient aquatic life criteria for 23 priority toxics, (2) ambient human health criteria for 57 priority toxics, and (3) a compliance schedule provision that authorizes the state to issue schedules of compliance for new or revised NPDES permit limits based on the Federal criteria when certain conditions are met. The State must use the criteria together with the State's existing water quality standards when controlling pollution in inland waters and enclosed bays and estuaries. The numeric water quality criteria contained in the final rule are identical to EPA's recommended CWA Section 304(a) criteria for these pollutants published in December 1998 (see 63 Federal Register (FR) 68353).

4.1.1.2 Section 404

Section 404 of the CWA establishes a requirement to obtain a permit before any activity that involves any discharge of dredged or fill material into waters of the United States. "Fill" is defined as any material that replaces any portion of a water of the United States with dry land, or that changes the bottom elevation of any portion of a water of the United States. Actions typically subject to Section 404 requirements are those that would take place in wetlands or stream channels that convey natural runoff, including intermittent streams, even if they have been realigned. Per 33 CFR 323.4, maintenance or construction of irrigation ditches, and maintenance (not construction) of drainage ditches are not subject to the Section 404 Regulatory Program.

The Section 404 permit issuance process is conducted in compliance with guidelines developed by EPA that require that there be a demonstration that no alternative is available to meet the project purpose and need that does not result in a discharge of fill in waters. Once this first test has been satisfied, the project that is permitted must be the least environmentally damaging practical alternative before the USACE may issue a permit for the proposed activity.

The USACE issues two broad categories of permits under Section 404: general permits and standard permits. General permits, which include nationwide permits and regional permits, are issued by USACE to streamline the permit process for nationwide, statewide, or regional activities that have minimal environmental impacts (CALFED 2001). Projects that meet specific

criteria, including certain PCWA O&M activities, may proceed under the authorization of a general permit once the conditions specified in the general permit are met (Cylinder et al. 2004). Many general permits may require notification to USACE before the start of an activity in the form of a Preconstruction Notification. Typically the USACE will provide the applicant with a written confirmation that the work can be authorized under the applicable permit. It is important to note that the use of more than one nationwide permit for a single and complete project is prohibited (72 FR 11196) and that all general permits must be reviewed every 5 years by USACE, at which time they may be reissued, modified, or revoked. Nationwide Permits have been issued for a variety of activities that may apply to PCWA, including:

- NW-03: Maintenance
- NW-07: Outfall Structures and Maintenance
- NW-13: Bank Stabilization
- NW-18: Minor Discharges
- NW-23: Approved Categorical Exclusions
- NW-41: Reshaping Existing Drainage Ditch
- NW-46: Discharge into Ditches

Regional conditions for nationwide permits to be applied across the entire Sacramento District include, but are not limited to, the following:

- Nationwide Permits 14, 29, 33, 39, 40, 41, 42, 43, and 44 are withdrawn from use in histosols, including fens (wetlands with organic/peat soils). For the use of all other nationwide permits in fens, project proponents are required to notify the USACE using the notification or preconstruction notification procedures of the nationwide permit program (General Condition 13). This will be a "USACE only" notification.

- For all activities using any existing and proposed nationwide permits, mitigation that is required by special condition must be completed before or concurrent with project construction. Where project mitigation involves the use of a mitigation bank or in-lieu fee, payment must be made to the bank or fee-in-lieu program before starting construction of the permitted activity.

- For all nationwide permits requiring notification, except 27, the applicant must provide a written statement to the district engineer explaining how avoidance and minimization of losses of waters of the United States were achieved on the project site.

Standard permits, which include letters of permission and individual permits, are issued for activities that may have more than a minimal adverse environmental impact and do not qualify for a general permit. A letter of permission is a type of standard permit for an individual action, designed to expedite the permitting process for activities having a minimal impact on the aquatic ecosystem (CALFED 2001). Projects not eligible for a general permit or a letter of permission

must obtain an individual permit. A standard permit for a specific activity may be issued only after an individual application is submitted to USACE and the formal review process is complete.

4.1.1.3 Section 401

Section 401 of the CWA specifies that any applicant for a Federal license or permit to conduct any activity that may result in any discharge into waters of the United States will provide the Federal licensing or permitting agency a certification that any such discharge will not violate State water quality standards. Although this is a federal law, it is state enforced. In California, the authority to grant water quality certification is delegated by the SWRCB to the nine RWQCB. The RWQCB is responsible for issuing water quality certifications indicating that the project will uphold State water quality standards. The RWQCB administers the Section 401 program with the intent of prescribing measures for the applicant's project that are necessary to avoid, minimize, and mitigate adverse impacts on water quality and the ecosystems. Projects that require a Section 404 permit from USACE must also file an application to obtain water quality certification from the RWQCB, and should be filed with the RWQCB at the same time that PCWA files the Section 404 permit application with USACE.

The PCWA service area falls under the jurisdiction of the Central Valley RWQCB. Applications for a 401 certification must be filed with the Central Valley RWQCB and must include: a full, technically accurate description of the entire proposed activity; an alternatives analysis; copies of any draft or final Federal, State, and local licenses, permits, and agreements required for actions associated with the proposed activity; a copy of the CEQA document and notice of determination; and a list of agencies that participated in the CEQA process (CALFED 2001). For projects that require a Section 404 permit from USACE, an application should be filed with the RWQCB at the same time that PCWA files the Section 404 permit application with USACE. The SWRCB has issued Section 401 water quality certifications for select Section 404 nationwide permits.

4.1.1.4 Section 402

Section 402 of the CWA authorized the NPDES program, which states that all discharges into the nation's waters are unlawful, unless specifically authorized by a permit. The primary objective of the NPDES is to restore and maintain the chemical, physical, and biological integrity of the nation's waters. The NPDES Permit Program establishes waste discharge requirements, including specific pollution limits and monitoring and reporting requirements, for permitted wastewater and stormwater discharges into waters of the United States. The U.S. EPA or the approved State environmental control agency has responsibility for administering NPDES permits for discharges to surface waters, which must be renewed every 5 years. In California, the SWRCB is responsible for permit administration, and the vast majority of NPDES permits are issued by the nine RWQCBs.

The SWRCB and RWQCBs issue both general and individual NPDES permits. A general permit covers multiple facilities within a specific category, industry facilities with similar operation

types, and facilities with similar wastewater discharge types. General permits may only be issued to dischargers within specific geographical areas, such as a designated planning area, sewer district, city, county, or State boundary. Stormwater, or non-point source, discharges are regulated by the RWQCBs under Stormwater Program General Permits. The following are some stormwater permits that may apply to PCWA raw water distribution system O&M activities:

1. General Permit for Discharges of Storm Water Associated with Construction Activity (Construction General Permit, 99-08-DWQ) is required for construction activities, including clearing, grading, and disturbances to the ground such as stockpiling, or excavation that results in soil disturbances of at least 1 acre of total land area. The general permit requires development of a Stormwater Pollution Prevention Plan (SWPPP) and annual monitoring reports for compliance with effluent limitations. The SWPPP will specify the implementation of site-specific BMPs using the best available technology economically achievable and best conventional pollutant control technology.
2. Municipal Separate Storm Sewer System Permits (MS4) require the discharger, or a municipality, to develop and implement a Storm Water Management Plan/Program with the goal of reducing the discharge of pollutants to the maximum extent practicable. Phase I MS4 permits apply to medium (serving between 100,000 and 250,000 people) and large (serving 250,000 people) municipalities. Phase II MS4 permits apply to smaller municipalities, including nontraditional Small MS4s, which are governmental facilities such as military bases, public campuses, and prison and hospital complexes. Placer County has a Phase II MS4 permit with the Central Valley RWQCB.

The SRWCB also issues several point-source general permits. Of them, the following two are most relevant to irrigation canal systems:

1. A General Permit for Dewatering and Other Low Threat Discharges (NPDES No. CAG995001) is required by the Central Valley RWQCB for temporary discharges of clean or relatively pollutant-free wastewater that poses little or no threat to water quality. Temporary discharges include well development water; construction dewatering; pump/well testing; pipeline/tank pressure testing; pipeline/tank flushing or dewatering; condensate discharges; water supply system discharges; and miscellaneous dewatering/low threat discharges.
2. A General Permit for Discharges of Aquatic Pesticides (WQ Order No. 2001-12-DWQ) is typically obtained by irrigation districts, municipal supply districts, and mosquito abatement districts. On November 27, 2007, the EPA issued a Final Rule concluding that pesticides applied in accordance with the FIFRA are exempt from the CWA's permitting requirements (40 CFR §122.3(h)). On January 7, 2009, an appeals court vacated the rule under the CWA, 33 U.S.C. § 1251 et seq., in response to a lawsuit by Baykeeper and supporting environmental groups (U.S. Sixth Circuit Court of Appeals 2009). An NPDES permit is now required even if the application of a pesticide is in compliance with the FIFRA. PCWA is in compliance with FIFRA regulations, has an active General

Permit for discharges of Aquatic Pesticides, and has an extensive Aquatic Weed Management Program.

4.1.2 Endangered Species Act

The Federal ESA was enacted by Congress in 1973 (16 U.S.C. §1531 et seq.). It combined and strengthened the provisions of the 1966 Endangered Species Preservation Act and the 1969 Endangered Species Conservation Act. Currently, the Federal ESA provides broad protection for species of fish, wildlife, and plants that are listed as threatened or endangered in the United States or elsewhere. The purposes of the Federal ESA are to provide a means of conserving the ecosystems on which endangered and threatened species depend; provide a program for conserving those species; and take steps necessary to achieve the purposes of international treaties and conventions (Federal ESA, Section 2).

USFWS and National Marine Fisheries Service (NMFS) share responsibility for implementing the Federal ESA, have authority over projects that may result in the take of a federally listed endangered species, and are required to maintain lists of threatened and endangered species. Both agencies ensure that ESA requirements are followed, and evaluate projects that may affect the continued existence of a federally listed (threatened or endangered) species. Generally, USFWS manages land and freshwater species, while NMFS manages marine and "anadromous" species, such as Chinook salmon.

4.1.2.1 Section 9

Section 9 of the ESA prohibits the “take” of federally listed species. Take is defined under the ESA, in part, as killing, harming, or harassment. Under Federal regulations, take is further defined to include habitat modification or degradation when it results in death or injury to wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. The federally listed species that may occur in, or may be affected by PCWA raw water distribution system O&M activities are described in **Chapter 3**. If an activity may affect a federally listed species, either an incidental take permit, under Section 10 of the Federal ESA, or a Federal interagency consultation, under Section 7 of the Federal ESA is required.

4.1.2.2 Section 7

If a PCWA project is funded by a Federal agency or would require a permit or approval from a Federal agency (federal nexus), PCWA would be required to comply with Section 7 of the Federal ESA rather than obtain an incidental take permit under Section 10. Under Section 7, all Federal agencies must ensure that any actions they authorize, fund, or carry out are not likely to jeopardize the continued existence of a listed species, or destroy or adversely modify its designated Critical Habitat. These requirements apply only to Federal agency actions, and the latter only to habitat that has been designated as Critical.

