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State of California  
The Resources Agency  
Department of Water Resources

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**PROJECT EFFECTS ON WATER QUALITY  
DESIGNATED BENEFICIAL USES  
FOR SURFACE WATERS**

**STUDY PLAN W1**

**Oroville Facilities Relicensing  
FERC Project No. 2100**



**DRAFT FINAL REPORT**

**SEPTEMBER 2004**

**ARNOLD  
SCHWARZENEGGER**  
Governor  
State of California

**MIKE CHRISMAN**  
Secretary for Resources  
The Resources Agency

**LESTER A. SNOW**  
Director  
Department of Water  
Resources

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**This report was prepared under the direction of**

Dwight P. Russell.....District Chief, Northern District  
Glen S. Pearson .....Chief, Special Investigations Branch, Northern District  
Terry J. Mills ..... Environmental Program Manager I, Division of Environmental Services  
Gerald L. Boles..... Chief, Water Quality and Biology Section, Northern District

**by**

Gerald L. Boles ..... Chief, Water Quality and Biology Section, Northern District  
Scott McReynolds.....Environmental Scientist, Northern District  
Ryan Martin .....Environmental Scientist, Northern District  
Thomas Boullion .....Environmental Scientist, Northern District

**Assisted by**

Perry LeBeouf.....Environmental Scientist, Northern District  
Michael Hendrick .... Environmental Scientist, Division of Planning and Local Assistance\*  
Ira Alexander ..... Fish and Wildlife Scientific Aide, Northern District  
Tom Kraemer..... Fish and Wildlife Scientific Aide, Northern District  
Beverly Anderson-Abbs ..... Graduate Student Assistant, Northern District  
Peter Coombe..... Graduate Student Assistant, Northern District  
Petra Lee ..... Graduate Student Assistant, Northern District  
Colin Purdy ..... Graduate Student Assistant, Northern District

\* formerly with the Northern District

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## REPORT SUMMARY

Construction of the Oroville Facilities have affected the physical, chemical, and biological characteristics of water in the Feather River. These changes in water quality characteristics may affect beneficial uses of the water. Prior to issuance of a new license for the Project, FERC will require a water quality certification by the SWRCB or a waiver of such certification. The certification requires a determination by the SWRCB that the Project complies with appropriate requirements of the CVRWQCB Basin Plan, which includes water quality objectives for protection of designated beneficial uses. Data obtained from this study will be used to determine compliance with standards, objectives, and criteria for those factors controllable by the Project.

The objective of the study is to evaluate the physical, chemical, and biological integrity of water quality in the Oroville Facilities, and other Project-affected surface waters. Information obtained from the study will be used to determine whether Project-affected waters meet Basin Plan objectives and are protective of beneficial uses designated in the Basin Plan.

Monitoring was conducted to evaluate Project effects on water quality objectives. Parameters monitored included bacteria, biostimulatory substances, chemical constituents, color, dissolved oxygen, floating material, oil and grease, pH, pesticides, salinity, sediment, settleable and suspended material, tastes and odors, water temperature, toxicity, and turbidity. Compliance with these objectives was used to determine Project effects on designated beneficial uses, which include municipal and domestic supply, irrigation, power, contact and non-contact recreation, canoeing and rafting, warm and cold fish migration, warm and cold freshwater habitat, warm and cold spawning, and wildlife habitat.

Water quality in the Project area is generally good. The quality of water in Lake Oroville is largely affected by that in upstream tributaries. Water released from Oroville Dam determines water quality downstream in the Feather River, which subsequently determines water quality in the Thermalito Forebay and Afterbay.

Thermal stratification during the summer in Lake Oroville occasionally leads to depressed dissolved oxygen conditions near the bottom of the water column. Nutrients and minerals in the reservoir were found at levels consistent with existing and proposed criteria, except for total phosphorus, which were occasionally at levels exceeding concentrations in the upstream tributaries and recommended water quality criteria. Metals exceeding various criteria in the reservoir included arsenic, aluminum, copper, iron, manganese, and lead. However, these and other metals are contributed to the reservoir in concentrations exceeding various criteria by the upper tributaries.

Water temperatures downstream from Oroville Dam are controlled by temperature requirements at the Feather River Fish Hatchery and Robinson Riffle. Releases are made from the reservoir to provide temperatures suitable for fish propagation at the

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hatchery, which also generally meets temperature requirements at Robinson Riffle. Water released from the reservoir to comply with fishery temperature needs conflicts with temperature requirements for other beneficial uses, such as irrigation.

Water quality in the Feather River downstream from Oroville Dam is affected by that in the reservoir. Dissolved oxygen levels in the Feather River were only infrequently found at levels less than those suitable for beneficial uses. Turbidity levels in the river downstream from the dam are less than those measured in tributaries to Lake Oroville, indicating that the reservoir acts as a settling basin for the turbid inflows. Nutrients and minerals downstream from Oroville Dam are at levels suitable for all beneficial uses. Metals in the Diversion Pool at the base of the dam reflect the quality of water in the reservoir near the dam. Further downstream, accretions to the river from tributaries, storm drains, surface runoff, and other sources affect water quality in the river. Metals occasionally exceeding various criteria within the Project boundary in the Feather River downstream from the Fish Barrier Dam include aluminum, arsenic, cadmium, copper, iron, and mercury.

Metals occasionally exceeding criteria in features of the Thermalito Complex include aluminum, arsenic, cadmium, iron, manganese, and lead.

Some ponds in the Oroville Wildlife Area also occasionally were found with depressed oxygen levels, and elevated levels of aluminum, arsenic, iron, and manganese.

Pesticides were not found in Project waters, though diuron was found upstream from Lake Oroville in the South Fork Feather River. MTBE was detected in the Diversion Pool.

Both total and fecal coliform bacteria were found from all water quality monitoring sites, but only fecal coliform bacteria exceeded criteria. Total and fecal coliform and enterococcus bacteria were found at all swim areas and were present at some swim areas at densities greater than criteria. In addition to human contact with water, high wildlife use of the swim areas could contribute bacterial contamination.

The phytoplankton communities in Lake Oroville and the Thermalito Complex were dominated by diatoms, while green algae were dominant in ponds in the Oroville Wildlife Area. Periphyton communities in the river were also generally dominated by diatoms, which are indicative of aquatic ecosystems that are not nutrient rich.

Aquatic macroinvertebrates in the Feather River are dominated by species that adapt readily to disturbed ecosystems. The species composition in the river near the dam is typical of that below large reservoirs. Further downstream, habitat conditions allow additional species to colonize.

Oroville Dam blocks movement of coarse sediment and most fine sediment to the Feather River. Occasional high flows scour smaller sediments so that the river bed is becoming increasingly composed of coarser materials.

Sites both upstream and downstream from Lake Oroville were identified that produced toxic effects to test organisms in bioassays. Both survival and reproduction of *Ceriodaphnia* and survival and growth of fathead minnow were affected.

Total suspended and settleable solids were usually reported at very low levels in both upstream tributaries and Project waters. Highest total suspended and settleable solids levels were usually found during winter months.

Color imparted to tributary or Project waters was not observed during monitoring.

Heavy storms which lead to high runoff transport woody debris to the reservoir. Management practices remove most of the debris in the spring so that these floating materials do not present a significant nuisance. No oil, grease, waxes, or other similar materials were evident during monitoring.

Odors described as "fishy," "septic," "algae," and "earthy" were noted for some monitoring sites.

The Feather River was monitored to determine effects to water quality from the large number of spawning salmon. Stream water of poor water quality was often measured, but the data do not indicate that spawning salmon are contributing to elevated concentrations of nutrients or decreased water quality.

Water quality in the Feather River is potentially affected by treated sewage discharged through the Sewage Commission Oroville Region (SCOR) Outlet to the Feather River downstream from the Afterbay Outlet. Monitoring of gravels and water upstream and downstream from the SCOR Outlet produced variable results.

Periphyton and macroinvertebrate communities in the tributaries to Lake Oroville are indicative of healthy ecosystems. Both periphyton and macroinvertebrate communities are similar to those found in the Feather River downstream from Oroville Dam in the low flow section, as well as other streams in which anadromous salmonids spawn. Comparisons of the periphyton and macroinvertebrate communities in the upper tributaries with communities in the low flow channel and other streams do not indicate that the upstream tributaries suffer from nutrient deprivation due to purported blockage of salmonid spawning in the upper tributaries caused by Oroville Dam.

Beneficial uses at least potentially affected by the Project based on evaluation of current objectives included municipal and domestic supply, irrigation, contact and non-contact recreation, warm and cold freshwater habitat, warm and cold spawning, and wildlife

habitat. The beneficial uses of power, canoeing and rafting, and warm and cold fish migration were not affected by Project water quality.

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## **1.0 INTRODUCTION**

The Environmental Work Group identified as an issue the effects of existing and future Project operations on the physical, chemical, and biological components of water quality in the Feather River, affected tributaries, and downstream waters. The Project was considered to have potential for direct and indirect water quality effects on aquatic ecosystem health, recreational opportunity, and domestic and agricultural water supply. Concern was expressed about the potential effects of the Project on compliance with water quality objectives identified in the Regional Water Quality Control Board's Water Quality Control Plan (Basin Plan) (CVRWQCB 1998), and effects on designated beneficial uses of the water. The beneficial uses for the reservoir and Feather River as defined in the Basin Plan include municipal and domestic supply, agriculture irrigation, electrical power production, contact and non-contact recreation, canoeing and rafting recreation, warm and cold freshwater habitat, warm and cold fish migration and spawning, and wildlife habitat.

### **1.1 BACKGROUND INFORMATION**

Some physical, chemical, and biological data had been collected prior to initiation of the FERC Relicensing studies from the North, Middle, and South forks of the Feather River near their confluences with Lake Oroville, from the reservoir, and downstream in the Feather River, Thermalito Power Canal, and Thermalito Afterbay. However, these older data are not, nor were expected to be, sufficient to determine compliance of Project waters with all Basin Plan objectives, goals, and criteria for protection of the designated beneficial uses. Therefore, additional water quality data were deemed necessary by the Environmental Workgroup to determine effects of the Project to water quality. Some of the existing data also indicate potential areas of concern for adverse water quality conditions. These data are identified and summarized in the Initial Information Package for Relicensing of the Oroville Facilities (DWR 2001). Additional physical, chemical, and biological data are needed to demonstrate Project compliance with Basin Plan standards.

#### **1.1.1 Statutory/Regulatory Requirements**

Relicensing of the Oroville Facilities by the Federal Energy Regulatory Commission (FERC) requires certification from the State Water Resources Control Board (SWRCB) that the Project complies with Section 401 of the federal Clean Water Act. The water quality certification signifies compliance with water quality standards and other appropriate requirements for any discharge or discharges to waters of the United States resulting from an activity that requires a federal license or permit. Information required by the SWRCB for certification includes evidence of compliance with appropriate requirements of the Basin Plan.

### **1.1.2 Study Area**

The study area is generally within the FERC Project boundary, but also includes tributaries to Lake Oroville and the Feather River downstream to the confluence with the Sacramento River for Project-related effects. Specific water bodies included in the study plan are the North, Middle, and South forks of the Feather River and the West Branch and Concow Creek just above their confluences with the reservoir, Lake Oroville, Feather River downstream from Oroville Dam to the confluence with the Sacramento River, Thermalito Diversion Pool, Forebay, and Afterbay, and Oroville Wildlife Area ponds.

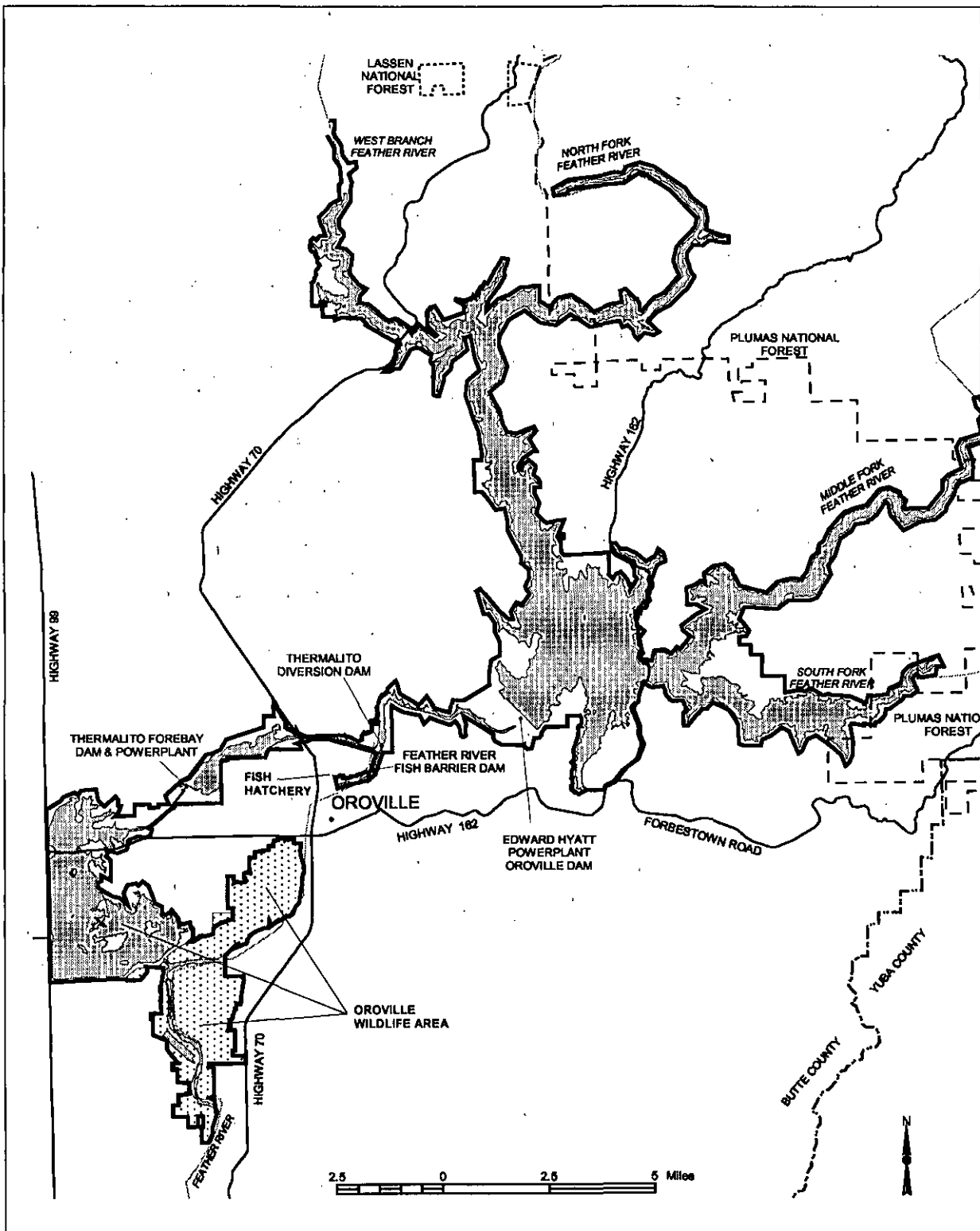
## **1.2 DESCRIPTION OF FACILITIES**

The Oroville Facilities were developed as part of the State Water Project (SWP), a water storage and delivery system of reservoirs, aqueducts, power plants, and pumping plants. The main purpose of the SWP is to store and distribute water to supplement the needs of urban and agricultural water users in northern California, the San Francisco Bay area, the San Joaquin Valley, and southern California. The Oroville Facilities are also operated for flood management, power generation, to improve water quality in the Delta, provide recreation, and enhance fish and wildlife.

FERC Project No. 2100 encompasses 41,100 acres and includes Oroville Dam and Reservoir, three power plants (Hyatt Pumping-Generating Plant, Thermalito Diversion Dam Power Plant, and Thermalito Pumping-Generating Plant), Thermalito Diversion Dam, the Feather River Fish Hatchery and Fish Barrier Dam, Thermalito Power Canal, OWA, Thermalito Forebay and Forebay Dam, Thermalito Afterbay and Afterbay Dam, and transmission lines, as well as a number of recreational facilities. An overview of these facilities is provided on Figure 1.2-1. The Oroville Dam, along with two small saddle dams, impounds Lake Oroville, a 3.5-million-acre-feet (maf) capacity storage reservoir with a surface area of 15,810 acres at its normal maximum operating level.

The hydroelectric facilities have a combined licensed generating capacity of approximately 762 megawatts (MW). The Hyatt Pumping-Generating Plant is the largest of the three power plants with a capacity of 645 MW. Water from the six-unit underground power plant (three conventional generating and three pumping-generating units) is discharged through two tunnels into the Feather River just downstream of Oroville Dam. The plant has a generating and pumping flow capacity of 16,950 and 5,610 cubic feet per second (cfs), respectively. Other generation facilities include the 3-MW Thermalito Diversion Dam Power Plant and the 114-MW Thermalito Pumping-Generating Plant.

Thermalito Diversion Dam, four miles downstream of the Oroville Dam creates a tail water pool for the Hyatt Pumping-Generating Plant and is used to divert water to the Thermalito Power Canal. The Thermalito Diversion Dam Power Plant is a 3-MW power



**Figure 1.2-1. Oroville Facilities FERC Project Boundary.**

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plant located on the left abutment of the Diversion Dam. The power plant releases a maximum of 615 cfs of water into the river.

The Power Canal is a 10,000-foot-long channel designed to convey generating flows of 16,900 cfs to the Thermalito Forebay and pump-back flows to the Hyatt Pumping-Generating Plant. The Thermalito Forebay is an off-stream regulating reservoir for the 114-MW Thermalito Pumping-Generating Plant. The Thermalito Pumping-Generating Plant is designed to operate in tandem with the Hyatt Pumping-Generating Plant and has generating and pump-back flow capacities of 17,400 cfs and 9,120 cfs, respectively. When in generating mode, the Thermalito Pumping-Generating Plant discharges into the Thermalito Afterbay, which is contained by a 42,000-foot-long earth-fill dam. The Afterbay is used to release water into the Feather River downstream of the Oroville Facilities, helps regulate the power system, provides storage for pump-back operations, and provides recreational opportunities. Several local irrigation districts receive water from the Afterbay.

The Feather River Fish Barrier Dam is downstream of the Thermalito Diversion Dam and immediately upstream of the Feather River Fish Hatchery. The flow over the dam maintains fish habitat in the low-flow channel of the Feather River between the dam and the Afterbay outlet, and provides attraction flow for the hatchery. The hatchery was intended to compensate for spawning grounds lost to returning salmon and steelhead trout from the construction of Oroville Dam. The hatchery can accommodate 15,000 to 20,000 adult fish annually.

The Oroville Facilities support a wide variety of recreational opportunities. They include: boating (several types), fishing (several types), fully developed and primitive camping (including boat-in and floating sites), picnicking, swimming, horseback riding, hiking, off-road bicycle riding, wildlife watching, hunting, and visitor information sites with cultural and informational displays about the developed facilities and the natural environment. There are major recreation facilities at Loafer Creek, Bidwell Canyon, the Spillway, North and South Thermalito Forebay, and Lime Saddle. Lake Oroville has two full-service marinas, five car-top boat launch ramps, ten floating campsites, and seven dispersed floating toilets. There are also recreation facilities at the Visitor Center and the Oroville Wildlife Area.

The Oroville Wildlife Area comprises approximately 11,000 acres west of Oroville that is managed for wildlife habitat and recreational activities. It includes the Thermalito Afterbay and surrounding lands (approximately 6,000 acres) along with 5,000 acres adjoining the Feather River. The 5,000 acre area straddles 12 miles of the Feather River, which includes willow and cottonwood lined ponds, islands, and channels. Recreation areas include dispersed recreation (hunting, fishing, and bird watching), plus recreation at developed sites, including Monument Hill day use area, model airplane grounds, three boat launches on the Afterbay and two on the river, and two primitive camping areas. California Department of Fish and Game's (DFG) habitat enhancement program includes a wood duck nest-box program and dry land farming for nesting cover and improved wildlife forage. Limited gravel extraction also occurs in a number of locations.

### **1.3 CURRENT OPERATIONAL CONSTRAINTS**

Operation of the Oroville Facilities varies seasonally, weekly and hourly, depending on hydrology and the objectives DWR is trying to meet. Typically, releases to the Feather River are managed to conserve water while meeting a variety of water delivery requirements, including flow, temperature, fisheries, recreation, diversion and water quality. Lake Oroville stores winter and spring runoff for release to the Feather River as necessary for Project purposes. Meeting the water supply objectives of the SWP has always been the primary consideration for determining Oroville Facilities operation (within the regulatory constraints specified for flood control, in-stream fisheries, and downstream uses). Power production is scheduled within the boundaries specified by the water operations criteria noted above. Annual operations planning is conducted for multi-year carry over. The current methodology is to retain half of the Lake Oroville storage above a specific level for subsequent years. Currently, that level has been established at 1,000,000 acre-feet (af); however, this does not limit draw down of the reservoir below that level. If hydrology is drier than expected or requirements greater than expected, additional water would be released from Lake Oroville. The operations plan is updated regularly to reflect changes in hydrology and downstream operations. Typically, Lake Oroville is filled to its maximum annual level of up to 900 feet above mean sea level in June and then can be lowered as necessary to meet downstream requirements, to its minimum level in December or January. During drier years, the lake may be drawn down more and may not fill to the desired levels the following spring. Project operations are directly constrained by downstream operational constraints and flood management criteria as described below.

#### **1.3.1 Downstream Operation**

An August 1983 agreement between DWR and DFG entitled, "Agreement Concerning the Operation of the Oroville Division of the State Water Project for Management of Fish & Wildlife," sets criteria and objectives for flow and temperatures in the low flow channel

and the reach of the Feather River between Thermalito Afterbay and Verona (DWR 1983). This agreement: (1) establishes minimum flows between Thermalito Afterbay Outlet and Verona which vary by water year type; (2) requires flow changes under 2,500 cfs to be reduced by no more than 200 cfs during any 24-hour period, except for flood management, failures, etc.; (3) requires flow stability during the peak of the fall-run Chinook spawning season; and (4) sets an objective of suitable temperature conditions during the fall months for salmon and during the later spring/summer for shad and striped bass.

#### **1.3.1.1 Instream Flow Requirements**

The Oroville Facilities are operated to meet minimum flows in the Lower Feather River as established by the 1983 agreement (see above). The agreement specifies that Oroville Facilities release a minimum of 600 cfs into the Feather River from the Thermalito Diversion Dam for fisheries purposes. This is the total volume of flows from the diversion dam outlet, diversion dam power plant, and the Feather River Fish Hatchery pipeline.

Generally, the instream flow requirements below Thermalito Afterbay are 1,700 cfs from October through March, and 1,000 cfs from April through September. However, if runoff for the previous April through July period is less than 1,942,000 af (i.e., the 1911 to 1960 mean unimpaired runoff near Oroville), the minimum flow can be reduced to 1,200 cfs from October to February, and 1,000 cfs for March. A maximum flow of 2,500 cfs is maintained from October 15 through November 30 to prevent spawning in overbank areas that might become de-watered.

#### **1.3.1.2 Temperature Requirements**

The Diversion Pool provides the water supply for the Feather River Fish Hatchery. The hatchery objectives are 52 °F for September, 51 °F for October and November, 55 °F for December through March, 51 °F for April through May 15, 55 °F for last half of May, 56 °F for June 1-15, 60 °F for June 16 through August 15, and 58 °F for August 16-31. A temperature range of plus or minus 4 °F is allowed for objectives, April through November.

There are several temperature objectives for the Feather River downstream of the Afterbay Outlet. During the fall months, after September 15, the temperatures must be suitable for fall-run Chinook. From May through August, they must be suitable for shad, striped bass, and other warmwater fish.

The National Marine Fisheries Service has also established an explicit criterion for steelhead trout and spring-run Chinook salmon. Memorialized in a biological opinion on the effects of the Central Valley Project and SWP on Central Valley spring-run Chinook and steelhead as a reasonable and prudent measure; DWR is required to control water

temperature at Feather River mile 61.6 (Robinson's Riffle in the low-flow channel) from June 1 through September 30. This measure requires water temperatures less than or equal to 65 °F on a daily average. The requirement is not intended to preclude pump-back operations at the Oroville Facilities needed to assist the State of California with supplying energy during periods when the California ISO anticipates a Stage 2 or higher alert.

The hatchery and river water temperature objectives sometimes conflict with temperatures desired by agricultural diverters. Under existing agreements, DWR provides water for the Feather River Service Area (FRSA) contractors. The contractors claim a need for warmer water during spring and summer for rice germination and growth (i.e., 65 °F from approximately April through mid May, and 59 °F during the remainder of the growing season). There is no obligation for DWR to meet the rice water temperature goals. However, to the extent practical, DWR does use its operational flexibility to accommodate the Feather River Service Area contractor's temperature goals.

#### **1.3.1.3 Water Diversions**

Monthly irrigation diversions of up to 190,000 (July 2002) af are made from the Thermalito Complex during the May through August irrigation season. Total annual entitlement of the Butte and Sutter County agricultural users is approximately 1 maf. After meeting these local demands, flows into the lower Feather River continue into the Sacramento River and into the Sacramento-San Joaquin Delta. In the northwestern portion of the Delta, water is pumped into the North Bay Aqueduct. In the south Delta, water is diverted into Clifton Court Forebay where the water is stored until it is pumped into the California Aqueduct.

#### **1.3.1.4 Water Quality**

Flows through the Delta are maintained to meet Bay-Delta water quality standards arising from DWR's water rights permits. These standards are designed to meet several water quality objectives such as salinity, Delta outflow, river flows, and export limits. The purpose of these objectives is to attain the highest water quality, which is reasonable, considering all demands being made on the Bay-Delta waters. In particular, they protect a wide range of fish and wildlife including Chinook salmon, Delta smelt, striped bass, and the habitat of estuarine-dependent species.

#### **1.3.2 Flood Management**

The Oroville Facilities are an integral component of the flood management system for the Sacramento Valley. During the wintertime, the Oroville Facilities are operated under flood control requirements specified by the U.S. Army Corps of Engineers (USACE). Under these requirements, Lake Oroville is operated to maintain up to 750,000 af of

storage space to allow for the capture of significant inflows. Flood control releases are based on the release schedule in the flood control diagram or the emergency spillway release diagram prepared by the USACE, whichever requires the greater release. Decisions regarding such releases are made in consultation with the USACE.

The flood control requirements are designed for multiple use of reservoir space. During times when flood management space is not required to accomplish flood management objectives, the reservoir space can be used for storing water. From October through March, the maximum allowable storage limit (point at which specific flood release would have to be made) varies from about 2.8 to 3.2 maf to ensure adequate space in Lake Oroville to handle flood flows. The actual encroachment demarcation is based on a wetness index, computed from accumulated basin precipitation. This allows higher levels in the reservoir when the prevailing hydrology is dry while maintaining adequate flood protection. When the wetness index is high in the basin (i.e., wetness in the watershed above Lake Oroville), the flood management space required is at its greatest amount to provide the necessary flood protection. From April through June, the maximum allowable storage limit is increased as the flooding potential decreases, which allows capture of the higher spring flows for use later in the year. During September, the maximum allowable storage decreases again to prepare for the next flood season. During flood events, actual storage may encroach into the flood reservation zone to prevent or minimize downstream flooding along the Feather River.



## 2.0 NEED FOR STUDY

Construction of Oroville Dam, impoundment of water to form Lake Oroville, and associated facilities of the Project have affected the physical, chemical, and biological characteristics of water in the Feather River. These changes in water quality characteristics may affect beneficial uses of the water.

Prior to issuance of a new license for the Project, FERC will require a water quality certification by the SWRCB or a waiver of such certification. The certification requires a determination by the SWRCB that the Project complies with appropriate requirements of the CVRWQCB Basin Plan, which includes water quality objectives for protection of designated beneficial uses. The CVRWQCB has established surface water quality objectives for a variety of water quality constituents, for which both numerical and narrative standards have been developed. Numerical objectives have been established for parameters which can be measured quantitatively (such as mg/L of a chemical contaminant), while narrative objectives have been established for parameters that may not be readily quantifiable (such as toxicity). Both numerical and narrative objectives are applicable in determining impacts to beneficial uses. Demonstration of compliance with water quality standards and other appropriate requirements is needed in the application for water quality certification. While compliance with numerical objectives will be determined by comparison of data to the numerical value of the objective, compliance with narrative objectives will be determined by comparison of data to other applicable criteria or standards that are recognized as levels protective of beneficial uses. Data obtained from this study will be used to determine compliance with standards, objectives, and criteria for those factors controllable by the Project.

### **3.0 STUDY OBJECTIVE(S)**

The objective of the study is to evaluate the physical, chemical, and biological integrity of water quality in Lake Oroville, its tributaries, the Feather River, Diversion Pool, Thermalito Power Canal, Forebay and Afterbay, and other Project-affected surface waters. Information obtained from the study will be used to determine whether Project-affected waters meet Basin Plan objectives and are protective of beneficial uses designated in the Basin Plan.

## **4.0 METHODOLOGY**

This study evaluates those parameters potentially affected by the Project for which the CVRWQCB has established water quality objectives in the Basin Plan. These parameters include physical constituents (temperature, dissolved oxygen, pH, turbidity, electrical conductivity), chemical constituents (minerals, nutrients, and metals), pesticides and organic contaminants, pathogens (bacteria), biostimulatory substances which promote aquatic growths (phytoplankton, periphyton), toxicity (aquatic macroinvertebrate indicators and toxicity bioassays), sediment, settleable and suspended material, color, floating material, oil and grease, and tastes and odors.

Data obtained from this study is compared to numerical or narrative objectives to determine compliance with the water quality standards for factors controllable by the Project.

### **4.1 STUDY DESIGN**

The study generally relied on monthly collection of data since water quality parameters vary with environmental conditions throughout the year, though some parameters are targeted to specific times of the year due to parameter specific factors. In addition, some parameters were collected to coincide with the first flush following significant fall rains as well as during some subsequent storm events since the higher runoff associated with these events often elevate certain parameters.

### **4.2 HOW AND WHERE THE STUDIES WERE CONDUCTED**

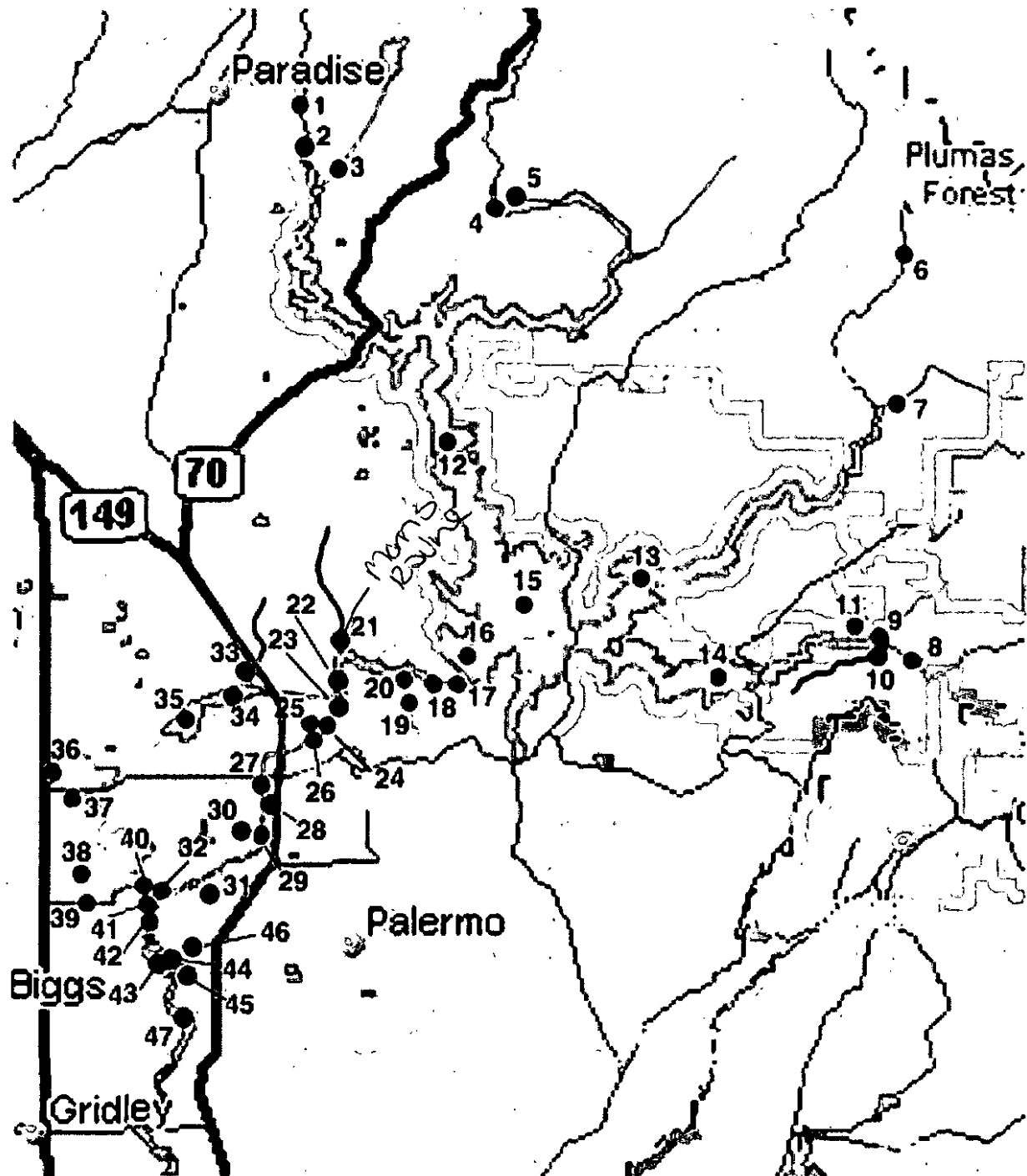
The study was divided into four specific tasks:

- Project effects on surface water;
- Project effects on water quality objectives;
- Project effects on designated beneficial uses; and
- Effects from future Project operations.

#### **4.2.1 Project Effects on Surface Water**

Monitoring was conducted at sites within and adjacent to the study area to assess physical, chemical, and biological water quality characteristics in major inflows, discharges, impounded waters, and ponds, and to assess effects of various land use activities within the Feather River watershed Project area (Figures 4.2.1-1 and 2, Table 4.2.1-1). Monitoring sites were identified in Environmental Workgroup Task Force meetings, which included participation by federal and State agencies and members of the public. Exact monitoring sites were determined in the field during initial sampling. Site coordinates were obtained with hand-held GPS units. Adjacent areas included in the monitoring program are primarily the tributaries entering Lake Oroville and stations on the Feather River downstream to the confluence with the Sacramento River.

Figure 4.2.1-1. Monitoring sites in the Project area.



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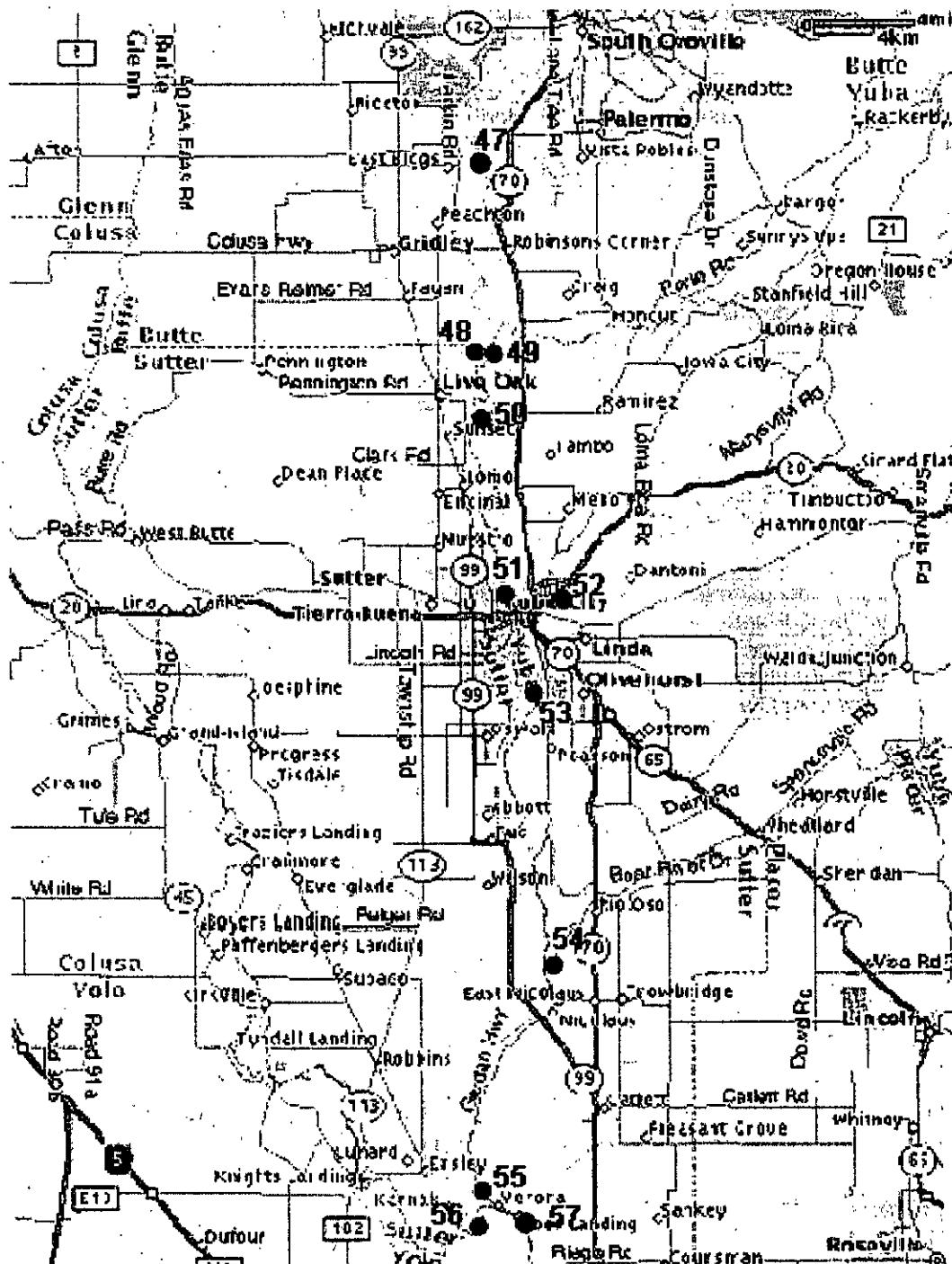
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Oroville Facilities Relicensing Team

September 2004

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Figure 4.2.1-2. Monitoring sites in the lower Feather River.



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**Table 4.2.1-1. Monitoring site number system for maps.**

1. West Branch Feather River near Paradise	30. Robinson Riffle Pond
2. West Branch Feather River upstream from Lake Oroville	31. Upper Pacific Heights Pond
3. Concow Creek at Jordan Hill Road	32. Feather River upstream from Afterbay Outlet
4. North Fork Feather River upstream from Poe Power House	33. North Thermalito Forebay Creek
5. Poe Power House Discharge	34. Thermalito Forebay (north)
6. Middle Fork Feather River near Merrimac	35. Thermalito Forebay (south)
7. Fall River upstream from Feather Falls	36. Western Canal at Afterbay Outlet
8. South Fork Feather River upstream from Ponderosa Reservoir	37. Thermalito Afterbay (north)
9. South Fork Feather River downstream from Ponderosa Reservoir	38. Thermalito Afterbay (south)
10. Miners Ranch Canal	39. Sutter Buttes Canal at Afterbay Outlet
11. Sucker Run near Forbestown	40. Afterbay Outlet Canal to Feather River
12. North Fork Arm Lake Oroville	41. Feather River downstream from Afterbay Outlet
13. Middle Fork Arm Lake Oroville	42. Feather River downstream from SCOR Outlet
14. South Fork Arm Lake Oroville	43. Mile Long Pond
15. Lake Oroville Main Body	44. Feather River near Mile Long Pond
16. Lake Oroville near Dam	45. Lower Pacific Heights Pond
17. Thermalito Diversion Pool upstream from Kelly Ridge PH (US of Power Plant)	46. See's Pond
18. Thermalito Diversion Pool downstream from Kelly Ridge PH (DS of Power Plant)	47. Feather River downstream from Project boundary
19. Glen Creek upstream from Glen Pond	48. Feather River at Singh AB Riviera Rd.
20. Glen Pond	49. Honcut Creek at Pacific Ranch near Palermo
21. Morris Ravine	50. Feather River at Archer Ave (near Live Oak)
22. Thermalito Diversion Pool upstream of Dam	51. Feather River upstream from Yuba River
23. Feather River at Oroville	52. Yuba River at Mouth
24. Feather River upstream from Hatchery	53. Feather River at Shanghai Bend
25. Feather River Hatchery Settling Pond	54. Bear River near Mouth
26. Feather River downstream from Hatchery	55. Feather River near Verona
27. Feather River downstream from Hwy 162	56. Sacramento River upstream from Feather River
28. Oroville Fishing Pond	57. Sacramento River at Verona
29. Feather River at Robinson Riffle	

Monitoring of these tributaries at their confluences with the reservoir establishes a baseline for determining any changes in water quality induced by the Project.

Physical, chemical, and biological components of water quality were assessed in study area waters (Table 4.2.1-2). Some parameters, such as temperature, were obtained with recording instruments, while others (such as inorganic chemistry) were sampled during monthly visits to the monitoring site.

**Table 4.2.1-2. Water quality monitoring schedule for the Oroville Relicensing Project.**

Station	Temperature (a)	Field Parameters (b)	Inorganic Chemistry (c)	Pesticides (d,f)	Coliform bacteria (t)	Phyto- & Zoo- plankton	Periphyton	Macro- Inverte- brates	Aquatic Toxicity
1 West Branch near Paradise	R	m (e)(t)	m (t)	F & W	m(t)		m		o
2 Concow Creek at Jordan Hill Rd	R	m (t)	m (t)	F & W	m(t)		m		o
3 North Fork upstream Poe Power House	R	m (t)	m (t)	F & W	m(t)		m		o
Poe PH discharge		m	m	m	m				o
4 French Creek at Oroville Reservoir	R	m							
5 Middle Fork at Milsap Bar Rd	R	m (t)	m (t)	F & W	m (t)		m		o
6 Fall River u/s Feather Falls	R	m (t)	m (t)	F & W	m (t)		m		o
7 South Fork u/s Ponderosa Res	R	m (t)	m (t)	F & W	m (t)		m		o
8 Sucker Run nr Forbestown	R	m (t)	m (t)	F & W	m (t)		m		o
9 South Fork downstream from dam or Pond. Res. Intake Structure	P	m (t)	m (t)	F & W	m (t)				o
<b>Lake Oroville</b>									
10 North Fork Arm—South?	P	m	m (r)	F & W (l)	m	m			
11 Middle Fork Arm	P	m	m (r)	F & W (l)	m	m			
12 South Fork Arm North?	P	m	m (r)	F & W (l)	m	m			
13 Main Body	P	m	m (r)	F & W (l)	m	m			
14 Dam	P	m	m (s)	F & W (l)	m	m			
<b>Diversion Pool</b>									
15 u/s from Kelly Ridge Power House	P	m	m	F & W (l)	m	m			
16 Kelly Ridge Power House discharge	R								
17 d/s from Kelly Ridge Power House	P	m	m	m	m				m
18 Glen Pond	P	m	m						
19 Glen Creek	R	m	m	F & W	m		m		
20 Diversion Pool nr Div. Dam Fish Barrier Pool	P	m	m (r)	F & W (l)	m	m			
<b>Feather River in Project Boundary</b>									
21 nr Fish Barrier Dam	Ru	m (g,t,u)	m (g,t)	F & W	m (t)		m (g)		m
22 u/s from Hatchery	Ru	m (g,u)	m (g)		m		m (g)		
Hatchery Pond (downstream pond)	R	m	m		m				m
23 d/s from Hatchery	Ru	m (g,t,u)	m (g,t)	F & W	m (t)		m (g)		m
24 d/s from Hwy 162 bridge	Ru	m (g,u)	m (g)		m		m (g)		
25 Robinson Riffle	Ru	m (g,u)	m (g)		m		m (g)		
26 u/s from Afterbay Outlet	Ru	m (g,t,u)	m (g,t)	F & W	m (t)		m (g)		m
27 pool at Afterbay Outlet	u	u							
28 d/s from Afterbay Outlet	Ru	m (g,t,u)	m (g,t)	F & W	m (t)		m (g)		m
29 d/s from SCOR Outlet (q)	R	m (g,t)	m (g,t)	F & W	m (t)		m (g)		m
30 nr Mile Long Pong	Ru	m (g,t,u)	m (g,t)	F & W	m (t)		m (g)		
31 d/s from Project boundary	Ru	m(t,g,u)	m(g,t)	F & W	m (t)		m		m
32 nr Gridley	u	u							
33 Oroville Wildlife Area ponds (Fishing, Robinson Riffle, Mile Long, Upper and Lower Pacific Heights ponds)	P	m	m	F & W (l)	m	m			m (Fishing, Mile Long, Lower Pacific Heights)

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Table 4.2.1-2. Continued.

Station	Temperature (a)	Field Parameters (b)	Inorganic Chemistry (c)	Pesticides (d,f)	Coliform bacteria (t)	Phyto- & Zoo- plankton	Periphyton	Macro- Inverte- brates	Aquatic Toxicity
<b>Thermalito Complex</b>									
34 Outlet to Feather River	R	m	m	F & W (l)	m				m
35 Sutter Buttes Canal	R	m							
36 South Afterbay	P	m	m (r)	F & W (l)	m	m			
37 North Afterbay	P	m	m (r)	F & W (l)	m	m			
38 Western Canal	R	m							
39 South Forebay	P	m	m (r)	F & W (l)	m	m			
40 N Forebay Swim area creek	m	m	m		m				
41 North Forebay	P	m	m (r)	F & W (l)	m	m			
<b>Feather River Downstream from Project Boundary</b>									
42 FR A Singh AB Riviera Rd (u/s from Honcut Creek)	Rg,u	m(t,g,u)	m(t)	F & W	m (t)		m		
43 Honcut Creek	R	m(t)	m(t)	F & W	m (t)		m		
44 FR A Archer Ave (nr Live Oak)	Ru	m(t,u)	m(t)	F & W	m (t)		m		
45 u/s from Yuba River	Ru	m(t,u)	m(t)	F & W	m (t)		m		
46 Yuba River	R	m(t)	m(t)	F & W	m (t)				
47 at Shanghai Bend	Ru	m(t,u)	m(t)	F & W	m (t)				
48 at Star Bend	u	u							
49 Bear River	R	m(t)	m(t)	F & W	m (t)				
50 nr Nicolaus	u	u							
51 nr Verona	Ru	m(t,u)	m(t)	F & W	m (t)				
52 Sacramento R ab FR	R	m(t)	m(t)	F & W	m (t)				

- a. R = recorder, P = profile; from study plan SPW6
- b. includes dissolved oxygen, conductivity, pH, turbidity
- c. minerals (calcium, sodium, potassium, magnesium, sulfate, chloride, boron, and alkalinity), nutrients (nitrate plus nitrite, total and dissolved ammonia, dissolved orthophosphate, and total phosphorus), total and dissolved metals (aluminum arsenic, cadmium, chromium, copper, iron, lead, manganese, nickel, selenium, and zinc), total recoverable mercury, total methyl mercury, total and dissolved solids, total hardness, settleable and suspended materials (solids), color, floating material, oil and grease, taste and odor, and total and dissolved organic carbon
- d. includes chlorinated organic pesticides, organic phosphorus pesticides, chlorinated phenoxy acid herbicides, volatile organic pesticides, carbamate pesticides, and glyphosate.
- e. m = monthly measurement or sample collection
- f. F = fall (after significant runoff), W = winter (after dormant spray season)
- g. nutrients, field parameters, and periphyton at two week intervals from September through December
- i. surface samples
- l. benthic macroinvertebrate samples collected in September 2002
- o. seasonal analysis of toxicity (July, September, first flush, February, April/May)
- p. spring (April/May) and summer (July) toxicity analyses
- q. Sewerage Commission Oroville Region discharge 1/4 mile downstream from Afterbay Outlet
- r. surface and bottom samples
- s. surface, intake structure withdrawal elevation, and bottom
- t. additional samples during four storm events
- u. temperature and dissolved oxygen biweekly from May through October and monthly from November through April.



#### **4.2.1.1 Water Temperature**

Water temperatures in the study area was assessed since this parameter controls the rate of chemical and biological processes, and is important in determining suitability of Project waters for survival and reproduction of aquatic organisms, including anadromous fish. These data are also necessary for development of a temperature model in other study plans. This information was collected in Study Plan SPW6.

#### **4.2.1.2 Field Parameters**

Basic water quality parameters, including temperature, dissolved oxygen, conductivity, pH, and turbidity, were measured with calibrated field instrumentation at each visit to every monitoring station. Stream samples or measurements were collected about one foot below the surface in flowing, well-mixed riffle or run areas. Dissolved oxygen was measured in streams by titration (azide modification of the iodometric method). Basic water quality parameters were measured in lentic waters (lakes and ponds) from the surface to the bottom at meter intervals when differences in individual parameters were observed between successive depths, and at three to five meter intervals when there were no differences in successive values. Temperature and dissolved oxygen in lentic waters were measured at intervals using meters and membrane electrode probes calibrated at the surface using the iodometric method. Conductivity and pH were measured with meters and probes in samples collected at intervals with a van Dorn water bottle. Turbidity was measured with a nephelometer from samples collected using the van Dorn water bottle.

Dissolved oxygen was also measured in pools near the sampling stations downstream from the Fish Barrier Dam to the mouth of the Feather River. Dissolved oxygen (and temperature in conjunction with SPW6) profiles were measured at half-meter intervals from the surface to the bottom of pools with meters and probes every other week from May through October, and monthly from November through April.

#### **4.2.1.3 Inorganic Chemistry**

Water inorganic chemistry was assessed since these parameters influence beneficial uses of water and may become elevated due to contamination, which often results in deleterious effects to aquatic life and other beneficial uses. Limnological processes in Project water bodies may alter the chemical state of some parameters, and include potential release of soluble metals from bottom sediments and methylation of mercury due to warmer water and organic content in the Thermalito Afterbay. Water samples were collected monthly for chemical analyses at the monitoring stations.

Inorganic chemical analyses include minerals (calcium, sodium, potassium, magnesium, sulfate, chloride, boron, and alkalinity), nutrients (nitrate plus nitrite, ammonia, dissolved orthophosphate, and total phosphorus), metals (aluminum arsenic, cadmium, chromium,

copper, iron, lead, manganese, mercury, nickel, selenium, and zinc), and total and dissolved organic carbon. For all metals except mercury, samples were collected for both total recoverable and dissolved metals. Mercury analyses include both total recoverable and total methyl fractions. Total and suspended solids and hardness was also analyzed from samples collected at each site.

Samples for chemical analyses from streams were collected by wading into the channel and dipping sample containers to a depth of approximately one foot into the well-mixed channel flow. Mineral and nutrient samples were collected into clean polyethylene containers. Samples for trace metals analyses at water quality criteria levels were collected into polyethylene or glass bottles according to U.S. EPA Method 1669 (USEPA 1996). Samples for mineral, nutrient, and metal analyses from lakes and ponds were collected from the surface by dipping an inverted container to approximately 0.5 meters below the surface. Water samples at greater depths were collected with a van Dorn water bottle for minerals and nutrients and Teflon bomb or Kemmerer style bottles for trace metals. Samples were collected from near the surface and bottom of lakes and ponds during periods of stratification or when differences in field parameters occurred between the surface and bottom, but only at mid-depth during those portions of the year when field parameters indicated uniform conditions throughout the water column in the shallower water bodies, such as Oroville Wildlife Area ponds.

Chemical analyses of minerals, nutrients, and metals were performed at the DWR Bryte Chemical Laboratory in West Sacramento using U.S. EPA approved techniques, equipment, and methods (Appendix 1).

#### **4.2.1.4 Pesticides**

A variety of pesticides may be used within the Feather River watershed that may affect the aquatic resources. Silviculture and agriculture pesticide uses are well regulated, but some application practices still contribute to pesticide contamination in streams and lakes. A significant source of pesticides in many areas has been identified as runoff from urbanized areas. Urban use of readily available household pesticides is unregulated and significantly more pesticides may be applied by homeowners than are applied for similar products by the regulated community.

Water samples were collected from the monitoring stations in the fall after rains produced the first significant runoff and again during February or March. Samples were analyzed at the Bryte Chemical Laboratory for chlorinated organic pesticides, organic phosphorus pesticides, chlorinated phenoxy acid herbicides, volatile organic pesticides, carbamate pesticides, and glyphosate.

#### **4.2.1.5 Pathogens**

Fecal coliform bacteria in aquatic ecosystems are indicative of fecal contamination. Though these bacteria generally do not pose adverse risks, their presence indicates the possible presence of far more serious microorganisms which may impact human health and potential nutrient loading that may adversely affect the aquatic environment.

Bacteria levels were screened monthly at the monitoring stations using membrane filter procedures for both fecal and total coliform bacteria. In addition, a focused coliform bacteria sampling program was conducted. Selective stations at intensively used recreation areas, such as the North Forebay Recreation Area, were monitored during a major holiday event according to requirements in the Basin Plan (i.e., not less than five samples for any 30-day period). This list of coliform sampling stations was developed in consultation with SWRCB staff and other members of the Environmental Work Group.

#### **4.2.1.6 Phytoplankton and Zooplankton**

Phytoplankton form the basis of the food web in lakes and reservoirs, and respond to nutrient enrichment by increasing in numbers of organisms as well as type of organism dominance. Zooplankton subsequently graze on phytoplankton, and may exhibit changes in populations due to nutrient enrichment or contamination. Populations of these organisms vary throughout the year in response to environmental variables.

Both phytoplankton and zooplankton were sampled from impounded Project waters. Phytoplankton and zooplankton were sampled with a plankton net towed from 30 feet in depth to the surface in Lake Oroville, and from the bottom in the other shallower impounded waters. Samples were collected during monthly visits to the monitoring stations. Analyses of phytoplankton include identification and enumeration, while zooplankton analyses include identification, enumeration, and volumetric measurement.

#### **4.2.1.7 Periphyton**

Periphyton are attached algae in streams that contribute to the basis of the food web along with organic input (e.g., leaves) from terrestrial sources. As with phytoplankton, periphyton also respond to nutrient enrichment by changes in types and abundance of species. However, direct measurements of nutrients in the water column can of limited value in determining changes, if any, in type or abundance within the periphyton community (Robertson 1999). Even when available nutrients are low in the water column, nutrients for periphyton growth are stored in stream sediments and enter the system from external sources. Nitrogen and phosphorus are considered the primary limiting factors to algae in stream systems (Wold and Hershey 1999). However, while algal growth bioassays indicate that nitrogen and phosphorus can be the primary limiting factors in algal growth, there is no direct evidence that these nutrients perform the same way under natural conditions (Baker *et al.* 2000, Robertson 1999, Winterbourn

1990). In addition, many algal growth bioassays, which are essentially nutrient enrichment experiments, yield mixed results with little or no significant change in algal biomass despite the added nutrients (Tank and Dodds 2003).

Periphyton were sampled monthly from riffle substrates in streams. A cylindrical sampler was used to enclose the periphyton, which was then brushed from the substrate and aspirated into collection jars. Ten samples from each site were composited. Analyses of the periphyton included species identification and counts.

#### **4.2.1.8 Aquatic Macroinvertebrates**

Aquatic macroinvertebrates form the basis of the aquatic food web and are excellent indicators of long-term water quality conditions since specific communities develop in response to specific stream conditions and perturbations. The Department of Fish and Game modification (California Stream Bioassessment Procedure) of the U.S. Environmental Protection Agency (USEPA) rapid bioassessment method (USEPA 1989) was used to assess aquatic macroinvertebrate communities.

Decreasing reservoir levels during the summer results in exposure of former stream channels that may become habitat for fish and other aquatic organisms. Riffle areas in these types of habitats in the major tributaries to Lake Oroville were sampled in September of 2002 to determine the benthic community structure. Organisms were collected using a kick screen and metal frame delineating a two square foot sampling area. Three transects were established across each monitoring site. Three samples were collected along each transect and combined into one sample, resulting in three samples per monitoring site. Organisms were removed from samples using the DFG rapid bioassessment method protocols, identified at the DFG laboratory at California State University, Chico to the lowest practical taxon (generally genus), and enumerated. The areas were again sampled during the spring when the riffles were inundated to evaluate changes in aquatic macroinvertebrate composition. Spring samples were collected with an Ekman dredge.

Habitat conditions downstream from major dams generally result in significant changes to macroinvertebrate community structure and function due to altered temperature, flow, food, and substrate regimes. Aquatic macroinvertebrates were assessed at the monitoring stations in the Feather River upstream from Lake Oroville and downstream from the Fish Barrier Dam during September of 2002 to determine effects from Oroville Dam on community structure and function. Organisms were collected from riffle substrate areas using a kick screen and metal frame delineating a two square foot sampling area. Three transects were established across each monitoring site. Three samples were collected along each transect and combined into one sample, resulting in three samples per monitoring station. Organisms were removed from samples following the DFG rapid bioassessment method protocols, identified to the lowest practical taxon (generally genus), and enumerated at the DFG laboratory at CSU, Chico.

Aquatic macroinvertebrates were sampled in four ponds in the Oroville Wildlife Area using an Ekman dredge. Ten dredged samples were collected from areas within a pond and composited. Samples were processed using procedures similar to those for samples collected from the Feather River.

#### **4.2.1.9 Stream Sediments**

Sedimentation is a major impairment in many streams, including those upstream from Lake Oroville. Fine sediments in gravels adversely affect salmonid reproduction and survival of aquatic macroinvertebrates and other organisms that are important as food for fish.

Stream gravels from riffle areas were analyzed for laboratory determination of particle size distribution in study plan SPG2, Task 2.

#### **4.2.1.10 Aquatic Toxicity**

The direct measurement of toxicity of stream water to aquatic organisms may be indicative of the ability of the stream to support aquatic life. The Basin Plan has an objective that "all waters shall be maintained free of toxic substances in concentrations that produce detrimental physiological responses ... in aquatic life." The Basin Plan stipulates that "compliance with this objective shall be determined by ... biotoxicity tests." Water column toxicity assessment was used to identify direct impacts to fish and zooplankton from toxic substances that may be either dissolved or suspended in the water column.

Water column toxicity testing used *Ceriodaphnia* and the fathead minnow. Toxicity tests measured survival and growth for the minnow, and reproduction and survival of *Ceriodaphnia* over a seven-day test period (USEPA 1994). Water samples were analyzed during the high temperature months of July and September, following the first flush in the fall, following winter dormant spraying in February, and again during the high runoff period in April or May in tributaries to Lake Oroville. Samples were analyzed monthly for toxicity analyses from the monitoring sites downstream from the Fish Barrier Dam to Honcut Creek. Identification of the causative agent for toxicity was attempted through toxicity identification evaluation (TIE) procedures for some sites displaying frequent toxicity. Several Oroville Wildlife Area ponds were sampled in the spring and again in mid-summer. Toxicity tests were conducted at the Pacific EcoRisk Laboratory.

#### **4.2.1.11 Settleable and Suspended Material**

Settleable and suspended materials in water may affect the beneficial uses of water and impart an aesthetically unpleasant appearance. Suspended materials may interfere with respiration of fish and other aquatic organisms, while settleable materials may smother eggs of fish and benthic organisms.

Water samples were collected for settleable and suspended materials analyses during monthly visits to the sites designated for inorganic chemistry analyses. Settleable materials were determined by settling the water sample in an Imhoff cone, while suspended material was determined by filtration.

#### **4.2.1.12 Color**

Color is defined as either true or apparent color. True color in water may result from the presence of metallic ions, humus and peat materials, plankton, weeds, and industrial wastes in solution, while apparent color includes the effects from turbidity caused by suspended materials.

Water samples were collected for color analyses during monthly visits to the sites designated for inorganic chemistry analyses. Color was determined by first filtering samples to remove apparent color and then comparing the filtered samples against calibrated glass disks (colorimetry).

#### **4.2.1.13 Floating Material and Oil and Grease**

The Basin Plan stipulates that floating material shall not be present in amounts that cause nuisance or adversely affect beneficial uses, and that oil, grease, waxes, or other materials shall not be present in concentrations that cause nuisance, result in a visible film or coating on the surface of the water or on objects in the water, or otherwise adversely affect beneficial uses.

Floating materials and oil and grease were determined through visual observation during each visit to each monitoring site. Floating materials, if present, were to be estimated as a percent cover of the water. If oil, grease, or related compounds were sighted, water samples were to be collected for laboratory determination of the type of compound.

#### **4.2.1.14 Tastes and Odors**

The Basin Plan states that water shall not contain taste or odor producing substances in concentrations that impart undesirable tastes or odors to domestic or municipal water supplies or to fish flesh or other edible products of aquatic origin, or that cause nuisance or otherwise adversely affect beneficial uses. Sampling water for taste requires that a sample be taken into the mouth for sensory analysis. However, raw water is not safe for taste testing due to the potential presence of bacteria, viruses, hazardous chemicals, and other factors. Therefore, water from the Project area was not subjected to taste tests.

Water can be analyzed for odor simply by smelling a sample. At least two individuals smelled water samples from each site visit to determine the presence of odors. The

samplers described the type of any odor detected to attempt determination of the causative agent.

#### **4.2.1.15 Other Factors Affecting Water Quality**

An issue that has been raised is the effect of the unnatural concentration of carcasses from over 100,000 salmon that spawn each year in the low flow section of the Feather River. Following spawning, the salmon die and begin decomposition. The decomposition process provides food for scavenger macroinvertebrates, bacteria, and other animals. Decomposition releases nutrients that may be used by periphyton and higher plants, but also may decrease oxygen levels in the water and contribute ammonia which is toxic to aquatic life, including fish eggs and fry, in sufficiently high concentration. Reduced oxygen and elevated ammonia levels may contribute to the low egg survival identified in the IIP in the upper river. Additional nutrient and periphyton monitoring was conducted from September through December at the monitoring sites within the Project boundary downstream from the Fish Barrier Dam to determine effects from decomposing salmon carcasses. Dissolved oxygen levels, as well as temperature, conductivity, and pH, in the water and within the gravels were measured with field instruments at several of these sites.

Additional nutrients and other waste treatment byproducts are discharged to the Feather River a quarter mile downstream from the Afterbay Outlet by the Sewerage Commission Oroville Region (SCOR), which treats sewage from the Oroville area. Monitoring of nutrients, dissolved oxygen, temperature, conductivity, and pH in the water and within the gravels was conducted at monthly intervals in the Feather River upstream and downstream from the SCOR discharge.

#### **4.2.2 Project Effects on Water Quality Objectives**

Water quality data collected for this study was evaluated for compliance to applicable criteria and objectives for protection of beneficial uses, most of which have been summarized by the CVRWQCB (CVRWQCB 2000). The CVRWQCB has established numerical objectives for parameters that can be measured quantitatively (such as mg/L of a chemical contaminant) and narrative objectives for parameters that are not readily quantifiable. Both numerical and narrative objectives are applicable in determining impacts to beneficial uses. The criteria and objectives used for evaluating the data include:

- numerical and narrative objectives identified in the CVRWQCB Basin Plan;
- criteria of the U.S. EPA California Toxics Rule (USEPA 2000a);
- criteria of the National Recommended Water Quality Criteria (USEPA 1999);
- criteria of the nutrient criteria guidance documents (USEPA 2000b and c, 2001);
- drinking water standards and health advisories (USEPA 2000d);
- drinking water criteria (DHS 2004);
- agriculture water quality (Ayers and Westcott 1985);

- draft bacterial limits guidelines (DHS 2001); and
- contaminant action levels established by the California Office of Environmental Health Hazard Assessment.

#### **4.2.3 Project Effects on Designated Beneficial Uses**

Information for analysis of Project effects on designated beneficial uses was obtained from the analysis of Project effects on water quality objectives (Section 4.2.2). Compliance with numerical and narrative water quality objectives were evaluated to determine Project effects to designated beneficial uses. Designated beneficial uses potentially affected by parameters that do not meet water quality objectives were identified in this study.

#### **4.2.4 Effects from Future Project Operations**

As future operations of the Project are identified that differ from those currently experienced, potential effects to water quality and beneficial uses from those operations will be evaluated in this study.



## **5.0 STUDY RESULTS**

This section presents the results of water quality monitoring conducted during this study. Data obtained during the study are compared to applicable criteria and standards.

### **5.1 PROJECT EFFECTS ON SURFACE WATER**

The Basin Plan provides objectives for a variety of physical, chemical, and biological attributes that contribute to surface water quality. Objectives are provided for bacteria, biostimulatory substances, chemical constituents, color, dissolved oxygen, floating material, oil and grease, pH, pesticides, radioactivity, salinity, sediment, settleable material, suspended material, tastes and odors, temperature, toxicity, and turbidity. The Environmental Workgroup approved a study plan to evaluate these objectives (with the exception of radioactivity) for the Oroville Facilities.

#### **5.1.1 Water Temperature**

Operation of the Oroville Facilities affects water temperatures in the Feather River. Concern has been expressed at public meetings for Project operation effects on temperature needs for fisheries, agriculture, and other beneficial uses; depletion of the cold water pool; effects from pump back; and effects of the hatchery in controlling temperatures in the Feather River. FERC will require a water quality certification by the SWRCB, which in turn must determine that the Project complies with appropriate requirements of the CVRWQCB Basin Plan, including objectives for temperature.

Water temperatures were monitored under study plan SPW6 and are discussed in the detailed report for that study (DWR 2004a). The report is summarized in this section. The objectives of SPW6 were to evaluate effects of Project facilities and operations on the temperature regime of Project waters and waters affected by the Project, and the ability of the Project to meet the temperature requirements for protection of beneficial uses, including agriculture, fish, and other aquatic resources. Information obtained from the study was used to determine the ability of the Project to meet water temperature requirements, and the need for Project modification or mitigation for impacts to water temperature from Project operations. Water temperature data collected for that study provides information for assessing current baseline conditions of the Project. The data are also used to verify temperature models, and can be use to evaluate proposed Project operation changes.

Water temperatures downstream from Oroville Dam are largely controlled by temperature requirements at the Feather River Fish Hatchery. Water is released from Oroville Dam to meet the hatchery temperature requirements, as well as those of NOAA Fisheries at Robinson's Riffle, while also conserving the cold water pool in Lake Oroville. Water is released from Lake Oroville that is as close as possible to the

maximum temperature allowable under the 1983 agreement with DFG to accommodate temperature requirements, as much as possible, for irrigation. However, due to conflicting temperature requirements for fisheries, it is not always possible to provide the temperatures desired by rice farmers.

During dryer years when reservoir levels are low, the cold water pool is diminished. In critically dry years, the cold water pool could be exhausted, resulting in water that is warmer than desired for the most critical needs (e.g., salmonid egg incubation). Deliveries from the reservoir are governed by the water year type. In dryer years, deliveries to water contractors are reduced so that carryover storage is increased and water may be conserved for critical in-stream needs.

Water released for power generation may be pumped back into the reservoir for re-use. While pump back operations can draw water that has warmed in the Thermalito Forebay or Afterbay back into the Diversion Pool and Lake Oroville, these activities are carefully monitored to insure that no adverse effects occur to other beneficial uses. Water temperatures at the hatchery, which receives water diverted from the Diversion Pool, are monitored during pump back. Pump back is curtailed if water temperatures approach the limits of hatchery requirements. No effects from pump back to water column temperatures in the reservoir could be determined.

### **5.1.2 Field Parameters**

Criteria and objectives used to evaluate measured physical parameters were taken from the Recommended Numerical Limits to Translate Water Quality Objectives (CVRWQCB 2004), USEPA Ambient Water Quality Criteria Recommendations for both rivers and streams in Ecoregion I (USEPA 2001) and lakes and reservoirs in nutrient Ecoregion II (USEPA 2000c), and Basin Plan (CVRWQCB 1998).

#### ***5.1.2.1 Upstream from Lake Oroville***

Dissolved oxygen and pH levels all fall within the appropriate criteria for the monitoring stations within the upper Feather River watershed (Appendix 2a).

Conductivity results met all appropriate criteria, with the exception of the Middle Fork of the Feather River near Merrimac monitoring station. Conductivity results from this station exceed the Basin Plan objective for the Feather River (150  $\mu$ mhos/cm) on six occasions. These high values, which occurred from August through October of 2002 and 2003, most likely were the result of the lower flows in the channel during these months.

Alkalinity results from the monitoring stations within the upper watershed did not meet the USEPA National Ambient Water Quality Criteria for aquatic life in only 13 of the 233 collected samples. However, this criterion is set as a four day average, while samples

from this study were collected once per month. Data collected throughout this study suggests that the alkalinity levels within the upper Feather River watershed are consistently high and meet the criterion.

Turbidity results from tributaries upstream from Lake Oroville exceed the primary and secondary Maximum Contaminant Level (MCL) and aquatic life criteria on numerous occasions. During the two years of monitoring, the maximum number of samples from any station that were found to exceed criteria was only six, which occurred in the South Fork at the Miners Ranch Canal monitoring station. The high turbidity results directly correspond with storm events.

#### **5.1.2.2 Lake Oroville**

Most of the dissolved oxygen and all of the pH levels that were measured at the monitoring stations on Lake Oroville fall within the appropriate criteria (Appendix 2b). Dissolved oxygen results fall below the Basin Plan objective a few times at each station near the bottom of the water column.

Alkalinity results from the monitoring stations on Lake Oroville did not meet the minimum USEPA National Ambient Water Quality Criterion for aquatic life in only 2 of the 131 collected samples. However this criterion is set as a four day average, while samples from this study were collected once a month. Data collected throughout this study suggests that the alkalinity levels within the upper Feather River watershed and Lake Oroville are consistently high and, therefore, generally meet the minimum criterion.

Turbidity results from Lake Oroville were exceeded a maximum of two times for the North, Middle, and South fork arms of the lake. The Lake Oroville Main Body and Dam stations had no samples which exceeded any turbidity criteria.

#### **5.1.2.3 Downstream from Oroville Dam**

Several dissolved oxygen measurements fell below the Basin Plan minimum objective (8.0 mg/L) for the Feather River from the Fish Barrier Dam to Verona for the critical salmonid period from September 1 through May 31 (Appendix 2c). Low dissolved oxygen levels found in the Feather River were 5.4 mg/L on October 27, 2003 downstream from the hatchery, 7.6 and 6.5 mg/L, respectively, on December 17, 2002 at Robinson Riffle and downstream from the Project boundary, and 6.8 mg/L on December 11, 2002 at Singh above Riviera Road. All remaining dissolved oxygen measurements for the Feather River met the minimum Basin Plan objective.

All stations met pH criteria with one exception. The Afterbay Outlet Canal to the Feather River had a measured pH of 6.3 on December 11, 2002, which failed to meet the secondary MCL and Basin Plan objective (6.5 to 8.5), agricultural goal (6.5 to 8.4), and the National Ambient Water Quality Criteria for protection of aquatic life (6.5 to 9.0).

Measured conductivity met the criterion (150  $\mu\text{mhos/cm}$ ) for all stations downstream from Oroville Dam, except on three occasions. The Feather River at Oroville (194  $\mu\text{mhos/cm}$ ) exceeded the Basin Plan objective for the Feather River during high storm flows on February 3, 2004. The Feather River Hatchery Settling Pond (398  $\mu\text{mhos/cm}$ ) and Feather River downstream from the hatchery (151  $\mu\text{mhos/cm}$ ) exceeded the objective on July 8, 2003.

All samples collected downstream from Oroville Dam met the minimum USEPA National Water Quality criterion for alkalinity (20 mg/L), which is for a four day average. All alkalinity samples for this study were collected as grab samples once per month.

Numerous samples from all monitoring locations downstream from Oroville Dam exceeded turbidity criteria. Samples from the Thermalito Complex were not compared to USEPA Recommended Ecoregion Criteria since these are currently under development for the Central Valley. Most turbidity exceedances in waters from Oroville Dam to the Feather River upstream from the Yuba River occurred during high flows from storms. Approximately half of the Feather River at Shanghai Bend and near Verona and Honcut Creek samples failed to meet turbidity objectives. The Bear River and Sacramento River stations exceeded criteria in all but one sample each.

### **5.1.3 Inorganic Chemistry**

Analyses for inorganic chemistry included nutrients, minerals, and metals.

#### **5.1.3.1 Nutrients**

Nutrient results were evaluated using criteria and objectives from the Recommended Numerical Limits to Translate Water Quality Objectives (CVRWQCB 2004), USEPA Ambient Water Quality Criteria Recommendations for rivers and streams in Ecoregion I (USEPA 2001) and lakes and reservoirs in nutrient Ecoregion II (USEPA 2000c), and Basin Plan (CVRWQCB 1998). Ecoregion I criteria apply to waters downstream from Oroville Dam, while Ecoregion II criteria apply to waters upstream from Oroville Dam. Ecoregion I criteria for lakes and reservoirs are under development and, therefore, not included in this analysis of ponds within the Oroville Wildlife Area or the Thermalito Complex.

**Upstream from Lake Oroville** — All nutrient recommendations and criteria have been met in the upper Feather River watershed, except the USEPA (2001) recommendations for total phosphorus (Appendix 3a1). The USEPA recommends that, in Ecoregion II, total phosphorus levels should not exceed 0.010 mg/L. This recommendation was exceeded numerous times at all stations. The South Fork watershed contained the fewest number of samples exceeding this criterion, while the Fall River station contained the most samples exceeding this criterion.

**Lake Oroville** — All nutrient recommendations and criteria have been met for Lake Oroville except the recommendations for total phosphorus (USEPA 2000c). The USEPA recommends that total phosphorus levels not exceed 0.00875 mg/L for lakes and reservoirs in Ecoregion II. This recommendation has been exceeded numerous times at all sampling sites (Appendix 3a2).

**Downstream from Oroville Dam** — All nutrient criteria, except for total phosphorus, were met for the Feather River and its tributaries, Thermalito Complex, and Oroville Wildlife Area ponds (Appendix 3a3). The USEPA recommends that total phosphorus levels not exceed 0.047 mg/L for streams in Ecoregion I. Monitoring locations downstream from the Fish Barrier Dam exceeded this objective occasionally at most locations. Several sites, including the Hatchery Settling Pond, Feather River downstream from the Hatchery, and Honcut Creek, exceeded the goal in approximately half of the sampling events, while the North Forebay Creek and Bear and Sacramento River locations exceeded the recommended total phosphorus objective in nearly all samples.

#### **5.1.3.2 Minerals**

Criteria used to evaluate mineral results were taken from the Recommended Numerical Limits to Translate Water Quality Objectives (CVRWQCB 2004), USEPA Ambient Water Quality Criteria Recommendations for rivers and streams in Ecoregion I (USEPA, 2001) and lakes and reservoirs in nutrient Ecoregion II (USEPA 2000c), and Basin Plan (CVRWQCB 1998). Ecoregion I criteria for lakes and reservoirs are under development and, therefore, were not included in analysis of ponds within the Oroville Wildlife Area or the Thermalito Complex.

**Upstream from Lake Oroville** — All mineral recommendations and criteria were met in the Upper Feather River watershed (Appendix 3b1). At all monitoring stations, no existing or proposed criteria were exceeded.

**Lake Oroville** — All mineral recommendations and criteria were met for Lake Oroville (Appendix 3b2). At all monitoring stations, no existing or proposed criteria were exceeded.

**Downstream from Oroville Dam** — All mineral recommendations and criteria were met in the Feather River downstream from Oroville Dam and its tributaries, Thermalito Complex, and ponds, except for the Feather River Hatchery Settling Pond sample collected on July 8, 2003 (Appendix 3b3). For this sample, the dissolved sodium level (81 mg/L) exceeded the criteria for water quality for agriculture (69 mg/L), USEPA drinking water advisory taste and odor threshold (30 to 60 mg/L), and USEPA drinking water advisory level (20 mg/L). The dissolved chloride level in the pond (132 mg/L),

while it did not exceed any criteria, was also much higher than was detected in any samples collected during the study.

According to hatchery records, two raceways at the Hatchery were treated with salt on the afternoon of July 7, 2003 (Anna Kastner, pers. comm.). All raceway water eventually flows to the settling ponds. Other salt related parameters (i.e., conductivity, total dissolved solids, and dissolved chloride) also showed marked increases on July 8, 2003. In addition, the same parameters also spiked in the samples collected on July 8 at the Feather River downstream from the hatchery, with dissolved sodium and chloride levels of 13 and 22 mg/L, respectively. While these levels did not exceed any criteria, they were a major increase over levels routinely found at this location and show connectivity between the settling pond and the Feather River. Dissolved sodium and chloride results for the Feather River upstream from the hatchery on July 8 were 3 and less than 1 mg/L, respectively, which indicates that the source of the increased levels of dissolved ions in the river downstream from the hatchery was the settling pond.

Hatchery staff advises that a larger quantity of salt was also applied to a larger number of raceways at the hatchery on June 17, 2003. Water samples collected from the Hatchery Settling Pond, as well as from the Feather River upstream and downstream from the hatchery, that same day yielding dissolved sodium levels of 3 mg/L at all three locations and dissolved chloride levels of less than 1 mg/L upstream from the hatchery and 1 mg/L in the settling pond and downstream from hatchery. Though salt was applied to the raceways the same day that water sampling occurred, the salt was undoubtedly applied after samples were collected since not even the settling pond had elevated levels of salt ions.

### **5.1.3.3 Metals**

Metals results were evaluated using criteria from the Recommended Numerical Limits to Translate Water Quality Objectives (CVRWQCB 2004), which summarizes criteria recommended to evaluate water quality objectives. The CVRWQCB listed California Toxic Rule (CTR) criteria for both total and dissolved metals, though the CTR only applies to the dissolved fractions. The CVRWQCB reasoned that since criteria for dissolved fractions were calculated from previous criteria for total recoverable fractions, the total recoverable fraction concentrations from which the dissolved criteria were calculated could be used to evaluate total recoverable concentrations in water samples.

**Upstream from Lake Oroville** — Several metals exceeded various criteria consistently during the study period (Appendix 3c1). Total recoverable arsenic exceeded the Cal/EPA cancer potency factor for drinking water (0.023 µg/L), as well as the USEPA NAWQC (0.018 µg/L), in all samples collected. Chromium, methyl mercury, selenium, silver, and zinc levels did not exceed any criteria in any samples.

Total recoverable aluminum occasionally exceeded the USEPA NAWQC criteria for protection of aquatic life, public health goal, primary and secondary MCLs, and agricultural goal. These elevated levels were usually associated with storm flows in the upper Feather River watershed. The greatest number of exceedances occurred at the Sucker Run Creek near Forbestown monitoring station. The public health goal and the primary MCL was exceeded twice, while the secondary MCL and USEPA NAWQC criteria were exceeded 4 and 11 times, respectively.

Total recoverable cadmium exceeded the Cal/EPA public health goal (0.07 µg/L) only once at the Poe Powerhouse discharge monitoring station. The elevated concentration of cadmium occurred on February 18, 2004 during high flows from storm runoff. The CTR for protection of aquatic life criteria for cadmium vary depending on total hardness of the sample water. No stations exceeded the criteria.

The CTR for protection of aquatic life criteria for copper are also hardness dependent. The West Branch Feather River near Paradise, North Fork Feather River upstream of Poe Power House, Poe Power House discharge, South Fork Feather River upstream of Ponderosa Reservoir, and South Fork Feather River downstream from Ponderosa Reservoir occasionally exceeded the CTR copper criteria. These exceedances were related to high flows from storm runoff.

Total iron criteria applicable to the study area include the secondary MCL (300 µg/L), agricultural goal (5,000 µg/L), and NAWQC criteria (1,000 µg/L). Most stations within the upper Feather River watershed rarely exceeded the secondary MCL and only exceeded the agricultural goal once at the Poe Power House discharge monitoring station.

The total mercury CTR level for humans (0.05 µg/L) was exceeded in one Sucker Run Creek near Forbestown sample collected on December 16, 2002 with a level of 0.183 µg/L. This sample was collected during a storm event with high flow from storm runoff. All of the other samples from this site, as well as the rest of the sites, were well below the criterion.

For total manganese, the California DHS action level for drinking water (500 µg/L), secondary MCL (50 µg/L), and agricultural goal (200 µg/L) apply. The secondary MCL was exceeded once at all stations sampled in the upper Feather River; except the North Fork Feather River upstream from Poe Power House, Poe Power House discharge, and Middle Fork Feather River near Merrimac, where it was exceeded twice. The agricultural goal was exceeded once in samples collected from Concow Creek at Jordan Hill Road, North Fork Feather River upstream from Poe Power House, and Poe Power House discharge.

The public health goal for total nickel (12 µg/L) was exceeded once in the West Branch Feather River near Paradise and South Fork Feather River upstream from Ponderosa Reservoir.

The CTR criteria for total and dissolved lead are hardness dependent. Only one sample taken from Sucker Run Creek near Forbestown exceeded the criteria. The public health goal for total lead is 2 µg/L. This criterion was exceeded once at both the North Fork Feather River upstream from Poe Power House and Poe Power House discharge monitoring stations.

**Lake Oroville** — Several metals consistently exceeded various criteria during the study (Appendix 3c2). Total recoverable arsenic exceeded the Cal/EPA cancer potency factor for drinking water as well as the USEPA NAWQC in all samples collected. Cadmium, chromium, total mercury, methyl mercury, nickel, selenium, silver, and zinc levels did not exceed any criteria in any Lake Oroville samples.

Total recoverable aluminum occasionally exceeded the USEPA NAWQC criteria for protection of aquatic life, public health goal, and secondary MCL. While the Main Body and near Dam stations rarely exceeded aluminum criteria, the stations in the North, Middle, and South Fork arms of the reservoir exceeded criteria with higher frequency. In addition, total aluminum levels in the North and Middle Fork arms surpassed goals in the bottom grab samples more frequently than in the surface grabs, while aluminum levels in the South Fork arm exhibited the opposite pattern, with twice as many surface grabs exceeding criteria than the bottom grabs.

The CTR for protection of aquatic life criteria for copper are hardness dependent. These criteria were exceeded one time in bottom grabs from both the Middle and South Fork arms. Copper levels in the rest of the reservoir did not exceed any criteria.

Total iron criteria applicable to the study area include the secondary MCL, agricultural goal, and NAWQC. The secondary MCL was exceeded once in surface grabs from the Middle and South Fork arms, once in bottom grabs from both the South Fork arm and Main Body, and four times in bottom grabs from the Middle Fork arm. The NAWQC for protection of aquatic life was exceeded once in bottom grabs from both the South Fork arm and Main Body.

The agricultural goal for total manganese (50 µg/L) was exceeded once at each location except the station near Oroville Dam, and twice from the bottom grabs in the Middle Fork arm.

The lead CTR for the protection of aquatic life criteria is variable depending on total hardness. These criteria were exceeded in one Middle Fork arm bottom grab sample.



A major spike in many metals levels was observed during a severe wind storm in early December 2002. This spike was likely caused by increased lake mixing due to winds which also destroyed the Lime Saddle Marina.

**Downstream from Oroville Dam** — Several metals exceeded various criteria consistently during the study period (Appendix 3c3). Total recoverable arsenic exceeded the Cal/EPA cancer potency factor for drinking water as well as the USEPA NAWQC in all samples collected. Chromium, methyl mercury, selenium, silver, and zinc levels did not exceed any criteria in any samples collected downstream from Oroville Dam.

Total recoverable aluminum occasionally exceeded the USEPA NAWQC criteria for protection of aquatic life, public health goal, and primary and secondary MCLs. These elevated levels were usually associated with storm flows in the Feather River from Oroville Dam downstream to near Mile Long Pond, including the Oroville Wildlife Area Ponds and the Thermalito Complex. Total aluminum criteria exceedances increased in frequency at the monitoring locations downstream from the Project boundary. Exceedances were found in about half of the Feather River samples downstream from the Project boundary and increased in occurrence in a downstream direction. All of the Sacramento River samples collected upstream from the Feather River exceeded the criteria. The agricultural goal for aluminum was exceeded only in the Sacramento River.

Total recoverable cadmium exceeded the Cal/EPA public health goal (0.07 µg/L) once in Glen Creek upstream from Glen Pond, the Hatchery Settling Pond, the Feather River downstream from Highway 162, at Robinson Riffle upstream and downstream from the Afterbay Outlet, and upstream from the Yuba River, and the North and South Thermalito Forebay (bottom). The public health goal was exceeded twice in the Sacramento River upstream from the Feather River.

The CTR for protection of aquatic life criteria for cadmium are variable, depending on total hardness of the sample water. Two stations exceeded these criteria for both dissolved and total recoverable fractions. The North Thermalito Forebay (bottom) and South Thermalito Afterbay (bottom) exceeded both chronic and continuous criteria once. The South Afterbay (bottom) also exceeded the primary MCL once.

The CTR for protection of aquatic life criteria for copper are also hardness dependent. Stations occasionally exceeding the CTR copper criteria included Glen Creek and Glen Pond, North Forebay Creek, Feather River Hatchery Settling Pond, Feather River downstream from the hatchery, downstream from the Afterbay Outlet, at Archer Avenue, upstream from the Yuba River, at Shanghai Bend, and near Verona Mile Long Pond (bottom), Honcut Creek, Bear River, and Sacramento River upstream from the Feather River. Over half of the Bear River samples exceeded the criteria, while the rest of the

locations exceeded the criteria much less frequently. None of the other copper criteria were exceeded.

Total iron criteria applicable to the study area include the secondary MCL, agricultural goal, and NAWQC. Most stations from Oroville Dam downstream to the Project boundary, including the Thermalito Forebay and Afterbay and Oroville Wildlife Area ponds, rarely exceeded the secondary MCL and never surpassed the other criteria. Glen Creek, Glen Pond, and North Forebay Creek exceeded the secondary MCL often, while the Feather River Hatchery Settling Pond and Robinson Riffle Pond exceeded the secondary MCL often and occasionally surpassed the agricultural and NAWQC goals. Three-quarters of the Honcut Creek samples exceeded the secondary MCL, mostly during winter and spring runoff, but rarely exceeded the NAWQC criterion. All Feather River stations downstream from Honcut Creek also failed to meet the MCL and occasionally exceeded the NAWQC. While the Bear River exceeded the MCL nearly ninety percent of the time, the Yuba River rarely exceeded any iron criteria, suggesting the main contributors of iron to the lower Feather River are Honcut Creek and Bear River.

The total mercury CTR level for humans (0.05 µg/L) was exceeded in one Feather River sample collected upstream from the hatchery on August 11, 2003 with a level of 0.059 µg/L. All of the other samples from this site, as well as the rest of the sites, were well below the criterion. However, the Bear River had a total mercury level of 0.0407 µg/L in a sample collected on February 19, 2004 during storm runoff.

For total manganese, the DHS action level for drinking water (500 µg/L), secondary MCL (50 µg/L), and agricultural goal (200 µg/L) apply. The secondary MCL was rarely exceeded at the Thermalito Diversion Pool upstream from Kelly Ridge Power House, Glen Creek and Pond, Morris Ravine, North Forebay Creek, North and South Afterbay, Lower Pacific Heights and Mile Long ponds, and the Feather River at Shanghai Bend and near Verona. The Oroville Fishing Pond exceeded the MCL in over half of the samples. The Robinson Riffle Pond surpassed the MCL in nearly ninety percent of the samples, exceeded the DHS criterion in one-third of the samples, and exceeded the agricultural goal in over half of the samples. The Feather River from the Diversion Dam downstream to Archer Avenue near Live Oak never exceeded any criteria. Sacramento River samples exceeded the MCL in nearly one-third of the samples. Honcut Creek and Bear River samples exceeded the secondary MCL more frequently than the other river stations, which also occurred during higher winter and spring flows.

The public health goal for total nickel (12 µg/L), was exceeded in one Feather River sample from the station at Singh above Riviera Road and two Sacramento River samples.

The CTR criteria for total and dissolved lead are hardness dependent. North Forebay Creek, South Thermalito Afterbay (surface), Honcut Creek, and Bear River each

exceeded the CTR chronic total lead level once, with the Bear River surpassing the dissolved chronic level once. The Feather River upstream from the Yuba River and the Sacramento River each exceeded the total chronic CTR criteria twice. The Feather River at Shanghai Bend exceeded the total chronic level three times and the dissolved chronic level once. The Feather River near Verona exceeded the total chronic CTR four times. The Thermalito Diversion Pool upstream from the dam exceeded both the total and dissolved chronic criteria once, the public health goal (2 µg/L) twice, and the primary MCL once. As with the iron levels, the majority of lead exceedances occurred in the section of the watershed downstream from Honcut Creek to the mouth of the Feather River.

#### **5.1.4 Pesticides and Organic Contaminants**

Samples for organic contaminant analyses were collected in November 2002, February and November 2003, and March 2004.

Few organic contaminants were detected at concentrations greater than minimum detection levels (Appendix 4). Diuron was detected at a concentration of 1.91 µg/L from the South Fork Feather River upstream from Ponderosa Reservoir from a sample collected on November 12, 2003. MTBE at a concentration of 3.1 µg/L was detected from the Thermalito Diversion Pool downstream from the Kelly Ridge Power House from the water sample collected on November 17, 2003. No other organic contaminants were detected at concentrations greater than the minimum detection limit.

The most stringent criterion for diuron was set by the USEPA at 10 µg/L for drinking water, while that for MTBE was set by the DHS at 5 µg/L as a secondary MCL for drinking water (CVRWQCB 2003). The concentrations of diuron and MTBE found during this study were less than these criteria.

#### **5.1.5 Pathogens**

Pathogen evaluation included monthly monitoring at the stream and lake water quality monitoring stations and targeted monitoring at recreation areas around two summer holidays.

Criteria used to evaluate coliform bacteria densities included DHS draft guidance for protection of the public from bacterial contamination at freshwater beaches (DHS 2001) and the Basin Plan (CVRWQCB 1998). The DHS recommends that beaches be posted or closed to protect public health when total coliform bacteria exceed 10,000 organisms, fecal coliform bacteria exceed 400 organisms, or enterococcus bacteria exceed 61 organisms per 100 mL of water sample. Additional sanitary surveys and evaluations are recommended when results of the log mean of at least five equally spaced samples in a 30-day period exceed 1,000 total coliform, 200 fecal coliform, or 33 enterococcus bacteria per 100 mL of sample. The Basin Plan designates contact recreation (REC-1)

as one of the existing beneficial uses of Lake Oroville. The Basin Plan requires that water designated for contact recreation shall not have fecal coliform bacteria in excess of a geometric mean of 200 bacteria per 100 mL of water from not less than five samples collected over a 30-day period and no more than ten percent of the total samples taken during any 30-day period shall have fecal bacteria in excess of 400 organisms per 100 mL.

The USEPA has also developed national bacteria criteria for bathing (full body contact) recreational waters (USEPA 1986). The geometric mean of a statistically significant number of samples (not less than five equally spaced over a 30-day period) from freshwater should not have densities of enterococcus bacteria greater than 33 organisms per mL. Single sample maximum allowable densities of enterococcus bacteria per 100 mL are 61 organisms for designated beach areas, and 89 organisms for moderate, 108 organisms for light, and 151 organisms for infrequent full body contact recreation.

#### **5.1.5.1 Monthly Pathogen Monitoring**

Samples for total and fecal coliform bacteria analyses were collected monthly from monitoring stations upstream from the Oroville Facilities, Lake Oroville, Thermalito Complex, and Feather River downstream from the Fish Barrier Dam (Table 5.1.5.1-1).

Samples were collected into 120 mL sterile water sample containers by dipping to a depth of approximately one foot beneath the water surface. Sample containers were immediately, capped, sealed, placed on ice, and delivered to the DWR laboratory in Red Bluff for analyses. Samples were analyzed within 24 hours of collection. Bacteria densities were analyzed using the membrane filter technique for members of the coliform group (APHA 1998).