Critical Habitat is defined as “the specific areas within the geographical area occupied by the species, at the time it is listed . . . that are essential to the conservation of the species and which may require special management considerations or protection” (Federal ESA, Section 3).

Critical Habitat is determined using the best available scientific information about the physical and biological needs of the species. These needs include: space for individual and population growth and for normal behavior; food, water, light, air, minerals, or other nutritional or physiological needs; cover or shelter; sites for breeding, reproduction, and rearing of offspring; habitat that is protected from disturbance or is representative of the historical geographic and ecological distribution of a species. A Critical Habitat designation does not set up a preserve or refuge, and applies only when federal funding, permits, or projects are involved. Critical Habitat requirements do not apply to citizens engaged in activities on private land that do not involve a federal agency. The required steps in the Section 7 consultation process are as follows:

1. Agencies must request information from USFWS and/or NMFS on the existence in a project area of listed species or species proposed for listing.
2. Following receipt of the USFWS/NMFS response to this request, agencies generally prepare a Biological Assessment to determine whether any listed species or species proposed for listing are likely to be affected by a proposed action.
3. Agencies must initiate formal consultation with USFWS and/or NMFS if the proposed action might adversely affect listed species.
4. USFWS and/or NMFS must prepare a Biological Opinion (BO) to determine whether the action would jeopardize the continued existence of listed species or adversely modify their Critical Habitat.
5. If a finding of jeopardy or adverse modifications is made in the BO, USFWS and/or NMFS must recommend reasonable and prudent alternatives that would avoid jeopardy, and the federal agency must modify the project to ensure that listed species are not jeopardized and that their Critical Habitat is not adversely modified (unless an exemption from this requirement is granted) (USFWS and NMFS 1998).

4.1.2.3 Section 10

If a PCWA project is not funded by, or does not need a permit from, a Federal agency, actions that would result in the take of a listed species require a permit issued under Section 10 of the Federal ESA. The most common permit is an "incidental take permit." Section 10 allows USFWS or NMFS, under certain conditions, to issue incidental take permits for actions in which a take of the species is incidental to, and not the purpose of, the action. To obtain an incidental take permit, PCWA would have to meet certain requirements, including preparation of a Habitat Conservation Plan (HCP). A complete application package consists of a permit application form, fee (if required), a completed HCP, a draft National Environmental Policy Act (NEPA) document (if required), and in some cases, an Implementing Agreement (USFWS and NMFS 1996, USFWS 2005). The HCP also must analyze and explain an action's impacts on listed species and discuss measures to minimize and mitigate impacts, identify funding, and include a Mitigation Monitoring Plan (USFWS and NMFS 1996, USFWS 2005).

In 1994, the "No Surprises" Policy was issued to provide sufficient incentives for the private sector to participate in the development of long-term conservation plans. The No Surprises

Policy provides regulatory assurances to the permittee, that if "unforeseen circumstances" arise, USFWS and NMFS will not require the commitment of additional land, water, or financial compensation or additional restrictions on the use of land, water, or other natural resources beyond the level otherwise agreed to in the HCP without the consent of the permittee (63 FR 8859). The government will honor these assurances as long as a permittee is implementing the terms and conditions of the HCP, permit, and other associated documents in good faith.

4.1.3 Magnuson-Stevens Fishery Conservation and Management Act and the 1996 Sustainable Fisheries Act

Essential Fish Habitat (EFH) was established under the 1996 amendments to the Magnuson-Stevens Fishery Conservation and Management Act. Under this act, suitable habitat is considered essential for the sustenance of commercial fisheries. Although the concept of EFH is similar to that of "critical habitat" under the Federal ESA, measures recommended to protect EFH by NMFS are advisory, not prescriptive. EFH includes all habitats necessary to allow commercially valuable aquatic species production needed to support a long-term sustainable fishery and contributions to a healthy ecosystem, and is defined in the Magnuson-Stevens Act as "...those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." EFH is further clarified by defining "waters" to include aquatic areas and their associated physical, chemical, and biological properties used by fish, and may include aquatic areas historically used by fish where appropriate; defining "substrate" to include sediment, hard bottom, structures underlying the waters, and associated biological communities; defining "necessary" to mean the habitat required to support a sustainable fishery and the managed species' contribution to a healthy ecosystem; and defining "spawning, breeding, feeding, or growth to maturity" to cover a species' full life cycle.

In response to growing concern about the status of fisheries in the U.S., the Sustainable Fisheries Act of 1996 (Public Law 104-297) was passed by Congress to amend the Magnuson-Stevens Fishery Conservation and Management Act (Public Law 94-265), the primary law governing marine fisheries management in the waters of the United States. Under the Sustainable Fisheries Act, consultation is required by NMFS on any activity that might adversely affect EFH. EFH includes those habitats that fish rely on throughout their life cycles. EFH encompasses habitats necessary to allow sufficient production of commercially valuable aquatic species to support a long-term sustainable fishery and contribute to a healthy ecosystem. The EFH mandate applies to all species managed under a Federal Fishery Management Plan. In California, estuarine species covered under the Sustainable Fisheries Act that occur in the San Francisco Bay/Sacramento-San Joaquin Delta (Bay-Delta), and could be affected by PCWA raw water distribution system O&M activities, include Pacific salmon (includes winter-run, spring-run, and fall-run/late fall-run Chinook salmon), Central Valley steelhead, northern anchovy, Pacific sardine, and starry flounder.

4.1.4 The Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA), first enacted in 1918, domestically implements a series of treaties among the United States and Great Britain (on behalf of Canada), Mexico, Japan, and the former Soviet Union that provide for international migratory bird protection. The MBTA authorizes the Secretary of Interior to regulate the taking of migratory birds; the act provides that it will be unlawful, except as permitted by regulations, "to pursue, take, or kill any migratory bird, or any part, nest or egg of any such bird…" (United States Code (USC) Title 16, Section 703). This prohibition includes both direct and indirect acts, although harassment and habitat modification are not included unless they result in direct loss of birds, nests, or eggs. The current list of birds protected by the MBTA contains several hundred species and essentially includes all native birds. The act offers no statutory or regulatory mechanism for obtaining an incidental take permit for the loss of nongame migratory birds.

4.2 STATE REGULATIONS

The following sections describe state regulatory requirements for O&M activities carried out by PCWA.

4.2.1 California Environmental Quality Act

The CEQA was enacted in 1970 as California's counterpart to the NEPA. CEQA requires State and local agencies to identify significant environmental impacts of their actions and to avoid or mitigate those impacts, if feasible. The objectives of CEQA are to:

- Disclose to decision makers and the public the significant environmental effects of proposed activities; identify ways to avoid or reduce environmental damage
- Prevent environmental damage by requiring implementation of feasible alternatives or mitigation measures
- Disclose to the public reasons for agency approval of projects with significant environmental effects; foster interagency coordination in the review of projects
- Enhance public participation in the planning process (CALFED 2001)

CEQA requires State and local agencies to prepare multidisciplinary environmental impact analysis. By requiring agencies to make decisions based on multidisciplinary studies, CEQA encourages the protection of all aspects of the environment. Depending on the potential impacts of a proposed project, the environmental information is presented in one of three CEQA documents: a notice of exemption (optional), an initial study supporting either a negative declaration or mitigated negative declaration, or an environmental impact report (EIR). A project is defined by CEQA as an activity undertaken by a public agency, or an activity undertaken by a private entity that must receive some discretionary approval from a government

agency, and may cause either a direct physical change in the environment or a reasonably foreseeable indirect change in the environment (CEQA Guidelines, Section 15378).

CEQA documents should be prepared during the agency planning process and must be completed and certified before project approval, which is the decision committing an agency to a definite course of action on the project (Bass et al.,1999). The two State agencies responsible for CEQA administration are the Governor's Office of Planning and Research and the Resources Agency.

The first phase of the CEQA process is a preliminary review of a project to determine whether it is subject to CEQA. A project may not be segmented into small parts for the purpose of avoiding full disclosure of environmental impacts; therefore, a project is the whole of an action which has the potential for resulting in physical change in the environment. The preliminary review is initiated when the project is ready for CEQA consideration. If there is no possibility of a significant impact, or if the activity is outside of the definition of a project, then the activity is outside the jurisdiction of CEQA. Additionally, if the project is described in either a Statutory Exemption or a Categorical Exemption, an optional notice of exemption may be written, and there is no need to continue with the CEQA process.

If the project is under the jurisdiction of CEQA, and not exempt, then an initial study will be conducted to determine whether the project may have significant environmental effects. A significant effect is generally defined as a substantial, or potentially substantial, adverse change in the physical environment, and may be direct, indirect, or cumulative (Bass et al. 1999). When there is evidence that a project may have a significant effect, an EIR is required. The agency must provide public notice of intent to prepare an EIR in the form of a notice of preparation (NOP). If there is no substantial evidence that a project may have a significant environmental impact, or if the project as mitigated or revised will have no significant impact on the environment, then a Negative Declaration (ND) or a Mitigated Negative Declaration (MND) may be prepared. As with an NOP during the EIR process, the agency must provide public notice of intent to adopt an ND or MND.

4.2.2 Porter-Cologne Water Quality Control Act (Title 23, California Water Code)

The Porter-Cologne Water Quality Control Act is the primary state law protecting the quality of California's waters. Enacted by the State Legislature in 1969, the act established the SWRCB and nine RWQCBs. The act gives the RWQCBs the authority to regulate discharges of waste into "waters of the State." "Waters of the State" are defined as "any surface or groundwater, including saline water, within the boundaries of the state" (California Water Code, Section 13050). Under this definition, surface watercourses and water bodies include lakes, bays, ponds, impounding reservoirs, springs, wells, rivers, streams, creeks, marshes, inlets, canals, and all other bodies of surface waters. This definition includes, but is broader than, "waters of the United States."

Section 13240 of the act requires each RWQCB to adopt water quality control plans (basin plans), for all areas within the region. Each basin plan establishes narrative and numerical water

quality objectives to ensure the protection of beneficial uses, and a program of implementation for achieving water quality objectives within the basin. In California, the beneficial uses and water quality objectives are the State's water quality standards. The NPDES permitting system is the primary process by which waste discharges are regulated and water quality objectives are met.

Although it is not explicitly part of the basin plans, the EPA rule established CFR Part 131, Water Quality Standards; Establishment of Numeric Criteria for Priority Toxic Pollutants for the State of California, which is regulated by the RWQCBs to protect aquatic life from exposure to toxic pollutants. These criteria are designed to protect human health and welfare and aquatic life from pollutants in freshwater and marine surface waters. The Central Valley RWQCB's staff report, A Compilation of Water Quality Goals, was last updated in July 2008. The report contains several tables of updated numerical water quality limits compiled from various sources, including EPA's National Recommended (Ambient) Water Quality Criteria, the NTR (**Table 3-5**), and the CTR (**Table 3-6**).