Both total and fecal coliform bacteria were found from all monitoring stations, though fecal coliform bacteria were generally found in much lower densities (Appendix 5a). None of the monitored sites exceeded the DHS criterion for total coliform bacteria, but several sites (Fall River, Glen Pond, Glen Creek, Morris Ravine, Upper Pacific Heights Pond, North Forebay Creek, Honcut Creek, Bear River, Feather River upstream from the Yuba River and near Verona, Yuba River, and Sacramento River) occasionally exceeded the DHS criterion for fecal coliform. The DHS fecal coliform criterion at these sites was exceeded only during some winter months, except at Morris Ravine and the Upper Pacific Heights Pond at which the criterion was also exceeded during some summer months.

The Basin Plan criteria are not applicable since multiple samples were generally not collected in any 30-day period. However, the criteria are used in this evaluation to indicate where elevated bacteria densities were found. The higher CVRWQCB criterion (400 organisms per 100 mL) is the same as the DHS criterion, thus those monitoring

sites at which the DHS criterion was exceeded also exceeded the CVRWQCB criterion. The lower CVRWQCB criterion (200 bacteria per 100 mL), in addition to the sites at which the upper criterion was exceeded, was occasionally exceeded at the Feather River downstream from the hatchery, downstream from the SCOR outlet, and at Archer Avenue, and from Robinson Riffle pond. Most of the samples that exceeded the CVRWQCB criteria were collected during the winter, though the criteria were also exceeded during some summer months from Glen Creek, Morris Ravine, Upper Pacific

Table 5.1.5.1-1. Bacteria monitoring locations.

West Branch near Paradise	Concow Creek at Jordan Hill Road
NF Feather River upstream from the Poe Power House	Poe Power House Outflow
NF Feather River downstream from the Poe Power House	MF Feather River near Merrimac
Fall River upstream from Feather Falls	SF Feather River upstream from Ponderosa Reservoir
SF Feather River downstream from Ponderosa Reservoir	Sucker Run near Forbestown
Miner's Ranch Canal	NF Lake Oroville
MF Lake Oroville	SF Lake Oroville
Lake Oroville Main Body	Lake Oroville at Dam
Thermalito Diversion Pool upstream from the Kelly Ridge Power House	Thermalito Diversion Pool downstream from the Kelly Ridge Power House
Glen Pond	Glen Creek upstream from Glen Pond
Morris Ravine	Thermalito Diversion Pool upstream from the Diversion Dam
Feather River at Oroville	Feather River upstream from Hatchery
Feather River Hatchery Settling Pond	Feather River downstream from Hatchery
Feather River downstream from Highway 162	Feather River at Robinson Riffle
Feather River upstream from the Afterbay Outlet	Feather River downstream from the Afterbay Outlet
Feather River downstream from the SCOR Outlet	Feather River near Mile Long Pond
Feather River downstream from the Project boundary	Oroville Fish Pond
Robinson Riffle Pond	Mile Long Pond
Upper Pacific Heights Pond	Lower Pacific Heights Pond
Thermalito Afterbay at Feather River Outlet	South Afterbay
North Afterbay	South Forebay
North Forebay	Feather River at Singh above Riviera Road
Honcut Creek at Pacific Ranch near Palermo	Feather River at Archer Avenue
Feather River upstream from the Yuba River	Yuba River at mouth
Feather River at Shanghai Bend	Bear River near mouth
Feather River near Verona	Sacramento River upstream from the Feather River.

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Heights Pond, North Forebay Creek, Honcut Creek, and Robinson Riffle pond. The criteria were most frequently exceeded in samples from North Forebay and Honcut creeks, followed next in frequency from Glen Pond, Glen Creek, and Morris Ravine. Samples from other monitoring sites at which fecal coliform bacteria were found at densities greater than the criteria exceeded the criteria on only one or two occasions.

#### **5.1.5.2 Recreation Area Pathogen Monitoring**

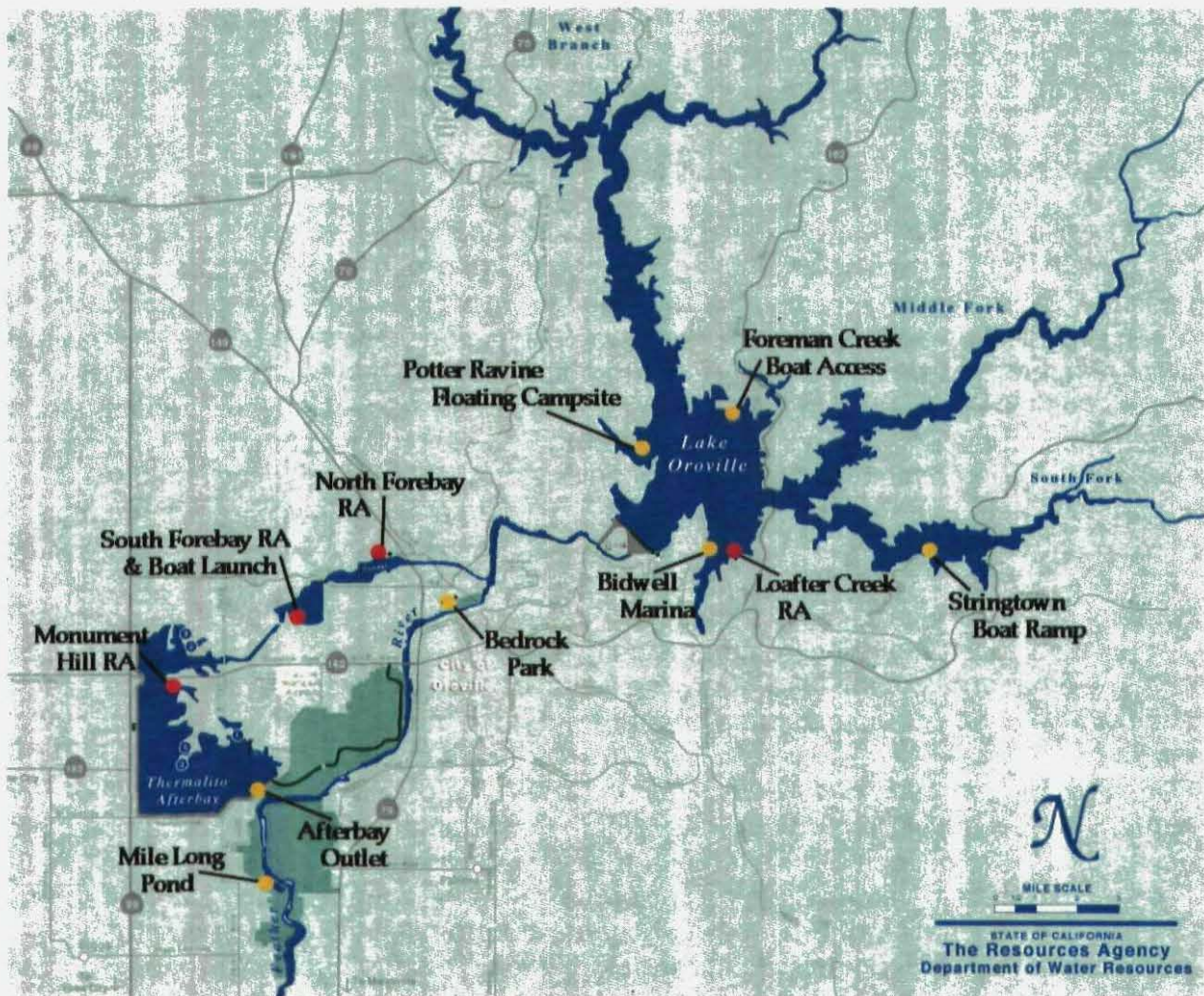
The Oroville Facilities provides a variety of recreational opportunities, including boating, camping, hiking, picnicking, swimming, fishing, and hiking, biking, and horse riding trails. There are several developed recreation areas with swim beaches, and a variety of undeveloped areas popularly used for swimming. Developed recreation areas with swim beaches include the North Forebay, South Forebay, Loafer Creek, and Monument Hill Recreation Areas (Figure 5.1.5.2-1). Facilities at these developed recreation areas include restrooms and picnic areas. The South Forebay and Monument Hill Recreation Areas also have boat launches. Areas popularly used for swimming include the Foreman Creek Boat Ramp, South Forebay Boat Ramp, Stringtown Boat Ramp, and Mile Long Pond. Portable restrooms are available at most of these sites. Bedrock Park, which is not within the Project boundary nor a Project facility, includes a side channel off the low flow section of the Feather River that was developed for swimming. This site includes permanent restrooms and a picnic area. Dispersed swimming occurs at many other areas of the lake where individual or several boats may anchor or beach and from day use of moored house boats.

During major summertime holidays, such as the Fourth of July and Labor Day, the number of people utilizing Project waters increases dramatically. Boat access sites are generally filled to capacity, while large numbers of families and groups of people use the developed recreation areas and popular access sites for swimming and picnicking. Potential contamination of Project waters can occur from fecal bacteria and organic material from human contact with the water. Portable restrooms, if not properly maintained, could be another source of bacterial contamination.

Recreation sites were selected in 2002 to include developed swimming areas (Bedrock Park, and Monument Hill, North Forebay, and South Forebay Recreation Areas), undeveloped swim areas (Foreman Creek boat access, Mile Long Pond, Stringtown boat access), marina mooring areas (Bidwell Marina), floating campsites (Potter Ravine), and boat launches (South Forebay Boat Launch). A site was also selected in the Afterbay, which receives a variety of uses including boating, swimming, hunting, fishing, and other activities. Sites used for swimming were also targeted for sampling in 2003. Developed swim areas sampled were Bedrock Park and the Loafer Creek, Monument Hill, North Forebay, and South Forebay Recreation Area swim beaches, while undeveloped areas included the Foreman Creek, South Forebay, and Stringtown boat access areas.



**Figure 5.1.5.2-1. Developed and popular swim areas at the Oroville Facilities.**



Water samples were collected from recreation areas in 2002 during early to mid afternoon from a week before to a couple of weeks after the Labor Day weekend. Samples were collected during morning hours in 2003 approximately every other week from mid-June through September, except that samples were collected twice each week from two weeks before to two weeks after the Fourth of July weekend. Water samples at each site were collected into sterile, labeled 120 mL coliform water test sample containers. Samples were collected by inverting the container about 12 inches below the water surface from wading into knee-deep water at swimming areas or with the aid of a boat at deeper water sites. The container was then sealed and placed into an ice chest for transport to the laboratory.



Analyses were begun within 6 hours following sample collection using standard procedures (APHA 1998). Membrane filter techniques were used in 2002 for analysis of total coliform (Standard Method 9222 B) and fecal coliform (Standard Method 9222 D) bacteria in the Red Bluff laboratory of DWR. Sample volumes of 100, 50, and 25 mL were filtered to achieve acceptable densities of bacteria for counting. Multiple tube fermentation techniques were employed in 2003 for total coliform (Standard Method 9221 BC), fecal coliform (Standard Method 9221 CE), enterococcus (Standard Method 9230 B), and fecal streptococcus (Standard Method 9230 B) bacteria at the Monarch Laboratory in Chico, California. Fifteen tube assays were generally used for the bacterial analyses, while 25 tube assays were performed from some of the sites found to exhibit higher bacterial densities.

Total coliform densities were less than the maximum allowable criterion at all monitored sites in 2002 (Appendix 5b). Most sites exhibited increased densities of total coliform bacteria a few days prior to the Labor Day weekend, but decreased significantly during the holiday weekend except at the Bidwell Marina houseboat mooring sampling sites, which continued to exhibit increased densities of bacteria from the holiday samples.

Fecal coliform densities were at low levels and within criteria at most sites in 2002. However, bacteria densities were relatively high on most sampling events from both the South and North Forebay monitoring sites. The DHS guidance for maximum fecal coliform densities from beaches was exceeded in one sample from the North Forebay Recreation Area. Fecal coliform density was also high, though not exceeding the criteria, from the sample collected from the Bedrock Park swim area during the Labor Day weekend, while the site upstream from the swim area exhibited a low bacteria level.

During 2003, the criterion for total coliform bacteria was exceeded from samples collected from two sites at the North Forebay Recreation Area (Appendix 5c). This area generally exhibited consistently high coliform bacteria densities. Bacteria densities from the other sampling sites varied over the sampling period, with no clear pattern associated with weekend or holiday use of the swim areas.

Several sites exhibited fecal coliform densities in 2003 that occasionally exceeded the DHS



The North Forebay Recreation Area is enjoyed by many visitors, especially swimmers and picnickers



guidance for maximum bacteria densities. Samples from the North Forebay Recreation Area beach exhibited rather consistent high fecal coliform bacteria densities that exceeded both DHS guidance and Basin Plan criteria.

Several sites also occasionally exceeded DHS or USEPA criteria for enterococcus bacteria. Nearly every sample from two sites within the North Forebay Recreation Area and many samples from the South Forebay exceeded these criteria. There is no clear pattern related to recreation use and bacteria densities.

There are no criteria for fecal streptococcus bacteria. However, highest densities of these bacteria were found from the North Forebay Recreation Area.

All the recreation areas monitored at least occasionally exceeded some of the bacteria criteria, including the DHS draft guidance for fresh water beaches. A few areas, such as the North Forebay Recreation Area, rather consistently exceeded the various criteria. The data, however, do not indicate any relationship between increased recreational use of Project waters and bacteria densities.

The CVRWQCB uses thirty-day averages of bacteria densities for determination of contamination and whether Basin Plan criteria have been exceeded, which takes into account the fluctuation in organism densities over time. The DHS draft guidance for fresh water beaches, however, bases determinations upon the most recent single sample. The DHS draft guidance recommends that beaches be posted to warn the public of contamination or closed when indicator organisms exceed the criteria. The DHS recommended level of bacteria contamination to trigger beach posting or closure was exceeded at least once at each of the recreation areas monitored in 2003. The

North Forebay Recreation Area exceeded the criteria from nearly every sample.



A variety of waterfowl and shorebirds make extensive use of the North Forebay Recreation Area throughout the year

However, high densities of coliform or enterococcus bacteria do not necessarily indicate human contamination or possible impacts to human health. Coliform and enterococcus bacteria used in water quality studies to indicate fecal contamination are not generally pathogenic, and are found in a variety of warm-blooded animals. Birds using wetland and open water areas can excrete indicator



bacteria in densities that would suggest a potential risk to human health, but birds do not carry the same types of pathogens as people (SWRCB 2001). While waterfowl and shorebirds were noted at nearly all of the recreation areas sampled during this survey, some areas, such as the North Forebay Recreation Area, receive exceptionally heavy use by these birds. Identification of sources of indicator coliform and enterococcus bacteria is difficult, since these bacteria are generally not host specific. All of the recreation areas monitored are accessible to a variety of wildlife that can contribute coliform and enterococcus bacteria. Human contact with recreation waters is, of course, another potential source. Diaper-wearing infants, especially, are a notorious source of fecal contribution to beach waters.

### **5.1.6 Phytoplankton and Zooplankton**

Study Plan SPF1 evaluated Project effects to non-fish aquatic resources, including phytoplankton and zooplankton (DWR 2004b). The SPF1 study used phytoplankton and zooplankton data collected under this study plan to evaluate effects to these communities from the Oroville Facilities. The SPF1 study describes the types of phytoplankton and zooplankton found in Lake Oroville, the Thermalito Complex, and Oroville Wildlife Area ponds. The study also describes effects of environmental disturbances on plankton communities, current Project effects, potential future Project operations effects, and effects of water quality on the phytoplankton and zooplankton communities.

Phytoplankton from nine taxonomic groups were identified from 14 collection sites. Overall, phytoplankton communities were dominated by diatoms (57 percent), green algae (16 percent), cryptomonads (9 percent), and blue-green algae (9 percent). Five other taxonomic groups accounted for the remaining nine percent. Diatoms were the most abundant algal type in Lake Oroville, Thermalito Complex, and the Fish Barrier Pool, while green algae were dominant in the Oroville Wildlife Area. Zooplankton from three taxonomic groups were identified from six collection sites. Rotifers were the most prevalent group at all Lake Oroville stations, followed by Copepoda and Cladocera. The Thermalito Afterbay was dominated by copepods, followed by cladocerans and rotifers.

The SPF1 report notes that the "maximum depth of Lake Oroville is approximately 722 feet and thus likely falls into a category of reservoirs with plankton communities that are controlled by water quality. Seasonal temperature fluctuations likely affect the production potential of plankton. Higher water temperatures during spring and summer generally lead to increased plankton production but also typically lead to higher feeding rates by predators. Nutrient concentrations in Project waters also contribute to the production potential of plankton. Based on these ecological relationships, it is difficult to assess whether water temperature variations related to Project operations constitutes a significant detrimental or beneficial impact to plankton. At the time of this report, there are no known water quality constituents in Lake Oroville or other Project waters that



exceed water quality criteria and would adversely affect plankton populations. Therefore, impacts to plankton from water quality were considered neutral."

### 5.1.7 Periphyton

Samples for periphyton analyses were collected from four stations on the branches of the Feather River upstream from Lake Oroville and thirteen stations on the Feather River downstream from the Fish Barrier Dam (Table 5.1.7-1) from May 2003 to March 2004.

**Table 5.1.7-1. Periphyton sampling stations**

<b>Station Name</b>	<b>Station Id</b>	<b>Samples (n)</b>
<b><i>Feather River above Lake Oroville</i></b>		
Feather River NF at Pulga	FRNFNP	1
Feather River MF near Merrimac	FRMFNM	17
Feather River SF above Ponderosa Dam	FRSFAPD	1
Feather River SF below Ponderosa Dam	FRSFBPD	3
<b><i>Feather River below Fish Barrier Dam</i></b>		
Feather River upstream from Hatchery	FRUSH	17
Feather River downstream from Hatchery	FRDSH	17
Feather River at Auditorium Riffle	FRAAR	7
Feather River at Spawning Channel	FRASC	8
Feather River downstream from Highway 162	FRDS162	17
Feather River at Robinsons Riffle	FRARR	17
Feather River upstream from Afterbay Outlet	FRUSAO	17
Feather River downstream from Afterbay Outlet	FRDSAO	17
Feather River upstream from SCOR Outlet	FRUSSO	7
Feather River downstream from SCOR Outlet	FRDSSO	17
Feather River downstream from SCOR at island	FRDSSOI	1
Feather River near Mile Long Pond	FRNMLP	17
Feather River upstream from Honcut Creek	FRUSHC	9

Samples were collected from ten submerged rocks (one sample per rock) and composited into two 50 mL jars. Chlorophyll-a analysis was performed on one jar and periphyton analysis was performed on the second jar.

A total of sixty-four species in six families was identified from the samples, including the Bacillariophyceae (diatoms), Chlorophyceae (green algae), Cryptophyceae (cryptomonads), Crysohyceae (yellow-green algae), Cyanophyceae (blue-green algae), and Rhodophyceae (red algae) (Appendix 6).



At all stations, the diatoms dominated algal communities throughout the sampling period, with either the green or blue-green algae as minor subdominants (Appendix 7). The green algae did dominate one sample at FRDSSO in June 2003 (Appendix 7.10), and was co-dominant with diatoms at FRUSSO in November 2003 (Appendix 7.9), but these were exceptions.

There appears to be no discernible seasonal pattern or spatial distribution to the abundance of diatoms. Some stations, like FRAAR, exhibit higher densities of diatoms in the spring/summer and lower densities in the winter/spring (Appendix 7.3), while other stations, like FRNMLP, show the opposite (Appendix 7.11). Still other stations, like FRUSH, exhibit high densities of diatoms throughout the year (Appendix 7.1).

The diatoms can be considered fairly indicative of nutrient-poor, mineral-rich systems (Hynes 1970). Community structure and abundance of diatoms have been directly related to silica concentrations in the water column, with silica the major limiting factor to diatom populations (Kilham 1971, as cited in Bold and Wynne 1978). Enrichment of silica into an aquatic system can actually encourage the growth of diatoms (Hynes 1970). Diatom abundance has been found to decrease in relation to other species in nutrient-rich systems, while blue-green and green algae abundances have been found to dominate in nutrient-rich waters (Heiskary and Markus 2003).

Comparison of periphyton numbers from those stations one would consider to be paired (i.e., Feather River upstream from hatchery vs. Feather River downstream from hatchery or Feather River at Auditorium Riffle) do not exhibit numbers and ratios that would indicate an enrichment effect within the Feather River. For example, diatoms dominate the periphyton community, with a significant fraction of green algae, at FRUSH, while diatoms were found at much lower levels and green algae are not found in any numbers at all. In one winter sample, a significant, though low, number of blue-green algae were found to dominate the periphyton community at FRDSH, indicating that some minor nutrient enrichment could be taking place. The June sample at FRDSSO exhibited a dramatic increase in green algae. This level of green algae density was not found in the upstream sampling site (FRUSSO) or at the other stations in the immediate area (FRUSAO, FRDSAO, FRNMLP). This bloom could indicate nutrient enrichment, possibly from the SCOR Outlet.

Algal community alterations have been related more directly to other factors, such as changing streamflows and scour (Heiskary and Markus 2003), zooplankton and nektonic herbivory (Huovinen *et al.* 1999), seasonal population growth (Huovinen *et al.* 1999), or the prior presence of other species of algae or fungi (Tank and Dodds 2003).

#### **5.1.8 Aquatic Macroinvertebrates**

In addition to plankton, other non-fish aquatic resources for which Study Plan SPF1 evaluated Project effects include aquatic macroinvertebrates (DWR 2004b). The SPF1



study used aquatic macroinvertebrate data collected under this study plan and a CSU, Chico study to evaluate aquatic macroinvertebrates in the Feather River. The SPF1 study describes the types of aquatic macroinvertebrates found in tributaries upstream from the Oroville Facilities, within the inundation zone of Lake Oroville, and the Feather River downstream from Oroville Dam. The study also describes effects of environmental disturbances on aquatic macroinvertebrate communities, current Project effects, potential future Project operations effects, and effects of water quality on the aquatic macroinvertebrate community.

The SPF1 report states that "data from DWR and CSU-Chico collected in 2002 and 2003 indicate that macroinvertebrate communities throughout the Project area are composed of similar species, suggesting that water quality is fairly uniform for most sites. Species of midges (Diptera: Chironomidae), blackflies (Diptera: Simuliidae) and baetid mayflies (Ephemeroptera: Baetidae) were present in moderate to high densities at most sites. Chironomid larvae usually live in the substrate where they build cases of sand or mud. Baetid nymphs are able to flourish in high flows because of their swimming ability. They often are one of the first species to recolonize disturbed areas. Blackfly larvae are typically found in high flows attached to rock surfaces. All three taxonomic groups contain genera that tolerate sedimentation and nutrient enrichment." These three taxa have also been found in many other studies to be present in high numbers downstream from dams. Temperature conditions downstream from dams generally preclude most other aquatic macroinvertebrate colonization. The midges, blackflies, and baetid mayflies are more tolerant of altered temperature regimes, are able to quickly colonize disturbed sites due to their short life cycles, and often develop large populations due to the absence of predatory macroinvertebrates.

"Aquatic worms (Subclass Oligochaeta) also were found at most sites in the study area. These organisms are usually found in the highest numbers in slow-moving to standing waters with silt or mud substrates. Although the above taxa are often used as indicators for organic pollution and sedimentation, the presence of these organisms alone do not necessarily indicate significantly impaired water quality because these taxa typically are widespread in rivers throughout the Sacramento Basin. The presence of taxa that are more tolerant to pollution and sites that contain low species diversity, however, may indicate areas where water quality is limiting for macroinvertebrates. In the Feather River, the site upstream of the Feather River Fish Hatchery and above Honcut Creek are possible locations where water quality may be affecting the macroinvertebrate community."

The report also indicates that "values for the California State Bioassessment Procedures metrics and tolerance values computed from benthic macroinvertebrates collected at the DWR and CSU-Chico sites were in the middle-to-low part of the range (3 to 6), suggesting that conditions in the study area are slightly disturbed. The rating of slightly disturbed is supported by two additional metrics, percent tolerant taxa and percent intolerant taxa. The percentage of intolerant taxa was consistently low (less



than 15 percent) across all sites except Fall River and Glen Creek. The percentage of tolerant taxa also was low across all sites except for one transect at Sucker Run Creek that showed 20 percent composition of tolerant taxa. Water temperature or other water quality conditions have not been identified in the area upstream of Lake Oroville, Lake Oroville, and in the Feather River below the Fish Barrier Dam at this time that would adversely affect macroinvertebrates," though toxicity bioassays have identified impacts to test organisms at several monitored sites. Cause of the toxicity has not been determined, nor have potential impacts to natural communities been determined.

Aquatic macroinvertebrate communities in upstream tributaries may also be impacted from the Oroville Facilities. The SPF1 report states that "construction of the Oroville facilities blocked upstream passage of salmonids above the Fish Barrier Dam, and in doing so, blocked import of marine-derived nutrients into the upper tributaries. Reductions in nutrients, such as nitrogen and phosphorus, reduce benthic algae and microbes in streams, and thus decrease food sources for stream grazers. Recent research suggests that inputs of marine-derived nutrients from salmon carcasses contribute to the productivity and diversity of benthic macroinvertebrate communities of streams where salmon spawn. Elimination of salmon carcasses may have a more direct effect on some dipteran species and other benthic invertebrates that are major carrion consumers." However, at least on the North and South forks of the Feather River, dams existing prior to construction of the Oroville Facilities had already eliminated salmon runs and, hence, "marine-derived" nutrients to these rivers. All other significant tributaries have impassable barriers usually very near the inundation zone of Lake Oroville, except the West Branch which may have passable barriers at some flows (DWR 2004c). Therefore, effects to nutrient deprivation from the Oroville Facilities for macroinvertebrate productivity is generally limited to the limited stream reaches upstream from the inundation zone before impassable barriers are encountered.

The Feather River has undergone significant habitat modification and degradation that has undoubtedly affected the aquatic macroinvertebrate community. The effects to the aquatic macroinvertebrate community from habitat modification and degradation can be difficult to differentiate from potential effects from adverse water quality conditions. Nevertheless, the report concludes that "the community metrics of the basin water bodies examined indicate that the biotic community is only slightly disturbed, which suggests that the water quality is generally good."

#### **5.1.9 Stream Sediments**

Stream sediments were evaluated upstream from the Project in SPG1 (DWR 2004d) and in the Feather River downstream from Oroville Dam in SPG2 (DWR 2004e). SPG1 stated that "streams change their sediment transport with time, typically in response to changes in climate, geologic events, changes in base level, and other factors. The Feather River is also changing, but mostly in response to human activity. These activities include land use in the upper watershed, hydraulic mining, water



diversions, and dams. Beginning in and about 1850, these human activities have affected hydrologic conditions in the upper watershed, resulting in large changes in water and sediment yields to the lower Feather River. Hydraulic mining introduced massive volumes of sediment into the stream system between the 1850s and 1890s. Later, numerous reservoirs were constructed in the upper watershed, trapping sediment and altering streamflow. Beginning in 1967, the Oroville Facilities started to regulate the lower Feather River and added to the change in streamflow and sediment discharge. Over 97 percent of the sediment from the upstream watershed is trapped in the upstream reservoirs, resulting in sediment starvation downstream."

"The upper Feather River watershed is producing high sediment yields due to accelerated erosion. The U.S. Soil Conservation Service estimated that 90 percent of the erosion in a 1,209 square mile study area was accelerated erosion. Accelerated erosion is a soil loss rate greater than natural geologic conditions and is caused by such human activities as road building, timber harvesting, overgrazing livestock, and agriculture. High sediment yield can reduce reservoir capacity, degrade water quality, and harm fish and wildlife. High sediment yields have significantly impaired storage capacity and hydroelectric operations in several reservoirs upstream of Lake Oroville on the North Fork Feather River."

"Past watershed instability, erosion, and sedimentation investigations have focused largely on tributaries of the North Fork with little attention to the Middle Fork watershed. This focus on the North Fork and its tributaries reflects concern over excessive sedimentation and increased maintenance effectively reducing the operating efficiency and life span of reservoirs and power plants. In addition, landslides cause increased sedimentation and downstream cumulative effects. Erosion and downcutting of streams lowers groundwater levels and dewater meadows. Reduced stream flow in the late summer and fall from dewatered meadows reduces hydropower generation capability. The dewatering of meadows has also resulted in their transformation from perennial grasses to dry land vegetation such as sagebrush."

"Sediment buildup or excessive erosion on the North Fork and South Fork above the reservoir are controlled by Big Bend and Ponderosa dams, respectively, and impacts from the Project to these tributaries would be obscured by the effects from these two dams. The Middle Fork and West Branch are controlled by bedrock reaches immediately above reservoir full pool and show no effects of sedimentation or erosion that could be attributed to the Project."

"One area of the West Branch at Miocene Dam that is accessible was chosen for a cross-section study. This area shows some sediment starvation effects from Miocene Dam and is an indicator for conditions in the West Branch pertaining to salmonid habitat. The stream thalweg drops 8.1 feet over a length of 352 feet (i.e., 0.023 foot drop per lineal foot). Stream banks are predominantly very coarse gravels to large boulders. Very little fine gravel or sand is present in this area, probably because of past



sediment trapping by the upstream Miocene Dam. The upstream portion of the left bank is well defined by a serpentine bed-rock outcrop. The downstream portion of the left bank is predominantly large boulders thickly covered with vegetation dominated by alders. The right bank is fairly well defined with a strip of willow habitat, then alders."

"Based on the geomorphological assessment and habitat typing of the West Branch and the Middle Fork tributaries above the full pool level (i.e., 900 feet) of Lake Oroville, impacts due to Project operations were not observed. Fluctuating water levels discourage substantial delta and sediment deposits above the 900 foot level. At the time of the field investigation for this study, upper portions of the fluctuation zone were exposed to fluvial (as opposed to lentic) conditions. Based on the geomorphological assessment and habitat typing of the four main tributaries within the fluctuation zone, the following preliminary conclusions are presented:

- The West Branch has in-stream gravel strata generally considered suitable for salmon spawning habitat in the upper portion of the fluctuation zone but silt accumulation on the downstream portions causes a degradation in spawning gravel quality;
- Salmon spawning habitat in the North Fork is affected because of daily fluctuating flows from upstream hydroelectric facilities;
- The Middle Fork has abundant gravel sources from remnant sediment wedge lag deposits; and
- The South Fork is gravel-starved above Sucker Run Creek and is subject to flow variations due to Ponderosa Dam. Spawning gravel quality improves downstream of Sucker Run Creek but gradually becomes sandier from remnant sediment wedge deposits."

"A large amount of sediment is captured by reservoirs upstream of Lake Oroville. Lake Oroville captures nearly all of the remaining sediment. This in turn results in a sediment-starved river system below the dam. It is estimated that the trap efficiency of the reservoirs is above 97 percent. A portion of silt and clay is discharged to the Feather River below the dam, but no pebbles, gravel, or cobbles."

"Downstream from Oroville Dam, stream channel deposits occur in active channels of the Feather, Bear, Yuba, and tributary streams and are transported by present-day hydraulic conditions (DWR 2004e). These deposits contain clay, silt, sand, gravel, cobbles, and boulders in various layers and mixtures that reflect conditions at the time of deposition. Between 1855 and the early 20th century, a large increase in sediment from hydraulic mining resulted in the lower Feather River becoming covered in a thick deposit of fine clay-rich, light yellow-brown colored "slickens." The slickens have been buried by more recent floodplain deposits but are evident in eroding banks along most of the river."

"Dredge tailings are large piles of gravels and cobbles occurring adjacent to the river between Oroville and Gridley. The tailings are a result of gold mining activity. Large



floating dredges were employed to process gravel and extract the gold. Coble and gravel from windrows in the Oroville Wildlife Area were used to construct Oroville Dam."

"Downstream of the Oroville Facilities, the river is affected by the altered stream discharge and distribution pattern, which are both instrumental in channel formation. These include attenuation of peak flows, decreased winter flows, increased summer flows, and changes in the historic flow frequencies. The larger flows, which occur only a small percentage of the time, transport most of the sediment because suspended sediment transport increases at a rate of about the square of streamflow, and bed material increases as the cube of velocity. Since sediment and streamflow are the primary factors influencing geomorphology, channel changes occur as the river adjusts to these modified conditions."

"Channel cross-sections surveyed by the U.S. Army Corps of Engineers between 1909 and 1911 were resurveyed by the DWR in 1965 and 1969. These sections show net scour, which include both widening and deepening of the channel. This trend is still continuing, as shown by surveys done by DWR in 2002 and 2003. Bed material was sampled between the Fish Barrier Dam and Honcut Creek. This is the reach where most of the Chinook salmon spawning occurs. Both bulk and surface samples were taken. Between Gridley and Verona, compositions were determined by visual examination of the bed surface. The samples were compared with sampling done in 1982, 1983, and 1995. These analyses show that there is a general but dramatic fining of the substrate in the downstream direction. The average or median grain size of bulk surface gravel samples below the Thermalito Diversion Dam is about 105 mm (4 inches), about 60 mm (2.4 inches) below the Thermalito Afterbay outlet, and about 35 mm (1.4 inches) at the Honcut Creek confluence. There is also a broad variation in mean gravel size on riffles. The variability occurs both locally on a riffle, and between adjacent riffles. The bed is armored, with a significantly coarser surface layer as compared to the subsurface layer. The bed also appears to be coarsening with time. A comparison of 1982, 1996, and 2003 data shows an over all bed material coarsening trend."

"The upper part of the river, from Oroville to Gridley, is mostly a combination of boulders, cobbles, and gravel. Below Gridley to the mouth, the substrate is mostly sand and fine gravel. Bed composition also varies locally depending on hydraulic and geomorphic variables. Pools tend to have smaller grain sizes than neighboring riffles and runs. For example, fine gravel is present on point bars and riffles below Gridley, but most of the pools, runs, and glides are composed of sand."

"Water Engineering and Technology sampled banks, point bars, and river beds. Between Gridley and Verona, geologic data suggests that, below the movable sand bed, the river is incised into the hydraulic mine slickens. They also concluded that all of the bed material load and most of the suspended sediment inflow into the study reach are cut off by Oroville Dam. Study Plan Report SPG1 estimates the amount of



sediment from upstream reaches deposited in the reservoir to be about 16,900 acre-feet from 1967 to 2003. This is the deficit amount of sediment to the lower river that can be attributed to Project operations. This amount is equivalent to covering the 67 miles of channel with 6 to 9 feet of sediment."

The SPG2 report concludes that "the amount of sediment transport in the Feather River is less than pre-dam conditions. Most of the sediment transported in the lower Feather River is from bed and bank erosion with minor contributions from tributaries. Sediment transport data were available from the U.S. Geological Survey prior to Project construction and for a short period directly after the construction of Project facilities. The average annual pre-dam sediment yield at the Feather River at Oroville gage was estimated to be 3,264 tons per day (1902 to 1962). The post dam yield (1968 to 1975) was estimated at 42.5 tons per day."

#### **5.1.10 Aquatic Toxicity**

DWR staff collected grab samples of ambient waters from twenty monitoring stations upstream from, within, and downstream from project waters (Table 5.1.10-1). Eight monitoring sites were sampled monthly, ten bi-monthly, and three wildlife area ponds adjacent to the Feather River were sampled during spring (May) and summer (July) 2002. These ponds were sampled monthly beginning in March 2003.

##### ***5.1.10.1 Field Collection***

Grab samples for toxicity analysis were collected by first rinsing a pre-cleaned, five-gallon polyethylene bottle three times in ambient water at the sampling site. The sample bottles were held approximately six inches below the water surface and filled with sample water. Samples from the Fall River upstream from Feather Falls were collected into five one-gallon cubettes to make transporting the samples manageable from this very remote location. The sample bottles were then labeled with the station name code, sampling date and time, sampler's name, placed into an ice chest, and preserved with ice at a temperature of approximately 39 °F.

Samples were delivered to the Pacific EcoRisk Laboratory (PER) in Martinez, California within 24 hours of collection. PER staff removed an aliquot from each water sample for analysis of initial water quality characteristics, including temperature, pH, dissolved oxygen, alkalinity, hardness, conductivity, and total ammonia. The remaining sample water was stored at 39 °F until used in setting up or maintaining the toxicity tests.



**Table 5.1.10-1. Ambient water toxicity monitoring sites.**

Station Number	Station Name (Code)	Months Sampled
A5-2260.50	Concow C A Jordan Hill Rd. (CCJHR)	Bi-Monthly
A5-2600.00	West Branch Near Paradise (WBNPA)	Bi-Monthly (Replaced WBAOR)
A5-2350.50	West Branch A Oroville Res. (WBAOR)	April, May, Jul. (2002)
A5-3130.50	NF Feather R DS Poe PH (NFPPH)	Bi-Monthly
A5-3931.50	Poe Powerhouse Discharge (PPHDI)	Bi-Monthly
A5-5100.00	Feather R MF NR Merrimack (MFMBR)	Bi-Monthly
A5-5050.50	Fall R US Feather Falls (FRUFF)	Bi-Monthly
A5-6110.500	SF Feather R AB Ponderosa Res. (SFUPR)	Bi-Monthly
A5-6050.50	SF Feather R DS Ponderosa Res. (SFDPR)	Bi-Monthly
A5-6925.00	Miners Ranch Canal (MIRAC)	Sept., Nov. (2002)
A5-6075.00	Sucker Run NR Forbestown (SRNFT)	Bi-Monthly
A5-1800.00	Feather R A Oroville (FRFBD)	Monthly
A5R93101333	Feather R Hatchery Settling Pond (FRHSP)	Monthly
A5-1780.50	Feather R DS from Hatchery (FRDFH)	Monthly
A5-1695.50	Feather R US from Afterbay Outlet (FRUAO)	Monthly
A5C92751383	Afterbay Outlet Canal to Feather R (AOCFR)	Monthly
A5-1687.50	Feather R DS from Afterbay Outlet (FRDAO)	Monthly
A5-1687.20	Feather R DS from SCOR Outlet (FRDSO)	Monthly
A5-1645.50	Feather R DS from Project Boundary (FRDPB)	Monthly
A5L92951347	Oroville Wildlife Area Fishing Pond (OWAFP)	May, July (2002), Monthly beginning March 2003.
A5L92541377	Oroville Wildlife Area Mile Long Pond (OWAMP)	May, July (2002), Monthly beginning March 2003.
A5L92551372	Oroville Wildlife Area Lower Pacific Heights Pond (OWALP)	May, July (2002), Monthly beginning March 2003.

Upstream from Lake Oroville	
Within Project Boundary	
Downstream from Project Boundary	

### 5.1.10.2 Chronic Toxicity Testing with *Ceriodaphnia dubia*

Most of the samples collected upstream from Lake Oroville had zero survival toxicity (i.e., no toxicity to survival) to *Ceriodaphnia dubia* (Appendix 8a). CCJHR, MFMBR, SFUPR, and SRNFT exhibited toxicity in 10 percent of the samples (Table 5.1.10-2). Twenty-two percent of the NFPPH samples proved toxic to survival. The frequency of reproductive toxicity ranged from 20 percent of the MFMBR samples to 83 percent of the SFDPR samples.



**Table 5.1.10-2. Percentage of sampling events toxic to *Ceriodaphnia dubia*.**

	Survival Toxicity	Reproduction Toxicity
Concow C A Jordan Hill Rd. (CCJHR)	1/10 = 10%	3/10 = 30%
West Branch Near Paradise (WBNPA)	0/8 = 0%	4/8 = 50%
West Branch A Oroville Res. (WBAOR)	0/3 = 0%	1/3 = 33%
NF Feather R DS Poe PH (NFPPH)	2/9 = 22%	5/9 = 56%
Poe Powerhouse Discharge (PPHDI)	0/9 = 0%	3/9 = 33%
Feather R MF NR Merrimack (MFMBR)	1/10 = 10%	2/10 = 20%
Fall R US Feather Falls (FRUFF)	0/10 = 0%	7/10 = 70%
SF Feather R AB Ponderosa Res. (SFUPR)	1/10 = 10%	6/10 = 60%
SF Feather R DS Ponderosa Res. (SFDPR)	0/6 = 0%	5/6 = 83%
Miners Ranch Canal (MIRAC)	0/2 = 0%	1/2 = 50%
Sucker Run NR Forbestown (SRNFT)	1/10 = 10%	6/10 = 60%
Thermalito Diversion Pool DS PP (DIVDPP)	0/1 = 0%	1/1 = 100%
Feather R A Oroville (FRFBD)	3/23 = 13%	6/23 = 26%
Feather R Hatchery Settling Pond (FRHSP)	4/12 = 33%	7/12 = 58%
Feather R DS from Hatchery (FRDFH)	5/24 = 21%	13/24 = 54%
Feather R US from Afterbay Outlet (FRUAO)	1/24 = 4%	5/24 = 21%
Afterbay Outlet Canal to Feather R (AOCFR)	1/24 = 4%	10/24 = 42%
Feather R DS from Afterbay Outlet (FRDAO)	1/24 = 4%	9/24 = 37.5%
Feather R DS from SCOR Outlet (FRDSO)	2/24 = 8%	10/24 = 42%
Feather R DS from Project Boundary (FRDPB)	3/24 = 12.5%	10/24 = 42%
Oroville Wildlife Area Fishing Pond (OWAFP)	0/16 = 0%	3/16 = 19%
Oroville Wildlife Area Mile Long Pond (OWAMP)	0/16 = 0%	4/16 = 25%
Oroville Wildlife Area Lower Pacific Heights Pond (OWALP)	0/16 = 0%	4/16 = 25%

The occurrence of survival toxicity to *Ceriodaphnia dubia* in waters sampled within the Project Boundary ranged from 4 percent of the FRUAO, AOCFR, and FRDAO site waters to 33 percent of the FRHSP samples. Again, reproductive toxicity occurred more frequently, ranging from 21 percent of the FRUAO samples to 58 percent of the FRHSP samples.

The three ponds sampled in the Oroville Wildlife Area were not toxic to *Ceriodaphnia dubia* survival, but reproductive toxicity occurred in 19 to 25 percent of these samples.

### 5.1.10.3 Chronic Toxicity Testing with Larval Fathead Minnows

Samples collected upstream from Lake Oroville resulted in survival toxicity to fathead minnows from 0 to 50 percent of the time, with one of two WBAOR and five of ten

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NFPPH ambient samples with the highest frequency (Appendix 8b, Table 5.1.10-3). Most of the water samples exhibited pathogen-related mortality (PRM) that affected survival results. The occurrence of PRM in chronic fathead minnow toxicity tests of ambient or ponded waters is a common, confounding problem characterized by random mortalities resulting in high inter-replicate variability and coverage of dead fish with a fungal "corona."

**Table 5.1.10-3. Percentage of sampling events toxic to the fathead minnow.**

	Fathead Survival Toxicity		Fathead Growth Toxicity	
	Unfiltered	Filtered	Unfiltered	Filtered
Concow C A Jordan Hill Rd. (CCJHR)	0/10 = 0%	1/10 = 10%	2/10 = 20%	3/10 = 30%
West Branch Near Paradise (WBNPA)	1/8 = 12.5%	1/8 = 12.5%	2/8 = 25%	2/8 = 25%
West Branch A Oroville Res. (WBAOR)	1/2 = 50%	0/2 = 0%	1/2 = 50%	0/2 = 0%
NF Feather R DS Poe PH (NFPPH)	5/10 = 50%	1/10 = 10%	2/10 = 20%	3/10 = 30%
Poe Powerhouse Discharge (PPHDI)	3/9 = 33%	1/9 = 11%	3/9 = 33%	3/9 = 33%
Feather R MF NR Merrimack (MFMBR)	3/10 = 30%	2/10 = 20%	3/10 = 30%	3/10 = 30%
Fall R US Feather Falls (FRUFF)	1/10 = 10%	1/10 = 10%	0/10 = 0%	2/10 = 20%
SF Feather R AB Ponderosa Res. (SFUPR)	2/10 = 20%	1/10 = 10%	2/10 = 20%	1/10 = 10%
SF Feather R DS Ponderosa Res. (SFDPR)	0/6 = 0%	1/6 = 17%	2/6 = 33%	2/6 = 33%
Miners Ranch Canal (MIRAC)	0/2 = 0%	0/2 = 0%	0/2 = 0%	1/2 = 50%
Sucker Run NR Forbestown (SRNFT)	5/10 = 50%	0/10 = 0%	1/10 = 10%	1/10 = 10%
Thermalito Diversion Pool DS PP (DIVDPP)	0/1 = 0%	0/1 = 0%	1/1 = 100%	0/1 = 0%
Feather R A Oroville (FRFBD)	9/24 = 37.5%	4/22 = 17%	7/24 = 29%	5/22 = 23%
Feather R Hatchery Settling Pond (FRHSP)	7/12 = 58%	1/12 = 8%	0/12 = 0%	3/12 = 25%
Feather R DS from Hatchery (FRDFH)	13/24 = 54%	4/22 = 18%	7/24 = 29%	6/24 = 27%
Feather R US from Afterbay Outlet (FRUAO)	11/24 = 46%	2/22 = 9%	3/24 = 12.5%	3/24 = 12.5%
Afterbay Outlet Canal to Feather R (AOCFR)	7/24 = 29%	4/22 = 18%	7/24 = 29%	7/24 = 29%
Feather R DS from Afterbay Outlet (FRDAO)	11/24 = 46%	1/22 = 4.5%	1/24 = 4%	1/24 = 4%
Feather R DS from SCOR Outlet (FRDSO)	12/24 = 50%	2/22 = 9%	3/24 = 12.5%	3/24 = 12.5%
Feather R DS from Project Boundary (FRDPB)	11/24 = 46%	1/22 = 4.5%	4/24 = 17%	4/24 = 17%
OWA Fishing Pond (OWAFP)	3/16 = 19%	0/16 = 0%	1/16 = 6%	1/16 = 6%
OWA Mile Long Pond (OWAMP)	3/16 = 19%	0/16 = 0%	2/16 = 12.5%	2/16 = 12.5%
OWA Lower Pacific Heights Pond (OWALP)	11/16 = 69%	1/16 = 6%	1/16 = 6%	1/16 = 6%

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PRM must be controlled in order to determine the toxicity of sample waters attributable to chemical contaminants. After April 24, 2002, fathead minnow water samples were tested by performing side-by-side analyses of unfiltered and 0.45 micron filtered "splits" in order to distinguish between pathogen and contaminant related mortality per USEPA guidelines.