The PCWA raw water distribution system area is situated within the jurisdiction of the Central Valley RWQCB. Of the two water quality control plans, or basin plans, adopted by the Central Valley RWQCB, the PCWA raw water distribution system area is covered within the Water Quality Control Plan for the Sacramento River and San Joaquin River Basins. As stated in the Basin Plan for the Sacramento River and San Joaquin River Basins, it is impractical to list beneficial uses for every surface water body in the region. Therefore, beneficial uses of the unidentified water bodies are evaluated on a case-by-case basis. Often the beneficial uses of a smaller tributary of a river are considered to be the same as those for the larger river. In this case, beneficial uses for study area streams are considered to be the same as those for the Sacramento River described in **Chapter 3**. Although water quality objectives are achieved primarily through the adoption of waste discharge requirements (including permits) and enforcement actions, they are intended to generally govern levels of constituents and characteristics in the water body.

4.2.3 California Endangered Species Act

The California ESA was enacted in 1970 to conserve, protect, restore, and enhance any endangered or threatened species and its habitat (California Fish and Game Code, Section 2052). California ESA Section 2080 prohibits the take of any threatened or endangered species within the state. Take is defined in Section 86 of the Fish and Game Code as "hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill." This definition does not include harm or harass, as the Federal act does. As a result, habitat modification is not necessarily considered take under California ESA. The DFG administers the California ESA for all native species of fish, plants, and wildlife. California ESA requires that DFG maintain lists of threatened and endangered species and provides for protection of species on these lists. The official California listing of endangered and threatened animals is contained in the California Code of Regulations, Title 14. The State-listed species that may be affected by PCWA raw water distribution system O&M activities are listed **Chapter 3**.

Section 2801 of California ESA requires that an incidental take permit be obtained for any project that would result in the take of a listed species. California ESA does not specifically require the preparation of an HCP, but requires an applicant to analyze and explain the project's impacts on listed species, identify measures to mitigate the impacts of taking the listed species, identify funding for implementation, and include a monitoring plan (CALFED 2001). The specific criteria for issuing an incidental take permit are as follows:

- The authorized take is incidental to an otherwise lawful activity.
- The impacts of the authorized take are minimized and fully mitigated.
- The measures required to minimize and fully mitigate the impacts of the authorized take are roughly proportional in extent to the impact of the taking on the species, maintain the applicant's objectives to the greatest extent possible, and are capable of successful implementation.
- Adequate funding is provided to implement the required minimization and mitigation measures and to monitor compliance with the effectiveness of the measures.
- Issuance of the permit will not jeopardize the continued existence of a State-listed species.

In addition, DFG cannot issue a permit for the take of a fully protected species. Ordinarily, Federal agencies are not subject to California ESA and are not required to obtain California ESA incidental take permits for Federal agency actions. The incidental take permit process is normally initiated in the region where the permitted activity will take place by contacting the appropriate regional office.

Under Section 2800.1, if PCWA obtains a Section 10 incidental take permit under the Federal ESA, they are not required to obtain a separate California ESA incidental take permit, so long as PCWA notifies the Director of DFG in writing that PCWA has received an incidental take permit, and includes in the notice to the Director, a copy of the incidental take permit. The Director must determine that the Federal document is "consistent" with the California ESA. If DFG determines that the Federal permit is not consistent with the California ESA, then the applicant must apply for a State incidental take permit under Section 2801.

4.2.4 California Fish and Game Code – Fully Protected Species

Protection of fully protected species, such as birds, mammals, reptiles, amphibians, and fish, is described in Sections 3511, 4700, 5050, and 5515 of the DFG. These statutes prohibit take or possession of fully protected species. DFG is unable to authorize incidental take of fully protected species when activities are proposed in areas inhabited by those species. DFG has informed non-Federal agencies and private parties that they must avoid take of any fully protected species in carrying out projects.

4.2.5 California Fish and Game Code Section 1602 – Lake and Streambed Alteration Program

California Fish and Game Code (Section 1602) requires an entity to notify DFG of any proposed activity that may substantially modify a river, stream, or lake that flows at least intermittently through a bed or channel. The types of activities that require notification include an activity that will substantially divert or obstruct the natural flow of any river, stream or lake; substantially change or use any material from the bed, channel, or bank of, any river, stream, or lake; or deposit or dispose of debris, waste, or other material containing crumbled, flaked, or ground pavement where it may pass into any river, stream, or lake. If DFG determines that an activity may substantially adversely affect fish and wildlife resources, a Lake or Streambed Alteration Agreement is prepared by DFG in compliance with CEQA, The agreement include measures to protect fish and wildlife resources while conducting the activity.

4.2.6 California Native Plant Protection Act

In addition to the California ESA, the California Native Plant Protection Act (NPPA) provides protection to endangered and "rare" plant species, subspecies, and varieties of wild native plants in California. The NPPA's definition of "endangered" and "rare" closely parallels the California ESA definitions of "endangered" and "threatened" plant species.

4.3 LOCAL REQUIREMENTS AND CONSIDERATIONS

The following sections describe local requirements and considerations for O&M activities carried out by PCWA.

4.3.1 Placer County Conservation Plan

Placer County has shown an active interest in the county's resources. Placer Legacy is a Placer County program designed to implement the goals of the 1994 Placer County General Plan. Placer Legacy will result in a comprehensive open space and habitat protection plan for Placer County that preserves the diversity of plant and animal communities in the county and addresses a variety of other open space needs, from agriculture and recreation to urban edges and public safety. Placer Legacy is intended to help maintain the county's high quality of life and promote economic vitality.

In June 2000, the Placer County Board of Supervisors directed staff to initiate implementation of the Placer Legacy Program. As part of that direction, staff began preparing an ambitious, large-scale habitat and wetland conservation plan to achieve a number of environmental, economic, and administrative objectives (Placer County Planning Department 2008). This effort, now referred to as the Placer County Conservation Plan (PCCP), is developing the first phase of Placer Legacy Program implementation, which will balance the needs of endangered species and wetlands with a wide variety of stakeholder issues. The PCCP will address the impacts associated primarily with unincorporated growth in western Placer County and growth associated

with the build-out of Lincoln's updated General Plan (Placer County Planning Department 2005c).

The PCCP includes two integrated programs intended to combine State and Federal regulatory requirements into a comprehensive and locally controlled program that will streamline permitting under State and Federal ESAs and other State and Federal environmental laws (Placer County Planning Department 2008). These programs include: (1) a joint Natural Community Conservation Plan (NCCP) and HCP that will protect fish and wildlife and their habitat, and (2) a County Aquatic Resources Program (CARP) that will protect streams, wetlands and other water resources (Placer County Planning Department 2008).

According to the Placer County Planning Department, the NCCP/HCP is intended to:

- Conserve threatened and endangered species in western Placer County
- Avoid or resolve potential conflicts between species conservation and the construction of new urban, suburban, and rural infrastructure and development
- Fulfill the requirements of State and Federal ESAs

The CARP is intended to:

- Protect streams, wetlands, and other water resources
- Avoid or resolve potential conflicts between water resources protection and the construction of new urban and rural infrastructure and development
- Fulfill the requirements of the Federal CWA and analogous State laws

PCWA is a participating entity in the PCCP, along with Placer County, City of Lincoln, and Placer County Transportation Authority on behalf of the South Placer Regional Transportation Authority for the Placer Parkway project. Participating entities will ensure that the PCCP's conservation program is implemented successfully and ensure that projects covered by the PCCP fulfill PCCP mitigation and conservation requirements (Placer County Planning Department 2008).

The PCCP is also intended to provide coverage under the following environmental permits and authorizations to be issued to Participating Entities and extended to projects encompassed by the PCCP (Placer County Planning Department 2008):

- A renewable, 50-year, incidental take permit for 31 species issued by the USFWS under the Federal ESA
- A renewable, 50-year, incidental take permit for three species issued by the NMFS under the Federal ESA

- A renewable, 50-year, incidental take authorization for 34 species issued by the DFG under the NCCP (which also fulfills the requirements of the California ESA)
- A renewable, 5-year, Programmatic Section 404 permit issued by the USACE under the CWA
- A renewable, 5-year, Section 401 certification for the Section 404 permit issued by the Central Valley RWQCB under the CWA
- "Joint Procedures" approved by the USACE that may be used by the Participating Entities for aquatic resource permit processing under the CWA
- A 50-year, programmatic master streambed alteration agreement issued by the DFG.

4.3.2 Placer County Stormwater Management Plan

As part of the NPDES MS4 program, municipalities are required to obtain a permit to develop and implement a Stormwater Management Plan (SWMP) with the goal of reducing the discharge of pollutants to the maximum extent practicable. The Placer County SWMP (2004) provides a comprehensive plan to reduce pollution in stormwater runoff in portions of western Placer County, and is designed to comply with the CWA and meet Federal and State NPDES stormwater regulations for small MS4s. In 2004, the Central Valley RWQCB issued an NPDES permit to Placer County for stormwater management program activities upon receipt of the Placer County SWMP for 2003 to 2008. The permit must be renewed every 5 years. Portions of the PCWA raw water distribution area fall within the NPDES stormwater permit area for western Placer County, and include the Dry Creek, Pleasant Grove Creek, and Auburn Ravine watersheds (Placer County 2004). Placer County's SWMP includes activities to improve and protect the quality of stormwater runoff, including the following control measures:

- Public education and outreach on stormwater impacts
- Public involvement/participation
- Illicit discharge detection and elimination
- Construction site stormwater runoff control
- Postconstruction stormwater management in new development and redevelopment
- Pollution prevention/good housekeeping for municipal operations

The SWMP provides guidance in establishing BMPs before, during, and after construction activities, as well as long-term maintenance BMPs. Placer County reviews and evaluates each program activity at least once a year to assure their BMPs are effective to the maximum extent practicable. Annual reports on Placer County's SWMP are provided to the Central Valley RWQCB.

4.3.3 Placer County Code, Tree Preservation Ordinance

The Tree Ordinance adopted by Placer County is contained within the Placer County Code, under Article 12.16. The ordinance sets a policy for the county to preserve trees through the review of all proposed development activities where trees are present on either public or private property, wherever feasible, while at the same time recognizing individual rights to develop private property in a reasonable manner (Placer County, No Date (ND)). The ordinance article does not categorically prohibit tree removal, and contains numerous exemptions for specific types of activities.

Placer County's tree ordinance sets county-wide requirements for projects within riparian zones, permit requirements for removal of landmark trees, removal of more than 50 percent of trees, and commercial firewood cutting, and establishes tree preservation zones (Placer County, ND).

In addition to the tree ordinance established by Placer County, localities within the county have established their own ordinances, including the City of Rocklin.