Growth endpoint (mean biomass) results for samples collected upstream from Lake Oroville that were significantly less than the control occurred in 0 to 50 percent of both unfiltered and filtered treatments (Table 5.1.10-3). Following USEPA guidelines, growth endpoints for fathead minnows were not statistically compared with control results if survival endpoints were significantly less than the controls.

Samples collected within the Project boundary exhibited survival toxicity ranging from 0 percent of the one DIVDPP sample to 54 percent of the FRDFH samples collected. Again, PRM was prevalent in most of these samples. The filtered samples exhibited toxicity less frequently than the unfiltered samples after removal of the pathogen. Mean biomass results statistically less than the control occurred in 0 to 29 percent of the ambient samples collected within the Project boundary. Unlike the improvement shown after filtration of the survival toxicity samples, there was no improvement in growth shown for the filtered treatments of samples collected within the Project boundary, with the exception being the single DIVDPP sample in which PRM induced "apparent" toxicity was eliminated after filtration.

The Oroville Wildlife Area ponds exhibited survival toxicity in 19 percent of OWAFP and OWAMP ambient samples and 69 percent of the OWALP ambient samples. Survival was greatly improved in the filtered treatments of these samples. Survival toxicity was not encountered in any of the filtered OWAFP and OWAMP samples and toxicity was found in only one of the sixteen OWALP samples (6 percent). The occurrence of growth toxicity to fathead minnow in the Oroville Wildlife Area ponds ranged from 6 percent of the OWAFP and OWALP samples to 12.5 percent of the OFAMP samples in both unfiltered and filtered treatments. Filtration of the ambient water did not result in a decrease in the frequency of toxicity to fathead minnow growth.

Targeted Toxicity Identification Evaluation (TIE) testing was performed on several samples collected in April 2002 and August 2003 in an attempt to identify contaminants that caused reduced survival in test organisms. Phase I TIEs were targeted toward particulate-associated contaminants (using centrifugation), non-polar organics (using C18 solid phase extraction (SPE) columns), and divalent cations (using Chelex solid phase extraction columns).

In April 24, 2002, there was 10 percent *Ceriodaphnia* survival for the FRDFH sample. Based on this testing, a Phase I TIE was performed on the sample. The baseline FRDFH sample was not toxic during the TIE, indicating that the toxicity was transient in nature, and had degraded by the time the TIE was performed. In addition, anomalous



mortalities were observed in several test replicates during the TIE, which also contributed to inconclusive information for determining the cause of the observed toxicity.

In August 11, 2003, complete *Ceriodaphnia* mortality was observed for several of the site waters. Based on these results, Phase I TIEs were performed on the samples. The FRFBD sample remained toxic during re-testing. Survival toxicity was removed in the centrifugation treatment, suggesting that particulate-associated contaminants were contributing to the observed toxicity. The AOCFR sample also remained toxic during re-testing. Survival toxicity was not removed through the centrifugation or C18 SPE treatments, but was removed during the Chelex treatment, suggesting that metals were contributing to the observed toxicity. Analysis of metals results for water samples collected concurrently with the toxicity sample indicate no elevated metals levels that could be implicated in the toxicity. The FRUAO sample remained toxic upon re-testing. Survival toxicity was removed using centrifugation, which suggests particulate-associated contaminants contributed to the observed toxicity. The FRDAO sample also remained toxic upon re-testing. Survival toxicity was removed in the C18 SPE and Chelex treatments, suggesting that metals and non-polar organic contaminants were contributing to the observed toxicity. Analysis of metals results for samples collected concurrently with the toxicity sample indicate no elevated metals levels that could be implicated in the toxicity. The FRDSO sample remained toxic during re-testing. Survival toxicity was removed in the C18 SPE treatment, suggesting that non-polar organic contaminants were contributing to the observed toxicity. The FRHSP sample also remained toxic upon re-testing. Survival toxicity was removed in the C18 SPE treatment, suggesting that non-polar organic contaminants were contributing to the observed toxicity.

#### **5.1.11 Settleable Material and Suspended Material**

Total suspended and settleable solids were measured from tributaries to the Project, waters of the Oroville Facilities, and the Feather River downstream from the Project to the confluence with the Sacramento River.

Total suspended solids in tributaries upstream from Lake Oroville were generally low, with the highest levels occurring during the winter months (Appendix 9). Total suspended solids levels from all the upstream tributaries were generally much less than 10 mg/L. The highest level of total suspended solids in upstream tributaries was found in the North Fork of the Feather River upstream from the Poe Power House. The laboratory reported 393 mg/L of suspended material from the sample collected in February of 2004. Other upstream tributaries also were found to contain elevated levels of suspended material during this period. Settleable solids were generally present in amounts too small to measure from all the upstream tributaries. Measurable levels of settleable solids were generally confined to the winter period. As with total suspended



solids, the highest level of settleable solids (1.0 mL/L) was measured during February of 2004 from the North Fork of the Feather River upstream from the Poe Power House.

In Lake Oroville, highest levels of total suspended solids levels were found in the upper arms, though generally at levels much less than 10 mg/L. Highest levels were usually found in the winter periods, with a maximum of 36 mg/L of total suspended solids found in the South Fork arm in late November of 2002. Total suspended solids from the main body and near the dam of Lake Oroville never exceeded 3.0 mg/L, indicating that the materials settle from the water column in the tributary arms. Settleable solids were usually not present at measurable quantities at any of the lake monitoring sites, especially from the sites in the main body and near the dam. The highest level of settleable solids was measured from the South Fork arm (0.8 mL/L), while only 0.4 mL/L was measured from the North Fork arm, and only a trace of settleable solids could be detected in samples from the Middle Fork arm.

Total suspended solids in the Thermalito Complex (Diversion Pool, Forebay, and Afterbay) ranged to 28 mg/L, with the highest levels measured from the North Thermalito Forebay in January of 2004. Most measurements from sites within the Thermalito Complex were much less than 10 mg/L, with the higher levels occurring during the winter. Monitoring sites within the Thermalito Complex rarely contained settleable solids at measurable levels. In the Diversion Pool, 0.2 mL/L of settleable solids was found on one occasion upstream from the Kelly Ridge Power House, while a maximum of 0.5 mL/L was found downstream from the power house, and only 0.1 mL/L was found on one occasion near the Diversion Dam.

Highest levels of total suspended solids were found in the Thermalito Outlet to the Feather River during the winter months. Total suspended solids ranged to a maximum of 23 mg/L, but most analyses indicated that less than 10 mg/L were present. Settleable solids from the Outlet to the Feather River were never found at levels above trace amounts.

Ponds sampled in the Oroville Wildlife Area generally contained total suspended solids at low levels. With the exception of the Robinson Riffle pond, the highest level of total suspended solids (61 mg/L) was found in Mile Long Pond during the winter. The Robinson Riffle Pond nearly always was found to have higher levels of total suspended solids, with levels ranging to 148 mg/L. Generally no more than trace amounts of settleable solids were found from the ponds, except for Mile Long and Robinson Riffle ponds. Levels greater than trace amounts (up to 6mL/L) were found on five occasions from Mile Long Pond, with each detection occurring during summer periods from samples collected near the bottom of the pond. These samples may have contained quantities of decomposing macrophytic plant material that grows extensively in Mile Long Pond. Settleable solids were measured at the Robinson Riffle Pond on most sampling occasions, with up to 13 mL/L found during the summer of 2003. This pond



also contains extensive growths of macrophytes and other organic materials that undoubtedly contribute to the settleable solids load.

Several small creeks that enter Project waters downstream from Oroville Dam were found to contain relatively high levels of total suspended solids. A small creek that enters the North Thermalito Forebay (dubbed North Thermalito Forebay Creek) generally contained less than 10 mg/L of total suspended solids, but during winter periods was found with levels up to 51 mg/L. Glen Creek upstream from Glen Pond also generally contained less than 10 mg/L of total suspended solids during the summer and up to 28 mg/L during the winter. Glen Pond, into which Glen Creek flows before entering the Diversion Pool, was found with total dissolved solids up to 40 mg/L in the late spring of 2002, but was generally at levels less than 10 mg/L during the dry portion of the year. Morris Ravine, which also flows to the Diversion Pool, frequently was found with high total suspended solids during winter months, which ranged to 77 mg/L. Settleable solids in the North Thermalito Forebay Creek, Glen Creek and Pond, and Morris Ravine ranged from amounts too small to measure to a few tenths of a milliliter per liter of sample.

The Feather River Hatchery Settling Pond generally contained less than 10 mg/L of total suspended solids, except in February of 2004 when 29 mg/L was reported. No more than trace amounts of settleable solids were found in samples from the Hatchery Settling Pond.

The low flow section of the Feather River usually contained total suspended solids at levels less than 5 mg/L. Total suspended solids seldom exhibited elevated levels at any of the sites monitored in the low flow section. During some winter periods, total suspended solids increased at some of the monitoring sites. The highest total suspended solids level (33 mg/L) was in a sample collected from the Feather River downstream from the hatchery in November of 2002. Settleable solids were usually not present in measurable quantities from sites monitored in the low flow section. At most, only up to 0.2 mL/L of settleable solids were found at any of the sites in the low flow section.

In the high flow section of the Feather River within the Project boundary, total suspended solids were generally found at low levels. Total suspended solids levels usually did not exceed 5 to 10 mg/L at all of the monitoring sites in the high flow section, even during winter periods. The highest level of total suspended solids found during the winter was only 11 mg/L. No settleable solids were measured at levels above a trace at any of the monitoring sites in the high flow section, except in the Feather River near Mile Long Pond in August of 2002. The laboratory reported 1.0 mL/L from this site. Both prior and subsequent samples from the Feather River near Mile Long Pond did not contain settleable solids at levels greater than a trace.

Downstream from the Project boundary, total suspended solids were generally at low levels during the drier months but increased significantly during the winter months. The levels of total suspended solids increased with increasing distance downstream from the Project boundary. While a maximum of 21 mg/L of total suspended solids was found in the Feather River just downstream from the Project boundary, up to 103 mg/L was reported from the Feather River near Verona. Settleable solids were reported from water samples collected at monitoring sites downstream from the Project boundary at low levels. Settleable solids were generally at levels less than those that could be measured in the upper portion of the river downstream from the Project boundary, but increased in frequency of levels found at trace or measurable levels in a downstream progression. The highest level of settleable solids was reported as 0.3 mL/L upstream from the Yuba River.

Downstream tributaries to the Feather River contained variable levels of total suspended solids. Samples from the Bear River usually always contained elevated levels of total suspended solids, even during the drier periods. The maximum level found in the Bear River was 57 mg/L during February of 2003. The Yuba River and Honcut Creek both were reported with total suspended solids that were generally less than 10 mg/L during the drier period of the year, and ranged up to 20 mg/L in the Yuba River and 53 mg/L in Honcut Creek during the winter. In the Bear and Yuba rivers and Honcut Creek, settleable solids were usually at levels no greater than a trace, though occasionally ranging to 0.2 mL/L during some winter months.

Total suspended solids were at significantly higher levels in the Sacramento River upstream from the Feather River than in the Feather River near Verona. Highest levels of total suspended solids in the Sacramento River were reported from winter samples, though samples collected during the drier months still ranged to 38 mg/L. Samples collected during the winter ranged to 193 mg/L of total suspended solids. Fewer samples from the Sacramento River were reported with only non-measurable or trace levels of settleable solids than Feather River monitoring sites. Levels of settleable solids in the Sacramento River ranged to 8.1 mL/L.

The laboratory data indicate that Project waters are not impacted by significant levels of total suspended or settleable solids, nor does the Project contribute significant levels of total suspended or settleable solids to the Feather and, subsequently, the Sacramento River. As with any stream system, slow moving or backwater areas allow suspended materials to settle. Higher stream flows in the winter usually flush these settled materials. However, in the low flow channel, higher flushing flows are a rare occurrence. Some slow moving and backwater areas of the low flow channel have accumulated deposits of sediments. Downstream from the Afterbay Outlet to the Feather River, flows are substantially greater than in the low flow section of the river and vary with seasonal conditions. Higher flow events downstream from the Afterbay Outlet tend to flush the fine sediments from the river channel. In general, though, fine sediment deposition has been found to not be significant, and, in fact, the river channel

is coarsening (i.e., sediment particle size is increasing) due to trapping of finer materials behind upstream dams (DWR 2004e).

#### **5.1.12 Color**

Water samples were filtered to remove "apparent color" due to any turbidity that may have been present (APHA 1998). "True color" was then measured by comparing the water color to a calibrated glass disk. The Hach Model CO-1 Color Test Kit was used for true color determinations. The Hach kit measures color from 0 to 100 units, though other methods record color as high as 500 units (APHA 1998).

True color ranged from 0 to 50 color units, with the highest color units reported from Honcut Creek (Appendix 10). Color generally increased from the upper watershed to the lower reaches of the Feather River. True color in the tributaries to Lake Oroville generally ranged from 0 to 10 color units, except in the North Fork which ranged from 0 to 20 color units. The Feather River upstream from the Afterbay Outlet generally ranged from 0 to 15 color units, while downstream from the Outlet color generally ranged from 0 to 20 color units. No seasonality is apparent in the data for intensity of color.

True color measured in the tributaries to Lake Oroville and the Feather River was at the lower end of the color scale (which has a maximum of 500 color units). Though color was measured using a comparator, color (after turbidity was removed by filtration) was not visually apparent to the eye in any of the samples. Though color was not measured with the comparator in Lake Oroville or the Thermalito Complex, no color to the water was observed.

#### **5.1.13 Floating Material and Oil and Grease**

Floating materials observed from Project waters were limited to woody debris in Lake Oroville brought in during winter and spring tributary runoff. No oil, grease, waxes, or other materials causing nuisance, visible film, or coating on the surface of the water or on objects in the water, was observed.

Tributaries naturally carry woody debris into the reservoir during periods of higher runoff and stream flow. The Oroville Field Division routinely collects as much floating woody debris as possible during the spring using log booms. The woody debris is piled in remote areas of the lake for burning.

#### **5.1.14 Tastes and Odors**

Water samples were not tasted due to the potential presence of bacteria, viruses, hazardous chemicals, and other factors. Also, edible aquatic organisms (i.e., fish

crayfish) were not tasted due to the potential for elevated mercury in edible tissues (DWR 2004f).

Water was analyzed for odor from each site visit by smelling a sample by two individuals. The samplers described the type of any odor detected to attempt determination of the causative agent. No odors were detectable from the tributaries upstream from Lake Oroville or the reservoirs (Lake Oroville, Thermalito Forebay and Afterbay, Diversion Pool, and Fish Barrier Pool).

In the Feather River downstream from the Fish Barrier Pool, odor was not detected from most water samples (Appendix 11). However, during the summer through fall, especially in the portion of the river within the Project boundary, a "fishy" odor was reported. A "septic odor" was reported from the hatchery waste water settling ponds in June 2002, and an odor described as "algae" was reported from the ponds in March of 2004. The "algae" or "moss" odor was also occasionally reported in samples from other monitoring sites in the low flow channel and ponds in the Oroville Wildlife Area. An "earthy" or "dirt" odor was occasionally detected in water samples collected from monitoring sites downstream from the Project boundary, especially in the Bear River.

The large numbers of primarily Chinook salmon crowded into the upper portion of the Feather River downstream from the Fish Barrier Dam undoubtedly was the cause for the "fishy" odors, which are a natural occurrence from decaying carcasses following spawning. The "septic odor" in the hatchery waste water settling ponds may have been produced due to antibiotic treatments at the hatchery. Decaying algae also produce odors. Algal mats that wash ashore undergo decomposition which produces odors. Decreasing water levels that exposed mud flats was cited as the likely source for the "earthy" or "dirt" odors.

#### **5.1.15 Other Factors Affecting Water Quality**

##### **5.1.15.1 Salmon Decomposition**

Additional monitoring was conducted from September through December at monitoring sites within the Project boundary downstream from the Fish Barrier Dam to determine effects to water quality from decomposing salmon carcasses. Dissolved oxygen level, as well as temperature, conductivity, and pH, in the water and within the gravels were measured with field instruments at several of these sites, while water samples were collected for laboratory determination of total ammonia and other analyses.

Temperatures in interstitial water gradually increased with distance downstream (Figure 5.1.15.1-1). Interstitial water temperatures were very similar amongst all monitoring sites by December. Dissolved oxygen levels in the gravels were usually at high levels from all stations, though the sites immediately upstream and downstream from the Afterbay Outlet occasionally displayed much lower levels. pH and conductivity were

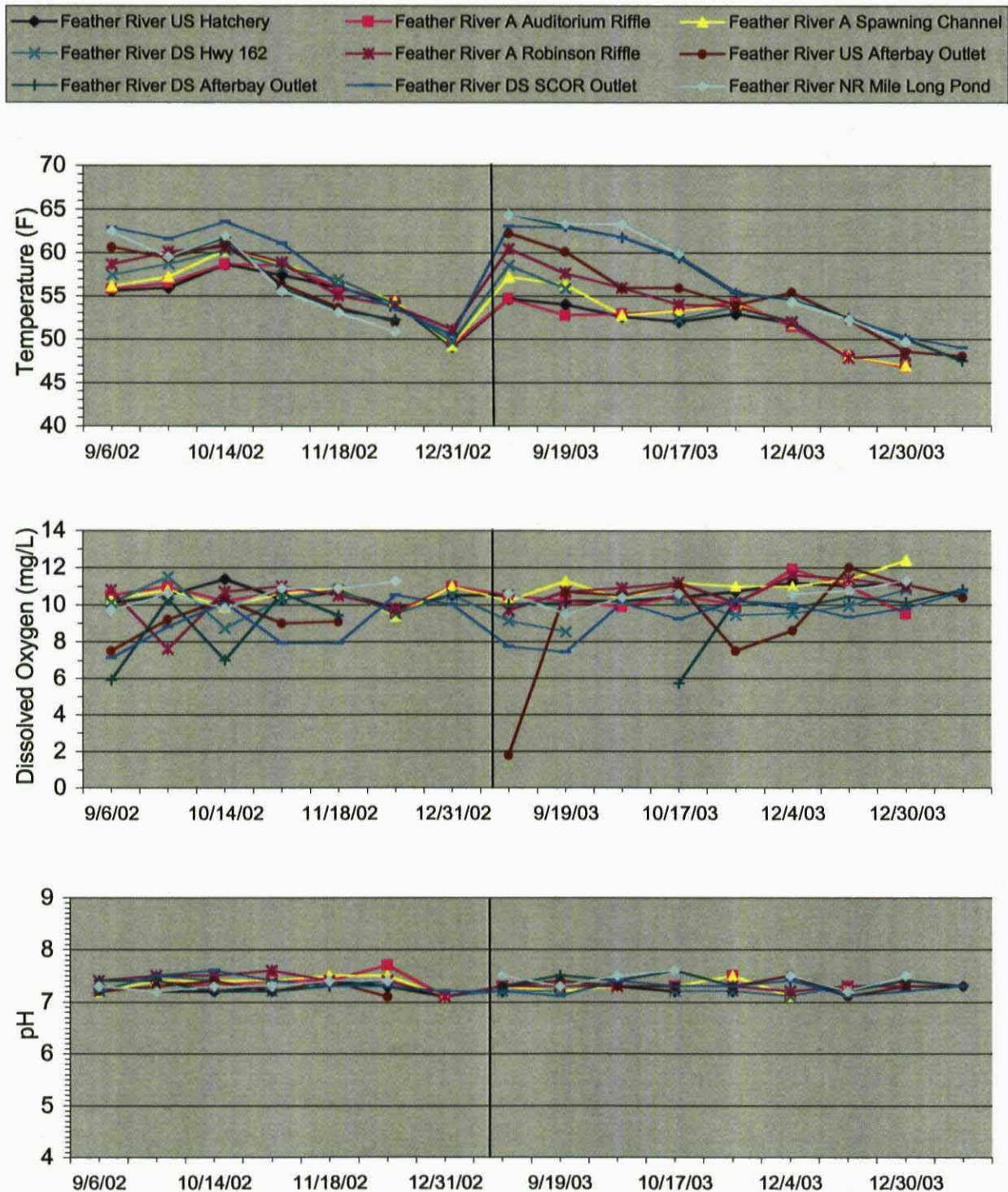


usually very uniform amongst all monitoring sites and throughout the study period, with a difference of no more than six-tenths of a pH unit between stations or from earlier to later periods. Dissolved nitrate plus nitrite, dissolved and total ammonia, dissolved orthophosphate, and total phosphorus were also generally similar between stations and varied little from the earlier to later period of the study. Dissolved nitrate plus nitrite was occasionally found at higher concentrations at the lower monitoring sites. Dissolved ammonia and orthophosphate and total phosphorus were elevated in the Feather River downstream from the Highway 162 bridge in early October 2003.

Water temperatures in the Feather River were similar to those found in the gravels, and also gradually increased with distance downstream and decreased from September through December (Figure 5.1.15.1-2). Dissolved oxygen levels in the river were at high levels at all monitoring sites, except occasionally downstream from the hatchery. Though dissolved oxygen in the vicinity of the Afterbay Outlet displayed decreased levels, river water in the area was always at high levels. pH and conductivity were also very uniform at all monitoring sites, though a slight decrease in pH was evident downstream from the hatchery in October 2002. Dissolved nitrate plus nitrite was generally at highest levels at the monitoring site downstream from the hatchery, though in November highest levels were found downstream from the SCOR Outlet. Dissolved was generally similar in the river at all monitoring sites, except higher levels were reported from stream water collected in October 2002 at the monitoring site downstream from the hatchery. Total ammonia was higher at the monitoring site downstream from the hatchery on several occasions, and sporadically at other stations. Dissolved orthophosphate was reported at slightly higher levels at the monitoring site downstream from the hatchery than from other sites in October 2003. Total phosphorus was reported at a relatively high level downstream from the Afterbay Outlet in September 2003, at slightly elevated levels downstream from the hatchery in October 2003, but was otherwise at similar levels at all stations.

Stream water was often of lower quality at the monitoring site downstream from the hatchery, which may be due to organic waste discharges from the hatchery. The monitoring site downstream from the SCOR Outlet occasionally was reported with elevated levels of dissolved nitrate plus nitrite and total ammonia. Decreased water quality in gravels was occasionally encountered. Low dissolved oxygen levels in the vicinity of the Afterbay Outlet is probably due to the higher sediment loads found in the gravels in this area (DWR 2004g). Though occasionally elevated levels of parameters were reported from various monitoring sites, the data do not indicate that spawned salmon are contributing to elevated concentrations of nutrients or decreased water quality.

**Figure 5.1.15.1-1. Interstitial gravel water quality in the fall in the Feather River.**



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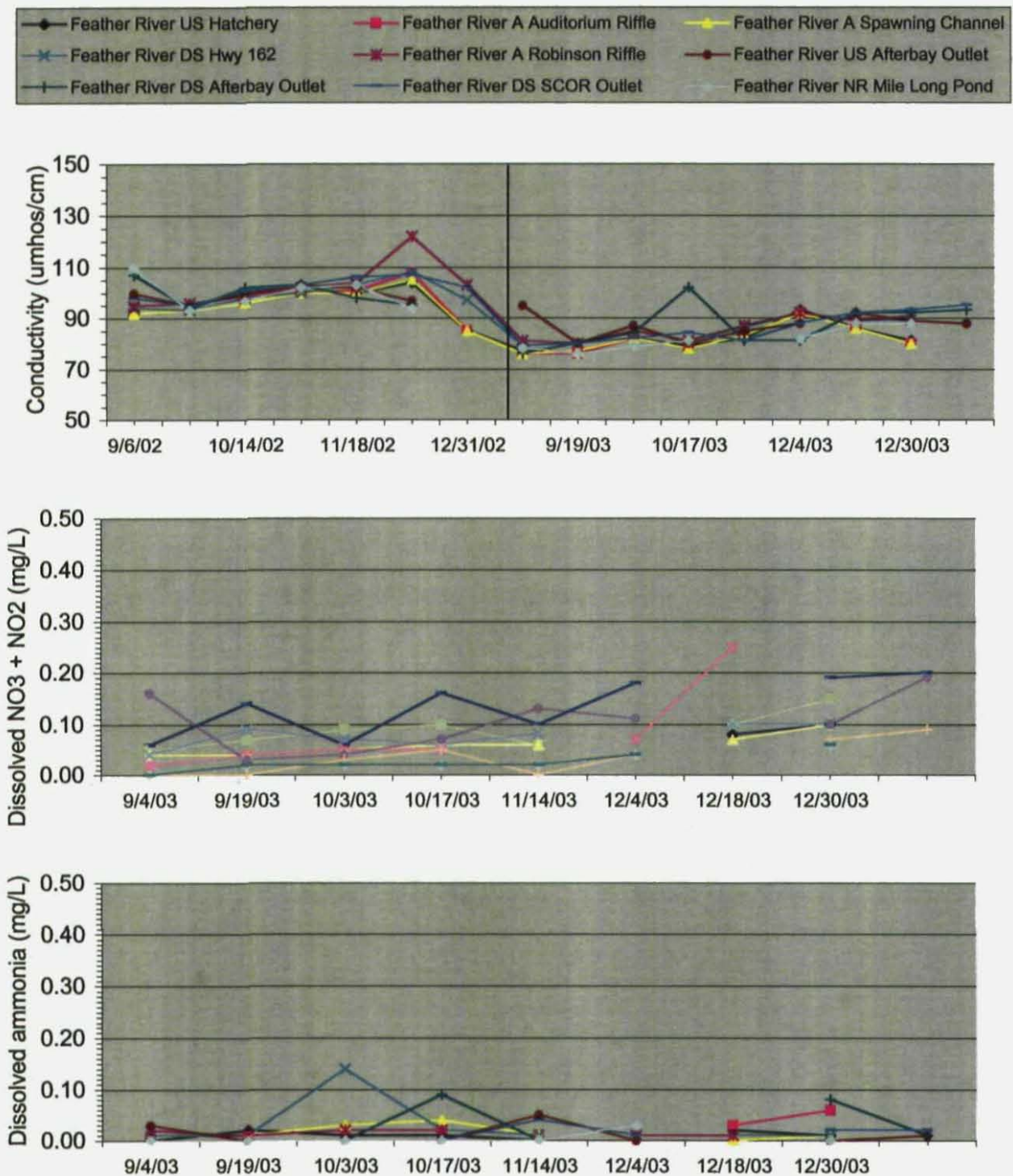
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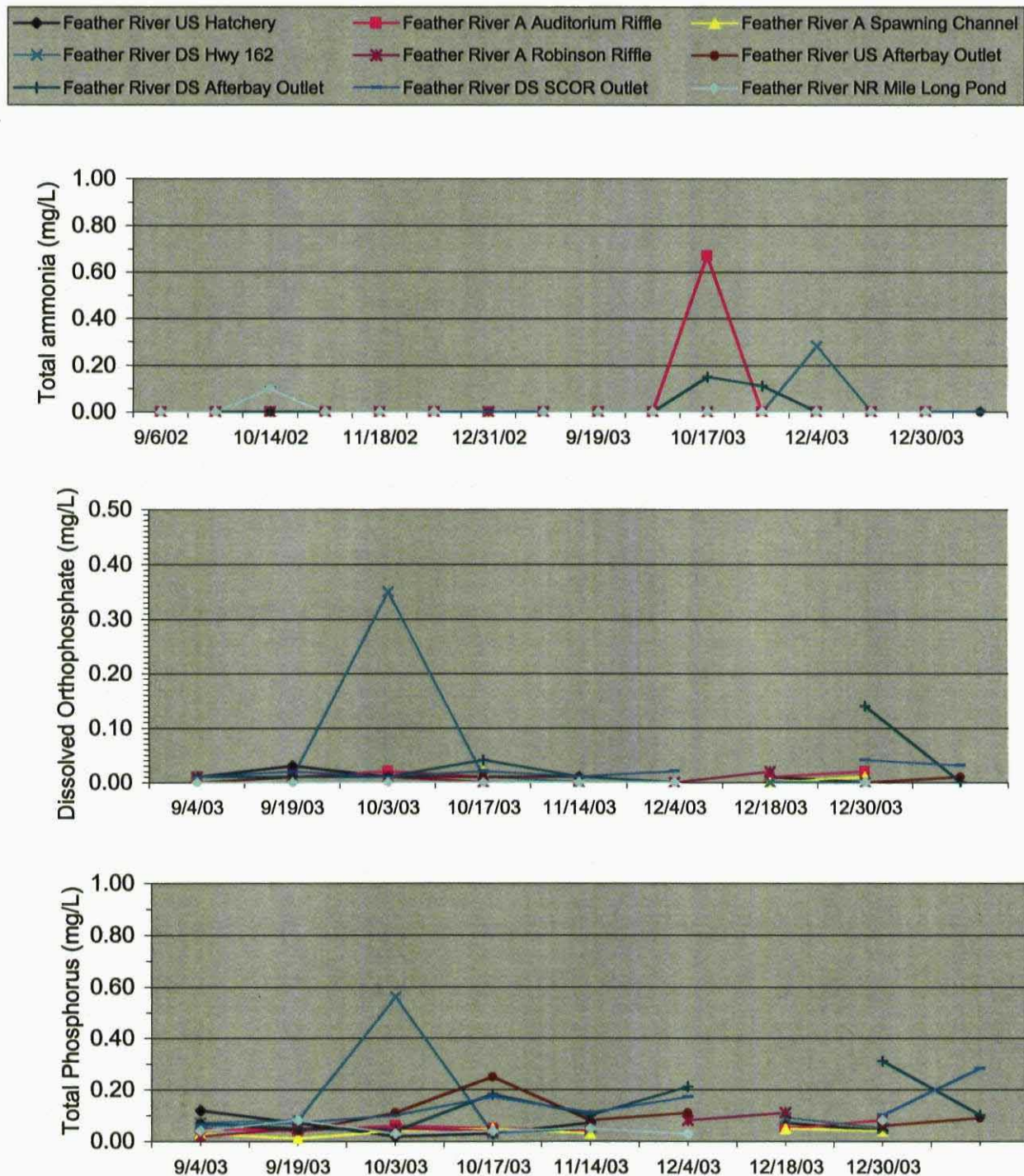
Figure 5.1.15.1-1. Continued.



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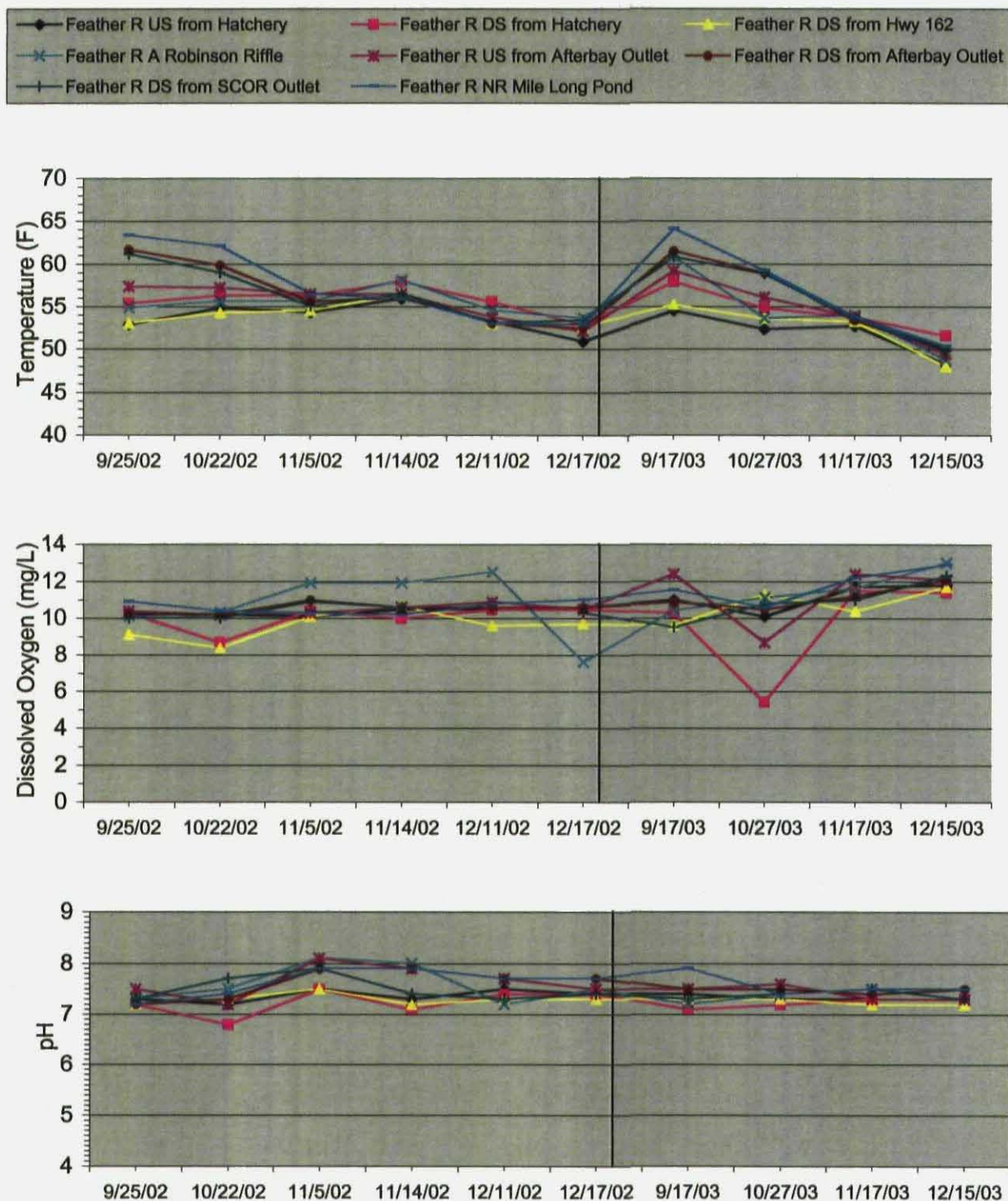
Figure 5.1.15.1-1. Continued.



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**Figure 5.1.15.1-2. Water quality during the fall in the Feather River.**

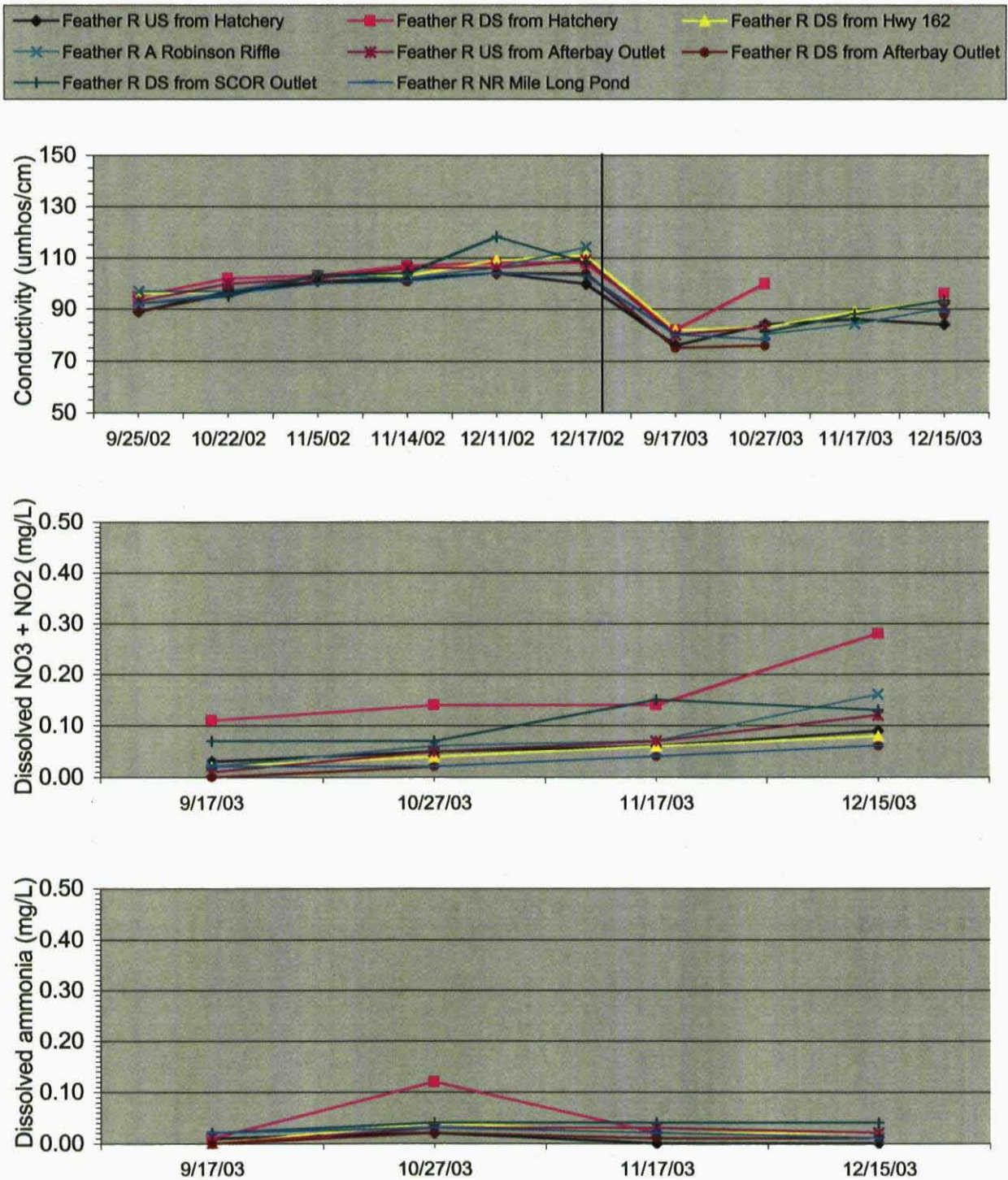


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Figure 5.1.15.1-2. Continued.



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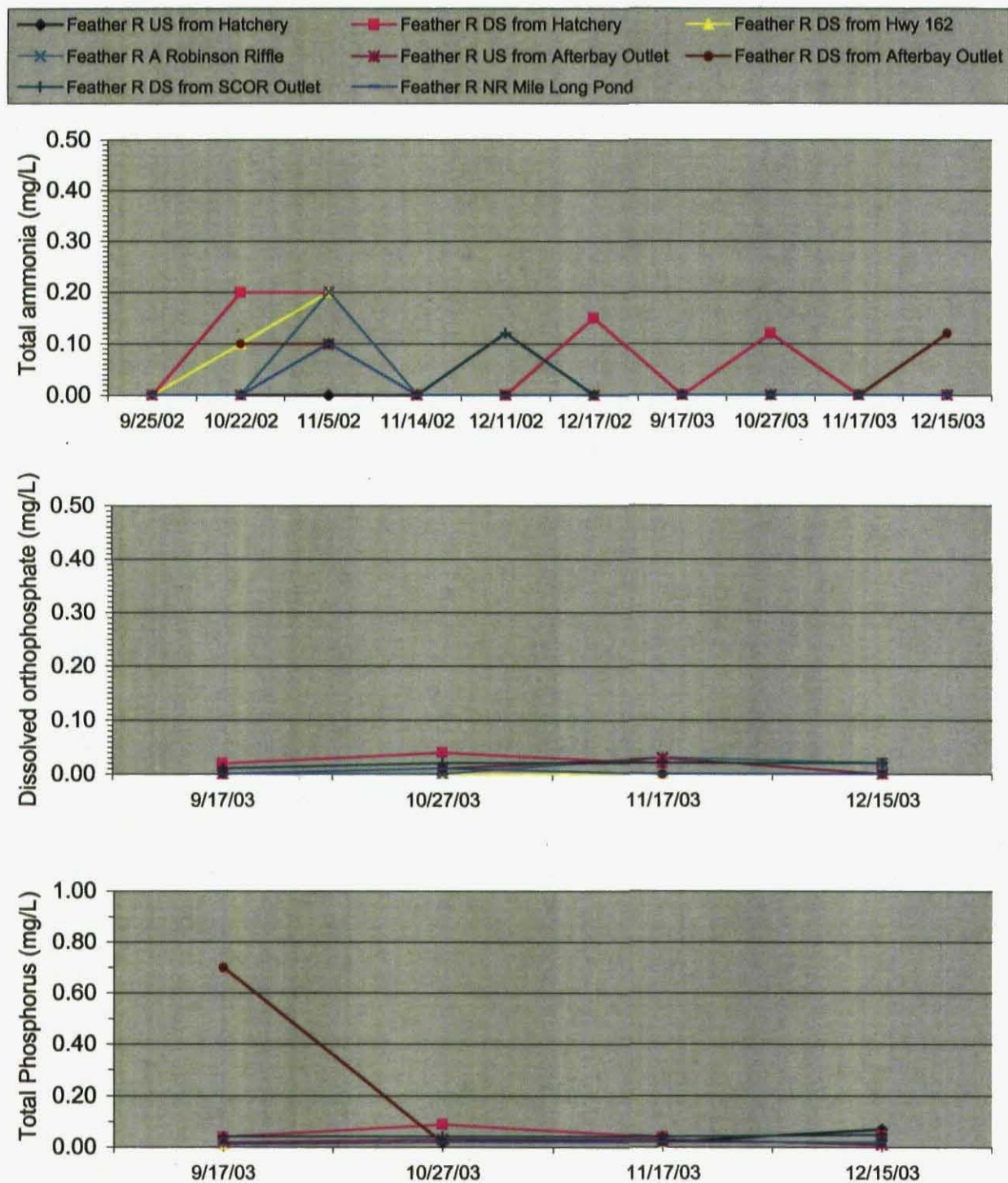
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Figure 5.1.15.1-2. Continued.



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#### **5.1.15.2 SCOR Outlet**

Nutrients, dissolved oxygen, temperature, conductivity, and pH in the water and within gravels were analyzed monthly in the Feather River upstream and downstream from the SCOR discharge. A perforated metal pipe was driven into the gravels at each monitoring site. Water aspirated from within the pipe with a peristaltic pump was allowed to purge for five minutes before performing analyses. A large island splits the flow of the Feather River immediately downstream from the SCOR outlet. Therefore, samples were collected from both the right bank (Feather River downstream SCOR Outlet) and left bank (Feather River downstream SCOR at Island) channels.

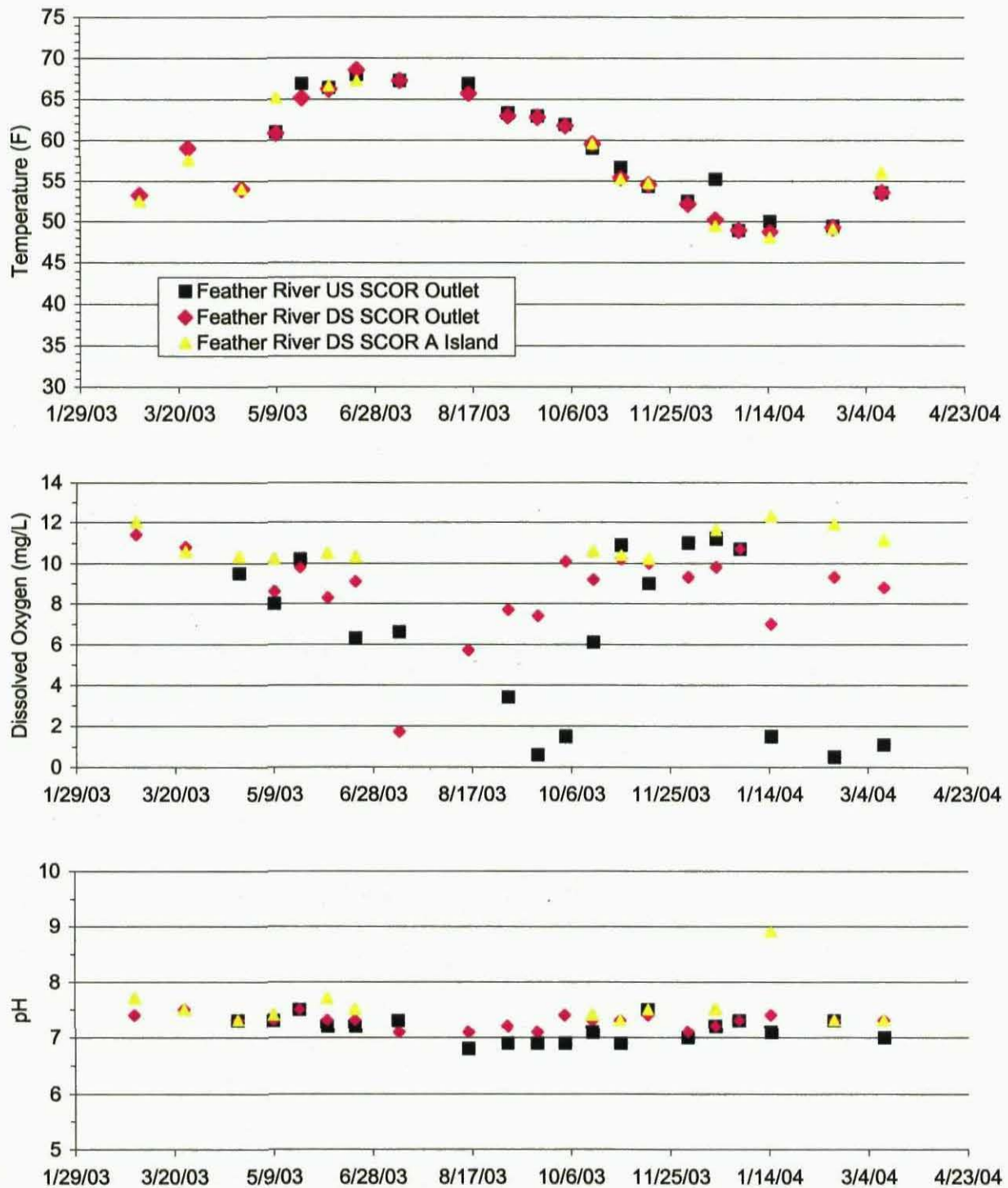
No differences in temperature within the gravels are apparent between the monitoring sites in the Feather River upstream and the two sites downstream from the SCOR Outlet (Figure 5.1.15.2-1). Dissolved oxygen, however, was often significantly higher in interstitial samples downstream from the SCOR Outlet than the upstream site, while pH and conductivity were similar amongst all three sites. Study plan SPW9 evaluated Project effects on natural protective processes, including the function of riffles in maintaining water quality (DWR 2004g). This study also identified low interstitial dissolved oxygen at the monitoring sites upstream and downstream from the SCOR Outlet. This report determined that low interstitial dissolved oxygen was caused by high silt and fine sediments in these two riffles, and could have an impact on interstitial macroinvertebrates and fish egg and larvae survival. Dissolved nitrate plus nitrite was usually at lower concentrations at the monitoring site upstream from the SCOR Outlet than the downstream sites, and at the downstream sites was lower from samples collected from the left bank channel than those from the right bank channel, which may indicate that most of the discharge from the SCOR Outlet is carried to the right bank channel of the river. Dissolved ammonia was usually at greater concentrations in the Feather River upstream from the SCOR Outlet, while total ammonia was usually at similar concentrations between the upper and lower sites, but on several occasions was present at greater concentrations from the upstream site. Dissolved orthophosphate was often at slightly greater concentrations from samples collected from the right bank channel than the upstream site, while total phosphorus was often at slightly greater concentrations at the upstream site than the downstream sites. The left bank channel displayed lower concentrations of dissolved orthophosphate and total phosphorus than was found from the right bank channel, again indicating that most of the discharge from the SCOR Outlet probably travels to the right bank channel of the river.