4.3.4 Placer County Oak Woodland Management Plan

The Placer County Oak Woodland Management Plan was developed through the Oak Woodlands Conservation Act of 2001, which recognizes the importance of California's oak woodlands, how they enhance the natural and scenic beauty of California, the critical role of the private landowner and the importance of private land stewardship (McCreary, 2004). Placer County's plan provides a consistent policy for oak woodland habitats throughout the county and compliments existing programs and policies including: (1) projects subject to an environmental assessment under the CEQA, (2) projects subject to the Placer County Tree Ordinance, and (3) projects evolving out of the Placer Legacy (Placer County Planning Department, ND).

CHAPTER 5.0
POTENTIAL EFFECTS, REGULATORY FRAMEWORK, AND BEST MANAGEMENT PRACTICES FOR SYSTEMWIDE OPERATIONS

This chapter provides an overview of the potential effects of PCWA raw water distribution systemwide operations on natural resource conditions in the study area, the regulatory framework for effects, and potential BMPs to reduce effects of operations' activities on natural resources.

5.1 POTENTIAL EFFECTS OF SYSTEMWIDE OPERATIONS ON NATURAL RESOURCES

The potential effects of the PCWA canal system operations on physical and biological resources in the study area are described below.

5.1.1 Yearly Outages

The yearly outages that occur within the PCWA canal system, typically from mid-October to mid-November, result in reductions in the amount of water available to PCWA's Zone 1 customers. The following sections describe potential effects of the yearly canal outages on natural resources.

5.1.1.1 Physical Resources

Potential effects of PCWA canal system operations during yearly PG&E outages on hydrology, water quality, and soils and sediment quality conditions in the study area are described in the following sections.

Hydrology

PCWA operations during yearly outages do not affect hydrologic conditions in Canyon Creek or Auburn Ravine. During the yearly outages, PCWA canal system contributions to streamflow in Canyon Creek and Auburn Ravine, and/or diversions from Canyon Creek and Auburn Ravine do not change as a result of PCWA operations.

Continuous flow data collected from canal and stream sites within PCWA's lower Zone 1 service area during 2006 were evaluated to determine the effects of yearly outages on hydrologic conditions in Clover Valley Creek, Antelope Creek, Secret Ravine, and Miners Ravine. Continuous flow monitoring locations used for operations' evaluations, and their respective watersheds, are listed in **Table 5-1**.

TABLE 5-1
CONTINUOUS FLOW MONITORING STATIONS IN ZONE 1 FOR OPERATIONS

Secret Ravine Watershed	Miners Ravine Watershed
Secret Ravine at Horseshoe Bar Road	Miners Ravine at Lomida Lane
Tributary to Secret Ravine from Yankee Hill Canal Outlet	Tributary to Miners Ravine from Ferguson Canal Outlet
Tributary to Secret Ravine from Turner Canal Outlet	Tributary to Miners Ravine Stallman Canal Outlet
Boardman Canal Outlet	Tributary to Miners Ravine Baughman Canal Outlet
Secret Ravine at Rocklin Road	Miners Ravine near North Sunrise Avenue

Average daily flows for canal and stream sites evaluated during 2006 outages are shown in **Figure 5-1** for sites within the Secret Ravine watershed, and in **Figure 5-2** for sites within the Miners Ravine watershed.

Based on the average daily flows for sites shown in **Figures 5-1** and **5-2**, streamflow within Secret and Miners ravines is substantially decreased during the yearly outages. Effects on flow conditions in Antelope and Clover Valley creeks are likely similar to conditions shown for Secret and Miners ravines. These data further demonstrate that canal system contributions (including unregulated releases and customer return flows) dominate dry season flows in Secret and Miners ravines. These historic reductions in canal system contributions, and resultant historic decreases in streamflow, are dictated by the PG&E annual water delivery outages.

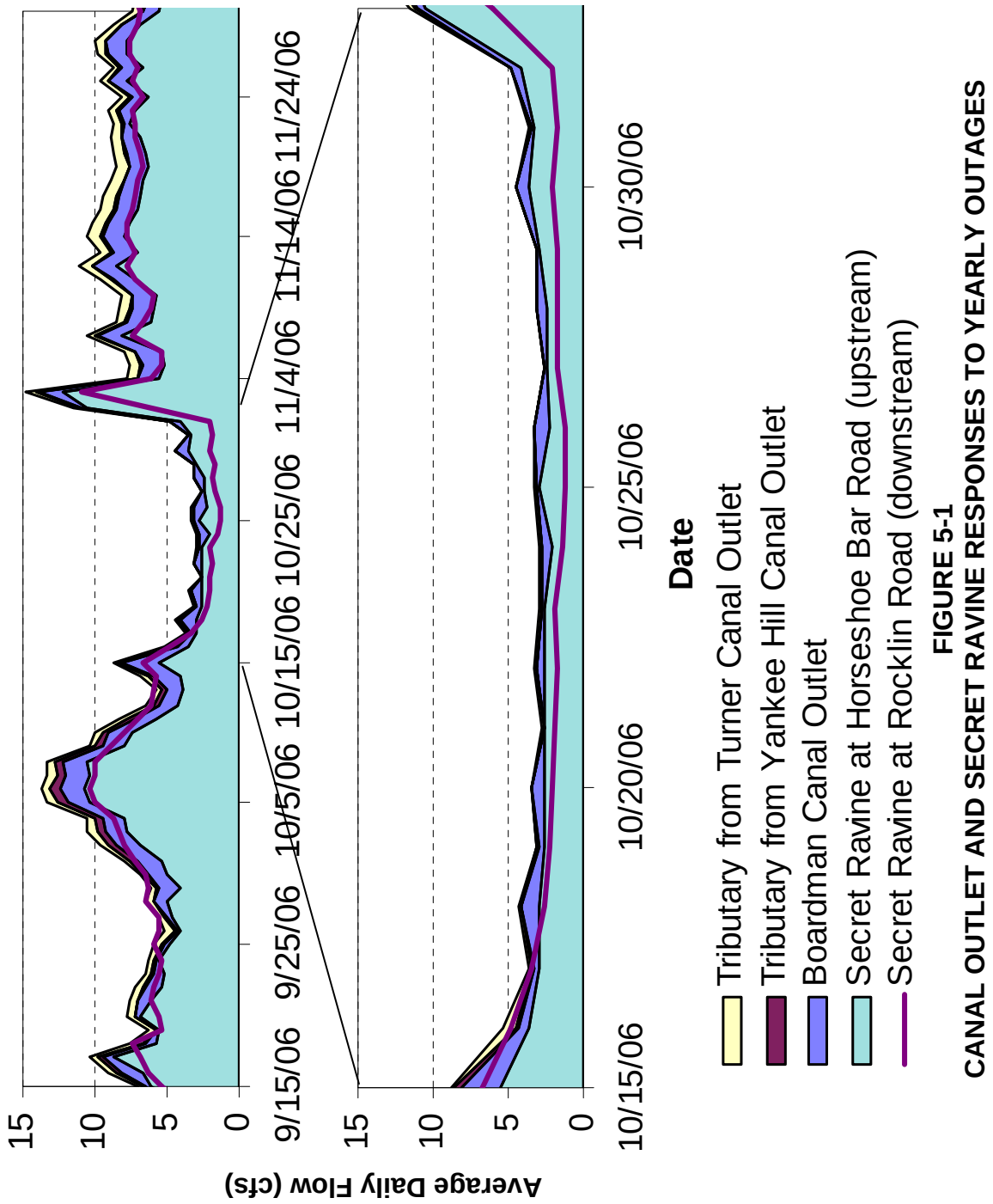

FIGURE 5-1
CANAL OUTLET AND SECRET RAVINE RESPONSES TO YEARLY OUTAGES

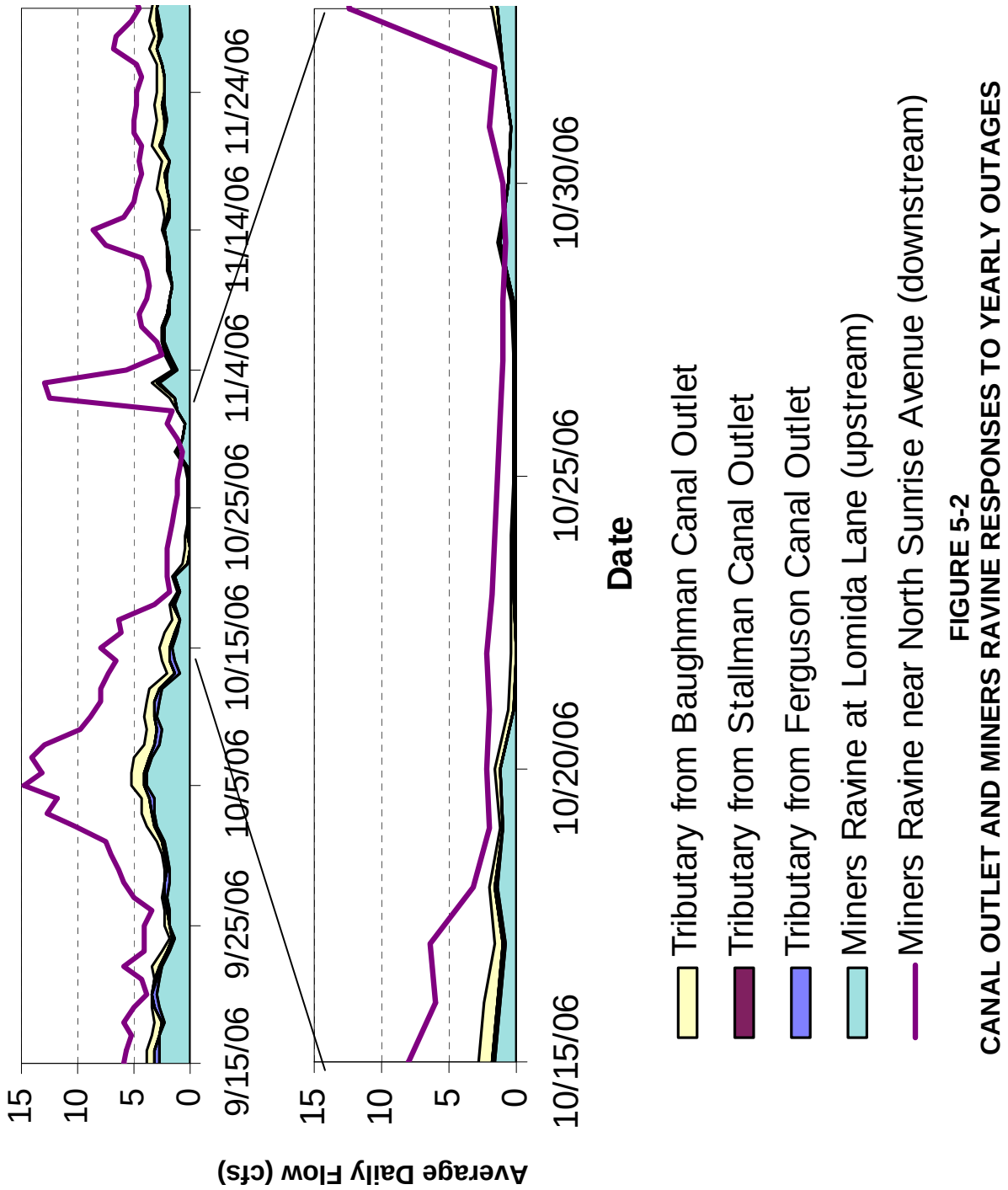

FIGURE 5-2
CANAL OUTLET AND MINERS RAVINE RESPONSES TO YEARLY OUTAGES

Water Quality

The locations listed in **Table 5-2** and shown in **Figures 5-3** and **5-4** were selected to identify potential effects of canal system contributions on water quality conditions in study area streams during yearly outages. The monitoring events targeted outages that occurred at Clover Valley and Mammoth reservoirs, and associated monitoring sites were located in PCWA's Zone 1 service area, within the Antelope Creek, Clover Valley Creek, Secret Ravine, and Miners Ravine watersheds. Outages below the reservoirs occurred on alternate days between the two reservoirs, with outages typically starting at 9:00 a.m., and ending at 9:00 a.m. the following day. Samples were obtained at upstream and downstream locations within the canal system, as well as within the receiving water tributaries and streams downstream of the canal outlets. Monitoring events spanned 2 days for each event. Samples were often collected at each location before, during, and after outage events. Measured water quality parameters are the same as those presented in **Table 3-3** for baseline sampling events, with the exception of mercury. Canal and stream monitoring sites are discussed within their associated watersheds.

Clover Valley Creek Watershed

Water quality monitoring was conducted within the Clover Valley Creek watershed on November 1 and 2, 2006, following the October 31, 2006, outage event. Flows were restored to the PCWA canal system below Clover Valley Reservoir at around 9:00 a.m. on November 1, 2006. The sites monitored within the Clover Valley Creek watershed during the outage event are described below, from the most upstream to the most downstream locations:

- **Clover Valley Reservoir release to Clover Valley Creek (CLVRESR)**
- **Clover Valley Creek at Midas Avenue (CLVRC3)**: located at the Sunset Whitney Country Club on Midas Avenue in Rocklin.

The following section describes water quality conditions at sites in the Clover Valley Creek watershed monitored on November 1 and 2, 2006, during the yearly canal outage. Figures providing a comparison of water quality conditions within the PCWA raw water distribution system and Clover Valley Creek are included in **Appendix B**.

TABLE 5-2
WATER QUALITY MONITORING LOCATIONS IN THE PCWA SERVICE AREA FOR YEARLY OUTAGE EVENTS

Site Name	Site ID	Type	Watershed(s)	Outage Start / End Time	Weather
Mammoth Reservoir Outage				Start: 10/30/2006, 9:00 a.m. End: 10/31/2006, 9:00 a.m. Start: 11/01/2006, 9:00 a.m. End: 11/02/006, 9:00 a.m.	11/01/2006: Clear and dry 11/02/2006: Light rain at 11:22 a.m. Heavy rain at 3:38 p.m.
Boardman Canal at Lubeck Road	YB69A	Canal	NA		
Boardman Canal at Powerhouse Road	YB78	Canal	NA		
Boardman Canal below Mammoth Reservoir	YB81	Canal	Miners Ravine / Secret Ravine		
Yankee Hill Canal Tributary	YHTRIB2	Stream	Secret Ravine		
Boardman Canal Outlet Release	BOARDMANCR	Canal	Secret Ravine		
Secret Ravine at Rocklin Road	SECRETRV3	Stream	Secret Ravine		
Secret Ravine at Roseville Parkway	SECRETRV2	Stream	Secret Ravine		
Baughman Canal Outlet Release	BAUGHMANCR	Canal	Miners Ravine		
Tributary to Miners Ravine from Baughman Canal	BCTRIB1	Drainage	Miners Ravine		
Miners Ravine near N. Sunrise Avenue	MINERSRV3	Stream	Miners Ravine		
Clover Valley Reservoir Outage				Start: 10/31/2006, 9:00 a.m. End: 11/01/2006 9:00 a.m.	11/01/2006: Clear and dry 11/02/2006: Light rain at 10:15 a.m.
Clover Valley Reservoir release to Clover Valley Creek and Antelope Canal	CLVRESR	Canal	Clover Valley Creek		
Clover Valley Creek at Midas Avenue	CLVRC3	Stream	Clover Valley Creek		
Antelope Stub Canal near Antelope Canal	ANTSTUBCR	Canal	Antelope Creek		
Antelope Creek at Midas Avenue	ANTC3B	Stream	Antelope Creek		
Antelope Creek near Sierra College Blvd	ANTC3	Stream	Antelope Creek		
Mammoth Reservoir Outage				Start: 10/27/2007, 9:00 a.m. End: 10/28/2007, 9:00 a.m.	10/27/2007: Clear and dry 10/28/2007: Clear and dry
Boardman Canal below Mammoth Reservoir	YB81	Canal	Miners Ravine / Secret Ravine		
Yankee Hill Canal Outlet Release	YANKEECR	Canal	Secret Ravine		
Boardman Canal Outlet Release	BOARDMANCR	Canal	Secret Ravine		
Yankee Hill Canal Tributary	YHTRIB2	Stream	Secret Ravine		
Secret Ravine at Rocklin Road	SECRETRV3	Stream	Secret Ravine		
Secret Ravine at Roseville Parkway	SECRETRV2	Stream	Secret Ravine		