Samples for evaluation of river water quality conditions were often collected on different days than when the interstitial gravels were sampled. River water quality can fluctuate from day to day, depending on releases to the river from the Project and climatic conditions. Though originally deemed adequate by the Environmental Workgroup, SPW9 found the time differences in sample collection made comparisons difficult between overlying river water and gravel interstitial water (DWR 2004g). Therefore,

surface water samples were collected at the same time as interstitial samples beginning in January 2004.

The water quality data indicate some differences between the interstitial gravels and overlying water. Temperatures and pH were essentially the same in the gravel and overlying stream waters (Table 5.1.15.2-1). Dissolved oxygen in overlying water from the Feather River upstream from the SCOR Outlet was significantly higher than that in the interstitial gravels, which was severely depressed. Conductivity was about the same in both overlying waters and interstitial gravels, except from the river upstream from the SCOR Outlet which was higher in January and February, but lower in March. Dissolved nitrate plus nitrite, dissolved ammonia, and dissolved orthophosphate did not display a clear pattern. Dissolved nitrate plus nitrite was much higher from the overlying water than interstitial gravel samples from the site upstream from the SCOR Outlet, but was much higher in the interstitial gravel samples in several samples collected from the monitoring sites downstream from the SCOR Outlet. Dissolved ammonia and orthophosphate also showed variable results, with interstitial gravels at times at higher concentrations than the overlying water, but at other times with lower concentrations. Total ammonia was not found at concentrations above the detection limit from any of the sites. Total phosphorus was usually at higher concentrations from the interstitial gravel samples at all of the sites, with the highest concentrations found upstream from the SCOR Outlet.

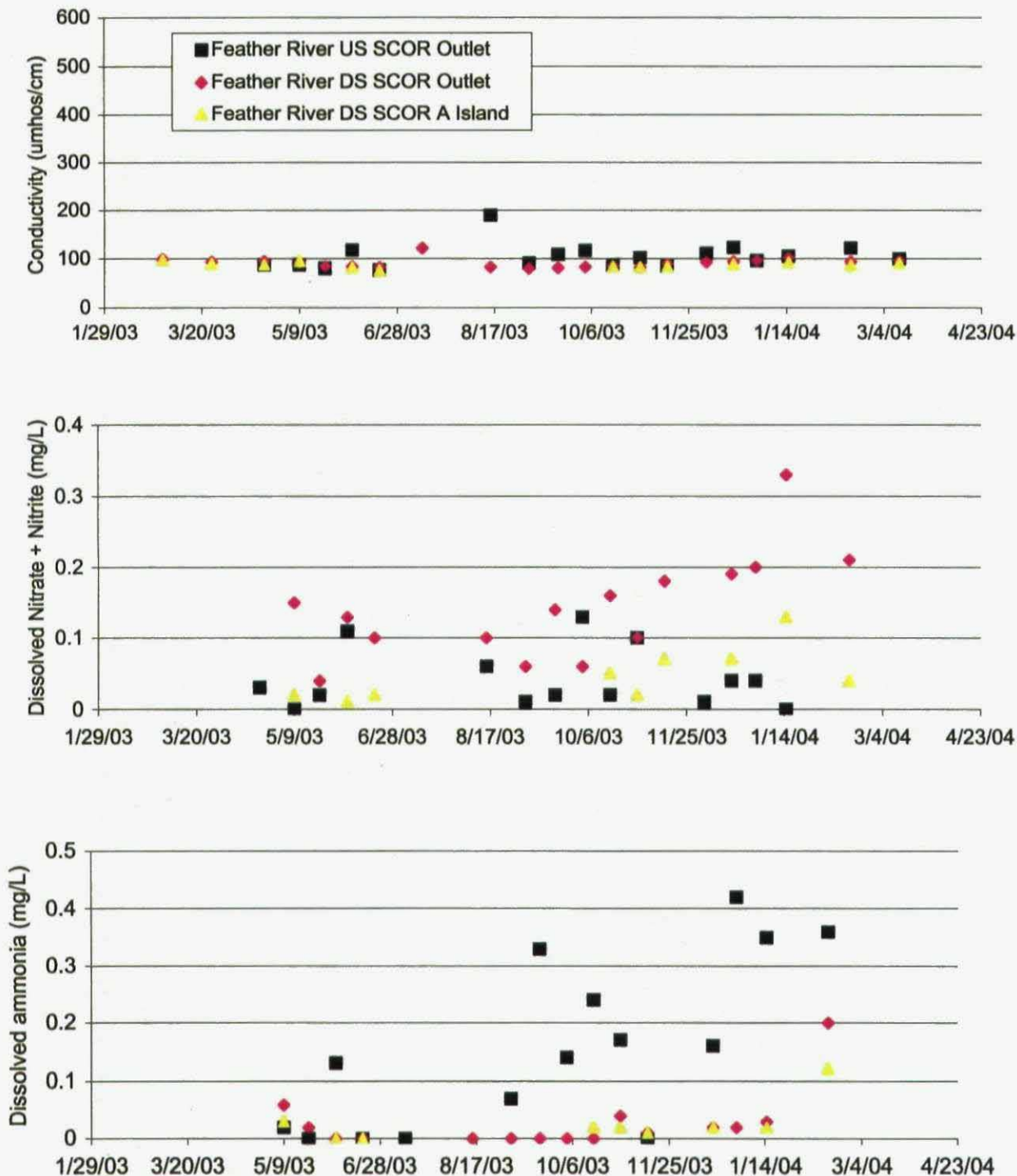
**Figure 5.1.15.2-1. Results of interstitial gravel monitoring upstream and downstream from the SCOR Outlet.**



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Figure 5.1.15.2-1. Continued.



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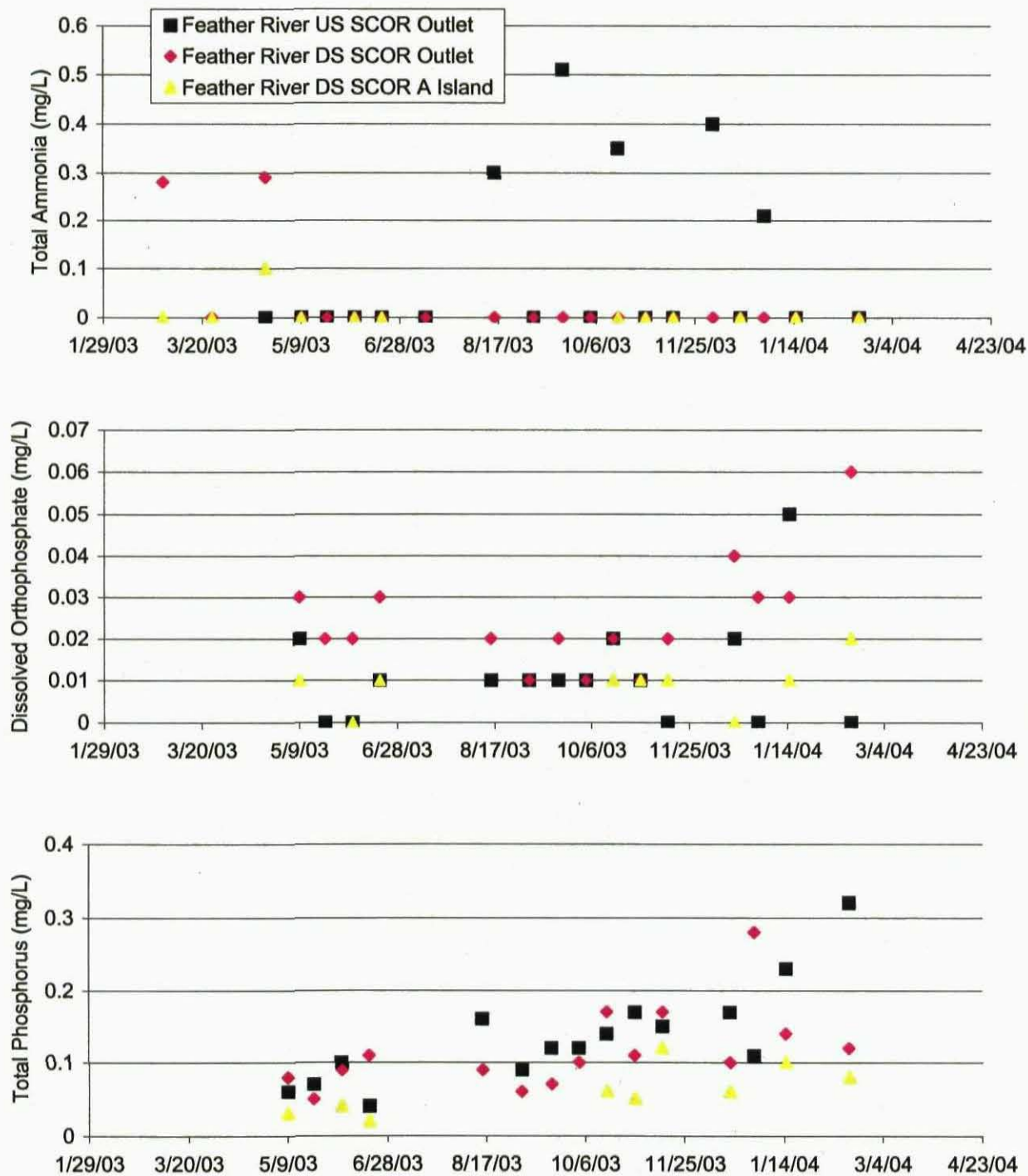
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Figure 5.1.15.2-1. Continued.



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**Table 5.1.15.2-1. Comparison of surface and interstitial water samples upstream and downstream from the SCOR Outlet.**

<u>Sample Site</u>	<u>Date</u>	<u>Time</u>	<u>Temp</u> <u>°F</u>	<u>Dissolved</u>	<u>pH</u>	<u>Conductivity</u> <u>(umhos/cm)</u>	<u>Dissolved</u>		<u>Total</u> <u>NH3</u> <u>(mg/L)</u>	<u>Dissolved</u>	<u>Total</u> <u>Phos-</u> <u>phorus</u> <u>(mg/L)</u>
				<u>Oxygen</u> <u>(mg/L)</u>			<u>NO3+NO2</u> <u>(mg/L)</u>	<u>NH3</u> <u>(mg/L)</u>		<u>Ortho-</u> <u>phosphate</u> <u>(mg/L)</u>	
Feather River US SCOR Outlet - IG	1/15/04	1310	50.0	1.5	7.1	105	0.04	0.35	<0.1	0.05	0.23
Feather River US SCOR Outlet - IG	2/16/04	1110	49.5	0.5	7.3	122	<0.01	0.36	<0.1	<0.01	0.32
Feather River US SCOR Outlet - IG	3/12/04	1230	53.6	1.1	7.0	99	<0.01	<0.01	<0.1	0.01	0.09
Feather River US SCOR Outlet - Water	1/15/04	1315	48.2	12.7	7.2	99	0.21	0.1	<0.1	0.05	0.09
Feather River US SCOR Outlet - Water	2/16/04	1115	48.9	11.6	7.3	95	0.05	0.36	<0.1	0.06	0.16
Feather River US SCOR Outlet - Water	3/12/04	1235	53.8	11.3	7.5	128	0.02	0.05	<0.1	0.01	0.03
Feather River DS SCOR A Island - IG	1/15/04	1400	48.0	12.3	8.9	92	0.13	0.02	<0.1	0.01	0.1
Feather River DS SCOR A Island - IG	2/16/04	1245	49.1	11.9	7.3	86	0.04	0.12	<0.1	0.02	0.08
Feather River DS SCOR A Island - IG	3/12/04	1325	55.9	11.1	7.3	90	<0.01	0.04	<0.1	<0.01	0.07
Feather River DS SCOR A Island -Water	1/15/04	1400	47.8	12.5	8.8	92	0.09	0.02	<0.1	0.01	0.02
Feather River DS SCOR A Island -Water	2/16/04	1245	49.1	11.9	7.3	86	0.06	0.47	<0.1	0.08	0.1
Feather River DS SCOR A Island -Water	3/12/04	1330	55.0	11.9	7.4	95	<0.01	0.03	<0.1	<0.01	0.02
Feather River DS SCOR Outlet - IG	1/15/04	1335	48.7	7.0	7.4	102	0.33	0.03	<0.1	0.03	0.14
Feather River DS SCOR Outlet - IG	2/16/04	1215	49.3	9.3	7.3	93	0.21	0.2	<0.1	0.06	0.12
Feather River DS SCOR Outlet - IG	3/12/04	1250	53.6	8.8	7.3	94	<0.01	0.11	<0.1	0.02	0.09
Feather River DS SCOR Outlet - Water	1/15/04	1340	48.2	12.5	7.5	96	0.16	0.07	<0.1	0.03	0.05
Feather River DS SCOR Outlet - Water	2/16/04	1220	49.3	9.3	7.3	93	0.03	0.12	<0.1	0.02	0.04
Feather River DS SCOR Outlet - Water	3/12/04	1255	54.7	11.9	7.4	95	<0.01	0.04	<0.1	<0.01	0.02

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### **5.1.15.3 Nutrient Deprivation**

Concern was expressed that Oroville Dam blocked upstream migration of anadromous fish which has led to nutrient deprivation in the upper tributaries. Increased nutrients are assumed to be necessary to stimulate increased productivity in the upper tributaries, though it has not been shown that productivity is low. Normal laboratory detection limits for nutrients were often too high to detect nutrient concentrations in the upper tributaries, though this is also the case in Project waters. Therefore, arrangements were made with Am Test Laboratories in Redmond, Washington to analyze samples for nutrients requested by consultants to DWR at low detection levels.

Analyses were conducted for low level nutrients from samples collected monthly from September 2003 through February 2004 at four of the monitoring stations in the upper watershed, which included the West Branch Feather River near Paradise, North Fork Feather River upstream from Poe Power House, Middle Fork Feather River near Merrimac, and South Fork Feather River upstream from Ponderosa Reservoir (Table 5.1.15.3-1).

Estimated increases in nutrients potentially attributable to decomposing salmon carcasses in the upper tributaries were made for August through November (DWR 2003). The estimated nutrients included total nitrogen and total phosphorus. Comparison of nutrient analyses with the estimated nutrient enrichment required summation of total ammonia and nitrate plus nitrite analyses to approximate total nitrogen (though the calculated value does not include all forms of nitrogen) (Table 5.1.15.3-2). While actual total nitrogen concentrations in the tributaries were at levels greater than the low range of the estimated contribution from salmon in all the tributaries, the high range of estimated total nitrogen contribution from salmon was much higher than that measured in the tributaries during August through November. Total phosphorus was usually higher in the actual measurements than both the low and high ranges of estimated contribution from salmon, except in the South Fork where the high range of the estimated contribution was greater. However, nutrients measured in subsequent months in the tributaries were substantially greater than the estimated contribution of salmon in the August through November period.

In addition, it is likely that additional nutrients added from decomposing salmon carcasses would cause the nutrient concentrations in the tributaries to Lake Oroville to exceed the USEPA Recommended Ecoregional Nutrient Criteria (USEPA 2000b). These criteria are intended to provide for the protection and propagation of aquatic life and recreation, and set the total nitrogen criterion at 0.12 mg/L and the total phosphorus criterion at 0.01 mg/L. Nutrient data collected in these tributaries from September to December (the time at which salmon carcasses would be present) show that these criteria are already exceeded on various occasions throughout the watershed, and there are many times when the criteria are close to being exceeded (Table 5.1.15.3-3).



**Table 5.1.15.3-1. Results of low level nutrient analyses in the upper tributaries.**

Station Name	Date	Total NH3	Nitrate + Nitrite	Ortho- PO4	Total P
Feather R Middle Fork near Merrimac	9/16/03	<0.005	0.001	0.002	0.001
Feather R Middle Fork near Merrimac	10/16/03	-	-	0.004	-
Feather R Middle Fork near Merrimac	11/12/03	<0.005	0.003	<0.005	0.009
Feather R Middle Fork near Merrimac	12/9/03	0.028	0.014	0.013	0.044
Feather R Middle Fork near Merrimac	1/14/04	<0.005	<0.001	<0.005	<0.001
Feather R Middle Fork near Merrimac	2/18/04	0.08	0.061	0.012	0.013
Feather R Middle Fork near Merrimac	3/15/04	<0.005	0.016	<0.005	0.02
South Fork Feather R US Ponderosa Res	9/16/03	<0.005	<0.001	<0.001	<0.001
South Fork Feather R US Ponderosa Res	10/16/03	-	-	<0.001	-
South Fork Feather R US Ponderosa Res	11/12/03	<0.005	0.004	<0.005	0.001
South Fork Feather R US Ponderosa Res	12/9/03	<0.005	<0.001	0.004	0.016
South Fork Feather R US Ponderosa Res	1/15/04	0.051	0.002	<0.005	<0.001
South Fork Feather R US Ponderosa Res	2/18/04	0.04	0.028	0.007	0.015
South Fork Feather R US Ponderosa Res	3/15/04	0.01	0.014	<0.005	0.007
North Fork Feather R US Poe PH	9/16/03	<0.005	0.001	0.001	<0.001
North Fork Feather R US Poe PH	10/16/03	-	-	0.003	-
North Fork Feather R US Poe PH	11/12/03	<0.005	0.007	<0.005	0.004
North Fork Feather R US Poe PH	12/9/03	0.19	0.039	0.007	0.007
North Fork Feather R US Poe PH	1/14/04	<0.005	0.035	<0.005	<0.001
North Fork Feather R US Poe PH	2/18/04	0.05	0.095	0.016	0.022
North Fork Feather R US Poe PH	3/15/04	0.022	0.037	0.007	0.012
West Branch Feather R near Paradise	9/16/03	<0.005	0.001	0.002	<0.001
West Branch Feather R near Paradise	10/16/03	-	-	0.003	-
West Branch Feather R near Paradise	11/12/03	<0.005	<0.001	<0.005	0.002
West Branch Feather R near Paradise	12/9/03	0.24	0.01	0.006	0.012
West Branch Feather R near Paradise	1/14/04	<0.005	0.017	<0.005	<0.001
West Branch Feather R near Paradise	2/18/04	0.05	0.03	0.008	0.015
West Branch Feather R near Paradise	3/15/04	0.058	0.019	<0.005	0.013

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**Table 5.1.15.3-2. Comparison of total nitrogen and phosphorus from the tributaries with estimated enrichment from salmon carcasses.**

Station Name	Date	Total Nitrogen (Total NH3 + Nitrate/Nitrite)	Nitrogen Enrichment From Salmon	Total P	Phosphorus Enrichment From Salmon
Feather R Middle Fork near Merrimac	9/16/03	>0.001	0.00011-0.00483	0.001	0.00001-0.00048
Feather R Middle Fork near Merrimac	10/16/03		0.00011-0.00483	-	0.00001-0.00048
Feather R Middle Fork near Merrimac	11/12/03	>0.003	0.00011-0.00483	0.009	0.00001-0.00048
Feather R Middle Fork near Merrimac	12/9/03	0.042		0.044	
Feather R Middle Fork near Merrimac	1/14/04	<0.001		<0.001	
Feather R Middle Fork near Merrimac	2/18/04	0.141		0.013	
Feather R Middle Fork near Merrimac	3/15/04	>0.016		0.02	
South Fork Feather R US Ponderosa Res	9/16/03	<0.001	0.00072-0.03268	<0.001	0.00005-0.00327
South Fork Feather R US Ponderosa Res	10/16/03		0.00072-0.03268	-	0.00005-0.00327
South Fork Feather R US Ponderosa Res	11/12/03	>0.004	0.00072-0.03268	0.001	0.00005-0.00327
South Fork Feather R US Ponderosa Res	12/9/03	<0.001		0.016	
South Fork Feather R US Ponderosa Res	1/15/04	0.053		<0.001	
South Fork Feather R US Ponderosa Res	2/18/04	0.068		0.015	
South Fork Feather R US Ponderosa Res	3/15/04	0.024		0.007	
North Fork Feather R US Poe PH	9/16/03	>0.001		<0.001	
North Fork Feather R US Poe PH	10/16/03			-	
North Fork Feather R US Poe PH	11/12/03	>0.007		0.004	
North Fork Feather R US Poe PH	12/9/03	0.229		0.007	
North Fork Feather R US Poe PH	1/14/04	>0.035		<0.001	
North Fork Feather R US Poe PH	2/18/04	0.145		0.022	
North Fork Feather R US Poe PH	3/15/04	0.059		0.012	
West Branch Feather R near Paradise	9/16/03	>0.001	0.00036-0.01613	<0.001	0.00003-0.00161
West Branch Feather R near Paradise	10/16/03		0.00036-0.01613	-	0.00003-0.00161
West Branch Feather R near Paradise	11/12/03	<0.001	0.00036-0.01613	0.002	0.00003-0.00161
West Branch Feather R near Paradise	12/9/03	0.25		0.012	
West Branch Feather R near Paradise	1/14/04	>0.017		<0.001	
West Branch Feather R near Paradise	2/18/04	0.08		0.015	
West Branch Feather R near Paradise	3/15/04	0.077		0.013	

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**Table 5.1.15.3-3. Total nitrogen and phosphorus from the tributaries in relation to USEPA recommended criteria.**

Station	Date	Time	Total Nitrogen (NO3+NO2+Total NH3)	Total Phosphorus
WEST BRANCH NR PARADISE	09/24/02	0630	0.02	0.02
WEST BRANCH NR PARADISE	10/18/02	0745	<0.02	0.03
WEST BRANCH NR PARADISE	11/12/02	1245	0.03	0.01
WEST BRANCH NR PARADISE	12/10/02	1200	0.02	0.01
WEST BRANCH NR PARADISE	12/16/02	1345	0.03	0.04
WEST BRANCH NR PARADISE	09/16/03	1140	0.03	0.02
WEST BRANCH NR PARADISE	10/16/03	1315	0.02	0.01
WEST BRANCH NR PARADISE	11/12/03	1515	0.02	0.02
WEST BRANCH NR PARADISE	12/09/03	1230	0.04	0.02
CONCOW C A JORDAN HILL RD.	09/24/02	0800	0.02	0.01
CONCOW C A JORDAN HILL RD.	10/18/02	0900	0.12	0.01
CONCOW C A JORDAN HILL RD.	11/12/02	1115	0.06	<0.01
CONCOW C A JORDAN HILL RD.	12/10/02	1040	0.03	<0.01
CONCOW C A JORDAN HILL RD.	12/16/02	1230	0.02	0.02
CONCOW C A JORDAN HILL RD.	09/16/03	1015	0.12	<0.01
CONCOW C A JORDAN HILL RD.	10/16/03	1135	0.15	0.04
CONCOW C A JORDAN HILL RD.	11/12/03	1400	0.15	0.02
CONCOW C A JORDAN HILL RD.	12/09/03	1110	0.02	0.01
NF FEATHER R US POE PH	09/24/02	0900	0.02	0.01
NF FEATHER R US POE PH	10/18/02	0945	<0.01	<0.01
NF FEATHER R US POE PH	11/12/02	0930	0.09	0.03
NF FEATHER R US POE PH	12/10/02	0900	0.01	0.07
NF FEATHER R US POE PH	12/16/02	1015	0.17	0.12
NF FEATHER R US POE PH	09/16/03	0840	0.05	0.01
NF FEATHER R US POE PH	10/16/03	0930	0.02	<0.01
NF FEATHER R US POE PH	11/12/03	1230	0.02	0.02
NF FEATHER R US POE PH	12/09/03	0915	0.12	0.02
FEATHER R MF NR MERRIMAC	09/24/02	1530	<0.01	<0.01
FEATHER R MF NR MERRIMAC	10/17/02	0800	0.03	<0.01
FEATHER R MF NR MERRIMAC	11/12/02	1010	<0.01	0.01
FEATHER R MF NR MERRIMAC	12/10/02	1230	0.71	0.01
FEATHER R MF NR MERRIMAC	09/16/03	0745	<0.10	0.01
FEATHER R MF NR MERRIMAC	10/16/03	1300	<0.10	0.01
FEATHER R MF NR MERRIMAC	11/12/03	0945	<0.10	0.02
FEATHER R MF NR MERRIMAC	12/09/03	1220	0.05	0.02
SF FEATHER AB POND. RES	09/24/02	1215	0.01	<0.01
SF FEATHER AB POND. RES	10/17/02	1115	<0.1	<0.01
SF FEATHER AB POND. RES	11/12/02	1310	<0.1	0.02
SF FEATHER AB POND. RES	12/10/02	1000	0.07	0.02
SF FEATHER AB POND. RES	12/16/02	1130	0.03	0.1
SF FEATHER AB POND. RES	09/16/03	1015	<0.10	<0.01
SF FEATHER AB POND. RES	10/16/03	0945	0.01	0.05
SF FEATHER AB POND. RES	11/12/03	0930	0.01	0.04
SF FEATHER AB POND. RES	12/09/03	0850	0.01	0.02

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Table 5.1.15.3-3 continued.

Station	Date	Time	Total Nitrogen (NO <sub>3</sub> +NO <sub>2</sub> +Total NH <sub>3</sub> )	Total Phosphorus
SUCKER RUN NR FORBESTOWN	09/24/02	1420	0.02	0.02
SUCKER RUN NR FORBESTOWN	10/17/02	1000	0.1	<0.01
SUCKER RUN NR FORBESTOWN	11/12/02	1430	<0.1	0.04
SUCKER RUN NR FORBESTOWN	12/09/02	1200	<0.1	0.02
SUCKER RUN NR FORBESTOWN	12/16/02	1330	0.03	0.07
SUCKER RUN NR FORBESTOWN	09/15/03	1225	0.02	0.01
SUCKER RUN NR FORBESTOWN	10/15/03	1315	0.02	<0.01
SUCKER RUN NR FORBESTOWN	11/12/03	1215	<0.10	0.02
SUCKER RUN NR FORBESTOWN	12/09/03	1000	<0.10	0.02
USEPA Recommended Ecoregional Nutrient Criteria exceeded				
USEPA Recommended Ecoregional Nutrient Criteria - at the limit,				
any additional nutrients would cause the criteria to be exceeded				
USEPA Recommended Ecoregional Nutrient Criteria could be				
exceeded with addition of salmon carcasses				
(used nutrient enrichment values from table 5.1.15.3-2)				

Note: North Fork Feather River upstream of Poe PH used nutrient enrichment values from the South Fork

As mentioned previously, direct measurements of nutrients in the water column can be of limited value in determining changes, if any, in type or abundance within the periphyton community (Robertson 1999). Even when available nutrients are low in the water column, nutrients for periphyton growth are stored in stream sediments and enter the system from external sources. Nitrogen and phosphorus are considered the primary limiting factors to algae in stream systems (Wold and Hershey 1999). While algal growth bioassays indicate that nitrogen and phosphorus can be the primary limiting factors in algal growth, there is no direct evidence that these nutrients perform the same way under natural conditions (Baker et al. 2000, Robertson 1999, Winterbourn 1990). Many algal growth bioassays, which are essentially nutrient enrichment experiments, yield mixed results, with little or no significant change in algal biomass despite the added nutrients (Tank and Dodds 2003).

The low flow channel downstream from Oroville Dam receives the bulk of natural salmon spawning activity in the Feather River. As such, this reach should receive any benefit of nutrient additions from decomposing salmon carcasses. Additional nutrients may stimulate periphyton growth, which could subsequently benefit the aquatic macroinvertebrate community.

Comparison of periphyton in tributaries upstream from Lake Oroville with those in the low flow channel of the Feather River downstream from the Highway 162 bridge, at Robinson Riffle, and upstream from the Thermalito Afterbay Outlet shows very similar communities. The periphyton communities in the North Fork upstream from Poe Power House, Middle Fork at Merrimac, and South Fork upstream from Ponderosa Dam are dominated by diatoms and followed in abundance by green and blue-green algae, as are communities in the low flow channel (Appendix 7). Diatom densities in the upper

tributaries generally ranged from 100 to 650 organisms per 40 cm<sup>2</sup>, which is very similar to the densities found in the low flow channel (100 to 875 organisms per 40 cm<sup>2</sup>). Some samples from each station displayed uncharacteristically high populations of diatoms. In May 2003 about 1,800 diatoms per 40 cm<sup>2</sup> were found in the sample from the North Fork, while a month later over 2,800 diatoms per 40 cm<sup>2</sup> were found in the sample from the Middle Fork. Similarly, very high densities of diatoms were reported from monitoring sites in the low flow channel in different months (about 1,800 diatoms per 40 cm<sup>2</sup> from upstream of the Thermalito Afterbay Outlet in December 2003, 1,900 diatoms per 40 cm<sup>2</sup> at Robinson Riffle in January 2004, and 2,565 and 3,420 diatoms per 40 cm<sup>2</sup> in May and October 2003 downstream from the Highway 162 bridge). These variable diatom densities are probably an artifact of the sampling method, but do indicate that high periphyton densities are possible in the upstream reaches of the Feather River.

During the fall, nutrient addition from decomposing salmon carcasses would presumably be the most important. Diatom densities in September 2003 in the North and South forks reached about 250 diatoms per 40 cm<sup>2</sup> and in the Middle Fork reached about 650 diatoms per 40 cm<sup>2</sup>, while densities at the low flow channel monitoring sites ranged from about 250 to 875 diatoms per 40 cm<sup>2</sup>. However, in November 2003, diatom density in the Middle Fork was only about 100 organisms per 40 cm<sup>2</sup>, while those in the low flow channel ranged from about 100 to 225 organisms per 40 cm<sup>2</sup>. Other monitoring sites upstream from Lake Oroville, however, had higher periphyton densities than sites in the low flow channel in November (e.g., about 350 diatoms per 40 cm<sup>2</sup> in the North Fork).

With the exception of the unusual sample from the Feather River downstream from the Highway 162 bridge in October, the periphyton data do not show an increase in density from salmon carcass decomposition in the low flow section. In fact, one station shows a decrease within the time period when salmon carcasses are present.

The data indicate that periphyton densities are highly variable (which may be an artifact of the limited sampling data and techniques) and that little differences are apparent between the upper tributaries and low flow channel.

Aquatic macroinvertebrate communities display many similarities and some dissimilarities between monitoring sites upstream from Lake Oroville and those in the low flow channel (Table 5.1.15.3-4). Sampling sites in the tributaries upstream from Lake Oroville had greater taxonomic richness, cumulative taxa, and cumulative EPT (Ephemeroptera, Plecoptera, and Trichoptera) taxa than sampling sites in the low flow channel. Other summary metrics, such as Shannon diversity, tolerance value, and percent chironomidae, were similar between the tributary and low flow channel stations. Percent collectors, filterers, predators, and shredders were variable between the sites, but overall were similar between the tributary and low flow channel stations. Percent grazers, however, were clearly more abundant in the tributary stations, which may indicate greater reliance on periphyton as a food source at these sites. With the exception of the Robinson Riffle monitoring station in the low flow channel, average abundances at the monitoring stations were similar.

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**Table 5.1.15.3-4. Summary data for aquatic macroinvertebrates collected in September 2002.**

	North Fork Feather River	Middle Fork Feather River	South Fork Feather River	West Branch Feather River	Feather River at Hwy 162 Bridge	Feather River at Robinson Riffle	Feather River US Afterbay Outlet
Taxonomic Richness	20	30	28	30	19	19	19
Cumulative Taxa	37	44	38	45	29	27	31
% Dominant Taxon	42	26	54	26	62	27	32
EPT Taxa	10	18	7	15	7	6	6
EPT Index (%)	39	68	18	53	26	69	55
Sensitive EPT Index (%)	1	11	0	21	1	7	0
Cumulative EPT Taxa	15	28	12	28	9	8	10
Shannon Diversity	1.9	2.5	2.0	2.6	1.5	2.1	2.0
Tolerance Value	5.4	4.3	5.6	4.0	5.6	4.7	5.2
% Intolerant Taxa (0-2)	1	11	2	19	1	7	0
% Tolerant Taxa (8-10)	1	1	2	2	2	5	8
% Chironomidae	28	9	54	26	62	10	15
% Collectors	51	51	68	52	81	62	49
% Filterers	36	34	15	17	10	27	40
% Grazers	11	10	9	23	5	5	8
% Predators	3	4	8	7	5	6	3
% Shredders	0	1	0	1	0	0	0
Average Abundance (#/ sample)	3580	6292	3435	3834	4567	16527	5084

Average abundances at the tributary stations are also similar to the abundances found in other higher elevation streams in which migrating salmonids have access (DWR, unpublished data, Table 5.1.15.3-5). Deer and Mill Creek both support distinct spring and fall runs of Chinook salmon (DFG 1993, USFWS 1997), which is similar to the Feather River prior to construction of Oroville Dam. Both average abundance and cumulative taxa indicate little difference between streams where salmonids have access and the tributaries upstream from Lake Oroville.

Study Plan F1 evaluated Project effects to aquatic macroinvertebrates. The report concludes that "although data indicates that streams upstream of Lake Oroville contain



low levels of nutrients, streams above the lake are not categorized as nutrient starved. The data also indicate that healthy populations of aquatic macroinvertebrates currently exist in the upstream tributaries" (DWR 2004). This conclusion is supported by Robertson (1999) who in a study on algal periphyton and nutrient limitations asserts that nutrient flux, not the nutrients in the water column at any given moment, supports the benthic communities. Though decomposing salmon carcasses could be a major source of nutrients, the periphyton and macroinvertebrate data from the tributaries do not indicate that any lack of nutrients is depressing aquatic productivity.

However, additional data should be collected. When originally developed, the periphyton sampling program was meant only to provide data to be used as an indicator of water quality. The sampling methodology was appropriate for that purpose. Subsequently, however, the issue of nutrient deprivation arose. A more systematic and standardized sampling regime is necessary to present a more robust assessment of possible effects of nutrient enrichment or deprivation. The available data, however, do not indicate any adverse effects from nutrient deprivation.

**Table 5.1.15.3-5. Summary metrics for aquatic macroinvertebrate monitoring stations in the upper tributaries, low flow channel, and Deer and Mill creeks.**

	Average Abundance (organisms per sample)	Cumulative Taxa
North Fork Feather River	3580	37
Middle Fork Feather River	6292	44
South Fork Feather River	3435	38
West Branch Feather River	3834	45
Feather River at Hwy 162 Bridge	4567	29
Feather River at Robinson Riffle	16527	27
Feather River US Afterbay Outlet	5084	31
Deer Creek at Upper Diversion Dam	6691	32
Deer Creek below Upper Falls	4025	51
Deer Creek at A-Line	5408	49
Mill Creek at Black Rock	4885	45
Mill Creek below Hwy 36	3262	29
Mill Creek at Hole-in-Ground	4274	36

## 6.0 ANALYSES

This section evaluates the results from the study to describe existing water quality conditions, and determine effects from the Project on water quality objectives, designated beneficial uses, and potential effects from future Project operations that may differ from those in place during this study.

### 6.1 EXISTING CONDITIONS/ENVIRONMENTAL SETTING

Water quality in the Project area is generally good. The quality of water released from Oroville Dam determines water quality downstream in the Feather River, which subsequently determines water quality following diversion to the Thermalito Forebay and Thermalito Afterbay. Water released back to the Feather River at the Thermalito Afterbay Outlet is influenced by passage through the Forebay and Afterbay.

Water temperatures downstream from Oroville Dam are controlled by temperature requirements at the Feather River Fish Hatchery. Releases are made from the reservoir to provide temperatures suitable for fish propagation at the hatchery. Meeting temperature objectives at the hatchery generally also provide suitable temperatures at Robinson Riffle in the low flow section. Sufficient cold water is available in the reservoir to meet downstream temperature requirements, except in critically dry years, during which the cold water pool in the reservoir may be depleted. Water released from the reservoir to comply with fishery temperature needs conflicts with temperature requirements for other beneficial uses, such as irrigation. Water is pumped back into the reservoir when power economics are favorable. Temperatures are closely monitored at the hatchery during pump back operations to insure that fish temperature requirements are not exceeded.

Water quality in Lake Oroville is affected by that in tributary streams, of which the North, Middle, and South forks of the Feather River contribute the bulk of the inflow to the reservoir. While generally representing the quality of the water in the upstream tributaries, thermal stratification during the summer occasionally leads to depressed dissolved oxygen conditions near the bottom of the water column. Nutrients and minerals in the reservoir were found at levels consistent with existing and proposed criteria, except for total phosphorus. Total phosphorus concentrations in the reservoir were occasionally at levels exceeding concentrations in the upstream tributaries and recommended water quality criteria. Metals exceeding various criteria in the reservoir include arsenic, aluminum, copper, iron, manganese, and lead. However, these and other metals are contributed to the reservoir in concentrations exceeding various criteria by the upper tributaries. Metals concentrations in the tributaries are generally greater than those found in the reservoir.

Water quality in the Feather River downstream from Oroville Dam is affected by that in releases from the reservoir. Though low dissolved oxygen conditions are occasionally

encountered in the reservoir, the dissolved oxygen in the Diversion Pool is at levels suitable for beneficial uses. Downstream in the Feather River, dissolved oxygen levels infrequently were found at levels less than those suitable for certain beneficial uses. Turbidity levels in the river downstream from the dam are less than those measured in tributaries to Lake Oroville, indicating that the reservoir acts as a settling basin for the turbid inflows. Nutrients and minerals downstream from Oroville Dam are at levels suitable for all beneficial uses. Metals in the Diversion Pool at the base of the dam reflect the quality of water in the reservoir near the dam. Further downstream, accretions to the river from tributaries, storm drains, surface runoff, and other sources affect water quality in the river. Metals occasionally exceeding various criteria within the Project boundary in the Feather River downstream from the Fish Barrier Dam include aluminum, arsenic, cadmium, copper, iron, and mercury.

Waters in the Thermalito Forebay and Afterbay reflect the quality of water diverted at the Diversion Pool dam. Only aluminum and arsenic were found at elevated levels in surface water samples from the Forebay, though cadmium and iron were reported at elevated levels from samples collected near the bottom. In addition to aluminum and arsenic in the Afterbay from surface water samples, manganese and lead were occasionally reported at elevated concentrations. Iron was occasionally also found in the Afterbay from bottom samples at concentrations exceeding some criteria.

Some ponds in the Oroville Wildlife Area also occasionally were found with depressed oxygen levels. While nutrients and minerals in the ponds were at acceptable levels, several metals occasionally were found at elevated levels. Aluminum, arsenic, and iron levels in the ponds were similar to concentrations found in the Feather River near the ponds. Occasionally manganese was also found at elevated levels in some ponds, though not present at elevated levels in the river.

Pesticides were not found in Project waters, though diuron was found upstream from Lake Oroville in the South Fork Feather River. MTBE was detected in the Diversion Pool.

Both total and fecal coliform bacteria were found from all water quality monitoring sites, but only fecal coliform bacteria exceeded criteria. The only site within Project waters exceeding the fecal coliform criteria was a pond in the Oroville Wildlife Area. Several other river sites were identified with elevated bacteria, including two within the Project boundary, though samples were not collected frequently enough to determine compliance with bacteria objectives. Total and fecal coliform and enterococcus bacteria were found at all swim areas and were present at some swim areas at densities greater than criteria. In addition to human contact with water, high wildlife use of the swim areas could contribute bacterial contamination.

The phytoplankton communities in Lake Oroville and the Thermalito Complex were dominated by diatoms, while green algae were dominant in ponds in the Oroville Wildlife



Area. Periphyton communities in the river were also generally dominated by diatoms, which are indicative of aquatic ecosystems that are not nutrient rich.

Aquatic macroinvertebrates in the Feather River are dominated by species that adapt readily to disturbed ecosystems. The species composition in the river near the dam is typical of that below large reservoirs. Further downstream, habitat conditions allow additional species to colonize.

Oroville Dam blocks movement of coarse sediment and most fine sediment to the Feather River. Occasional high flows scour smaller sediments so that the river bed is becoming increasingly composed of coarser materials.

Sites both upstream and downstream from Lake Oroville were identified that produced toxic effects to test organisms in bioassays. Both survival and reproduction of *Ceriodaphnia* and survival and growth of fathead minnow were affected. While all sites displayed some degree of toxicity, sites monitored in the vicinity of the hatchery displayed the most consistent toxicity.

Total suspended and settleable solids were usually reported at very low levels in both upstream tributaries and Project waters. Solids increased in the lower Feather River and were highest in the Sacramento River upstream from the confluence with the Feather River. Highest total suspended and settleable solids levels were usually found during winter months.

Color imparted to tributary or Project waters was not observed during monitoring. Color measured with a comparator produced results that were at the lower end of the color scale.

Tributaries transport woody debris into Lake Oroville. Heavy storms which lead to high runoff produce the most woody debris. During late winter and early spring, the woody debris is collected and transported to remote areas of the reservoir for burning. Though some minor amounts of woody debris may remain on the lake, these floating materials do not present a significant nuisance. No oil, grease, waxes, or other similar materials were evident during monitoring.

Odors described as "fishy," "septic," "algae," and "earthy" were noted for some monitoring sites. During the salmon spawning season, the large numbers of fish in the upper portion of the Feather River imparted a "fishy" odor. The hatchery waste water holding pond was reported on one occasion to contain a "septic" odor. Odors associated with algae were occasionally reported from sites in the low flow channel and ponds in the Oroville Wildlife Area, while the "earthy" odor was occasionally detected at sites downstream from the Project boundary, especially the Bear River.

The Feather River was monitored to determine effects to water quality from the large number of spawning salmon. Stream water was often of lower quality at the monitoring site downstream from the hatchery. The monitoring site downstream from the SCOR Outlet occasionally was reported with elevated levels of dissolved nitrate plus nitrite and total ammonia. Poor water quality in gravels was occasionally encountered. Low dissolved oxygen levels in the vicinity of the Afterbay Outlet is probably due to the higher sediment loads found in the gravels in this area. The data, however, do not indicate that spawning salmon are contributing to elevated concentrations of nutrients or decreased water quality.

Water quality in the Feather River is potentially affected by treated sewage discharged through the SCOR Outlet to the Feather River downstream from the Afterbay Outlet. Monitoring of gravels and water upstream and downstream from the SCOR Outlet produced variable results. Dissolved nitrate plus nitrite and dissolved orthophosphate were usually at higher concentrations in gravels downstream from the SCOR Outlet, while dissolved and total ammonia and total phosphorus were at least occasionally at greater concentrations from the upstream site. In the river upstream and downstream from the SCOR Outlet, dissolved nitrate plus nitrite, dissolved ammonia, and dissolved orthophosphate also did not display a clear pattern. Dissolved nitrate plus nitrite was much higher from the overlying water than interstitial gravel samples from the site upstream from the SCOR Outlet, but was much higher in the interstitial gravel samples in several samples collected from the monitoring sites downstream from the SCOR Outlet. Dissolved ammonia and orthophosphate were occasionally at higher concentrations in interstitial gravels than the overlying water, but at other times were at lower levels. Total phosphorus was usually at higher concentrations from the interstitial gravel samples than the overlying water at all of the sites, with the highest concentrations found upstream from the SCOR Outlet.

Periphyton and macroinvertebrate communities in the tributaries to Lake Oroville are indicative of healthy ecosystems. Both periphyton and macroinvertebrate communities are similar to those found in the Feather River downstream from Oroville Dam in the low flow section, as well as other streams in which anadromous salmonids spawn. Comparisons of the periphyton and macroinvertebrate communities in the upper tributaries with communities in the low flow channel and other streams do not indicate that the upstream tributaries suffer from nutrient deprivation due to purported blockage of salmonid spawning in the upper tributaries caused by Oroville Dam.

## **6.2 PROJECT RELATED EFFECTS**

### **6.2.1 Project Effects on Water Quality Objectives**

The Basin Plan has water quality objectives for various categories of substances or parameters for inland surface waters. Some objectives apply to all surface waters, while others apply to only certain water bodies or stream segments.

### **6.2.1.1 Bacteria**

The Basin Plan establishes objectives for coliform bacteria in waters designated for contact recreation. The Basin Plan requires that water designated for contact recreation shall not have fecal coliform bacteria in excess of a geometric mean of 200 bacteria per 100 mL of water from not less than five samples collected over a 30-day period and no more than ten percent of the total samples taken during any 30-day period shall have fecal bacteria in excess of 400 organisms per 100 mL.

The DHS recommends that beaches be posted or closed to protect public health when total coliform bacteria exceed 10,000 organisms, fecal coliform bacteria exceed 400 organisms, or enterococcus bacteria exceed 61 organisms per 100 mL of water sample. Additional sanitary surveys and evaluations are recommended when results of the log mean of at least five equally spaced samples in a 30-day period exceed 1,000 total coliform, 200 fecal coliform, or 33 enterococcus bacteria per 100 mL of sample.

In addition, the USEPA has developed national bacteria criteria for bathing (full body contact) recreational waters. The geometric mean of a statistically significant number of samples (not less than five equally spaced over a 30-day period) from freshwater should not have densities of enterococcus bacteria greater than 33 organisms per mL. Single sample maximum allowable densities of enterococcus bacteria per 100 mL are 61 organisms for designated beach areas, and 89 organisms for moderate, 108 organisms for light, and 151 organisms for infrequent full body contact recreation.