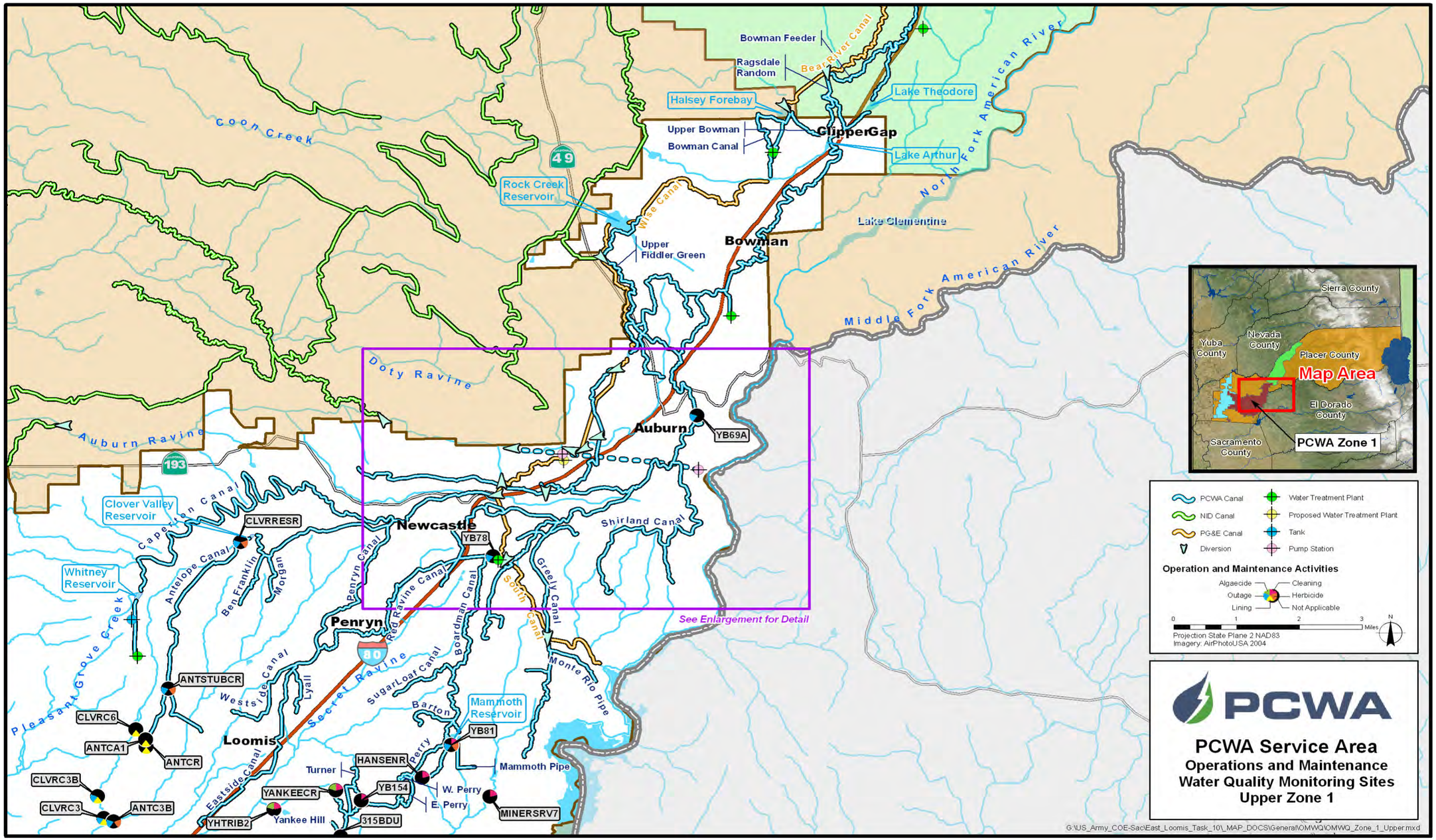

FIGURE 5-3
OPERATIONS AND MAINTENANCE ACTIVITY WATER QUALITY SAMPLING LOCATIONS WITHIN THE UPPER ZONE 1 SERVICE AREA

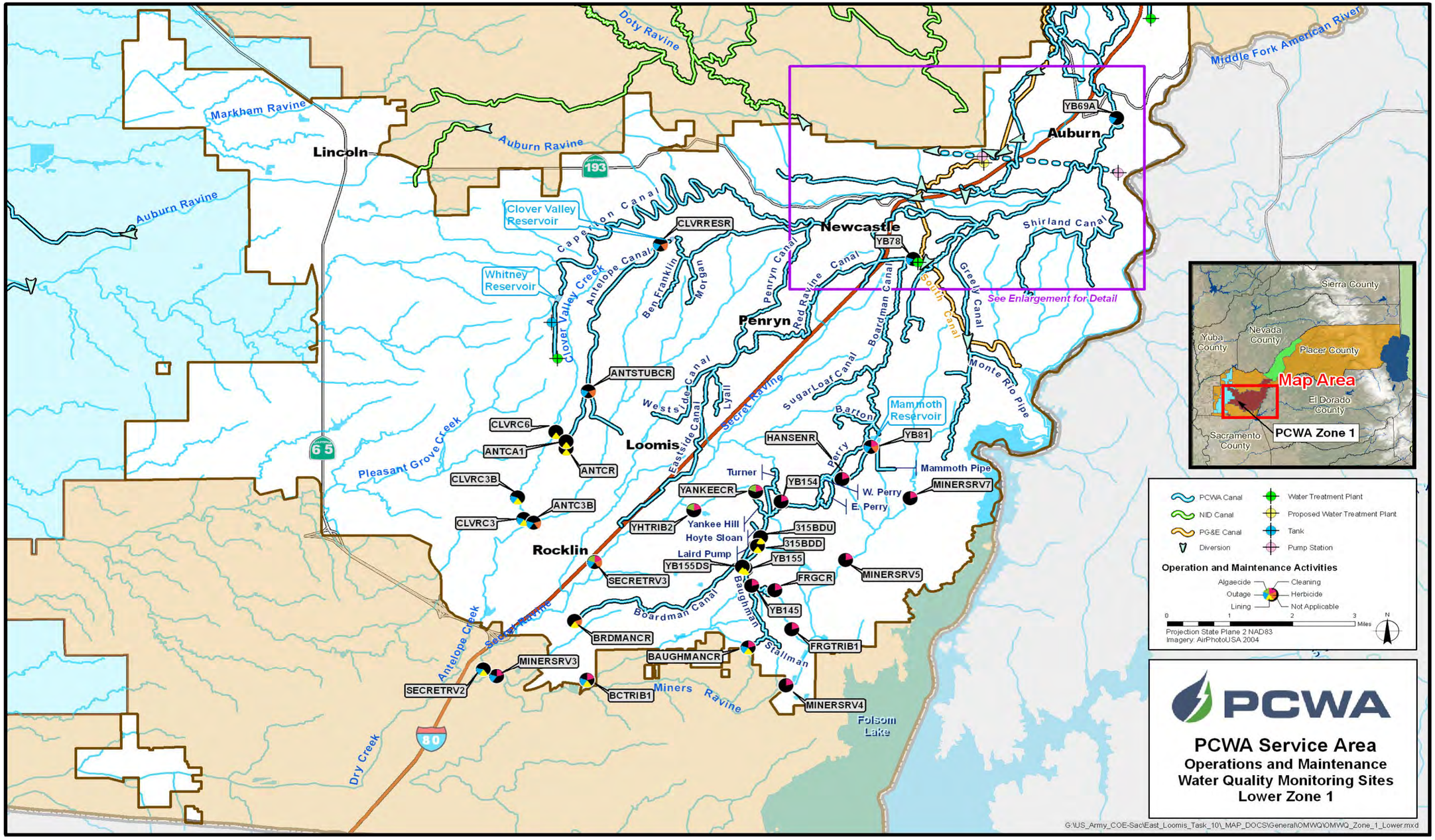

FIGURE 5-4
OPERATIONS AND MAINTENANCE ACTIVITY WATER QUALITY SAMPLING LOCATIONS WITHIN THE LOWER ZONE 1 SERVICE AREA

Water Temperature and Dissolved Oxygen

PCWA operations during the yearly outages did not result in notable effects on water temperature in Clover Valley Creek. Water temperatures in the Clover Valley watershed were higher during the November 1 to 2, 2006, outage event compared to the fall baseline, collected on December 12, 2006. These temperature differences, however, are likely due to the gradual decreases in air temperature observed between the sampling dates.

DO levels across canal and stream sites monitored during the event were relatively high. Based on the water quality data collected before, during, and after the outage, DO levels in Clover Valley Creek did not appear to be affected by the yearly outage.

pH, Alkalinity, and Hardness

Values for pH across sites monitored in the Clover Valley Creek watershed were not affected by the outage. Alkalinity and calculated total hardness levels were generally higher at CLVRC3 than at CLVRESR, suggesting that canal system contributions may decrease alkalinity and hardness conditions in Clover Valley Creek.

Total Suspended Solids and Turbidity

Based on sampling results, TSS concentrations and turbidity in Clover Valley Creek did not appear to be affected by the canal system outage. TSS concentrations and turbidity did increase at Clover Valley Creek on November 2, 2006 (after canal flows were restored below Clover Valley Reservoir), most likely in response to runoff contributions to streamflow during the November 2, 2006, precipitation event.

Specific Conductivity and Ions

Based on water quality data collected across the Clover Valley Creek watershed, SC, calcium, iron, magnesium, sodium, chloride, and sulfate concentrations in Clover Valley Creek did not appear to be affected by the yearly canal outages. Some constituents, including SC, calcium, magnesium, and iron did have higher concentrations in samples collected from Clover Valley Creek on November 2, 2006, most likely in response to runoff contributions to streamflow during the November 2, 2006, precipitation event.

Nitrate and potassium concentrations are not affected by yearly outages. Nitrate levels were at or slightly above the nondetect level (0.1 mg/L) throughout the monitoring period, while potassium concentrations were either below the detection limit (1 mg/L) or very low across all sites. Potassium reached a maximum level of 2.5 mg/L at CLVRC3.

Trace Elements

Barium and zinc concentrations across sites in the Clover Valley Creek watershed showed similar trends as TSS and turbidity in samples obtained during the outage event, and did not appear to be affected by yearly outages. Barium levels at CLVC3 ranged from 73 to 110 µg/L, compared to the maximum observed during routine canal operations, 42 µg/L. Concentrations of barium and zinc were higher at CLVRC3 on November 2, 2006, most likely in response to runoff contributions to streamflow during the to the November 2, 2006, precipitation event. Aluminum concentrations at canal and stream sites monitored during the yearly outage event were comparable for most samples. One sample obtained at Clover Valley Creek on November 2, 2006, had a substantially higher concentration of aluminum compared to previous samples and

samples obtained during baseline sampling events. Copper concentrations were consistently low across canal sites and slightly higher in Clover Valley Creek. The highest measured concentration of copper in Clover Valley Creek during yearly outage sampling event was 8.5 µg/L. All cadmium levels were below the detection limit (0.5 µg/L) at Clover Valley Creek watershed sites during the yearly outage monitoring event.

Antelope Creek Watershed

Water quality monitoring was conducted within the Antelope Creek watershed on November 1 and 2, 2006, following the October 31, 2006, outage event. Flows were restored to the PCWA canal system below Clover Valley Reservoir at around 9:00 a.m. on November 1, 2006. The sites monitored in the Antelope Creek watershed during the outage event are described below, from the most upstream to the most downstream locations:

- **Antelope Stub Canal near Antelope Canal (ANTSTUBCR)**: located at the head of Antelope Stub Canal and Antelope Canal.

- **Antelope Creek at Midas Avenue (ANTC3B)**

The following section describes water quality conditions at sites in the Antelope Creek watershed monitored on November 1 and 2, 2006, during the yearly canal outage. Figures providing a comparison of water quality conditions within the PCWA raw water distribution system and Antelope Creek are included in **Appendix B**.

Water Temperature and Dissolved Oxygen

Based on measurements taken at sites, yearly outages did not appear to affect water temperature conditions in Antelope Creek. Little to no water temperature changes were observed at ANTSTUBCR and ANTC3/ANTC3B during monitoring for the November 1, 2006, outage event at Clover Valley Reservoir. Water temperatures measured within the Antelope Creek watershed ranged from 50.8 to 59.0 °F.

DO concentrations in Antelope Creek during and after the outage at Clover Valley Reservoir were comparable to conditions during baseline sampling events, and are not likely affected by PCWA operations during yearly outages. Overall, DO concentrations were higher at ANTSTUBCR than at ANTC3/ANTC3B.

pH, Alkalinity, and Hardness

Based on water quality data collected, yearly outages did not affect pH, alkalinity, and hardness in Antelope Creek. Results for pH, alkalinity, and hardness across sites in the Antelope Creek watershed were fairly invariable during and after the outage at Clover Valley Reservoir. Alkalinity and hardness values were consistently lower, and pH was consistently higher, within the canal system compared to Antelope Creek.

Total Suspended Solids and Turbidity

TSS concentrations and turbidity levels in samples collected from Antelope Creek were not affected by PCWA canal system operations during the yearly outage sampling event. TSS and turbidity values were consistently low across all sites monitored during the event.

Specific Conductivity and Ions

Based on water quality monitoring during the yearly outage event, SC and ion concentrations did not appear to be affected by PCWA operations during yearly outages. Little SC variation was observed across sites monitored in the Antelope Creek watershed during the yearly outage event. Overall, SC was higher in Antelope Creek compared to the canal system.

Calcium, iron, magnesium, sodium, chloride, and sulfate concentrations were also consistently higher in Antelope Creek, and demonstrated little variation during and after the outage event. Nitrate and potassium concentrations were low across all sites sampled during and after the outage at Clover Valley Reservoir.

Trace Elements

Barium and copper concentrations in samples collected from Antelope Creek increased after flows were restored to Antelope Canal following the Clover Valley Reservoir outage. These increases may be attributed to precipitation in the watershed and runoff contributions to streamflow, or to PCWA operations during the yearly outage. Aluminum concentrations in Antelope Creek also increased, but were comparable to concentrations measured during baseline sampling events. Zinc concentrations in samples were fairly constant during and after the outage, and were comparable across sites sampled in the Antelope Creek watershed. All samples collected had cadmium concentrations below the detection limit (0.5 µg/L).

Secret Ravine Watershed

As shown in **Table 5-2**, water quality monitoring in the Secret Ravine watershed was conducted during two different outage events at Mammoth Reservoir; November 1 and 2, 2006, following the November 1, 2006, outage, and October 28, 2007, following the October 27, 2007, outage. For the 2006 outage monitoring event, flows were restored to the PCWA canal system below Mammoth Reservoir at around 9:00 a.m. on October 31, 2006, and November 2, 2006. Flows were restored to the PCWA canal system below Mammoth Reservoir at around 9:00 a.m. on October 28, 2007, for the 2007 outage monitoring event. Water quality was monitored at three canal sites (Boardman Canal at Lubeck Road (YB69A), YB78, and YB81) and one stream site in Secret Ravine (SECRETRV3), for the November 1 to 2, 2006, monitoring event. On October 28, 2007, monitoring occurred at three canal sites (YB81, YANKEECR, Boardman Canal Outlet Release (BOARDMANCR)) and three stream sites (YHTRIB2, SECRETRV3, Secret Ravine at Roseville Parkway (SECRETRV2)). Only water temperature, DO, pH, SC, turbidity, alkalinity, sulfate, and copper were measured during the October 28, 2007, event. The sites monitored during the yearly outage events are described below, from the most upstream to the most downstream locations:

- **Boardman Canal at Lubeck Road (YB69A)**: located east of the railroad tracks on Lubeck Road in Auburn. This is the most upstream monitoring site for yearly outage events.

- **Boardman Canal at Powerhouse Road (YB78)**

- **Boardman Canal below Mammoth Reservoir (YB81)**

- **Yankee Hill Canal Outlet Release (YANKEECR)**
- **Tributary to Secret Ravine from Yankee Hill Canal (YHTRIB2)**
- **Secret Ravine at Rocklin Road (SECRETRV3)**
- **Boardman Canal Outlet Release (BOARDMANCR)**: located at the end of the Boardman Canal. Unregulated releases from the Boardman Canal currently flow through a planned residential development, and outflow directly to Secret Ravine. This is the most downstream terminal point within the PCWA raw water distribution system.
- **Secret Ravine at Roseville Parkway (SECRETRV2)**: located just upstream from its confluence with Miners Ravine.