Bacteria data from monthly monitoring are too infrequent for application of the Basin Plan criteria. However, the criteria are used in this evaluation to indicate where elevated bacteria densities were found. The higher fecal coliform criterion (400 organisms per 100 mL) was occasionally exceeded at several sites (Fall River, Glen Pond, Glen Creek, Morris Ravine, Upper Pacific Heights Pond, North Forebay Creek, Honcut Creek, Bear River, Feather River upstream from the Yuba River and near Verona, Yuba River, and Sacramento River). The lower fecal coliform criterion (200 bacteria per 100 mL), in addition to the sites at which the upper criterion was exceeded, was occasionally exceeded at the Feather River downstream from the hatchery, downstream from the SCOR outlet, and at Archer Avenue, and from Robinson Riffle pond. Most of the samples that exceeded the criteria were collected during the winter, though the criteria were also exceeded during some summer months from Glen Creek, Morris Ravine, Upper Pacific Heights Pond, North Forebay Creek, Honcut Creek, and Robinson Riffle pond.

None of the sites monitored monthly exceeded the DHS criterion for total coliform bacteria, but several sites occasionally exceeded the DHS criterion for fecal coliform. These sites are the same as those exceeding the higher Basin Plan criterion. The DHS fecal coliform criterion was exceeded only during some winter months, except at Morris



Ravine and the Upper Pacific Heights Pond at which the criterion was also exceeded during some summer months.

Recreational beach monitoring conducted in conformance with Basin Plan criteria indicates that every site is prone to elevated bacteria levels. The Basin Plan criterion of 200 fecal coliform bacteria per 100 mL was exceeded from every sample collected from the North Forebay Swim Area beach, and occasionally from the NFSA cove and South Forebay Boat Ramp, while the 400 fecal coliform bacteria per 100 mL criterion was exceeded at the Monument Hill Swim Area, NFSA beach, cove, and mouth, South Forebay Boat Ramp and Swim Area, and Stringtown Boat Ramp.

Those sites exceeding the higher Basin Plan criterion also exceeded the DHS criteria for fecal coliform, while the total coliform bacteria criterion of 10,000 organisms per 100 mL was exceeded at the NFSA beach and cove. The DHS and USEPA enterococcus criterion of 61 bacteria per 100 mL was exceeded at every monitoring site, with nearly every sample collected from the NFSA beach and cove and the South Forebay Boat Ramp exceeding the criterion. The USEPA criterion of 33 enterococcus bacteria per 100 mL was exceeded in every sample from the NFSA beach and cove, and at least occasionally from the Loafer Creek Swim Area, Monument Hill Swim Area, NFSA mouth, South Forebay Boat Ramp and Swim Area, and Stringtown Boat Ramp.

Many of the sites monitored monthly where bacteria were found in excess of criteria are not under the influence of the Project. The Fall River, Glen Pond, Glen Creek, Morris Ravine, and North Forebay Creek flow to Project waters, but are not affected by the Project. Honcut Creek, Bear River, and Yuba River flow to the Feather River downstream from the Project boundary, and are also not affected by the Project. Therefore, the Project has no effect on water quality objectives for bacteria in these streams. In addition, most of the samples that exceeded the criteria were collected during the winter, which indicates surface runoff is contributing bacterial contamination, though the criteria were also exceeded during some summer months from Glen Creek, Morris Ravine, North Forebay Creek, and Honcut Creek.

Other monthly monitoring sites at which bacteria were found in excess of criteria are far downstream from the Project boundary. Other factors are likely responsible for contributing bacteria at these sites, which include the Feather River at Archer Avenue, upstream from the Yuba River, and near Verona, and the Sacramento River.

Some monthly monitoring sites at which high levels of bacteria were found are within the Project boundary. These sites include the Upper Pacific Heights and Robinson Riffle ponds, and the Feather River downstream from the hatchery and downstream from the SCOR outlet. There are no Project related or recreational activities at the ponds. High wildlife use of the ponds probably contributed the high bacteria loads that were found. There are no Project activities that would contribute bacteria to the Feather River. Though elevated levels of fecal coliform were identified in the river downstream

from the hatchery, the hatchery is probably not the source since these organisms are associated only with the fecal material of warm-blooded animals. In addition, elevated fecal coliform bacteria were found in the river downstream from the hatchery on only one date. Fecal coliform from the hatchery settling ponds on that date was at a low level. This section of the river has several drains from the City of Oroville, which could have contributed to the elevated bacteria in the river. Though the SCOR Outlet beneath the Feather River could contribute bacteria, all bacteria samples collected at this site were at low levels except one in February of 2003. Samples collected downstream from the Afterbay Outlet did not contain elevated levels of bacteria on this date, indicating that the Project was not responsible for the bacteria found downstream from the SCOR Outlet.

Beneficial uses of Project waters include water contact recreation. Several sites have been specifically developed for water contact recreation (i.e., swim areas), while several other undeveloped sites are routinely used for water contact recreation. All the developed and undeveloped recreation areas monitored at least occasionally exceeded some of the bacteria criteria. A few areas, such as the North Forebay Recreation Area, consistently exceeded the various criteria. Human contact with recreation waters is a potential source for the bacteria. However, a wide variety of animals excrete coliform and enterococcus bacteria. Numerous waterfowl and shorebirds were noted at nearly all of the recreation areas sampled during this survey, especially at the North Forebay Recreation Area. The Project has contributed to bacteria levels by creating water contact recreational sites used by humans as well as wildlife that could be contributing bacteria.

#### **6.2.1.2 Biostimulatory Substances**

The primary interest in nutrient concentrations in natural waters concerns stimulation of excessive growths of algae and macrophytes. The Basin Plan states that "water shall not contain biostimulatory substances which promote aquatic growths in concentrations that cause nuisance or adversely affect beneficial uses." While numerical criteria for nutrients have not been established, periphyton growth can be used to indicate whether nutrients are present in quantities leading to excessive production.

Analysis of the periphyton data indicate that the Feather River is relatively nutrient-poor, based on the abundance and predominance of diatoms in the periphyton communities. Project operations did not appear to exceed the Basin Plan objective on biostimulatory substances. However, one event appears to have exceeded this objective. The Sewage Commission Oroville Region (SCOR) sewage treatment facility has an outlet that empties directly into the Feather River just downstream of the Thermalito Afterbay Outlet. The periphyton community experienced a dramatic increase in green algae, an algal group that relies on nutrient-rich waters for growth, in the summer of 2003. Green algae were found at this station prior to and after this bloom, but not at the same

densities. This bloom was not captured at any of the other stations that were directly monitoring project operations.

### **6.2.1.3 Chemical Constituents**

The Basin Plan states that "waters shall not contain chemical constituents in concentrations that adversely affect beneficial uses." The Basin Plan lists maximum allowable concentrations of a number of metals, and incorporates other criteria for protection of beneficial uses.

**Nutrients** — The U.S. EPA is currently developing nutrient criteria recommendations for adoption by the States, and has published draft guidance manuals for lakes and rivers (USEPA 2000c, 2001). The USEPA has developed recommendations for various ecoregions. Lake Oroville and the upstream tributaries are within Ecoregion II, while the Feather River downstream from Oroville Dam is in Ecoregion I. The USEPA recommends a total phosphorus criterion for lakes and rivers in Ecoregion II of 8.75 and 10 µg/L, respectively, and for rivers in Ecoregion I of 47 µg/L. The USEPA also recommends a minimum secchi clarity depth of 4.5 meters for lakes in Ecoregion II, and turbidity in rivers that is no greater than 1.30 NTU in Ecoregion II and 4.25 NTU for rivers in Ecoregion I.

Ammonia at sufficient concentration can be deleterious to aquatic life. In response, the USEPA published criteria for continuous and maximum allowable ammonia levels for the protection of freshwater aquatic life (CVRWQCB 2000). These criteria vary based on water pH and temperature.

The different forks of the Feather River, as well as several smaller tributaries that discharge into Lake Oroville, regularly exceeded total phosphorus levels recommended by the USEPA for Region II rivers and streams. While the streams that flow into Lake Oroville regularly exceeded total phosphorus criteria, sampling locations in the reservoir rarely exceeded the more stringent recommended USEPA total phosphorus criteria for lakes and reservoirs in Region II. All monitoring locations downstream from Oroville Dam occasionally failed to meet the USEPA Ecoregion I objective for total phosphorus (0.047 mg/L). The Feather River Hatchery Settling Pond, Feather River downstream from Hatchery, and Honcut Creek locations exceeded the objective during approximately half of the sampling events, while the North Forebay Creek and Bear and Sacramento River locations surpassed the objective during nearly all of the sampling events.

Secchi depth is an index of water clarity and is affected by suspended organic and inorganic matter. The USEPA recommended secchi depth for lakes and reservoirs within Ecoregion II has not been met in Project waters. Numerous times throughout this study secchi readings were less than the minimum suggested 4.5 meters at all sampling



stations (Appendix 3a2). However, turbid inflows from upstream tributaries result in the low secchi depth readings in Project waters.

**Minerals** — Minerals are naturally found in waters at concentrations that usually do not produce adverse effects. However, low concentrations of minerals increase the toxicity of metals and corrosiveness of water. Conversely, high concentrations of minerals can cause increased soap consumption in domestic use, staining of laundry fixtures, scale formation in industrial applications, and adverse effects to crops and soils.

While the Basin Plan states that “waters shall not contain chemical constituents in concentrations that adversely affect beneficial uses,” specific criteria for most minerals have not been formulated. However, conductivity, for which goals have been established, is indicative of the mineral concentration of water and can be used to determine general mineral quality. A few samples from the Middle Fork Feather River at Merrimack, Feather River Hatchery Settling Pond, and Feather River at Oroville and downstream from the hatchery occasionally exceeded the conductivity objective, which indicates that increased mineralization occurred. However, conductivity at most stations did not exceed the objective.

The Basin Plan contains an objective for boron that is only applicable to the San Joaquin River watershed. However, the Food and Agriculture Organization of the United Nations established a goal of a maximum concentration of boron in irrigation water of 0.7 mg/L for protection of crops (CVRWQCB 2000). Dissolved boron levels met the objectives for the protection of irrigated crops.

**Metals** — Metals in the aquatic environment are a concern due to direct toxicity to aquatic life and other beneficial uses. Several agencies have adopted criteria addressing effects of metals to beneficial uses (CVRWQCB 2000). DHS has adopted MCLs for several metals as part of the drinking water standards. Criteria for protection of crops from metals toxicity have not been developed. However, agricultural goals have been published by the Food and Agriculture Organization of the United Nations to protect agricultural uses of water. The USEPA established National Ambient Water Quality Criteria to protect human health and welfare and freshwater and marine aquatic life from pollutants, including metals, in surface water. These criteria were last updated in 1986. In December of 1992, the USEPA adopted the National Toxics Rule, which updated many of the earlier criteria. This rule required water quality samples to be analyzed for total recoverable concentrations of metals to determine compliance with the aquatic life protection criteria. Many of the aquatic life criteria were converted to dissolved concentrations in an amendment by the USEPA in 1995. The USEPA proposed and subsequently adopted on May 18, 2000 water quality criteria known as the California Toxics Rule for priority toxic pollutants for California's inland surface waters and enclosed bays and estuaries (USEPA 2000a). The CTR establishes criteria for total mercury and the dissolved fraction of other metals.

All objectives were met for chromium, methyl mercury, selenium, silver, and zinc levels in water in the entire study area.

Total arsenic exceeded the toxicity to humans objective in every sample, but met the drinking water and aquatic life protection objectives.

Total aluminum concentrations in water samples met agricultural objectives. However, secondary MCLs for aluminum in drinking water were exceeded at least occasionally from every monitoring site, except the North Fork arm (surface), main body (surface), and near the dam (surface and mid depths) of Lake Oroville, Thermalito Diversion Pool upstream from the Kelley Ridge Power House, Feather River downstream from Highway 162 and near Mile Long Pond, Oroville Fishing, Robinson Riffle, Mile Long, and Upper Pacific Heights ponds, North and South Thermalito Forebay, and North and South Thermalito Afterbay (surface). The drinking water objective was exceeded with increasing frequency in the Feather River from near Honcut Creek downstream to the mouth. The objective for protection of aquatic life was rarely exceeded at most locations, yet there were some areas that exceeded this objective more frequently. Most of the aluminum objective exceedances occurred in waters entering the Project or well downstream from the Project boundary. More than 25 percent of the upper tributary samples failed to meet this objective, while the South Fork arm of Lake Oroville exceeded the objective more frequently than the other lake stations. While the aquatic life objective was not met in approximately 20 percent of samples collected in the Thermalito Complex, about two-thirds of the Afterbay Outlet Canal to Feather River samples failed to meet the objective. Sampling locations in the Feather River from the station downstream from the Project boundary to Live Oak failed to meet the objective in about half of the samples, which is the same frequency exhibited by Honcut Creek. From Yuba City downstream to Verona the frequency that samples failed to meet the aquatic life protection objective was 80 to almost 100 percent.

Total cadmium met drinking water and agricultural objectives and only rarely exceeded the toxicity to humans and aquatic life objectives. The human toxicity objective was exceeded once at the Poe Power House discharge and Feather River upstream from the Yuba River and twice at the Sacramento River during storm runoff in February 2004. Honcut Creek failed to meet this objective during May and October of 2003. Glen Creek and the Feather River downstream from Highway 162, at Robinson Riffle, and upstream and downstream from the Afterbay Outlet exceeded this objective in May of 2003. The Hatchery Settling Pond and bottom sample from the South Forebay failed to meet the human toxicity objective in June 2003 and April 2002, respectively. The North Forebay bottom sample exceeded the objective for toxicity to aquatic life during June 2002. All other samples met the objective. The Project may have had some effect on cadmium levels that resulted in the objectives for human and aquatic life protection to be exceeded on rare occasions.

Total and dissolved copper met the drinking water, agricultural, and human toxicity objectives for all samples. The aquatic life toxicity objective was met at the majority of sampling locations. The objective was exceeded only rarely in the West Branch, North and South Fork Feather River, Middle and South Fork arms of Lake Oroville (bottom), Mile Long Pond, North Forebay Creek, and the Feather River downstream from the hatchery, downstream from the Afterbay Outlet, at Archer Avenue, and upstream from the Yuba River. Sites with a higher frequency of aquatic life objective exceedances included Glen Creek, Hatchery Settling Pond (during the summer), Feather River at Shanghai Bend and Verona, and Sacramento River upstream from the Feather River. The Bear River exceeded the objective in most samples. The summer exceedances in the Settling Pond may have been caused by treatments of hatchery raceways with copper sulfate, which is used to control algal growth. Most other failures to meet the aquatic life objective occurred during the winter and spring months, when levels of suspended particulates, which often have metals bound to them, increased in the water column due to storms. Concentrations of copper in Lake Oroville that exceed objectives are the result of tributary inflows. The Thermalito Afterbay, however, may have some effect on copper levels that exceeded the objective for aquatic life protection in the Feather River immediately downstream from the Outlet. Failures to meet the objective in the Feather River from Yuba City to the mouth are due to non-Project accretions.

Iron levels met the agricultural objective in all but two locations. During a storm, the Robinson Riffle Pond and the Sacramento River stations failed to meet the agricultural goal. Total iron levels rarely exceeded the drinking water and aquatic life protection objectives at most monitoring locations. Sampling locations with a high frequency of exceeding the drinking water objective include Glen Creek and Glen Pond (over 50 percent), North Forebay Creek (66 percent), Robinson Riffle Pond (70 percent), Honcut Creek (75 percent), Feather River at Archer Avenue (25 percent), upstream from Yuba River (over 50 percent), at Shanghai Bend (60 percent), and near Verona (65 percent), Bear River (over 85 percent), and Sacramento River upstream from the Feather River (over 95 percent). Exceedance of the iron objective for drinking water follows a similar pattern in the lower Feather River as was discussed previously for other metals. The iron objective for protection of aquatic life was occasionally exceeded in the upper tributaries, mainly in the North, South, and Middle forks, but also Sucker Run and Fall River. The Middle Fork arm and Main Body stations in Lake Oroville failed to meet the objective on only one occasion. The aquatic life objective was met in all waters affected by the Project except the Hatchery Settling Pond in which the criteria was exceeded on two occasions. The Robinson Riffle Pond exceeded the criteria on nine occasions. The lower Feather River samples had a higher frequency of failure to meet the aquatic life objective, with Honcut Creek and Bear River accretions likely responsible for most of the iron found in the lower river. The Project has a beneficial effect on iron objectives. Tributary inflows cause iron concentrations to increase in Lake Oroville. However, iron concentrations decrease as particulate matter settles in Lake Oroville, so that releases from Oroville Dam have lower iron concentrations than the water flowing into the reservoir.



The total mercury objectives for drinking water and toxicity to aquatic life were met for all but two samples collected during this study. Sucker Run, which flows into Lake Oroville, failed to meet these objectives on December 16, 2002. This sample was collected following a storm that resulted in increased flow in Sucker Run. The sample collected from the Feather River upstream from the hatchery on August 11, 2003 also failed to meet the drinking water objective. The detected level of mercury from the Feather River was much higher than normally found at this location or upstream Project waters during the study and may have been due to contamination of the sample.

The total manganese objectives for agriculture and toxicity to humans were rarely exceeded in the upper tributaries. The drinking water objective was exceeded only once or twice in the upper tributaries and at all Lake Oroville locations, except the near the dam which did not exceed the objective. In the Thermalito Complex, only one sample from both the North and South Afterbay exceeded the drinking water objective. Morris Ravine and North Forebay Creek, which flow into Project waters, failed to meet the objectives for drinking water and agriculture occasionally, while Glen Creek and Glen Pond failed to meet the drinking water objective five and six times, respectively. All of the Oroville Wildlife Area ponds, except Upper Pacific Heights Pond, exceeded the objectives for drinking water and agriculture, with Oroville Fishing Pond exceeding the drinking water objective in over half of the samples and Robinson Riffle Pond exceeding both drinking water and agriculture objectives in 87 and 50 percent of the samples, respectively. Only Robinson Riffle and Mile Long ponds failed to meet the objective for toxicity to humans. All manganese objectives were met in the Feather River from Oroville Dam downstream to Archer Avenue in Live Oak. The Feather River upstream from the Yuba River to Verona showed increased frequency of sampling events that failed to meet these objectives, following the same pattern exhibited by other metals levels described above. Manganese levels in Project waters are affected by tributary inflows rather than affects from the Project. Most of the ponds within the Project boundary did show some degree of elevated manganese levels, but low dissolved oxygen levels in these ponds contribute to dissolution of manganese from bottom sediments.

All objectives for nickel were met in Project waters. In the upper tributaries, only one sample from the West Branch and the South Fork Feather River failed to meet the objective for toxicity to humans. In the lower Feather River, only the monitoring station at Singh exceeded this objective on one occasion. The Sacramento River was found to exceed the human toxicity objective twice. No adverse effects from the Project to objectives for nickel are indicated.

Several upper tributary stations exceeded the toxicity to humans and aquatic life protection objectives for lead. The West Branch and Sucker Run each exceeded the aquatic life objective once, while the North Fork Feather River and Poe Power House discharge surpassed the toxicity to humans objective once. All objectives for lead were

met in Project waters except for the objective to protect aquatic life in one sample from a bottom grab in the Middle Fork arm of Lake Oroville and a surface grab in the South Thermalito Afterbay. The North Forebay Creek also exceeded this objective on one occasion. Both Honcut Creek and Bear River failed to meet the aquatic life objective once. In the lower Feather River, the stations upstream from the Yuba River exceeded this objective twice, while the Feather River at Shanghai Bend exceeded the aquatic life objective on three occasions and the objective for toxicity to humans once. The Feather River near Verona and the Sacramento River upstream from the Feather River failed to meet the aquatic life objective on four and two occasions, respectively. As with other metals, levels of lead in Project waters are affected by tributary inflows. Lead settles from the water column in Lake Oroville, resulting in water released from the Project with acceptable levels of lead. Tributaries downstream from Lake Oroville (e.g., North Forebay Creek) also contribute lead to Project waters. Though settling also occurs in the Thermalito Complex, winds may stir bottom sediments into the water column resulting in occasionally increased concentrations of lead in the water.

**Organic Contaminants** — Analyses for MTBE was conducted in water samples collected for pesticide contamination. MTBE at a concentration of 3.1 µg/L was detected from the Thermalito Diversion Pool downstream from the Kelly Ridge Power House from a water sample collected in November of 2003. The criterion for MTBE was set by DHS at 5 µg/L as a secondary MCL for drinking water. The concentration of MTBE found in the Diversion Pool is less than the maximum allowable limit, and therefore does not exceed the water quality objective. The source of the MTBE is not known.

#### **6.2.1.4 Color**

The Basin Plan contains narrative, rather than numeric, objectives for color. The Plan states that "water shall be free of discoloration that causes nuisance or adversely affects beneficial uses."

No unnatural coloration was observed in any water bodies that were monitored, and, hence, there were no nuisance conditions due to color. The secondary MCL for color is 15 units. Most monitoring stations occasionally slightly exceeded the color MCL.

#### **6.2.1.5 Dissolved Oxygen**

Dissolved oxygen objectives of the Basin Plan that apply to all water bodies require a minimum level of 5.0 mg/L for waters designated as warm freshwater habitat, and 7.0 mg/L for cold freshwater habitat and spawning habitat. In addition, a minimum of 8.0 mg/L of dissolved oxygen is required from September 1 to May 31 in the Feather River from the Fish Barrier Dam at Oroville to Honcut Creek.

The Basin Plan objectives for dissolved oxygen were met at most of the sampling locations. However, several locations failed to meet the objectives. The Feather River downstream from the hatchery failed to meet both the cold freshwater and spawning habitat objectives and the September 1 to May 31 objective for the Feather River from the Fish Barrier Dam to Honcut Creek. The Feather River at Robinson Riffle, downstream from the Project boundary, and at Singh each failed to meet the September 1 to May 31 objective during December 2002.

The Thermalito Forebay and Afterbay support both warm and coldwater fish, yet these waters are not designated as cold- and warm-water habitat in the Basin Plan. While all monitoring locations in the Thermalito Complex meet the WARM objective, the COLD objective was not met in two dissolved oxygen measurements taken from bottom samples at the North Thermalito Afterbay in November and December 2003.

#### **6.2.1.6 Floating Material**

The Basin Plan states that "water shall not contain floating material in amounts that cause nuisance or adversely affect beneficial uses."

Floating material, which is generally comprised of woody debris, is carried into Lake Oroville by tributaries during winter months. The debris is inhibited from moving downstream into other Project waters by Oroville Dam. The floating material can interfere with contact and non-contact water recreation in the reservoir by creating hazards for water skiers and boaters. However, most of the woody debris is removed from the water surface in early spring to alleviate effects to recreational activities. The minor amount of woody debris which may remain during the recreation season does not seriously interfere with water contact and non-contact recreational activities. Therefore, the Project does not contribute to nuisance or adverse affects to beneficial uses due to floating material and meets water quality objectives for floating material.

#### **6.2.1.7 Oil and Grease**

The Basin Plan requires that "waters shall not contain oils, greases, waxes, or other materials in concentrations that cause nuisance, result in a visible film or coating on the surface of the water or on objects in the water, or otherwise adversely affect beneficial uses."

Since no oil, grease, waxes, or other materials causing nuisance, visible film, or coating on the surface of the water or on objects in the water, was observed, the Project was not found to adversely affect the objective for oil and grease.



#### **6.2.1.8 pH**

The Basin Plan stipulates that pH "shall not be depressed below 6.5 nor raised above 8.5." In addition, "changes in normal ambient pH levels shall not exceed 0.5 in fresh waters with designated" cold or warm water habitat beneficial uses.

The Basin Plan objective for pH was met in all samples except two. The Middle Fork arm of Lake Oroville in February 2002 and the Afterbay Outlet Canal to the Feather River in December 2002 exhibited pH levels below the objective.

#### **6.2.1.9 Pesticides**

The Basin Plan states, among other things, that "no individual pesticide or combination of pesticides shall be present in concentrations that adversely affect beneficial uses."

Only one pesticide was detected during monitoring. Diuron at a concentration of 1.91 µg/L was reported from the South Fork Feather River upstream from Ponderosa Reservoir from a sample collected in November of 2003. The most stringent criterion for diuron was set by the USEPA at 10 µg/L for drinking water. Since diuron in this sample was well below the drinking water criterion and no other criteria were exceeded, the water quality objective was met. In addition, the Project has no effect to the South Fork upstream from Ponderosa Reservoir.

#### **6.2.1.10 Salinity**

Objectives for conductivity are included in the Basin Plan for the North Fork of the Feather River, Middle Fork of the Feather River from Little Last Chance Creek to Lake Oroville, and the Feather River from the Fish Barrier Dam to the Sacramento River. Conductivity in these waters is not to exceed 150 µmhos/cm.

Conductivity levels met the Basin Plan objective at all monitoring stations except that the Middle Fork Feather River at Merrimack exceeded the objective on six occasions, and the Feather River Hatchery Settling Pond and Feather River at Oroville and downstream from the hatchery each exceeded the objective only once.

#### **6.2.1.11 Sediment**

According to the Basin Plan, "the suspended sediment load and suspended sediment discharge rate of surface waters shall not be altered in such a manner as to cause nuisance or adversely affect beneficial uses."

The Project has decreased the contribution of suspended sediments to the Feather River downstream from Oroville Dam, and therefore has not adversely affected

beneficial uses due to changes in suspended sediment loads and meets the water quality objective.

#### **6.2.1.12 Settleable Material**

The Basin Plan states that "waters shall not contain substances in concentrations that result in the deposition of material that causes nuisance or adversely affects beneficial uses."

The winter runoff period contributes the highest levels of settleable material to Lake Oroville from the tributaries. However, settleable materials were never found in appreciable quantities either in the tributaries or reservoir. The minute quantities of settleable material that enter Lake Oroville settle from the water column, resulting in release of water to the Feather River and Thermalito Complex with little or no settleable material. Little to no settleable material was reported during the study from the Feather River within the Project boundary. Settleable material was found in the Feather River at increasing frequency with distance downstream from the Project boundary, though not at significant levels. Settleable material in the Sacramento River upstream from the Feather River was found at much higher levels than contributed by the Feather River.

Two ponds (Mile Long and Robinson Riffle) were found with relatively high levels of settleable material in samples collected near the bottom. However, these ponds produce abundant macrophytic growths that undoubtedly contribute to the settleable material load during decomposition.

Settleable material in Project waters do not create nuisance conditions or adversely affect beneficial uses, and therefore comply with the water quality objective.

#### **6.2.1.13 Suspended Material**

The Basin Plan states that "waters shall not contain suspended material in concentrations that cause nuisance or adversely affect beneficial uses."

Suspended materials are transported to Lake Oroville in tributaries, especially following heavy runoff from storms. However, the suspended materials generally settle from the water column in the upper arms of the reservoir. Higher levels of suspended material were occasionally found during winter months from the Thermalito Complex, which is likely due to turbid input from tributaries and stirring of bottom sediments from high winds during winter storms. Suspended material in the Feather River within the Project boundary was never found at significant levels. However, downstream from the Project boundary, suspended material was found to increase significantly during the winter months and increase in concentration with distance downstream. Highest levels of suspended material, though, were found in the Sacramento River upstream from the Feather River.

High levels of suspended material were found in the Mile Long and Robinson Riffle ponds. The abundant macrophytic growths in these ponds undoubtedly contributed to the suspended loads. Suspended material in Project waters do not cause nuisance or adversely affect beneficial uses, and therefore comply with Basin Plan objectives.

#### **6.2.1.14 Tastes and Odors**

"Water shall not contain taste- or odor-producing substances in concentrations that impart undesirable tastes or odors to domestic or municipal water supplies or to fish flesh or other edible products of aquatic origin, or that cause nuisance, or otherwise adversely affect beneficial uses," according to the Basin Plan.

Odors were occasionally detected during monitoring. An odor described as "fishy" was detected during the fall months in the Feather River within the Project boundary. Such odors are natural in waters used by spawning salmon, which is a designated beneficial use for the Feather River. A "septic" odor was reported from the hatchery waste water settling pond, which may have been due to antibiotic treatments at the hatchery. The septic odor was not detected from any other monitoring sites. "Algae" and "moss" odors were reported from the low flow channel and ponds in the Oroville Wildlife Area. Decaying algae which naturally wash ashore along the river or rise to the surface in ponds produce odors. An "earthy" or "dirt" odor was reported occasionally at sites downstream from the Project boundary, especially in the Bear River. Decreasing water levels that exposed mud flats was cited as the likely source for the "earthy" or "dirt" odors.

MTBE, which can produce tastes and odors in drinking water, was found at a concentration of 3.1 µg/L in the Thermalito Diversion Pool downstream from the Kelly Ridge Power House from a water sample collected in November of 2003. The criterion for MTBE of 5 µg/L as a secondary MCL for drinking water was established to prevent adverse tastes and odors. The concentration of MTBE found in the Diversion Pool is less than the maximum allowable limit, and therefore should not produce noticeable tastes or odors.

No unnatural odors were detected during monitoring that would adversely affect beneficial uses, and therefore Basin Plan objectives were met.

#### **6.2.1.15 Water Temperature**

Unless demonstrated to the satisfaction of the Regional Water Board that beneficial uses are not adversely affected, the Basin Plan requires that water temperatures shall not be altered, and "at no time shall the temperature of COLD or WARM intrastate waters be increased more than 5 °F above natural receiving water temperature." The Basin Plan also requires that the temperature in the Sacramento River shall not be

elevated "above 68 °F in the reach from Hamilton City to the I Street Bridge during periods when temperature increases will be detrimental to the fishery."

Post-project water temperatures in the Feather River near Oroville are warmer in the winter and cooler in the summer than pre-project temperatures. Pre-project water temperatures averaged about 73 °F in the summer and 36 °F in the winter, while post-project water temperatures average about 63 °F in the summer and 45 °F in the winter.

Beneficial uses for the Feather River from the Fish Barrier Dam to the Sacramento River include municipal and domestic supply, irrigation, contact and non-contact recreation, wildlife habitat, cold and warm freshwater habitat, cold and warm migration, and cold and warm spawning. Although there are no temperature criteria for contact recreation, there has been concern from the Oroville community that post-project water temperatures in the Feather River downstream from Oroville Dam are colder and less comfortable for contact recreational uses than pre-project temperatures. The colder water in the Feather River in the vicinity of Oroville has affected the beneficial uses of the river for contact recreation. However, the Project has provided contact recreation opportunities within the Project facilities.

The Basin Plan stipulates that segments with both cold and warm freshwater habitat designations will be considered cold water bodies for the application of water quality objectives. Water temperatures in the Feather River are controlled by requirements for the Feather River Hatchery and Robinson's Riffle.

Spring-run Chinook salmon begin migration into the Feather River in late spring and hold in pools throughout the summer before the onset of spawning in early September, while fall-run Chinook salmon begin showing up in late summer and hold more briefly before spawning begins concurrently with the spring-run fish. Optimal temperatures for migration and holding of spring- and fall-run Chinook salmon have been determined to range from 60 to 64 °F (EWG-36, 2004). Optimal spawning and egg incubation temperatures for both spring- and fall-run Chinook salmon have been determined to range from 56 to 58 °F. Chinook spawning concludes near the end of December and egg incubation lasts until the middle of February. Suitable Chinook salmon holding temperatures existed from the Fish Barrier Dam, near river-mile 67, as far downstream as the Project Boundary, near river-mile 54, in late August 2002. Appropriate holding temperatures extended downstream as far as Star Bend near river-mile 19 in late August 2003. Appropriate spawning and egg incubation temperatures for Chinook salmon were available in the low flow channel and the high flow channel from the Afterbay Outlet downstream to near river-mile 57 for the entire spawning and egg incubation period in both 2002 and 2003. Downstream from river-mile 57, mean daily water temperatures exceeded 58 °F until the middle of October before cooling to suitable spawning and egg incubation temperatures in both years.



Adult steelhead begin arriving in September and spawn from about December to April, with egg incubation continuing through May. Suitable spawning and egg incubation temperatures for steelhead range from 52 to 54 °F. Steelhead spawning and egg incubation temperatures of 52 to 54 °F were available from late November 2002 until the middle of May 2003. Temperatures fell below 50 °F from late December 2002 until the middle of March 2003 in the upper reaches of the LFC (Auditorium Riffle), and from late December 2002 until late February 2003 in the lower reaches of the LFC (Eye Riffle). Suitable steelhead holding temperatures existed from the Fish Barrier Dam, near river mile 67, as far downstream as the Highway 162 crossing, near river mile 64.5, in late October 2002. Appropriate holding temperatures extended downstream to just above the Afterbay Outlet, near river mile 60, in late October 2003. Late January pool temperatures were suitable for steelhead holding for the entire Feather River in both years. Optimal steelhead spawning and egg incubation temperatures of 52 to 54 °F were available in the HFC from late November 2002 until the middle of May 2003. Mean daily water temperatures fell below 50 °F from late December 2002 until the middle of March 2003 in the HFC, and between late December 2003 and late February 2004.

The data indicate that water temperatures generally are suitable for the beneficial use as cold water habitat and spawning.

An agreement in 1983 between the Department of Water Resources and Department of Fish and Game specifies water temperature requirements for the Feather River Fish Hatchery (DWR 1983). Water temperatures of the water supply for the hatchery must be maintained at 51 °F from April 1 to May 15; 55 °F from May 16 to 31; 56 °F from June 1 to 15; 60 °F from June 16 to August 15; 58 °F from August 16 to 31; 52 °F from September 1 to 30; 51 °F from October 1 to November 30; and no greater than 55 °F from December 1 to March 31. A temperature deviation of four degrees is allowed between April 1 and November 30. In addition, the agreement contains an objective for provision of suitable temperatures for fall-run salmon not later than September 15 below the Thermalito Diversion Dam and Thermalito Afterbay Outlet, and for shad, striped bass, and other warm water fish between May 1 and September 1 below the Afterbay Outlet.

The Project is operated to comply with the temperature objective for the hatchery. Water temperatures at the hatchery and in the reservoir are monitored, and adjustments to the depth of release from the reservoir are made to maintain hatchery water temperatures within the objectives. Pump back operations are also controlled to comply with hatchery temperature objectives. Pump back operations are curtailed if temperature monitoring indicates that the limits of the objectives are being reached.

Several water districts, including the Richvale Irrigation District, Biggs-West Gridley Water District, Butte Water District, and Sutter Extension Water District, diverted water from the Feather River prior to construction of Oroville Dam. The Department entered

into agreements with these water districts to continue to provide their entitled water due to prior rights. Local rice farmers desire water of about 65 °F from April through mid-May and 59 °F during the remainder of the growing season (DWR 2001).

Water temperature data show that temperatures at the river outlet of the Thermalito Afterbay are more suitable for rice production during the early portion of the irrigation season and meet the mid-season threshold required for rice production earlier than pre-project temperatures in the Feather River at the Oroville gage and near Gridley. Water temperatures at the Sutter Butte Canal Outlet from the Afterbay are nearly identical to those at the outlet to the Feather River, and thus diversions to the Sutter Butte Canal from the Afterbay are also more suitable for rice production than pre-project temperatures in the Feather River. However, while water temperatures are slightly warmer during the early irrigation season in diversions at the Western Canal Outlet from the Afterbay, water temperatures in subsequent months at the Western Canal Outlet are much cooler than pre-project temperatures in the Feather River near Oroville. Water temperatures at the Western Canal Outlet do not consistently reach the threshold for rice production as soon as the threshold was reached by pre-project temperatures in the Feather River. Western Canal Outlet water temperatures also do not warm during the mid-season as much as pre-project temperatures in the Feather River or at the Afterbay Outlet to the Feather River (and Sutter Butte Canal), and cool to below the threshold earlier in the irrigation season.

Additional temperature requirements are contained in a Biological Opinion by the NOAA Fisheries for protection of steelhead trout and spring-run Chinook salmon for the Feather River downstream from Lake Oroville. The Biological Opinion specifies that reservoir releases from June 1 through September 30 should be managed to achieve a daily average water temperature less than or equal to 65 °F at Feather River mile 61.6 (Robinson's Riffle in the low-flow channel).

Exceedance curves show that the NOAA Fisheries temperature objective was slightly exceeded a small percentage of the time in both 2002 and 2003. Water temperature requirements must also be met at the Feather River Fish Hatchery, which may result in some exceedances of the requirement at Robinson's Riffle. Water is withdrawn from the reservoir at depths that, after warming due to prevailing air temperatures, will provide the required temperature at the hatchery and Robinson's Riffle. The depth from which water is released from the reservoir initially controls temperatures in the river. Air temperatures, which fluctuate from day to day, modify the river temperatures. Altering the depth from which water is released requires installation or removal of shutters at the intake structures, which is an arduous process. The release depth cannot be changed quickly to meet day to day variations in air temperatures. Shutters are held at the minimum depth required to generally meet the criterion at Robinson's Riffle in order to preserve the cold water pool in the reservoir.

The Feather River joins the Sacramento River near Verona. Temperatures in the lower reaches of the Feather River are beyond the control of the Project. Atmospheric conditions and major accretions from tributaries (such as the Yuba River) control water temperatures in the lower reaches of the Feather River. However, water temperatures in the Feather River adhere to the Basin Plan requirement that the temperature in the Sacramento River not be elevated above 68 °F in the reach from Hamilton City to the I Street Bridge during periods when temperature increases will be detrimental to the fishery. Water temperatures in the Feather River near Verona are usually less than those in the Sacramento River upstream from the confluence with the Feather River, especially in the period of salmon and steelhead migration (Figure 6.2.1.15-1). Thus, though not controllable by the Project, water temperatures in the Feather River meet the objective of not elevating Sacramento River water temperatures above 68 °F during periods important to cold water fish.

**Figure 6.2.1.15-1. Comparison of water temperatures near the confluence of the Feather and Sacramento rivers.**



### 6.2.1.16 Toxicity

The Basin Plan states that "all waters shall be maintained free of toxic substances in concentrations that produce detrimental physiological responses in human, plant, animal, or aquatic life." The Plan states that "compliance with this objective will be determined by analyses of indicator organisms, species diversity, population density, growth anomalies, and biotoxicity tests of appropriate duration or other methods as specified by the Regional Water Board.

**Benthic Macroinvertebrates** — Monitoring of biological organisms is increasingly being used as an indicator of water quality. Benthic macroinvertebrates comprise a large group of insect and other bottom dwelling organisms that are naturally present in surface water bodies. The types of macroinvertebrates present reflect past water quality history. Certain types of organisms are less tolerant than others of various types of perturbations. Perturbations generally result in elimination or severe reduction in numbers of individuals or species of intolerant organisms and development of large populations of tolerant species due to lack of competition or predation. In relatively undisturbed environments, communities are composed of large numbers of species with no individual species present in overwhelming abundance.

The Basin Plan states that "the survival of aquatic life in surface waters subjected to a waste discharge or other controllable water quality factors shall not be less than that for the same water body in areas unaffected by the waste discharge." Numerical criteria for benthic macroinvertebrate communities have not been developed. However, numerous indices are available for evaluating benthic macroinvertebrate community data. The USEPA has applied numerous metrics to evaluate the health of aquatic macroinvertebrate communities (USEPA 1989).

The Project does not produce "waste discharge" that could adversely affect aquatic life. However, the Project has altered water quality characteristics in the Feather River downstream from the dam. Water released at the dam is colder in the summer but warmer in the winter than pre-Project temperatures. In addition, the Feather River has undergone significant habitat modification and degradation that has affected the aquatic macroinvertebrate community. Species of aquatic macroinvertebrates tolerant of altered temperature regimes have developed moderate to high densities downstream from Oroville Dam. The effects to the aquatic macroinvertebrate community from habitat modification and degradation can be difficult to differentiate from potential effects from adverse water quality conditions. The Feather River downstream from the Fish Barrier Dam had relatively low species diversity and more taxa tolerant to pollution, while toxicity bioassays have identified impacts to test organisms. This site may be experiencing adverse water quality conditions. The community metrics upstream and downstream from Lake Oroville indicate that the biotic community is only slightly disturbed, which suggests that the water quality is generally good.

Other than possibly at the monitoring site downstream from the Fish Barrier Dam, the aquatic macroinvertebrate data do not indicate any adverse water quality conditions. The aquatic macroinvertebrate community has developed in response to altered physical habitat conditions, including substrate, flow, and food organisms. Therefore, with the possible exception of the site downstream from the Fish Barrier Dam, the Project complies with the objective to maintain waters free of toxic substances in concentrations that produce detrimental physiological responses as determined by analyses of indicator organisms.



**Toxicity Bioassays** — Toxicity bioassay results indicate some toxicity to laboratory organisms occurred at all sampling locations. For *Ceriodaphnia dubia*, survival toxicity rarely occurred in samples collected from the upper tributary monitoring stations with Concow Creek, Middle Fork Feather River, South Fork Feather River above Ponderosa Reservoir, and Sucker Run samples each indicating toxicity on one occasion. The North Fork Feather River downstream from Poe Power House was toxic to survival twice. Reproductive toxicity was greater than survival toxicity for upper tributary samples.

Survival toxicity to *Ceriodaphnia* occasionally occurred in samples collected from the Feather River upstream from the Fish Barrier Dam to downstream from the Project boundary. The Hatchery Settling Pond, Feather River downstream from the hatchery and downstream from the Project boundary exhibited survival toxicity more frequently than the stations influenced by the Thermalito Afterbay Outlet. All Feather River stations upstream from the Fish Barrier Dam to downstream from the Project boundary also exhibited greater reproductive toxicity than survival toxicity, as was also observed in the upper tributaries.

While the Oroville Wildlife Area ponds had no observed survival toxicity to *Ceriodaphnia*, reproductive toxicity was observed in 20 to 25 percent of the samples.

The fathead minnows used for survival and growth toxicity testing consistently developed a fungal corona, which caused random mortalities that resulted in high inter-replicate variability in the survival results. Most of the water samples exhibited this pathogen-related mortality (PRM), which affected fathead minnow survival. Pacific Ecorisk Laboratory staff, after consultation with DWR staff, instituted USEPA recommended filtration procedures on the ambient water samples beginning in May 2002, in an attempt to distinguish between pathogen and contaminant related mortality. Filtration of ambient waters can physically remove some contaminants not related to pathogens, and, thus, filtered sample results may have shown improved survival because toxic contaminants were removed along with the pathogens. New USEPA guidance on methods to remove pathogens was not available until the last sampling event in April 2004. This new method reduces the number organisms in each replicate cup in order to inhibit the spread of the pathogen, while not affecting the physical composition of the ambient sample water.

Fathead minnow survival results generally improved after the filtration of the ambient sample waters, yet some toxicity persisted in some samples from all sampling locations except the West Branch, Sucker Run, and Oroville Fishing and Mile Long ponds. Filter-treated survival results that indicated toxicity occurred in 4 to 20 percent of the sampling events for the remaining locations.

Ambient sample waters used to determine mean biomass were also filtered in order to distinguish between pathogen and contaminant related mortality. Additionally, USEPA guidelines instruct that growth endpoints not be statistically compared to controls if survival endpoints were significantly less than for the controls. Fathead minnow results indicating reduced growth, caused by toxic substances, occurred occasionally in samples collected from the upper tributaries entering the Project. While filtration of the ambient waters improved the growth results for some samples, several others actually showed increased frequency of growth toxicity in the filtered splits than in the ambient waters. Manipulation of the ambient samples through filtration increases the risk of sample contamination, which can lead to results that are inconclusive, at best.

For samples collected within the Project boundary, most station locations showed no improvement in mean biomass results over the un-filtered sample waters. Several locations with a higher percentage of growth toxicity than other stations within the Project boundary include the Feather River Hatchery Settling Pond, Feather River at Oroville, downstream from the hatchery, and downstream from the Project boundary, and Afterbay Outlet Canal to the Feather River, with frequencies of the samples exhibiting reduced growth ranging from 17 to 29 percent.

Several samples with observed toxicity were analyzed using TIE testing methods in an attempt to identify specific toxic substances. Most of the TIE tests were unable to identify causes of toxicity due to lack of toxicity persistence in the ambient samples. Phase I TIEs applied to several August 2003 samples identified particulate-associated contaminants, metals, and non-polar organic substances as potential toxicity causes.

As all monitoring locations exhibited toxicity some of the time, the Basin Plan objective that waters be maintained free of toxic substances in concentrations that produce detrimental physiological responses in human, plant, animal, or aquatic life was not met.

#### **6.2.1.17 Turbidity**

Numerical goals or criteria have not been established for natural turbidity levels. The Basin Plan specifies that "waters shall be free of changes in turbidity that cause nuisance or adversely affect beneficial uses." For controllable factors, allowable increases in turbidity are no more than 1 Nephelometric Turbidity Unit where natural turbidity ranges between 0 and 5 NTUs; 20 percent where natural turbidity ranges between 5 and 50 NTUs; 10 NTUs where natural turbidity ranges between 50 and 100 NTUs; and 10 percent where natural turbidity exceeds 100 NTUs.

The Basin Plan objective for turbidity was met for the Project since turbidity levels entering Lake Oroville are much higher than levels in waters discharged at the dam, which indicates that the Project operations do not increase turbidity. In the Feather River downstream from Oroville Dam, turbidity levels rarely exceeded the objectives down to the confluence with Honcut Creek. The frequency in which turbidity objectives

were exceeded increased in a downstream direction from Honcut Creek to Verona. Most of the increases in turbidity in the Feather River are attributable to storm runoff, with Honcut Creek and the Bear River principal contributors to increases in lower Feather River turbidity levels.

### **6.2.2 Project Effects on Designated Beneficial Uses**

The Basin Plan states that "beneficial uses are critical to water quality management in California. State law defines beneficial uses of California's waters that may be protected against quality degradation to include (and not be limited to) domestic; municipal; agricultural and industrial supply; power generation; recreation; aesthetic enjoyment; navigation; and preservation and enhancement of fish, wildlife, and other aquatic resources or preserves." The Basin Plan, in describing existing and potential beneficial uses, states that the "beneficial uses of any specifically identified water body generally apply to its tributary streams."