The following section describes water quality conditions during the yearly canal outage at sites in the Secret Ravine watershed monitored on November 1 and 2, 2006, and October 28, 2007. Figures providing a comparison of water quality conditions within the PCWA raw water distribution system and Secret Ravine are included in **Appendix B**.

Water Temperature and Dissolved Oxygen

Based on water quality data obtained during sampling events, water temperature and DO conditions in Secret Ravine do not appear to be affected by PCWA operations during yearly outages. Water temperature and DO values at sites monitored in Secret Ravine were comparable to conditions sampled during baseline sampling events. Water temperature and DO fluctuations at sites are likely attributed to natural variability due to diurnal effects, such as photosynthesis and respiration.

pH, Alkalinity, and Hardness

The yearly outages did not appear to affect pH within the PCWA canal system, but measured values for pH in Secret Ravine on November 1 and 2, 2006, fluctuated from 6.67 to 7.51. No effects on pH were observed at sites monitored in the Secret Ravine watershed during the October 28, 2007, sampling event. Alkalinity and hardness are not likely affected by yearly outages. Measured values for all sites in the Secret Ravine watershed were comparable to values measured during baseline sampling events.

Total Suspended Solids and Turbidity

Based on data collected on November 1 and 2, 2006, for the yearly outages, TSS levels in Secret Ravine are not affected by the yearly outages. One sample obtained at SECRETRV2 did have a high concentration of TSS, but the value is most likely associated with heavy rain and runoff contributions to streamflow at the time of sampling. TSS was not evaluated during the October 2007 sampling event.

The yearly outages may affect turbidity conditions in Secret Ravine. Measured values of turbidity at canal sites during the November 2006 sampling event fluctuated during sampling, but did not result in variation in turbidity at Secret Ravine sampling sites. During the October 2007 sampling event, turbidity values at canal and stream sites in the Secret Ravine watershed

increased after flows were restored to the canal system (**Figure 5-5**). These higher values were likely attributed to mobilization of fine sediment and organic material that had settled when canals were dewatered during the outage.

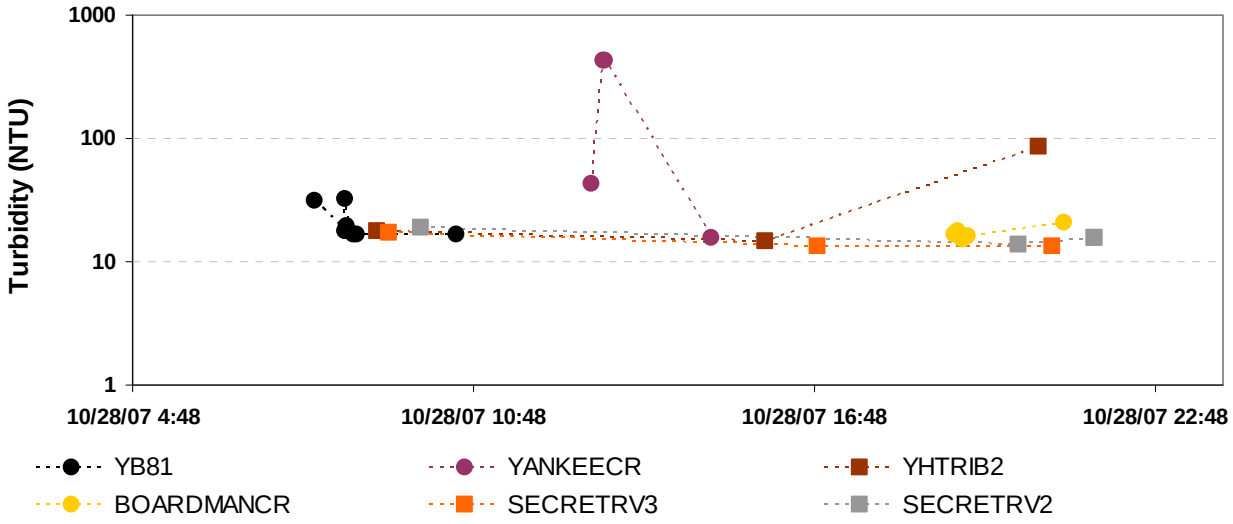

FIGURE 5-5
MEASURED TURBIDITY VALUES AT SECRET RAVINE WATERSHED SITES DURING OCTOBER 2007 YEARLY OUTAGE SAMPLING EVENT

Specific Conductivity and Ions

Based on water quality monitoring during the yearly outage events, SC and ion concentrations at sites sampled in Secret Ravine did not appear to be affected by PCWA operations during yearly outages. Measured SC values remained relatively low at all sites sampled during the November 2006 and October 2007 outages, with Secret Ravine sites exhibiting higher values than canal sites. Calcium, magnesium, sodium, chloride, and sulfate concentrations were also consistently higher in Secret Ravine, and demonstrated little variation during and after the November 2006 outage event. Iron concentrations across canal and stream sites increased after heavy rainfall in the watershed, and are most likely associated with runoff contributions to streamflow at the time of sampling. Nitrate and potassium concentrations were low across all sites sampled in the Secret Ravine watershed during and after the November 2006 outages at Mammoth Reservoir.

Trace Elements

Based on water quality data collected, PCWA operations during the November 2007 yearly outage event did not affect barium, cadmium, copper, or zinc concentrations in Secret Ravine. Barium, copper, and zinc concentrations did increase at canal and stream sites on November 2, 2006, likely due to heavy rain and runoff contributions to streamflow. During the precipitation event, barium and copper concentrations reached 58 µg/L and 21 mg/L, respectively, at SECRETRV3, while zinc concentrations at YB69A and SECRETRV3 measured 71 and 60 µg/L, respectively. All samples had cadmium concentrations below the detection limit (0.5 µg/L) during the 2006 yearly outage monitoring event. Aluminum concentrations at canal sites monitored during the November 2006 yearly outage event were consistently higher than samples

obtained in Secret Ravine, and higher at all sites after heavy rain in the watershed, most likely due to heavy rain and runoff contributions to canal and streamflows at the time of sampling.

During the October 2007 sampling event, measured copper values at canal and stream sites in the Secret Ravine watershed increased after flows were restored to the canal system (**Figure 5-6**). These higher values were likely attributed to mobilization of copper associated with fine sediment and organic material that had settled when canals were dewatered during the outage.

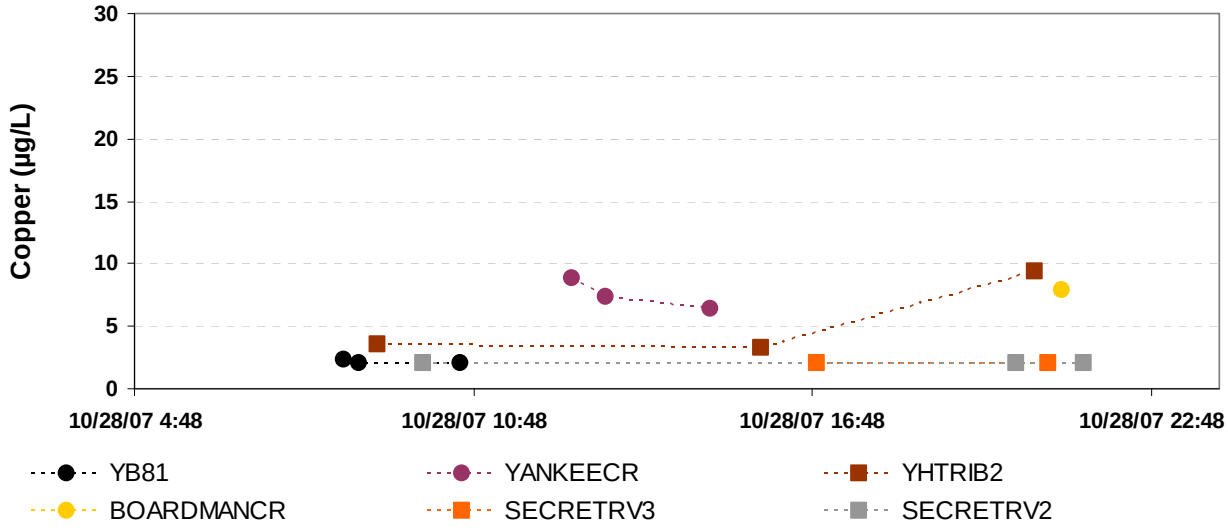

FIGURE 5-6
MEASURED COPPER CONCENTRATIONS AT SECRET RAVINE WATERSHED SITES DURING THE OCTOBER 2007 YEARLY OUTAGE SAMPLING EVENT

Miners Ravine Watershed

As with the Secret Ravine watershed, water quality monitoring in the Miners Ravine watershed was conducted during two different outage events at Mammoth Reservoir; November 1 and 2, 2006, following the November 1, 2006 outage, and October 28, 2007, following the October 27, 2007, outage. For the 2006 outage monitoring event, flows were restored to the PCWA canal system below Mammoth Reservoir at around 9:00 a.m. on October 31, 2006, and November 2, 2006. Flows were restored to the PCWA canal system below Mammoth Reservoir at around 9:00 a.m. on October 28, 2007, for the 2007 outage monitoring event. BAUGHMANCR was monitored along with some canal monitoring sites also used for analysis within the Secret Ravine watershed (YB69A, YB78, and YB81). Water quality was monitored at two stream sites during this event (BCTRIB1 and MINERSRV3). During the October 28, 2007, monitoring sites were located at YB81 and MINERSRV3. Only water temperature, DO, pH, SC, turbidity, alkalinity, sulfate, and copper were measured during the October 28, 2007, event. The sites monitored in the Miners Ravine watershed during the yearly outage events are described below, from the most upstream to the most downstream locations:

- **Boardman Canal at Lubeck Road (YB69A)**
- **Boardman Canal at Powerhouse Road (YB78)**
- **Boardman Canal below Mammoth Reservoir (YB81)**
- **Baughman Canal Outlet Release (BAUGHMANCR)**
- **Tributary to Miners Ravine from Baughman Canal (BCTRIB1)**
- **Miners Ravine near N. Sunrise Avenue (MINERSRV3)**

The following section describes water quality conditions during the yearly canal outage at sites in the Miners Ravine watershed monitored on November 1 and 2, 2006, and October 28, 2007. Figures providing a comparison of water quality conditions within the PCWA raw water distribution system and Miners Ravine are included in **Appendix B**.

Water Temperature and Dissolved Oxygen

Based on results of water quality monitoring, water temperature and DO conditions in Miners Ravine were not affected by PCWA operations during the yearly outages. Water temperature and DO values at BCTRIB1 and MINERSRV3 were comparable to values measured during baseline sampling events. Water temperature and DO fluctuations at sites were likely attributed to natural variability due to diurnal effects, such as photosynthesis and respiration.

pH, Alkalinity, and Hardness

Monitoring results suggest that Miners Ravine pH, alkalinity, and hardness values were not likely affected by PCWA operations during yearly outages. Measured values for pH and alkalinity decreased at BCTRIB1 and MINERSRV3 following the outage at Mammoth Reservoir. These fluctuations were not likely associated with the decreased canal flows because pH and alkalinity values at canal sites remained consistent. Values for pH, alkalinity, and hardness across canal and stream sites in the Miners Ravine watershed were comparable to values measured during baseline sampling events.