The beneficial uses identified in the Basin Plan for Lake Oroville (and hence its tributaries) include municipal and domestic supply, irrigation, power, contact and non-contact recreation, warm and cold freshwater habitat, warm and cold spawning, and wildlife habitat. Beneficial uses in the Feather River from the Fish Barrier Dam to the Sacramento River include municipal and domestic supply, irrigation, contact and non-contact recreation, canoeing and rafting, warm and cold fish migration, warm and cold freshwater habitat, warm and cold spawning, and wildlife habitat.

Water quality objectives have been developed to protect beneficial uses (CVRWQCB 1998). Water quality objectives for surface waters have been developed for bacteria, biostimulatory substances, chemical constituents, color, dissolved oxygen, floating material, oil and grease, pH, pesticides, radioactivity, salinity, sediment, settleable material, suspended material, tastes and odors, temperature, toxicity, and turbidity. Tributary streams upstream from the Project, Project waters, and the Feather River downstream from the Project boundary were monitored to determine Project compliance with water quality objectives and effects to beneficial uses.

#### ***6.2.2.1 Municipal and Domestic Supply***

Objectives for bacteria, chemical constituents, color, pesticides, tastes and odors, and turbidity are important for protecting municipal and domestic supply beneficial uses. Section 64426.1 (Total Coliform Maximum Contaminant Level (MCL), Title 22, Chapter 15 specifies that "a public water system is in violation of the total coliform MCL when any of the following occurs:

- (1) For a public water system which collects at least 40 samples per month, more than 5.0 percent of the samples collected during any month are total coliform-positive; or

- (2) For a public water system which collects fewer than 40 samples per month, more than one sample collected during any month is total coliform-positive; or
- (3) Any repeat sample is fecal coliform-positive or E. coli-positive; or
- (4) Any repeat sample following a fecal coliform-positive or E. coli-positive routine sample is total coliform-positive."

Bacteria present in Project waters potentially adversely affects beneficial use for municipal and domestic supply. Every site monitored in SPW1 exceeded the coliform MCL for public water systems. However, Section 64650, Title 22, Chapter 17 requires that each supplier of domestic water "using an approved surface water shall provide multibarrier treatment necessary to reliably protect users from the adverse health effects of microbiological contaminants and to comply with the requirements and performance standards prescribed in this chapter." An "approved surface water" is defined as "a surface water or groundwater under the direct influence of surface water that has received permit approval from the Department in accordance with sections 4011 through 4016 of the Health and Safety Code." Therefore, required treatment would allow use of water from the Oroville Facilities for municipal and domestic supply.

Section 64431 (Maximum Contaminant Levels – Inorganic chemicals), Title 22, Chapter 15 establishes primary standards for inorganic chemicals (Table 6.2.2.1-1). The only measured inorganic chemical that exceeded the MCL was aluminum. Other than the Middle Fork arm of Lake Oroville (bottom), no Project waters exceeded the inorganic chemicals MCL for aluminum. The MCL was exceeded in samples from the West Branch, Fall River, Sucker Run Creek, Poe Power House discharge, North, Middle, and South forks of the Feather River, Morris Ravine, Glen Pond, North Forebay Creek, Feather River downstream from the Project boundary, upstream from Yuba City, at Shanghai Bend, and near Verona, Bear River, Honcut Creek, and the Sacramento River. The high aluminum levels in the upper tributaries undoubtedly contributed to the elevated level of aluminum found in the bottom sample from the Middle Fork arm of Lake Oroville. Aluminum apparently settles to the bottom sediments in Lake Oroville, allowing water released from the reservoir to meet the MCL for domestic use. Antimony, asbestos, barium, beryllium, cyanide, fluoride, nitrite, and thallium were not analyzed. Therefore, Project waters do not adversely affect municipal and domestic supply beneficial uses due to inorganic chemicals.

MTBE is the only organic chemical found during monitoring that is included in Section 64444 (Maximum Contaminant Levels – Organic Chemicals) of Title 22, Chapter 15. MTBE was found in one sample from the Thermalito Diversion Pool at a concentration of 0.0031 mg/L, while the MCL is 0.013 mg/L. Therefore, Project waters do not adversely affect municipal and domestic supply beneficial uses due to organic chemicals.

Secondary Maximum Contaminant Levels and Compliance for drinking water was established in section 64449 of Title 22, Chapter 15. These MCLs were established



based on consumer acceptance of taste, odor, and appearance of drinking water (Table 6.2.2.1-2).

**Table 6.2.2.1-1. Maximum contaminant levels for inorganic chemicals.**

Chemical	Maximum Contaminant Level, mg/L
Aluminum	1.
Antimony	0.006
Arsenic	0.05
Asbestos	7 MFL*
Barium	1.
Beryllium	0.004
Cadmium	0.005
Chromium	0.05
Cyanide	0.15
Fluoride	2.0
Mercury	0.002
Nickel	0.1
Nitrate (as NO <sub>3</sub> )	45.
Nitrate+Nitrite (sum as nitrogen)	10.
Nitrite (as nitrogen)	1.
Selenium	0.05
Thallium	0.002

**Table 6.2.2.1-2. Secondary maximum contaminant levels.**

Constituents	Maximum Contaminant Levels/Units
Aluminum	0.2 mg/L
Color	15 Units
Copper	1.0 mg/L
Corrosivity	Non-corrosive
Foaming Agents (MBAS)	0.5 mg/L
Iron	0.3 mg/L
Manganese	0.05 mg/L
Methyl-tert-butyl ether (MTBE)	0.005 mg/L
Odor--Threshold	3 Units
Silver	0.1 mg/L
Thiobencarb	0.001 mg/L
Turbidity	5 Units
Zinc	5.0 mg/L

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Secondary MCLs for aluminum were exceeded at least occasionally from every monitoring site, except the North Fork arm (surface), main body (surface), and near the dam (surface and mid depths) of Lake Oroville, Thermalito Diversion Pool upstream from the Kelley Ridge Power House, Feather River downstream from Highway 162 and near Mile Long Pond, Oroville Fishing, Robinson Riffle, Mile Long, and Upper Pacific Heights ponds, North and South Thermalito Forebays, and North and South Thermalito Afterbay (surface). The color MCL was exceeded occasionally from nearly every monitoring site. The secondary MCLs for copper, zinc, and silver were not exceeded from any of the monitoring stations. Corrosivity and foaming agents were not measured. The secondary MCL for iron was exceeded at least occasionally from nearly every monitoring station, though Project waters had the lowest detected concentrations. Project waters did not exceed the MCL for manganese except at the North and South Afterbay. Upstream tributaries, Oroville Wildlife Area ponds, and the lower Feather River (downstream from the Project boundary) contained the highest manganese levels. MTBE found in the Thermalito Diversion Pool did not exceed the secondary MCL. Odor was not quantified during the study, but was determined objectively. Some odors associated with natural water bodies were reported. Thiobencarb was not detected in any water sample. The secondary MCL for turbidity was exceeded at least occasionally at all monitoring stations, except in Lake Oroville at the main body and dam stations. Runoff following storms usually coincided with the increased turbidity. The upstream tributaries had higher turbidity levels than Project waters. Turbidity greatly increased downstream from the Project boundary due to tributary inflow. Municipal and domestic supply beneficial uses could be affected by water quality in the Feather River watershed. Several parameters (aluminum, color, iron, manganese, and turbidity) were found at levels that may impart unacceptable taste, odor, or appearance of drinking water. However, the Project has little influence on these parameters, since upstream tributaries contribute to the levels found in Project waters.

#### **6.2.2.2 Irrigation**

Objectives for surface waters that affect the irrigation beneficial use include biostimulatory substances, chemical constituents, salinity, and temperature. Biostimulatory substances in irrigation water could lead to increased weed growth and costs for control, but could also increase desired crop growth. However, nutrients found in Project waters were not at levels considered to be biostimulatory. Project waters also were not found to contain any chemical constituents (minerals, metals, organic contaminants) that would adversely affect use for irrigation. Though the agricultural goal for manganese was occasionally exceeded from some stations in Lake Oroville, water released from the reservoir did not contain concentrations that exceeded the agricultural goal. Some tributaries (e.g., Morris Ravine, North Forebay Creek, Robinson Riffle and Mile Long ponds) to Project waters downstream from Oroville Dam contained elevated levels of manganese, but assimilation in Project waters resulted in agricultural goals being met. Other tributaries downstream from Project waters (Honcut Creek and

Bear River) also contributed elevated concentrations of manganese to the Feather River, but the agricultural goal was still met at the mouth of the Feather River. No pesticides or organic contaminants were detected that would adversely affect use of Project waters for irrigation. The agricultural goal for salinity (i.e., conductivity) was not exceeded in any Project water.

Water released from the reservoir to comply with fishery temperature requirements conflicts with temperature requirements for other beneficial uses, such as irrigation. While orchards are prevalent along the lower Feather River, in the vicinity of the Afterbay rice is the dominant crop. Concerns for the temperature of water applied to orchards have not been expressed. However, there have been concerns expressed and research conducted (Mutters et al. 2003a and b) about the suitability of temperatures for rice production in water released from the Thermalito Afterbay. Water temperatures are suitable for rice production in releases near the Afterbay Outlet to the Feather River, but are cooler than desired for much of the irrigation season in water released to the Western Canal. The irrigation designated beneficial use is adversely affected for certain rice farmers in the vicinity of the Afterbay.

#### **6.2.2.3 Power**

Water quality data do not indicate any adverse effects to the beneficial use of Project waters for power generation. However, maintenance of downstream fish migration, freshwater habitat, and spawning beneficial uses could affect the ability of the Project to generate power, especially in critically dry years. Releases of water through the low level outlet in the dam to maintain downstream water temperatures bypasses power generation facilities.

#### **6.2.2.4 Contact and Non-contact Recreation**

Recreational activities, both contact and non-contact, are affected by objectives for bacteria, biostimulatory substances, chemical constituents, color, floating material, oil and grease, pesticides, tastes and odors, temperature, toxicity, and turbidity.

Bacteria levels have been identified from Project waters, including facilities developed for contact recreation, that exceed criteria for protection of human health. Bacteria levels in Project waters adversely affect the beneficial use of contact recreation.

Biostimulatory substances could lead to increased growths of aquatic plants that could cause nuisance conditions for recreational uses, including swimming and boating. Since nutrients in Project waters are not at levels considered to be biostimulatory, there should be no adverse effects to recreation beneficial uses in Project waters. Aquatic macrophytes are prevalent in shallower areas of the Afterbay and Oroville Wildlife Area ponds. The macrophytic growths can interfere with power boating. The aquatic weeds are also important as habitat for various fish and other aquatic species.

Chemical constituents (minerals, metals, organic contaminants) were not found in Project waters in concentrations that would adversely affect beneficial use for contact and non-contact recreation.

Though measurable color was identified in Project waters, noticeable color was absent. Therefore, color does not affect contact or non-contact recreation beneficial uses.

Floating material could adversely affect recreation beneficial uses. Large amounts of woody debris are transported into Lake Oroville during the winter by upstream tributaries. However, most of the woody debris is removed by maintenance crews in the early spring. The small amounts of floating material remaining do not significantly adversely affect contact or non-contact recreation beneficial uses.

Oil and grease were not identified from any Project waters, and therefore do not affect contact or non-contact beneficial uses.

The only pesticide or organic contaminant identified from Project waters was MTBE. The concentration detected was below the level determined to impart any adverse taste to water. MTBE is being eliminated from the gasoline supply, and therefore should not be an issue in the future. Pesticide and organic contaminants were not found to adversely affect contact or non-contact recreation beneficial uses.

Odors identified from Project waters were associated with the large number of fish in the low flow channel, macrophytic and algal growth in ponds or along river banks, and water treatment at the hatchery. Other than water treatment at the hatchery, the odors encountered are naturally present along natural waterways. Such odors are not considered detrimental to the beneficial uses of contact and non-contact recreation.

Although there are no temperature criteria for contact recreation, there has been concern from the Oroville community that post-project water temperatures in the Feather River downstream from Oroville Dam are colder and less comfortable for contact recreational uses than pre-project temperatures. The colder water in the Feather River in the vicinity of Oroville has affected the beneficial uses of the river for contact recreation.

Toxicity bioassays identified effects to test organisms from several monitoring sites within the Project boundary. The cause of the toxicity to test organisms was not identified. Therefore, effects to contact or non-contact beneficial uses are not known. However, other studies have identified several organic and metal contaminants in elevated levels from fish tissue (DWR 2004-add SPW2 to citations). The organic contaminants include chlordane, DDT, dieldrin, and PCBs, while metal contaminants include arsenic, cadmium, chromium, copper, lead, mercury, nickel, and zinc. Since contact recreation includes fishing, contaminants in fish in Project waters adversely



affect the contact recreation beneficial use. However, the elevated levels of contaminants in the fish tissues are typical of most reservoirs and there is no evidence that this adverse effect is related to the Project.

Turbidity in Project waters increases due to turbid inflows in tributaries during storms. Most suspended particles settle from the water column in Lake Oroville, resulting in water with less turbidity released downstream to the Feather River. Turbid conditions in Lake Oroville, which occur during the cooler winter and early spring months, could interfere with boating and fishing. Boat operators may not be able to see shallow obstructions, while poor visibility may inhibit feeding behavior of fish, and, hence, successful fishing. Turbidity, therefore, though not a result of Project operations, may adversely affect beneficial uses of Project waters for contact and non-contact recreation.

#### **6.2.2.5 Canoeing and Rafting**

Water quality data do not indicate any adverse effects to canoeing and rafting in the Feather River downstream from Oroville Dam.

#### **6.2.2.6 Warm and Cold Fish Migration**

The warm and cold fish migration beneficial use is designated for the Feather River downstream from the Fish Barrier Dam, and can be affected by water quality objectives for water temperature, dissolved oxygen, and turbidity. The water temperature objectives at the Feather River Hatchery and Robinson Riffle are the main targets controlling Project operations. Meeting the hatchery temperature objectives generally also satisfy temperature objectives at Robinson Riffle in the low flow channel.

Water temperatures are carefully controlled to meet temperature objectives at the hatchery, which also generally result in meeting the objective at Robinson Riffle, though temperatures occasionally slightly exceed the Robinson Riffle for very brief periods.

Basin Plan objectives for dissolved oxygen levels in the Feather River downstream from the Fish Barrier Dam were generally met for cold freshwater beneficial uses, while warm freshwater beneficial uses were satisfied during all sampling events.

Turbidity level objectives affecting the warm and cold fish migration beneficial uses rarely failed to be met in the Feather River from Oroville Dam downstream to the confluence with Honcut Creek. However elevated turbidity occurrences increased downstream from Honcut Creek to Verona. Most turbidity increases were attributable to storm runoff from accretions outside of Project influences, with Honcut Creek and the Bear River contributing most to increased turbidity levels. While increases in turbidity levels occasionally exceeded criteria, migrating salmonids, especially out-migrating

juveniles, use increased turbidity levels in a river as a form of cover in a behavioral strategy to avoid predation.

#### **6.2.2.7 Warm and Cold Freshwater Habitat**

The warm and cold freshwater habitat beneficial use is applicable to Lake Oroville and the Feather River downstream from the Fish Barrier Dam. This beneficial use can be affected by water quality objectives for chemical constituents, water temperature, dissolved oxygen, and turbidity.

There are no specific water temperature objectives for Lake Oroville, while water temperatures downstream from Oroville Dam are largely controlled by the temperature requirements of the Feather River Fish Hatchery. Water is released from Oroville Dam to meet the hatchery temperature requirements, as well as those of NOAA Fisheries at Robinson Riffle, while also conserving the cold water pool in Lake Oroville.

Lake Oroville has a two-tier fishery due to thermal stratification during the summer. The reservoir provides warm water species habitat in the epilimnion, while cold freshwater habitat is provided in the hypolimnion. While the epilimnion provides abundant habitat, the cold water hypolimnion habitat can be diminished in critically dry years due to requirements to maintain downstream cold temperatures.

Warm and cold freshwater habitat beneficial uses were occasionally affected by levels of several metals. Aluminum and copper exceeded objectives for protection of aquatic life occasionally in the Feather River from the Fish Barrier Dam to the confluence with Honcut Creek, and were usually associated with storm runoff. The frequency of these objectives being exceeded greatly increased in the river downstream from Honcut Creek. While lead levels that are considered to be deleterious to aquatic life were occasionally found in the Feather River at sampling locations from Honcut Creek downstream to the mouth, analysis of lead level data from waters directly affected by Project operations indicate no detrimental affect to spawning habitat beneficial uses.

Basin Plan objectives for dissolved oxygen levels in the Feather River downstream from the Fish Barrier Dam were generally met for cold freshwater habitat beneficial uses, while warm freshwater habitat beneficial uses were satisfied during all sampling events.

Turbidity level objectives affecting the warm and cold freshwater habitat beneficial uses rarely failed to be met in the Feather River from Oroville Dam downstream to the confluence with Honcut Creek. However elevated turbidity occurrences increased in a downstream direction from Honcut Creek to Verona. Most turbidity increases were due to storm runoff from sources outside of Project influences, with Honcut Creek and the Bear River contributing most to increased turbidity levels.

#### **6.2.2.8 Warm and Cold Spawning**

The warm and cold freshwater spawning beneficial uses can be affected by water quality objectives for water temperature, dissolved oxygen, nutrients (including ammonia), metals, organic contaminants, pH, sediment (including settleable and suspended materials), and toxicity.

**Lake Oroville** — Beneficial uses designated for Lake Oroville include both cold and warm freshwater spawning. Lake Oroville provides spawning habitat for warm water species, but cold water spawning habitat is limited to inflowing tributaries. Water temperatures in streams entering Lake Oroville are not controlled by the Project, but may be suitable for resident cold water fish species spawning during the appropriate season. Though Project operations may affect warm water spawning by drawing water levels down during the period of spawning by some warm water species, there are no known water quality effects to the beneficial uses for warm and cold spawning.

**Feather River downstream from Oroville Dam** — Current applicable objectives include requirements for temperatures at the fish hatchery, downstream from the Afterbay Outlet, and at Robinson Riffle. The agreement with DFG for the hatchery establishes specific water temperature objectives at the hatchery throughout the year, and narrative temperature objectives downstream from the Afterbay Outlet for fall-run salmon after September 15 and for shad, striped bass, and other warm water fish from May through August. NOAA Fisheries established a numerical objective at Robinson Riffle for protection of steelhead and spring-run Chinook salmon. As indicated previously, the temperature objectives are carefully monitored for compliance at the hatchery, which generally results in compliance at Robinson Riffle, though water temperatures occasionally slightly exceed the objective for brief periods.

Dissolved oxygen levels in the Feather River downstream from the Fish Barrier Dam infrequently were found at levels less than those suitable for cold freshwater spawning, and not found to affect warm freshwater spawning.

Nutrient, pH, and organic contaminant levels identified in this study in the Feather River downstream from the Fish Barrier Dam to the mouth are suitable for the spawning beneficial uses designated for this reach.

As with warm and cold freshwater habitat, warm and cold spawning beneficial uses were occasionally affected by elevated levels of several metals. Aluminum and copper levels exceeded the objectives for protection of aquatic life occasionally in the Feather River from the Fish Barrier Dam to the confluence with Honcut Creek, and were usually associated with storm runoff.

Sediment levels, including both suspended and settleable materials, were not found to affect spawning beneficial uses in waters affected by Project operations. However, the

physical presence of Oroville Dam has affected the natural movement of sediments from areas upstream from the dam to the river downstream from the dam, leading to the riverbed becoming increasingly composed of coarser material, which has an effect on spawning beneficial uses.

Observed toxicity from bioassay tests, performed on samples collected in the Feather River near the Fish Barrier Dam to downstream from the Project boundary, indicate occasional toxic effects to laboratory test organisms, thus possibly affecting the spawning beneficial use.

#### **6.2.2.9 Wildlife Habitat**

The beneficial use of Project waters for wildlife habitat can be affected by water quality objectives for chemical constituents, pesticides, and toxicity.

Chemical constituents and pesticide concerns include direct effects to wildlife and effects to their habitat, which is primarily the food resources. No chemicals or pesticides were identified in this study that would adversely affect wildlife habitat. Chemical constituent and pesticide levels in fish species that are potentially food resources for wildlife are identified in Study Plan SPW2. This report identifies and compares organic compounds and metals detected within the Feather River watershed to known guidelines and criteria. Organic compounds identified from fish tissues in exceedance of various criteria include chlordane, DDT Isomers, dieldrin, and PCBs. Metals identified which exceed guidelines or criteria pertaining to wildlife and their habitats include cadmium and mercury. These data suggest that the beneficial use of wildlife habitat may be adversely affected by movement of these compounds and elements through the food chain.

Observed toxicity from bioassay tests performed on samples collected in the Feather River near the Fish Barrier Dam downstream to the Project boundary indicate occasional toxic effects to laboratory organisms. These occasional toxic effects may negatively affect the wildlife habitat beneficial use.

Study Plan SPT1 evaluates effects of Project operations and features on wildlife and wildlife habitat, and examines potential future Project related effects on wildlife and wildlife habitat. Findings from this report reveal no significant implications due to water quality.

#### **6.2.3 Effects from Future Project Operations**

A variety of potential future Project operations have been discussed which may or may not have effects to water quality. While some of the potential Project operation changes may occur, others will not be implemented. Effects to water quality from future Project operations will be evaluated once actual Project operations changes have been determined.



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## **APPENDICES**

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*Preliminary Information – Subject to Revision – For Collaborative Process Purposes Only*

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*Preliminary Information – Subject to Revision – For Collaborative Process Purposes Only*

Oraville

FERC #2100

Table 1. Results for bacterial monitoring in 2002

Bacteria Criteria			Total Coliform (#/100 ml)	Fecal Coliform (#/100 ml)	Geometric Mean Fecal Coliform (5 samples/30 days)		
DHS <sup>1</sup>	Single sample maximum		10,000	400			
CVRWQCB <sup>2</sup>	Geometric Mean of 5 samples/30 days				200		
	No more than 10% of samples in 30 days			400			
	Sample Date	Sample Time	Sample Vol. Filt.	Total Coliform (#/100 mL)	Sample Vol. Filt.	Fecal Coliform (#/100 mL)	Geometric Mean Fecal Coliform (5 samples/30 days)
Afterbay Outlet	8/25/02	1645	50	28	100	0	
Afterbay Outlet	8/25/02	1645	25	28			
Afterbay Outlet	8/28/02	1655	50	16	100	1	
Afterbay Outlet	8/28/02	1655	25	8			
Afterbay Outlet	9/2/02	1715	50	8	100	4	
Afterbay Outlet	9/2/02	1715	25	88			
Afterbay Outlet	9/8/02	1405	50	16	100	5	
Afterbay Outlet	9/8/02	1405	25	24			
Afterbay Outlet	9/15/02	1345	50	38	100	1	2
Afterbay Outlet	9/15/02	1345	25	40			
Bedrock Park (Upstream)	8/25/02	1730	50	82	100	0	
Bedrock Park (Upstream)	8/25/02	1730	25	96			
Bedrock Park (Upstream)	8/28/02	1845	50	64	100	21	
Bedrock Park (Upstream)	8/28/02	1845	25	368			
Bedrock Park (Upstream)	9/2/02	1810	50	166	100	8	
Bedrock Park (Upstream)	9/2/02	1810	25	138			
Bedrock Park (Upstream)	9/8/02	1420	50	48	100	0	
Bedrock Park (Upstream)	9/8/02	1420	25	92			
Bedrock Park (Upstream)	9/15/02	1400	50	40	100	4	4
Bedrock Park (Upstream)	9/15/02	1400	25	44			
Bedrock Park (Downstream)	8/25/02	1730	50	66	100	0	
Bedrock Park (Downstream)	8/25/02	1730	25	152			
Bedrock Park (Downstream)	8/28/02	1850	50	94	100	20	
Bedrock Park (Downstream)	8/28/02	1850	25	432			
Bedrock Park (Downstream)	9/2/02	1815	50	18	100	332	
Bedrock Park (Downstream)	9/2/02	1815	25	24			
Bedrock Park (Downstream)	9/8/02	1425	50	78	100	0	
Bedrock Park (Downstream)	9/8/02	1425	25	72			
Bedrock Park (Downstream)	9/15/02	1410	50	162	100	5	8
Bedrock Park (Downstream)	9/15/02	1410	25	172			
Bidwell Marina Houseboats @ E-36	8/25/02	1500	50	0	100	0	
Bidwell Marina Houseboats @ E-37	8/25/02	1500	25	0			
Bidwell Marina Houseboats @ E-38	8/28/02	1450	50	82	100	0	
Bidwell Marina Houseboats @ E-39	8/28/02	1450	25	124			
Bidwell Marina Houseboats @ E-40	9/2/02	1515	50	28	100	3	
Bidwell Marina Houseboats @ E-41	9/2/02	1515	25	124			
Bidwell Marina Houseboats @ E-42	9/8/02	1655	50	8	100	0	
Bidwell Marina Houseboats @ E-43	9/8/02	1655	25	4			
Bidwell Marina Houseboats @ E-44	9/15/02	1635	50	26	100	0	1
Bidwell Marina Houseboats @ E-45	9/15/02	1635	25	48			
Bidwell Marina Houseboats @ L-4	8/25/02	1515	50	6	100	1	
Bidwell Marina Houseboats @ L-5	8/25/02	1515	25	0			
Bidwell Marina Houseboats @ L-6	8/28/02	1505	50	70	100	0	
Bidwell Marina Houseboats @ L-7	8/28/02	1505	25	88			
Bidwell Marina Houseboats @ L-8	9/2/02	1530	50	72	100	2	
Bidwell Marina Houseboats @ L-9	9/2/02	1530	25	0			
Bidwell Marina Houseboats @ L-10	9/8/02	1635	50	2	100	1	
Bidwell Marina Houseboats @ L-11	9/8/02	1635	25	4			
Bidwell Marina Houseboats @ L-12	9/15/02	1610	50	54	100	1	1
Bidwell Marina Houseboats @ L-13	9/15/02	1610	25	60			
Foreman Creek Boat Access	8/25/02	1215	50	6	100	0	
Foreman Creek Boat Access	8/25/02	1215	25	0			
Foreman Creek Boat Access	8/28/02	1400	50	44	100	0	
Foreman Creek Boat Access	8/28/02	1400	25	336			
Foreman Creek Boat Access	9/2/02	1430	50	2	100	0	
Foreman Creek Boat Access	9/2/02	1430	25	12			
Foreman Creek Boat Access	9/8/02	1600	50	8	100	4	
Foreman Creek Boat Access	9/8/02	1600	25	16			
Foreman Creek Boat Access	9/15/02	1530	50	10	100	0	1
Foreman Creek Boat Access	9/15/02	1530	25	8			
Mill Long Pond	8/25/02	1630	50	TNTC	100	71	
Mill Long Pond	8/25/02	1630	25	TNTC			
Mill Long Pond	8/28/02	1640	50	26	100	2	

Bacteria Criteria				Total Coliform (#/100 ml)	Fecal Coliform (#/100 ml)		Geometric Mean Fecal Coliform (5 samples/30 days)
DHS <sup>1</sup>	Single sample maximum			10,000	400		
CVRWQCB <sup>2</sup>	Geometric Mean of 5 samples/30 days						200
	No more than 10% of samples in 30 days				400		
	Sample Data	Sample Time	Sample Vol. Filt.	Total Coliform (#/100 mL)	Sample Vol. Filt.	Fecal Coliform (#/100 mL)	Geometric Mean Fecal Coliform (5 samples/30 days)
Mile Long Pond	8/28/02	1640	25	200			
Mile Long Pond	9/2/02	1700	50	38	100	7	
Mile Long Pond	9/2/02	1700	25	58			
Mile Long Pond	9/8/02	1355	50	74	100	10	
Mile Long Pond	9/8/02	1355	25	158			
Mile Long Pond	9/15/02	1315	50	54	100	7	9
Mile Long Pond	9/15/02	1315	25	92			
Monument Hill Recreation Area	8/25/02	1700	50	68	100	6	
Monument Hill Recreation Area	8/25/02	1700	25	296			
Monument Hill Recreation Area	8/28/02	1710	50	138	100	42	
Monument Hill Recreation Area	8/28/02	1710	25	304			
Monument Hill Recreation Area	9/2/02	1730	50	0	100	TNTC	
Monument Hill Recreation Area	9/2/02	1730	25	0			
Monument Hill Recreation Area	9/8/02	1335	50	26	100	5	
Monument Hill Recreation Area	9/8/02	1335	25	44			
Monument Hill Recreation Area	9/15/02	1250	50	0	100	0	6
Monument Hill Recreation Area	9/15/02	1250	25	4			
North Forebay Recreation Area @ Beach	8/25/02	1800	50	88	50	8	
North Forebay Recreation Area @ Beach	8/25/02	1800	25	124	25	16	
North Forebay Recreation Area @ Beach	8/28/02	1915	50	TNTC	50	208	
North Forebay Recreation Area @ Beach	8/28/02	1915	25	688	25	228	
North Forebay Recreation Area @ Beach	9/2/02	1840	50	8	50	158	
North Forebay Recreation Area @ Beach	9/2/02	1840	25	48	25	196	
North Forebay Recreation Area @ Beach	9/8/02	1240	50	0	50	288	
North Forebay Recreation Area @ Beach	9/8/02	1240	25	32	25	416	
North Forebay Recreation Area @ Beach	9/15/02	1220	50	4	50	6	
North Forebay Recreation Area @ Beach	9/15/02	1220	25	12	25	8	
North Forebay Recreation Area @ Beach	9/19/02	1615	100	12	100	18	64
North Forebay Recreation Area @ Beach	9/19/02	1615					
North Forebay Recreation Area @ Footbri	8/25/02	1800	50	12	50	4	
North Forebay Recreation Area @ Footbri	8/25/02	1800	25	4	25	0	
North Forebay Recreation Area @ Footbri	8/28/02	1910	50	0	50	38	
North Forebay Recreation Area @ Footbri	8/28/02	1910	25	4	25	44	
North Forebay Recreation Area @ Footbri	9/2/02	1845	50	0	50	148	
North Forebay Recreation Area @ Footbri	9/2/02	1845	25	0	25	140	
North Forebay Recreation Area @ Footbri	9/8/02	1235	50	0	50	22	
North Forebay Recreation Area @ Footbri	9/8/02	1235	25	4	25	44	
North Forebay Recreation Area @ Footbri	9/15/02	1215	50	0	50	10	
North Forebay Recreation Area @ Footbri	9/15/02	1215	25	0	25	4	
North Forebay Recreation Area @ Footbri	9/19/02	1615	100	2	100	0	14
North Forebay Recreation Area @ Footbri	9/19/02	1615					
North Forebay Recreation Area @ Mouth	8/25/02	1800	50	130	50	20	
North Forebay Recreation Area @ Mouth	8/25/02	1800	25	156	25	16	
North Forebay Recreation Area @ Mouth	8/28/02	1905	50	32	50	2	
North Forebay Recreation Area @ Mouth	8/28/02	1905	25	140	25	0	
North Forebay Recreation Area @ Mouth	9/2/02	1835	50	4	50	40	
North Forebay Recreation Area @ Mouth	9/2/02	1835	25	44	25	28	
North Forebay Recreation Area @ Mouth	9/8/02	1245	50	32	50	16	
North Forebay Recreation Area @ Mouth	9/8/02	1245	25	48	25	4	
North Forebay Recreation Area @ Mouth	9/15/02	1205	50	0	50	18	
North Forebay Recreation Area @ Mouth	9/15/02	1205	25	12	25	32	
North Forebay Recreation Area @ Mouth	9/19/02	1615	100	18	100	2	9
North Forebay Recreation Area @ Mouth	9/19/02	1615					
Potter Ravine Floating Campsite	8/25/02	1400	50	0	100	0	
Potter Ravine Floating Campsite	8/25/02	1400	25	0			
Potter Ravine Floating Campsite	8/28/02	1345	50	2	100	1	
Potter Ravine Floating Campsite	8/28/02	1345	25	0			
Potter Ravine Floating Campsite	9/2/02	1415	50	0	100	10	
Potter Ravine Floating Campsite	9/2/02	1415	25	16			
Potter Ravine Floating Campsite	9/8/02	1550	50	2	100	0	
Potter Ravine Floating Campsite	9/8/02	1550	25	0			
Potter Ravine Floating Campsite	9/15/02	1520	50	34	100	1	2
Potter Ravine Floating Campsite	9/15/02	1520	25	36			
South Forebay Boat Launch	8/25/02	1715	50	78	100	1	
South Forebay Boat Launch	8/25/02	1715	25	148			
South Forebay Boat Launch	8/28/02	1730	50	192	100	78	
South Forebay Boat Launch	8/28/02	1730	25	328			



Bacteria Criteria		Total Coliform (#/100 ml)	Fecal Coliform (#/100 ml)	Geometric Mean Fecal Coliform (5 samples/30 days)
DHS <sup>1</sup>	Single sample maximum	10,000	400	
CVRWQCB <sup>2</sup>	Geometric Mean of 5 samples/30 days			200
	No more than 10% of samples in 30 days		400	

	Sample Date	Sample Time	Sample Vol. Filt.	Total Coliform (#/100 mL)	Sample Vol. Filt.	Fecal Coliform (#/100 mL)	Geometric Mean Fecal Coliform (5 samples/30 days)
South Forebay Boat Launch	9/2/02	1750	50	0	100	96	
South Forebay Boat Launch	9/2/02	1750	25	88			
South Forebay Boat Launch	9/8/02	1315	50	64	100	81	
South Forebay Boat Launch	9/8/02	1315	25	172			
South Forebay Boat Launch	9/15/02	1235	50	334	100	59	31
South Forebay Boat Launch	9/15/02	1235	25	258			
South Forebay Recreation Area	8/25/02	1715	50	324	100	111	
South Forebay Recreation Area	8/25/02	1715	25	392			
South Forebay Recreation Area	8/28/02	1735	50	TNTC	100	103	
South Forebay Recreation Area	8/28/02	1735	25	468			
South Forebay Recreation Area	9/2/02	1755	50	2	100	213	
South Forebay Recreation Area	9/2/02	1755	25	4			
South Forebay Recreation Area	9/8/02	1320	50	28	100	1	
South Forebay Recreation Area	9/8/02	1320	25	64			
South Forebay Recreation Area	9/15/02	1240	50	40	100	13	32
South Forebay Recreation Area	9/15/02	1240	25	0			
Stringtown Cove	8/25/02	1430	50	0	100	0	
Stringtown Cove	8/25/02	1430	25	4			
Stringtown Cove	8/28/02	1410	50	132	100	0	
Stringtown Cove	8/28/02	1410	25	164			
Stringtown Cove	9/2/02	1445	50	4	100	0	
Stringtown Cove	9/2/02	1445	25	8			
Stringtown Cove	9/8/02	1615	50	0	100	0	
Stringtown Cove	9/8/02	1615	25	0			
Stringtown Cove	9/15/02	1545	50	0	100	0	0
Stringtown Cove	9/15/02	1545	25	0			
Stringtown Main Body	8/25/02	1435	50	6	100	1	
Stringtown Main Body	8/25/02	1435	25	8			
Stringtown Main Body	8/28/02	1415	50	28	100	0	
Stringtown Main Body	8/28/02	1415	25	44			
Stringtown Main Body	9/2/02	1450	50	0	100	0	
Stringtown Main Body	9/2/02	1450	25	32			
Stringtown Main Body	9/8/02	1620	50	2	100	1	
Stringtown Main Body	9/8/02	1620	25	4			
Stringtown Main Body	9/15/02	1550	50	0	100	0	1
Stringtown Main Body	9/15/02	1550	25	4			

1. California Department of Health Services. Draft Guidance for Fresh Water Beaches. July 24, 2001.

2. Central Valley Regional Water Quality Control Board. Water Quality Control Plan (Basin Plan), Fourth Edition, 1998.

Numbers in red exceed criterion

Oroville

FERC #2106

5-5

Table 2. Results for bacterial monitoring of swimming areas in 2003

Bacteria Criteria		Total Coliform (#/100 ml)	Fecal Coliform (#/100 ml)	Geometric Mean Fecal Coliform (5 samples/30 days)	Enterococcus (#/100 ml)	Geometric Mean Enterococcus (5 samples/30 days)	Fecal Streptococcus (#/100 ml)
DHS <sup>1</sup>	Single sample maximum	10,000	400		61		
CVRWQCB <sup>2</sup>	Geometric Mean of 5 samples/30 days			200			
	No more than 10% of samples in 30 days		400				
USEPA <sup>3</sup>	Single sample maximum				61		
	Geometric Mean of 5 samples/30 days					33	

Oroville (FERC #2106)  
Bacterial  
Exceedance

Shouldn't they be presenting E. coli as the benchmark for freshwater?

Need 1000 test per year  
QAC  
Aftt  
not issue Oct

Station Name	Sample Date	Sample Time	Total Coliform (#/100 ml)	Fecal Coliform (#/100 ml)	Geometric Mean Fecal Coliform (5 samples/30 days)	Enterococcus (#/100 ml)	Geometric Mean Enterococcus (5 samples/30 days)	Fecal Streptococcus (#/100 ml)
Bedrock Park US	6/10/03	0905	300	300		170		170
Bedrock Park US	6/23/03	0845	70	50		30		50
Bedrock Park US	6/26/03	0945	90	11		2		8
Bedrock Park US	6/30/03	1020	130	8		14		22
Bedrock Park US	7/3/03	1030	90	4	22	4	14	11
Bedrock Park US	7/7/03	1005	240	9	11	4	7	14
Bedrock Park US	7/10/03	1035	70	6	7	2	4	7
Bedrock Park US	7/14/03	1045	23	23	8	4	4	8
Bedrock Park US	7/17/03	1045	80	23	10	30	5	50
Bedrock Park US	8/6/03	0850	>1600	170	22	50	9	280
Bedrock Park DS	6/10/03	0905	300	170		300		500
Bedrock Park DS	6/23/03	0855	350	14		17		27
Bedrock Park DS	6/26/03	0955	500	23		30		170
Bedrock Park DS	6/30/03	1025	110	13		4		30
Bedrock Park DS	7/3/03	1140	220	30	29	11	23	22
Bedrock Park DS	7/7/03	1010	189	8	18	12	12	16
Bedrock Park DS	7/10/03	1045	80	17	16	4	9	26
Bedrock Park DS	7/14/03	1100	240	17	16	11	7	140
Bedrock Park DS	7/17/03	1055	240	80	22	23	11	80
Bedrock Park DS	8/6/03	0855	900	300	35	4	9	11
Foreman Creek Boat Access	6/10/03	0810	>1600	>1600		500		900
Foreman Creek Boat Access	6/23/03	0700	220	80		-		-
Foreman Creek Boat Access	6/26/03	0845	22	2		2		7
Foreman Creek Boat Access	6/30/03	0845	50	8		7		7
Foreman Creek Boat Access	7/3/03	0850	170	4	24	280		280
Foreman Creek Boat Access	7/7/03	0755	50	8	8	6	26	6
Foreman Creek Boat Access	7/10/03	0830	220	140	9	<2	7	2
Foreman Creek Boat Access	7/14/03	0900	>1600	13	14	20	12	23
Foreman Creek Boat Access	7/17/03	0850	17	7	13	2	9	4
Foreman Creek Boat Access	8/6/03	0815	21	<2	10	-		<2
Loafer Creek Swim Area	6/10/03	0830	>1600	1600		>1600		>1600
Loafer Creek Swim Area	6/23/03	0830	>1600	500		59		123
Loafer Creek Swim Area	6/26/03	0805	240	50		300		500
Loafer Creek Swim Area	6/30/03	0900	300	130		23		23
Loafer Creek Swim Area	7/3/03	0910	300	50	192	<2	58	33
Loafer Creek Swim Area	7/7/03	0815	220	11	71	27	26	110
Loafer Creek Swim Area	7/10/03	0855	30	8	31	2	13	2
Loafer Creek Swim Area	7/14/03	0920	70	8	21	17	7	33
Loafer Creek Swim Area	7/17/03	0905	130	30	16	7	6	80
Loafer Creek Swim Area	8/6/03	0745	14	2	8	8	8	6
Monument Hill Swim Area	6/10/03	1005	80	30		50		50
Monument Hill Swim Area	6/23/03	0930	60	4		110		170
Monument Hill Swim Area	6/26/03	0910	130	50		280		900
Monument Hill Swim Area	6/30/03	0950	80	8		27		27
Monument Hill Swim Area	7/3/03	1005	500	30	17	23	53	30
Monument Hill Swim Area	7/7/03	920	900	23	16	30	56	130
Monument Hill Swim Area	7/10/03	1000	900	500	42	120	58	130

Bacteria Criteria		Total Coliform (#/100 ml)	Fecal Coliform (#/100 ml)	Geometric Mean Fecal Coliform (5 samples/30 days)	Enterococcus (#/100 ml)	Geometric Mean Enterococcus (5 samples/30 days)	Fecal Streptococ- us (#/100 ml)
DHS <sup>1</sup>	Single sample maximum	10,000	400		61		
CVRWQCB <sup>2</sup>	Geometric Mean of 5 samples/30 days			200			
	No more than 10% of samples in 30 days		400				
USEPA <sup>3</sup>	Single sample maximum				61		
	Geometric Mean of 5 samples/30 days					33	

Station Name	Sample Date	Sample Time	Total Coliform (#/100 ml)	Fecal Coliform (#/100 ml)	Geometric Mean Fecal Coliform (5 samples/30 days)	Enterococcus (#/100 ml)	Geometric Mean Enterococcus (5 samples/30 days)	Fecal Streptococ- us (#/100 ml)
Monument Hill Swim Area	7/14/03	1020	220	7	29	4	25	7
Monument Hill Swim Area	7/17/03	1010	900	170	53	30	25	70
Monument Hill Swim Area	8/6/03	1000	>1600	110	68	17	24	22
North Forebay Swim Area (Beach)	6/10/03	0935	220	23		22		50
North Forebay Swim Area (Beach)	6/23/03	0920	>1600	>1600		1600		1600
North Forebay Swim Area (Beach)	6/26/03	1010	1600	1600		>1600		>1600
North Forebay Swim Area (Beach)	6/30/03	1040	900	500		140		140
North Forebay Swim Area (Beach)	7/3/03	1105	>1600	>1600	543	1600	417	1600
North Forebay Swim Area (Beach)	7/7/03	1040	170	130	767	50	491	70
North Forebay Swim Area (Beach)	7/10/03	1115	300	50	384	1600	491	1600
North Forebay Swim Area (Beach)	7/14/03	1125	>1600	500	384	220	330	500
North Forebay Swim Area (Beach)	7/17/03	1125	1600	900	342	80	295	130
North Forebay Swim Area (Beach)	8/6/03	0915	50000	5000	430	>1600	295	>1600
North Forebay Swim Area (Cove)	6/10/03	0930	500	500		500		500
North Forebay Swim Area (Cove)	6/23/03	0915	1300	140		300		300
North Forebay Swim Area (Cove)	6/26/03	1005	1600	300		80		80
North Forebay Swim Area (Cove)	6/30/03	1035	1600	240		70		140
North Forebay Swim Area (Cove)	7/3/03	1100	500	130	231	1600	266	>1600
North Forebay Swim Area (Cove)	7/7/03	1035	1600	300	208	80	185	110
North Forebay Swim Area (Cove)	7/10/03	1110	80	22	144	2	68	4
North Forebay Swim Area (Cove)	7/14/03	1120	>1600	900	179	70	66	70
North Forebay Swim Area (Cove)	7/17/03	1115	>1600	300	187	220	83	280
North Forebay Swim Area (Cove)	8/6/03	0905	>160000	22000	523	>1600	83	>1600
North Forebay Swim Area (Mouth)	6/10/03	0925	300	70		900		900
North Forebay Swim Area (Mouth)	6/23/03	0900	500	50		13		13
North Forebay Swim Area (Mouth)	6/26/03	1015	140	30		23		23
North Forebay Swim Area (Mouth)	6/30/03	1050	600	30		14		14
North Forebay Swim Area (Mouth)	7/3/03	1050	280	220	59	110	53	110
North Forebay Swim Area (Mouth)	7/7/03	1025	>1600	80	60	29	27	29
North Forebay Swim Area (Mouth)	7/10/03	1055	220	14	47	21	29	21
North Forebay Swim Area (Mouth)	7/14/03	1110	900	50	52	11	25	11
North Forebay Swim Area (Mouth)	7/17/03	1105	>1600	500	91	110	38	220
North Forebay Swim Area (Mouth)	8/6/03	0920	>1600	>1600	135	1600	65	>1600
South Forebay Boat Ramp	6/10/03	0945	22	22		23		23
South Forebay Boat Ramp	6/23/03	0950	130	8		900		900
South Forebay Boat Ramp	6/26/03	0920	17	4		4		4
South Forebay Boat Ramp	6/30/03	1000	300	130		220		220
South Forebay Boat Ramp	7/3/03	1015	170	50	21	7	42	7
South Forebay Boat Ramp	7/7/03	940	900	130	31	80	54	80
South Forebay Boat Ramp	7/10/03	1015	280	11	33	50	30	50
South Forebay Boat Ramp	7/14/03	1030	900	500	86	300	71	300
South Forebay Boat Ramp	7/17/03	1020	>1600	>1600	142	500	84	500
South Forebay Boat Ramp	8/6/03	0945	>1600	>1600	283	300	178	300
South Forebay Swim Area	6/10/03	0950	30	17		2		30
South Forebay Swim Area	6/23/03	0945	17	13		7		7
South Forebay Swim Area	6/26/03	0925	110	26		30		30
South Forebay Swim Area	6/30/03	1005	500	30		11		11
South Forebay Swim Area	7/3/03	1020	300	30	22	>1600	24	>1600
South Forebay Swim Area	7/7/03	945	140	7	18	2	24	6

Bacteria Criteria		Total Coliform (#/100 ml)	Fecal Coliform (#/100 ml)	Geometric Mean Fecal Coliform (5 samples/30 days)	Enterococcus (#/100 ml)	Geometric Mean Enterococcus (5 samples/30 days)	Fecal Streptococcus (#/100 ml)	
DHS <sup>1</sup>	Single sample maximum	10,000	400		61			
CVRWQCB <sup>2</sup>	Geometric Mean of 5 samples/30 days			200				
	No more than 10% of samples in 30 days		400					
USEPA <sup>3</sup>	Single sample maximum				61			
	Geometric Mean of 5 samples/30 days					33		
Station Name	Sample Date	Sample Time	Total Coliform (#/100 ml)	Fecal Coliform (#/100 ml)	Geometric Mean Fecal Coliform (5 samples/30 days)	Enterococcus (#/100 ml)	Geometric Mean Enterococcus (5 samples/30 days)	Fecal Streptococcus (#/100 ml)
South Forebay Swim Area	7/10/03	1020	40	8	17	17	28	17
South Forebay Swim Area	7/14/03	1035	>1600	1600	38	1600	63	1600
South Forebay Swim Area	7/17/03	1030	300	50	42	30	76	50
South Forebay Swim Area	8/6/03	0950	>1600	>1600	94	>1600	76	>1600
Stringtown Boat Ramp	6/10/03	0735	300	130		900		1600
Stringtown Boat Ramp	6/23/03	0800	70	4		900		900
Stringtown Boat Ramp	6/28/03	0830	50	2		29		44
Stringtown Boat Ramp	6/30/03	0915	2	2		2		2
Stringtown Boat Ramp	7/3/03	0930	1600	1600	20	>1600	150	>1600
Stringtown Boat Ramp	7/7/03	0835	30	<2	8	2	44	4
Stringtown Boat Ramp	7/10/03	0915	11	<2	6	<2	11	2
Stringtown Boat Ramp	7/14/03	0945	37	4	7	4	8	6
Stringtown Boat Ramp	7/17/03	0930	22	<2	6	2	8	29
Stringtown Boat Ramp	8/6/03	0720	17	<2	1	<2	2	2

1. California Department of Health Services. Draft Guidance for Fresh Water Beaches. July 24, 2001.

2. Central Valley Regional Water Quality Control Board. Water Quality Control Plan (Basin Plan), Fourth Edition, 1998.

3. USEPA. Ambient Water Quality Criteria for Bacteria - 1986. EPA 440/5-84-002.

Numbers in red exceed criterion



Oroville Facilities Relicensing  
Federal Energy Regulatory Commission Project No. 2100

Study Plan SPW1

**Project Effects on Water Quality  
Designated Beneficial Uses for  
Surface Waters**



Jerry - introductory comment

**Oroville Facilities Relicensing  
Federal Energy Regulatory Commission Project No. 2100  
Study Plan SPW1**

**Study Objectives:**

- **evaluate the physical, chemical, and biological integrity of water quality in Lake Oroville, its tributaries, the Feather River, Diversion Pool, Thermalito Power Canal, Forebay and Afterbay, and other Project-affected surface waters**
- **determine whether Project-affected waters meet Basin Plan objectives and are protective of beneficial uses designated in the Basin Plan**



Jerry

## Oroville Facilities Relicensing

Federal Energy Regulatory Commission Project No. 2100

Study Plan SPW1

### **General Methodology for Achieving Objectives:**

- **evaluate those parameters potentially affected by the Project for which the CVRWQCB has established water quality objectives in the Basin Plan:**
  - physical constituents
  - pesticides
  - pathogens (bacteria)
  - toxicity
  - settleable material
  - color
  - oil and grease
  - chemical constituents
  - organic contaminants
  - biostimulatory substances
  - sediment
  - suspended material
  - floating material
  - tastes and odors
- **compare data to numerical or narrative objectives to determine compliance with the water quality standards for factors controllable by the Project**



Jerry

**Oroville Facilities Relicensing  
Federal Energy Regulatory Commission Project No. 2100  
Study Plan SPW1**

**General Methodology for Achieving Objectives:**

**• evaluate effects to beneficial uses identified in the Basin  
Plan**

- municipal and domestic supply
- irrigation
- power
- contact and non-contact recreation
- warm and cold freshwater habitat
- warm and cold spawning
- wildlife habitat



Jerry



**Oroville Facilities Relicensing  
Federal Energy Regulatory Commission Project No. 2100  
Study Plan SPW1**

**Other Factors Affecting Water Quality**

- **Salmon decomposition**
- **SCOR Outfall**
- **Nutrient Deprivation**



Jerry - other issues

**Oroville Facilities Relicensing**  
**Federal Energy Regulatory Commission Project No.**  
**Study Plan SPW1**

**Monitoring Stations**

- tributaries upstream from Lake Oroville
- Project waters
- tributaries to Project waters downstream from Oroville Dam
- Feather River downstream from Project boundary
- Sacramento River



Ryan – just say what's on the slide (don't mention each station)

Project Effects on Designated Beneficial Uses -  
Municipal and Domestic Supply

- Applicable Objectives - bacteria, chemical constituents, color, pesticides, tastes and odors, and turbidity
- Results



Jerry

**Bacteria** potentially adversely affect beneficial use for municipal and domestic supply

- Every site monitored in SPW1 exceeded the coliform MCL for public water systems.
  - Title 22 requires suppliers of domestic water "using surface water shall provide multibarrier treatment to reliably protect users from microbiological contaminants."
  - required treatment would allow use of water from the Oroville Facilities for municipal and domestic supply.
- **Inorganic chemical** primary standards established in Title 22 of Health & Safety Code.
- No Project waters exceeded inorganic chemicals MCL, other than aluminum from MF arm of L Oroville (bottom), but not in water released at dam; Source=upstream tribs.
- Several sites outside or project boundary (US & DS) also exceeded for aluminum.
- Project cannot control contaminants from upstream sources.
- MTBE is the only **organic chemical** found in Project waters for which is an MCL.
- from Thermalito Diversion Pool at concentration of 0.0031 mg/L - MCL is 0.013 mg/L.
- Secondary MCLs for drinking water established based on consumer acceptance of taste, odor, and appearance of drinking water.
- aluminum, iron, turbidity exceeded secondary MCL at least occasionally from nearly every monitoring site, though usually lowest in Project waters.
  - Manganese occasionally exceeded secondary MCL at some sites
  - MTBE in Diversion Pool did not exceed secondary MCL.
- Due to stormwater inflows, rather than sources controllable by the Project

**Conclusion:** Municipal and domestic supply beneficial use in Project water is affected by water quality in the Feather River watershed. Several parameters (aluminum, iron, manganese, and turbidity) were found at levels that may impart unacceptable taste, odor, or appearance to drinking water. However, the Project has little influence on these parameters, since upstream tributaries are responsible for the levels found in Project waters. Therefore, municipal and domestic supply are not affected through any Project- controllable water quality factor.