Total Suspended Solids and Turbidity

Measured TSS concentrations at stream sites monitored in the Miners Ravine watershed during the November 2006 event were not affected by PCWA operations during the yearly outages. TSS concentrations were close to or below detection limits at all sites monitored on November 1, 2006, and increased at sites sampled during and after heavy rain on November 2, 2006. Higher TSS concentrations at sites sampled on November 2, 2006, are likely associated with heavy rain and runoff contributions to flow at sites during sampling. TSS was not evaluated during the October 2007 sampling event.

Turbidity values measured at sites during the November 2006 outage event followed the same trends described for TSS, demonstrating no effects associated with PCWA operations during the yearly outages. Measured turbidity values during the October 2007 also suggest that the yearly outages are not likely to affect turbidity in Miners Ravine.

Specific Conductivity and Ions

Based on results of water quality monitoring, PCWA operations during yearly outages did not affect SC and ion concentrations in Miners Ravine. Measured SC and ion values at sites were comparable to values measured during baseline sampling events at sites in the Miners Ravine watershed. SC was consistently low (less than 0.2 mS/cm) across all sites during monitoring, with the exception of one sample obtained at the Baughman Canal Outlet Release on November 1, 2006 (0.5 mS/cm). Calcium, magnesium, sodium, chloride, and sulfate concentrations were also consistently higher in Miners Ravine during the November 2006 outage event, and demonstrated little variation during and after the outage event. Iron, nitrate, and potassium concentrations were low across all sites sampled in the Miners Ravine watershed, and had slightly higher concentrations in Miners Ravine during heavy rain. Measured sulfate concentrations during the October 2007 outage event were also consistently higher in Miners Ravine, and demonstrated little variation at canal and stream sites during and after the outage event.

Trace Elements

Barium, zinc, and copper concentrations were consistently low across canal and stream sites during the November 2006 yearly outage, but increased following heavy rain in the watershed. Aluminum concentrations were comparable to values measured during baseline sampling events, but also increased across sites after heavy rain. The higher concentrations of barium, zinc, copper, and aluminum follow the same trend as TSS, and are most likely due to high flows at sites during sampling, which may have may have mobilized sediments and metals bound in sediments. Copper concentrations across canal and stream sites were consistently low during the November 2006 and October 2007 yearly outage monitoring events. All cadmium concentrations were below the detection limit (0.5 µg/L) during the 2006 yearly outage monitoring event.

Soils and Sediment Quality

Soils and sediment quality in the study area are not likely to be affected by PCWA activities during the annual PG&E delivery outages. PCWA operations during the yearly outages do not disturb soils in the study area, or introduce constituents that may affect sediment quality.

5.1.1.2 Biological Resources

The following sections describe effects of PCWA operations during yearly outages to terrestrial and aquatic habitat and species.

Terrestrial Habitat and Species

Yearly outages are not expected to have substantial effects on terrestrial habitats and species. Historic decreases in water delivery during the PG&E outages could result in temporary minimal decreases in the extent of wetland habitats that may be indirectly supported by canal deliveries. This could have minimal effects on species that use wetland habitats such as foraging birds and amphibians by decreasing the amount of available habitat, but these effects are representative of historic conditions within the study area.

Other changes in water quality, such as increased water temperature, decreased DO, and increased pH and alkalinity could have some negative effects on plants and wildlife on the margins of canals and tributaries; however, any effects are expected to be very minimal because these changes are anticipated to be very small.

Aquatic Habitat and Species

PCWA's operations during yearly outages likely affect fish found in the canal system, potentially including brown trout (*Salmo trutta*), rainbow trout (*Oncorhychus mykiss*), catfish (*Ictalurus* or *Ameiurus* sp.), Sacramento sucker (*Catastomus occidentalis*), Sacramento pikeminnow (*Ptychocheilus grandis*), black bass (*Micropterus* sp.), and mosquitofish (*Gambusia affinis*) (PCWA 2004; field observations, MWH). Potential effects to fish in the canal system are associated with canal system dewatering.

Aquatic habitat and species in Canyon Creek and Auburn Ravine are not affected by PCWA operations during the PG&E annual outages since the operations do not alter hydrologic and water quality conditions in Canyon Creek and Auburn Ravine.

As described above and shown in **Figure 5-2**, decreased and intermittent canal system flows during the PG&E yearly outages result in reduced flow contributions from the PCWA canal system and flow reductions in Clover Valley Creek, Antelope Creek, Secret Ravine, and Miners Ravine. These flow reductions likely affect aquatic habitat and species in these streams. The reduced canal system contributions, and resultant decreased flow in Clover Valley Creek, Antelope Creek, Secret Ravine, and Miners Ravine are dictated by the PG&E annual water delivery outages. PCWA's reliance on stored water in surface reservoirs and water delivered through the ARPS to supplement flow to WTPs and canal customers during the yearly outages limits PCWA's ability to maintain canal system flows. Antecedent hydrologic conditions may reduce or accentuate the effects of PCWA's operations during yearly outages on aquatic habitat and species in Clover Valley Creek, Antelope Creek, Secret Ravine, and Miners Ravine.

Special Status Species

PCWA operations during PG&E's yearly outages are not expected to have substantial effects on terrestrial special status species. Historic decreases in water delivery during the PG&E outages could result in temporary minimal decreases in the extent of wetland habitats that may be indirectly supported by the canal system. This could have minimal effects on species that use these habitats wetland habitats, such as foraging special status bird and amphibian species by decreasing the amount of available habitat, but these effects are representative of historic conditions within the study area. The typical timing of the outage period from mid-October to mid-November is outside of the breeding period for special status amphibians. California red-legged frog breeding occurs between late November and March, though most frogs lay eggs in March (USFWS 2002, Stebbins 2003). The foothill yellow-legged frog breeds mid-March through early June, and the western spadefoot toad breeds late January through July (Stebbins 2003).

Other changes in water quality, such as increased water temperature, decreased DO, and increased pH and alkalinity could have some negative effects on plants and wildlife on the

margins of canals and tributaries; however, any effects are expected to be minimal because these changes are anticipated to be small.

Fall-run Chinook salmon and Central Valley steelhead spawn in both Secret and Miners ravines. Because streamflows are typically lower, and water temperatures higher in the Dry Creek watershed, spawning often occurs later than in other Central Valley streams. Historic reductions in streamflow contributions from the canal system during PG&E's yearly outages may also delay the spawning migration.

Fall-run Chinook salmon may begin spawning activities from early November to December, which may, in some years, coincide with the tail end of PG&E's yearly outages and the resulting streamflow reductions. If the reduction of canal system contributions to streamflow occurs after spawning has begun, there is a potential for redd dewatering, providing the flow and stage decrease occurs where spawning has occurred.

Central Valley steelhead typically do not start their upstream migration until after a large storm event, typically after the PG&E yearly outages are completed. Spawning also occurs after the outages, so spawning and egg incubation would not be affected by the outages. Juvenile outmigration typically occurs before the PG&E outages. Steelhead do, however, rear year-round, especially in Secret Ravine, and may be affected by the PG&E yearly outages through the reduction or loss of rearing habitat, and the potential increase in predation rates. The level of effect to the rearing steelhead is dependent upon how low the flows drop during the annual outages, and if the water temperatures increase. If flows decrease too much, or if water temperatures rise too high, steelhead will move to locations more suitable, most likely downstream into Dry Creek.

5.1.2 Seasonal Customer Delivery Schedule Changes

The following sections describe potential effects of PCWA's seasonal customer delivery schedule changes on physical and biological resources in the study area. PCWA's customer delivery schedule changes typically take 1 week to complete, with minimal interruptions to service. Post-irrigation season customer delivery schedule changes coincide with yearly outages.

5.1.2.1 Physical Resources

Potential effects of PCWA seasonal delivery schedule changes on hydrology, water quality, and soils and sediment quality conditions in the study area are described in the below sections.

Hydrology

PCWA customer delivery schedule changes do not affect hydrologic conditions in Canyon Creek. Diversions from Canyon Creek to PCWA's Pulp Mill Canal, and resulting streamflow in Canyon Creek, are maintained during delivery schedule changes.

Hydrologic conditions in Auburn Ravine are not affected by customer delivery schedule changes. PCWA customer delivery schedule changes along Auburn Ravine and in the Zone 5 service area do not require any exchanges of orifices at customer delivery points. PCWA's water diversions to Auburn Ravine are limited to the irrigation season, when natural flows in Auburn

Ravine are low. Also, PCWA contributions to streamflow in Auburn Ravine during the irrigation season are a fairly small fraction of the flow augmentation that occurs through other irrigation conveyance and return flow, hydroelectric generation releases, and treated effluent discharges.

Delivery schedule changes after the irrigation season do not affect the hydrologic conditions in Clover Valley Creek, Antelope Creek, Secret Ravine, or Miners Ravine. As described above, post-irrigation season delivery schedule changes coincide with yearly outages.

Delivery schedule changes during the irrigation season also are not likely to affect hydrologic conditions in Clover Valley Creek, Antelope Creek, Secret Ravine, or Miners Ravine. The orifice changes at customer delivery points do not require canal dewatering and have minimal interruptions to service.

Water Quality

As described above, PCWA's activities associated with delivery schedule changes typically coincide with other O&M activities that require canal dewatering, such as yearly outages, canal lining/guniting, and canal cleaning and flushing. However, because delivery schedule changes do not require dewatering, water quality conditions in study area streams are not likely to be affected by PCWA operations during irrigation season delivery schedules changes. It is possible that sediment and/or debris could enter the canals from canal banks if PCWA personnel need to enter the canals to switch out orifice plates, but would not likely result in water quality effects at canal outlets. Effects of outages during the fall season delivery schedule changes are described above in the yearly outages section.

Soils and Sediment Quality

Soils and sediment quality in the study area are not likely to be affected by PCWA's seasonal customer delivery schedule changes. PCWA operations during seasonal customer delivery schedule changes do not disturb soils in the study area, or introduce constituents that may affect sediment quality.

5.1.2.2 Biological Resources

The following sections describe effects of PCWA operations during seasonal customer delivery schedule changes on terrestrial and aquatic habitat and species.

Terrestrial Habitat and Species

Very minimal effects are likely to occur to terrestrial habitats and species, mostly associated with trampling vegetation while orifices are being changed.

Aquatic Habitat and Species

Aquatic habitat and species are not affected by seasonal customer delivery schedule changes. As described above, hydrology and water quality conditions in study area streams are not likely affected by seasonal customer delivery schedule changes.