**Project Effects on Designated Beneficial Uses -  
Irrigation**

- Applicable Objectives - biostimulatory substances, chemical constituents, salinity, and temperature
- Results



Jerry

**Biostimulatory substances** in irrigation water could lead to increased weed growth and costs for control

- nutrients occasionally found in Project waters at levels considered biostimulatory according to recommended USEPA nutrient criteria
- could also increase desired crop growth; no complaints about excessive weed growth from farmers due to biostimulatory substances

Water released to the Diversion Pool and Project waters not found to contain any **chemical constituents** that would adversely affect use for irrigation.

- agricultural goal for manganese occasionally exceeded from some stations in Lake Oroville
- water released from reservoir did not contain Mn levels that exceeded the agricultural goal.
- No pesticides or organic contaminants were detected that would adversely affect use of Project waters for irrigation.

Agricultural goal for **salinity** (i.e., conductivity) was not exceeded in any Project water.

Water released from the reservoir to comply with fishery temperature requirements may conflict with **temperature** requirements for beneficial use of irrigation.

- concerns expressed and research conducted (Mutter) about the suitability of temperatures for rice production in water released from the Afterbay.
- water temperatures are suitable for rice production in releases near the Afterbay Outlet to the Feather River, but are cooler than desired for much of the irrigation season in water released to the Western Canal.

**Conclusion:** Irrigation beneficial uses may be affected by temperature requirements for fisheries, but no other water quality objectives adversely affect use of project water for irrigation.



**Oroville Facilities Relicensing**  
**Federal Energy Regulatory Commission Project No. 2100**  
**Study Plan SPW1**

**Project Effects on Designated Beneficial Uses -  
Power**

- **Applicable Objectives - (downstream fish migration, freshwater habitat, and spawning beneficial uses)**
- **Results**



Jerry

Water quality data do not indicate any adverse effects to the beneficial use of Project waters for power generation.

However, maintenance of downstream fish migration, freshwater habitat, and spawning beneficial uses could affect the ability of the Project to generate power, especially in critically dry years. Releases of water through the low level outlet in the dam to maintain downstream water temperatures bypasses power generation facilities.

- Project Effects on Designated Beneficial Uses
  - Contact and Non-contact Recreation
- Applicable Objectives - bacteria, biostimulatory substances, chemical constituents, color, floating material, oil and grease, pesticides, tastes and odors, temperature, toxicity, and turbidity
- Results



**Jerry-Bacteria** - exceed criteria for protection of human health for contact recreation - Recreation Areas, popular swimming areas, as well as general monitoring sites.

**Biostimulatory substances** could lead to increased growths of nuisance aquatic plants

- Nutrients in Project waters occasionally at levels considered biostimulatory.
- Aquatic macrophytes prevalent in shallower areas of Afterbay and OWA ponds.
- Macrophytic growths can interfere with power boating and swimming.
- Aquatic weeds also important habitat for various fish and other aquatic species.

**Chemical constituents** not found in concentrations adversely affecting beneficial use.

**Color** was measured in Project waters, but noticeable color was absent

Large amounts **floating material** (woody debris) transported to L Oroville during winter-tribs.

- Most removed by maintenance crews in early spring.
- Small amounts remaining do not significantly affect contact or non-contact recreation use

**Oil and grease** not identified.

Only **pesticide** or organic contaminant identified from Project waters was MTBE;

- below level determined to impart adverse taste to water.

**Odors** identified associated with large number of fish in low flow channel, macrophytic and algal growth in ponds or along river banks, and water treatment at the hatchery.

- Other than water treatment at the hatchery, the odors encountered are naturally present along natural waterways and are not considered detrimental to beneficial uses.

No **temperature** criteria for contact recreation;

- concern from Oroville community that post-project water temps in Feather R DS from Oroville Dam are colder and less comfortable for contact recreation than pre-project temps.

**Toxicity** bioassays-effects to test organisms from several sites within Project boundary.

- Cause of toxicity to test organisms not identified.
- other studies identified several organic and metal contaminants in elevated levels from fish

- Since non-contact recreation includes fishing, contaminants in fish in Project waters adversely affect the non-contact recreation beneficial use.

**Turbidity** in Project waters could interfere with boating and fishing. Boat operators may not be able to see shallow obstructions, while poor visibility may inhibit successful fishing.

- Turbid conditions in L Oro occur during winter and early spring months-storm runoff in tribs.
- Most suspended particles settle from the water column in L Oroville, resulting in water with less turbidity released downstream to the Feather R.

**Conclusion:** Bacteria levels, temperature (in Feather River nr Oroville), contaminants in fish, and reservoir turbidity adversely affect contact and non-contact beneficial use. At least contaminants in fish and turbidity are not a result of Project operations. Fish contaminant issue is widespread throughout California and turbidity is the result of turbid tributary inflows.

**Oroville Facilities Relicensing**  
**Federal Energy Regulatory Commission Project No. 2100**  
**Study Plan SPW1**

**Project Effects on Designated Beneficial Uses**  
**- Canoeing and Rafting**

- **Applicable Objectives -**
- **Results**



Jerry

Water quality data do not indicate any adverse effects to canoeing and rafting in the Feather River downstream from Oroville Dam.

**Project Effects on Designated Beneficial Uses -  
Warm and Cold Fish Migration**

- **Applicable Objectives** - water temperature, dissolved oxygen, and turbidity
- **Results**



Scott : --Meeting the hatchery temperature objectives generally also satisfy temperature objectives at Robinson Riffle in the low-flow channel. Exceedance curves show that the NOAA Fisheries temperature objective was slightly exceeded a small percentage of the time in both 2002 and 2003 (less than 5% of the time)

While Project operations have no effect on water temps at the Feather R. nr Verona (Ambient warming, other accretions), temperatures at this location were generally lower than the Sacramento R. location upstream from the confluence, especially during the period of the year when salmonids are migrating, thus Feather River temperatures at Verona to not adversely affect the Basin plan objective for water temperature in the Sacramento River.

--Basin Plan objectives for dissolved oxygen levels in the Feather River, downstream from the Fish Barrier Dam, were generally met for cold freshwater beneficial uses, while warm freshwater beneficial uses were satisfied during all sampling events.

However, The Feather River at Robinson Riffle, downstream from the Project boundary, and at Singh each failed to meet the September 1 to May 31 objective (8.0mg/L) during December 2002.

The Feather River downstream from the hatchery failed to meet Basin Plan DO objective for cold freshwater fish migration on one occasion (October 2003.).

--Turbidity level objectives affecting the warm and cold fish migration beneficial uses rarely failed to be met in the Feather River from Oroville Dam, downstream to the confluence with Honcut Creek. However elevated turbidity occurrences increased in a downstream direction from Honcut Creek to Verona. Most turbidity increases were attributable to storm runoff from accretions outside of Project influences, with Honcut Creek and the Bear and Sacramento Rivers contributing most to increased turbidity.

**Conclusion-** The data indicate that the warmwater fish migration beneficial use was not adversely affected by Project operations. However, the cold freshwater fish migration beneficial use was affected by some low DO levels, and possibly higher than desired temperatures at Robs Rfl. The only area directly influenced by the project where low DO was observed was in the Feather R. DS from Hatchery, at which hatchery operations could have been responsible.

Other sites at which low DO levels were found are not directly controllable by the Project.

While the Project operations do influence water temps at Robs. Rfl, operational constraints (shutter pulls, etc.) make it difficult to rapidly adjust releases to provide temps meeting the NOAA goals during high air temps that significantly vary from day to day



Oroville Facilities Relicensing  
Federal Energy Regulatory Commission Project No. 2100  
Study Plan SPW1

**Project Effects on Designated Beneficial Uses -  
Warm and Cold Freshwater Habitat**

- **Applicable Objectives** - chemical constituents, water temperature, dissolved oxygen, and turbidity
- **Results**



Ryan

Chemical constituents – affected by metals, Al and Cu, which occasionally exceeded objectives for protection of aquatic life from the Fish Barrier dam to confluence with Honcut C

Water temp. – no specific temp. requirements for Lake Oroville, waters downstream controlled by Hatchery requirements, and NOAA Fisheries requirements for Robinson Riffle, while at the same time conserving the cold water pool in the lake. Lake has a two-tier fishery (warm and cold fisheries) – in critically dry years the cold water hypolimnion habitat can be diminished.

Dissolved oxygen – cold water objectives (7.0 mg/L) generally met, all warm water objectives met (5.0mg/L)

Turbidity – rarely failed to met objectives, most exceedances due to storm runoff and from sources outside the Project influences such as Honcut C, Bear River.

Conclusion: No adverse effects to the warm and cold freshwater habitat beneficial use.

Chemical constituents - not an issue except some metals, most of these are found throughout the system (upper, lake, lower Fr).

Temperature and dissolved oxygen requirements generally met.

Turbidity – outside of project influence

Project Effects on Designated Beneficial Uses -  
Warm and Cold Spawning  
• Applicable Objectives: water temperature, dissolved  
oxygen, chemical constituents, pH, sediment,  
settling and suspended materials, and toxicity  
• Results



Scott

**Lake Oroville** – Beneficial uses designated for Lake Oroville include both cold and warm freshwater spawning. The water quality data indicate these beneficial uses are not affected by Project operations.

**Feather River downstream from Oroville Dam** – The warm freshwater spawning beneficial use was satisfied for the entire study period, while the cold freshwater spawning beneficial use was generally met with a few exceptions that follow.

**Temps-** same effects as described for migration BU. ROB(temp),

**Dissolved oxygen** levels in the Feather River downstream from the Fish Barrier Dam infrequently were found at levels less than those suitable for cold freshwater spawning (as described for migration BU) Hatchery (DO), DS River (DO), and not found to adversely affect warm freshwater spawning

**pH, and organic contaminant** levels in the Feather River downstream from the Fish Barrier Dam to the mouth are suitable for the spawning beneficial uses designated for this reach.

Of the nutrients analyzed, total phosphorus levels exceeded the USEPA recommended Ecoregion 1 criteria (0.047 mg/L) occasionally at all stations, most of the time at N. Forebay C, Honcut C, Bear and Sacramento R. (Handout)(In Project area Hatch Pond/DS from Hatch almost 50%)

**Metals** - Aluminum and copper levels exceeded the objectives for protection of aquatic life infrequently in the Feather River from the Fish Barrier Dam to the confluence with Honcut Creek, usually associated with storm runoff events, while the frequency of these objectives being exceeded greatly increased in the river downstream from Honcut Creek.

**Sediments** When turbidity levels elevated (storms, lower tribs, uncontrollable)

**Toxicity not OK.** Toxicity observed at all sampling locations occasionally, most frequently DS from Hatchery.

**Conclusions:** The warmwater spawning BU and cold spawning BU in Lake Oroville were not found to be adversely affected by water quality due to Project operations.

Coldwater spawning BU in the Feather R DS from Oroville Dam was adversely affected by a few low Dos, higher than desired water temperatures occurring infrequently, with one low DO level at the FR DS Hatchery possibly affected by Hatchery operations. Other locations probably affected by causes not related to the Project.

Occasional elevated total P levels not shown to be affected by the Project, Again Hatchery Pond/DS from Hatchery.

Metals such as Al and Cu- Metals levels at Lake O Dam (levels in Lake < levels from upper tribs) is what the project releases (Reservoir acts as a sink).

Sediment levels; Project Ops not shown to adversely affect the CW Spawning BU.

Toxicity may be adversely affected by Project at locations influenced by Project releases including Hatchery, but other activities adjacent to River including Urban and Ag. R/O, and industrial land use/discharges may also contribute to toxicity at some locations.

**Oroville Facilities Relicensing**  
**Federal Energy Regulatory Commission Project No. 2100**  
**Study Plan SPW1**

**Project Effects on Designated Beneficial Uses**  
**- Wildlife Habitat**

- **Applicable Objectives - chemical constituents, pesticides, and toxicity**
- **Results**



Ryan

Chemical constituents – concerns include direct effects to wildlife and their food resources. No chemicals or pesticides found that would adversely affect wildlife habitat.

Study Plan SPW2 identified chemical constituents and pesticides levels in fish species (potential food for wildlife) – Organic compounds found were chlordane, DDT isomers, dieldrin, and PCBs – Metals found were cadmium and mercury.

Toxicity was occasionally observed downstream from Oroville Dam so this and the findings from SPW2 suggest that the beneficial use of wildlife habitat may be adversely affected by movement of these compounds and elements through the food chain.

SPT1 evaluated effects of Project operations and features on wildlife and wildlife habitat. No significant implications were found due to water quality.

Conclusion: No direct adverse effects found. There is concern over movement of certain constituents (metals, organics) through the food chain.

**Other Factors Affecting Water Quality**

- Salmon decomposition



Tom

WQ impacts from salmon decomposition

- additional monitoring from September through December from the Fish Barrier Dam to FR nr Mile Long Pond
- Nutrients and physical measurements in the water column and in the gravels

Physical

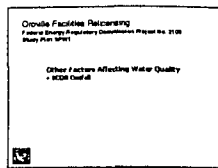
- Water temperatures water column similar to the gravels, and also gradually increased with distance downstream and decreased from September through December.
- Dissolved oxygen levels in the river usually high. Dissolved oxygen in the vicinity of the Afterbay Outlet displayed decreased levels, water column dissolved oxygen levels in the area was always high.
- pH and conductivity uniform at all monitoring sites

Nutrients

- nutrients similar, except downstream from the hatchery and from the SCOR outfall.
- Total and dissolved ammonia, dissolved nitrate plus nitrite, total phosphorus, and dissolved orthophosphate relatively high downstream from the hatchery and the SCOR outlet
- Total phosphorus sporadically at high levels downstream from the Afterbay Outlet, but otherwise similar among the stations.
- \* WQ in gravels occasionally poor, though not significantly different from the water column.
- Low DO in the vicinity of the Afterbay Outlet probably due to the higher sediment loads found in the gravels in this area.

Data do not indicate that salmon are contributing to elevated concentrations of nutrients or decreased water quality.





Tom

Nutrients, DO, temp., conductivity, and pH in the water and within gravels were analyzed monthly US & DS from SCOR

- No differences in temperature within the gravels to surface waters
- DO significantly lower in gravels than surface waters
- DO significantly higher in interstitial samples DS from the SCOR than the US site
- pH and conductivity were similar

SPW9 = low interstitial DO caused by high silt and fine sediments in these two riffles

Nutrients:

- Dissolved nitrate+nitrite at lower concentrations US from the SCOR and from the left bank vs. right bank channel
- Dissolved ammonia higher US from the SCOR, while total ammonia was similar
- Dissolved orthophosphate slightly greater from the right bank channel than the upstream site, while total phosphorus slightly greater at the US than the DS sites.
- \* Indicates that most of the discharge from the SCOR probably travels to the right bank channel of the river.

Interstitial gravels vs. water column

- Temperature, conductivity, and pH were essentially the same
- DO in overlying water from the SCOR was significantly higher than in the interstitial gravel
- Dissolved nitrate+nitrite, ammonia, and orthophosphate mixed results
- Total ammonia never above the detection limit
- Total phosphorus usually higher in interstitial gravels, especially US from SCOR Outlet.
- FRDSSO - significant number of green algae as a proportion of the periphyton community, usually not found at FRUSSO or at the other stations in the immediate area (FRUSAO, FRDSAO, FRNMLP).

Green algae bloom

- localized nutrient enrichment, possibly from the SCOR outfall, not reflected in water column nutrient levels
- suspected nutrients probably tied up in living tissue, stored in gravels, or exported

**Project Effects on Designated Beneficial Uses -  
Warm and Cold Fish Migration**

- **Applicable Objectives** - water temperature, dissolved oxygen, and turbidity
- **Results**



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Project Effects on Designated Beneficial Uses -  
Warm and Cold Spawning  
• Applicable Objectives - water temperature, dissolved  
oxygen, chemical constituents, pH, sediment,  
settling and suspended materials, and toxicity  
• Results



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Of the nutrients analyzed, total phosphorus levels exceeded the USEPA recommended Ecoregion 1 criteria (0.047 mg/L) occasionally at all stations, most of the time at N. Forebay C, Honcut C, Bear and Sacramento R. (Handout) In Project area Hatch/DS/Hatch

**Metals** - Aluminum and copper levels exceeded the objectives for protection of aquatic life infrequently in the Feather River from the Fish Barrier Dam to the confluence with Honcut Creek, usually associated with storm runoff events, while the frequency of these objectives being exceeded greatly increased in the river downstream from Honcut Creek.

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**Toxicity not OK.** Toxicity observed at all sampling locations occasionally, most frequently DS from Hatchery.

**Conclusions:** The warmwater spawning BU and cold spawning BU in Lake Oroville were not found to be adversely affected by Project operations. *water quality due to*

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Sediment levels; Project Ops not shown to adversely affect the CW Spawning BU.

Toxicity may be adversely affected by Project at locations influenced by Project releases including Hatchery, but other activities adjacent to River including Urban and Ag. R/O, and industrial land use/discharges may also contribute to toxicity at some locations.

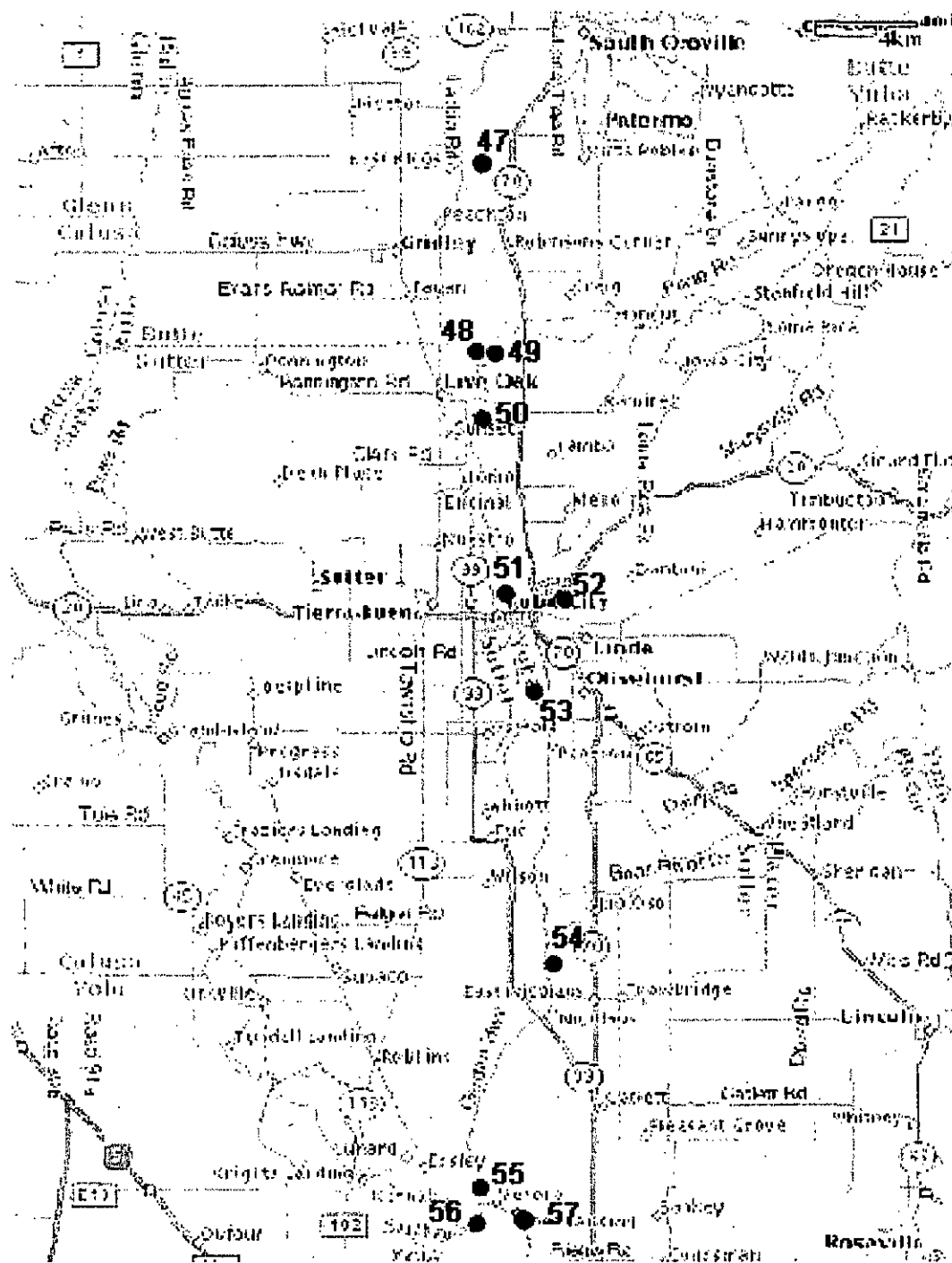


# Nutrients- Total Phosphorus exceedences in waters downstream from Oroville Dam

47µg/L (0.047 mg/L) USEPA Recommended Ecoregion 1 Criteria for rivers and streams (2001)

Station Name	Number of samples	total P exceedence frequency	Months phosphorus levels exceeded criteria		
			2002	2003	2004
Concow Creek	28	2 (7%)	April, Aug.		
West Branch Feather River	28	2 (7%)	April, May		Feb.
North Fork Feather River US from Poe PH	24	3 (13%)	Dec 2X		Feb.
Poe PH Outflow	24	3 (13%)	Dec.	Jan.	Feb.
Fall River	27	4 (15%)	Dec.	Aug, Dec.	Feb.
Middle Fork Feather River	27	2 (7%)	April		Feb.
Sucker Run	28	2 (7%)	Dec.		Feb.
South Fork Feather River	28	3 (11%)	Dec.	Oct.	Feb.
Thermalito Div. Pool US from PP	26	2 (8%)	May	Nov.	
Glen Creek	27	5 (19%)	April, May, Aug, Dec.		Feb.
Morris Ravine	12	6 (50%)		Aug., Sept., Oct.	Feb 3X
N. Forebay Creek	19	17 (89%)	Aug.	All except Feb.	Feb 3X, Mar, April
Feather R. at Oroville	30	4 (13%)	May	June, Aug.	Feb.
Feather R US from Hatchery	31	4 (13%)	May	Dec.	February 2X
Hatchery Settling Pond	27	12 (44%)	May, Jul, Aug, Oct, Nov.	May, Jul, Dec	Feb 2X, Mar, April
Feather R. DS from Hatchery	30	14 (47%)	April, May, Aug Though Nov.	June, Jul, Oct, Dec	Jan, Feb, April
Feather R. DS from HWY 162	30	2 (7%)	May		Feb.
Feather R. at Robinson Riffle	30	4 (13%)	April, May	Feb.	Feb.
Feather R. US from Afterbay Outlet	31	4 (13%)	April, May	July	Feb.
Afterbay Outlet Canal to Feather R.	27	5 (19%)	July, Aug.	Jan., Mar., May	
Feather R. DS from Afterbay Outlet	31	3 (10%)	Sept.	Sept.	Feb.
Feather R. DS from SCOR Outlet	30	5 (17%)	April, May	April, Dec.	Feb.
Feather R. NR Mile Long Pond	30	2 (7%)	May	May	
Feather R. DS from Project Boundary	31	5 (16%)	April, May, Dec.		Feb 2X
Feather R at Singh (US from Honcut C)	29	2 (7%)	May, Dec.		
Honcut C. at Pacific Ranch	29	12 (41%)	May, Nov. Dec. 2X	Jan, Oct, Nov, Dec.	Jan, Feb 2X, Mar.
Feather R. at Archer Ave. (NR Live Oak)	29	5 (17%)	Dec.	Jan, July	Feb. 2X
Feather R. US from Yuba R.	30	9 (30%)	May, Dec.	Jan, April, Sept, Dec.	Feb 3X
Yuba R. at Mouth	30	6 (20%)	May, Dec.	Dec.	Jan, Feb 2X
Feather R. at Shanghai Bend	30	9 (30%)	April, May, Oct. Dec.	Jan, Dec.	Feb 3X
Bear R. NR mouth	29	22 (76%)	April, May, July through Dec.	Jan, April, Aug through Dec.	Feb 3X, Mar.
Feather R. NR Verona	30	6 (20%)	Dec.	Jan, Dec.	Jan, Feb 2X
Sacramento R. US from Feather R.	28	25 (89%)	April, May, July through Dec.	All except June	Jan, Feb 3X, Mar, April
tributaries upstream from Lake Oroville					
minor tributaries to project waters					
not a stream station (potential point source)					
Feather River within Project Boundary					
Feather R. and major tributaries downstream from Project Boundary					

Figure 4.2.1-2. Monitoring sites in the lower Feather River.



Preliminary Information – Subject to Revision – For Collaborative Process Purposes Only



**Oroville Facilities Relicensing**  
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**Study Plan SPW1**

**Other Factors Affecting Water Quality**

**• Nutrient Deprivation**



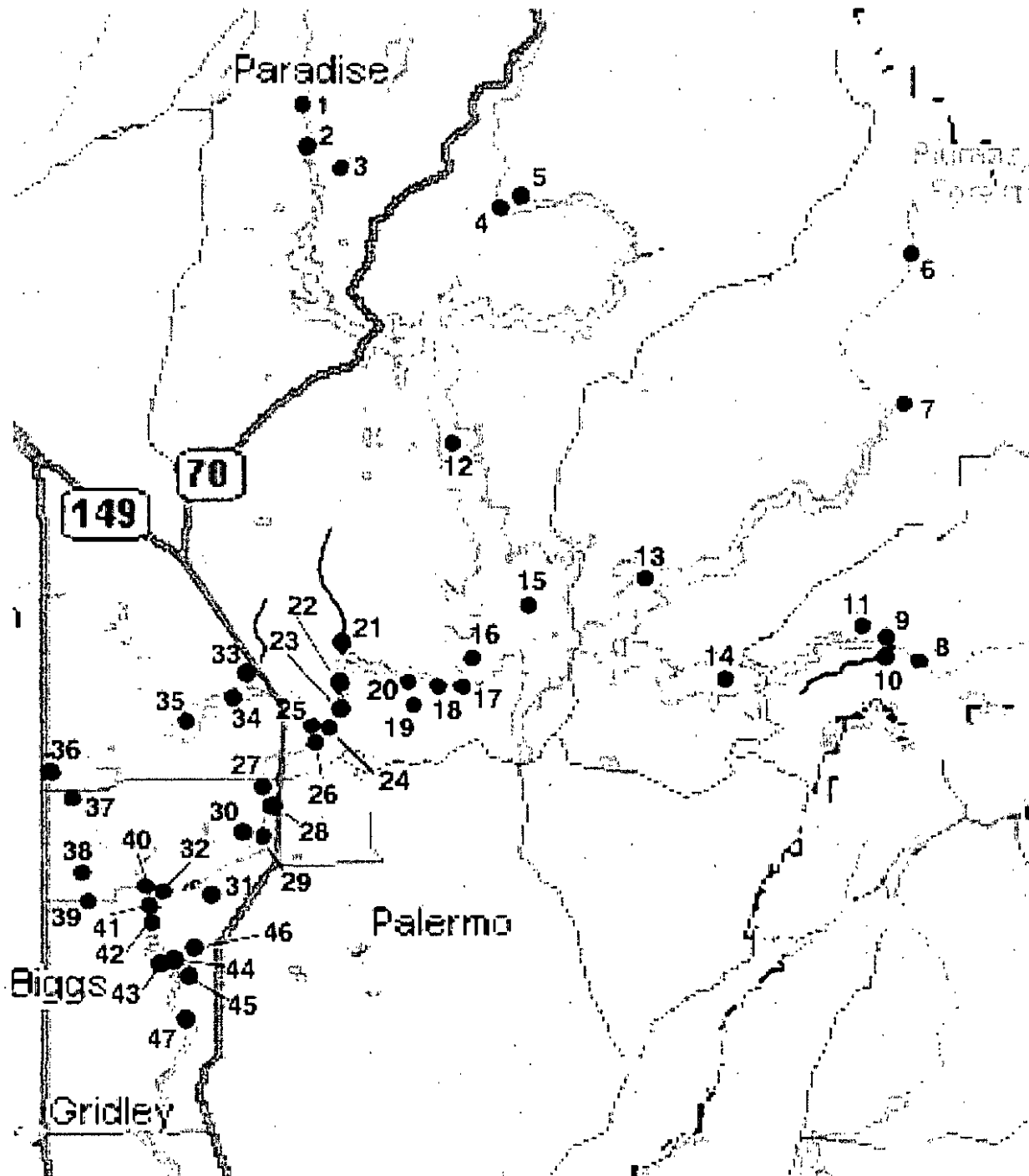
Jerry-

Concern expressed that Oroville Dam blocked upstream migration of anadromous fish

- led to nutrient deprivation in the upper tributaries.
- Increased nutrients assumed necessary to stimulate productivity in upper tributaries, though not been shown that productivity is low.
- Normal laboratory detection limits for nutrients were often too high to detect nutrient concentrations in upper tributaries; arrangements made with Am Test Laboratories in Washington to analyze samples for nutrients requested by consultants at low detection levels.
- Analyses conducted for low level nutrients from Sept 03 through Feb 04 at West Branch, NF US Poe PH, MF nr Merrimac, and SF US Ponderosa Res
- Low and high range of estimated increases in nutrients potentially attributable to decomposing salmon carcasses made for August through November in SPF8 for upper tributaries. The estimated nutrients included total nitrogen and total phosphorus.

(next slide)

Figure 4.2.1-1. Monitoring sites in the Project area.



Preliminary Information – Subject to Revision – For Collaborative Process Purposes Only

4-2

**Table 5.1.15.3-3. Total nitrogen and phosphorus from the tributaries in relation to USEPA recommended criteria.**

Station	Date	Time	Total Nitrogen (NO3+NO2+Total NH3)	Total Phosphorus
WEST BRANCH NR PARADISE	09/24/02	0630	0.02	0.02
WEST BRANCH NR PARADISE	10/18/02	0745	<0.02	0.03
WEST BRANCH NR PARADISE	11/12/02	1245	0.03	0.01
WEST BRANCH NR PARADISE	12/10/02	1200	0.02	0.01
WEST BRANCH NR PARADISE	12/16/02	1345	0.03	0.04
WEST BRANCH NR PARADISE	09/16/03	1140	0.03	0.02
WEST BRANCH NR PARADISE	10/16/03	1315	0.02	0.01
WEST BRANCH NR PARADISE	11/12/03	1515	0.02	0.02
WEST BRANCH NR PARADISE	12/09/03	1230	0.04	0.02
CONCOW C A JORDAN HILL RD.	09/24/02	0800	0.02	0.01
CONCOW C A JORDAN HILL RD.	10/18/02	0900	0.12	0.01
CONCOW C A JORDAN HILL RD.	11/12/02	1115	0.06	<0.01
CONCOW C A JORDAN HILL RD.	12/10/02	1040	0.03	<0.01
CONCOW C A JORDAN HILL RD.	12/16/02	1230	0.02	0.02
CONCOW C A JORDAN HILL RD.	09/16/03	1015	0.12	<0.01
CONCOW C A JORDAN HILL RD.	10/16/03	1135	0.15	0.04
CONCOW C A JORDAN HILL RD.	11/12/03	1400	0.15	0.02
CONCOW C A JORDAN HILL RD.	12/09/03	1110	0.02	0.01
NF FEATHER R US POE PH	09/24/02	0900	0.02	0.01
NF FEATHER R US POE PH	10/18/02	0945	<0.01	<0.01
NF FEATHER R US POE PH	11/12/02	0930	0.09	0.03
NF FEATHER R US POE PH	12/10/02	0900	0.01	0.07
NF FEATHER R US POE PH	12/16/02	1015	0.17	0.12
NF FEATHER R US POE PH	09/16/03	0840	0.05	0.01
NF FEATHER R US POE PH	10/16/03	0930	0.02	<0.01
NF FEATHER R US POE PH	11/12/03	1230	0.02	0.02
NF FEATHER R US POE PH	12/09/03	0915	0.12	0.02
FEATHER R MF NR MERRIMAC	09/24/02	1530	<0.01	<0.01
FEATHER R MF NR MERRIMAC	10/17/02	0800	0.03	<0.01
FEATHER R MF NR MERRIMAC	11/12/02	1010	<0.01	0.01
FEATHER R MF NR MERRIMAC	12/10/02	1230	0.71	0.01
FEATHER R MF NR MERRIMAC	09/16/03	0745	<0.10	0.01
FEATHER R MF NR MERRIMAC	10/16/03	1300	<0.10	0.01
FEATHER R MF NR MERRIMAC	11/12/03	0945	<0.10	0.02
FEATHER R MF NR MERRIMAC	12/09/03	1220	0.05	0.02
SF FEATHER AB POND. RES	09/24/02	1215	0.01	<0.01
SF FEATHER AB POND. RES	10/17/02	1115	<0.1	<0.01
SF FEATHER AB POND. RES	11/12/02	1310	<0.1	0.02
SF FEATHER AB POND. RES	12/10/02	1000	0.07	0.02
SF FEATHER AB POND. RES	12/16/02	1130	0.03	0.1
SF FEATHER AB POND. RES	09/16/03	1015	<0.10	<0.01
SF FEATHER AB POND. RES	10/16/03	0945	0.01	0.05
SF FEATHER AB POND. RES	11/12/03	0930	0.01	0.04
SF FEATHER AB POND. RES	12/09/03	0850	0.01	0.02

Station	Date	Time	Total Nitrogen (NO3+NO2+Total NH3)	Total Phosphorus
SUCKER RUN NR FORBESTOWN	09/24/02	1420	0.02	0.02
SUCKER RUN NR FORBESTOWN	10/17/02	1000	0.1	<0.01
SUCKER RUN NR FORBESTOWN	11/12/02	1430	<0.1	0.04
SUCKER RUN NR FORBESTOWN	12/09/02	1200	<0.1	0.02
SUCKER RUN NR FORBESTOWN	12/16/02	1330	0.03	0.07
SUCKER RUN NR FORBESTOWN	09/15/03	1225	0.02	0.01
SUCKER RUN NR FORBESTOWN	10/15/03	1315	0.02	<0.01
SUCKER RUN NR FORBESTOWN	11/12/03	1215	<0.10	0.02
SUCKER RUN NR FORBESTOWN	12/09/03	1000	<0.10	0.02
USEPA Recommended Ecoregional Nutrient Criteria exceeded				
USEPA Recommended Ecoregional Nutrient Criteria - at the limit, any additional nutrients would cause the criteria to be exceeded				
USEPA Recommended Ecoregional Nutrient Criteria could be exceeded with addition of salmon carcasses (used nutrient enrichment values from table 5.1.15.3-2)				
Note: North Fork Feather River upstream of Poe PH used nutrient enrichment values from the South Fork				



**Table 5.1.15.3-3. Total nitrogen and phosphorus from the tributaries in relation to USEPA recommended criteria.**

Station	Date	Time	Total Nitrogen (NO3+NO2+Total NH3)	Total Phosphorus
WEST BRANCH NR PARADISE	09/24/02	0630	0.02	0.02
WEST BRANCH NR PARADISE	10/18/02	0745	<0.02	0.03
WEST BRANCH NR PARADISE	11/12/02	1245	0.03	0.01
WEST BRANCH NR PARADISE	12/10/02	1200	0.02	0.01
WEST BRANCH NR PARADISE	12/16/02	1345	0.03	0.04
WEST BRANCH NR PARADISE	09/16/03	1140	0.03	0.02
WEST BRANCH NR PARADISE	10/16/03	1315	0.02	0.01
WEST BRANCH NR PARADISE	11/12/03	1515	0.02	0.02
WEST BRANCH NR PARADISE	12/09/03	1230	0.04	0.02
CONCOW C A JORDAN HILL RD.	09/24/02	0800	0.02	0.01
CONCOW C A JORDAN HILL RD.	10/18/02	0900	0.12	0.01
CONCOW C A JORDAN HILL RD.	11/12/02	1115	0.06	<0.01
CONCOW C A JORDAN HILL RD.	12/10/02	1040	0.03	<0.01
CONCOW C A JORDAN HILL RD.	12/16/02	1230	0.02	0.02
CONCOW C A JORDAN HILL RD.	09/16/03	1015	0.12	<0.01
CONCOW C A JORDAN HILL RD.	10/16/03	1135	0.15	0.04
CONCOW C A JORDAN HILL RD.	11/12/03	1400	0.15	0.02
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NF FEATHER R US POE PH	09/24/02	0900	0.02	0.01
NF FEATHER R US POE PH	10/18/02	0945	<0.01	<0.01
NF FEATHER R US POE PH	11/12/02	0930	0.09	0.03
NF FEATHER R US POE PH	12/10/02	0900	0.01	0.07
NF FEATHER R US POE PH	12/16/02	1015	0.17	0.12
NF FEATHER R US POE PH	09/16/03	0840	0.05	0.01
NF FEATHER R US POE PH	10/16/03	0930	0.02	<0.01
NF FEATHER R US POE PH	11/12/03	1230	0.02	0.02
NF FEATHER R US POE PH	12/09/03	0915	0.12	0.02
FEATHER R MF NR MERRIMAC	09/24/02	1530	<0.01	<0.01
FEATHER R MF NR MERRIMAC	10/17/02	0800	0.03	<0.01
FEATHER R MF NR MERRIMAC	11/12/02	1010	<0.01	0.01
FEATHER R MF NR MERRIMAC	12/10/02	1230	0.71	0.01
FEATHER R MF NR MERRIMAC	09/16/03	0745	<0.10	0.01
FEATHER R MF NR MERRIMAC	10/16/03	1300	<0.10	0.01
FEATHER R MF NR MERRIMAC	11/12/03	0945	<0.10	0.02
FEATHER R MF NR MERRIMAC	12/09/03	1220	0.05	0.02
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SF FEATHER AB POND. RES	11/12/03	0930	0.01	0.04
SF FEATHER AB POND. RES	12/09/03	0850	0.01	0.02



Station	Date	Time	Total Nitrogen (NO3+NO2+Total NH3)	Total Phosphorus
SUCKER RUN NR FORBESTOWN	09/24/02	1420	0.02	0.02
SUCKER RUN NR FORBESTOWN	10/17/02	1000	0.1	<0.01
SUCKER RUN NR FORBESTOWN	11/12/02	1430	<0.1	0.04
SUCKER RUN NR FORBESTOWN	12/09/02	1200	<0.1	0.02
SUCKER RUN NR FORBESTOWN	12/16/02	1330	0.03	0.07
SUCKER RUN NR FORBESTOWN	09/15/03	1225	0.02	0.01
SUCKER RUN NR FORBESTOWN	10/15/03	1315	0.02	<0.01
SUCKER RUN NR FORBESTOWN	11/12/03	1215	<0.10	0.02
SUCKER RUN NR FORBESTOWN	12/09/03	1000	<0.10	0.02
USEPA Recommended Ecoregional Nutrient Criteria exceeded				
USEPA Recommended Ecoregional Nutrient Criteria - at the limit,				
any additional nutrients would cause the criteria to be exceeded				
USEPA Recommended Ecoregional Nutrient Criteria could be				
exceeded with addition of salmon carcasses				
(used nutrient enrichment values from table 5.1.15.3-2)				
Note: North Fork Feather River upstream of Poe PH used nutrient enrichment values from the South Fork				

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Jerry

- While actual total nitrogen concentrations in the tributaries were at levels greater than the low range of the estimated contribution from salmon in each tributary, the high range of estimated total nitrogen contribution from salmon was much higher than that measured in the tributaries during August through November.
- Total phosphorus was usually higher in the actual measurements than both the low and high ranges of estimated contribution from salmon, except in the South Fork where the high range of the estimated contribution was greater.
- However, nutrients measured in subsequent months in the tributaries were substantially greater than the estimated contribution of salmon in the August through November period.

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**Other Factors Affecting Water Quality**  
• **Nutrient Deprivation**



Ryan - discuss total N and total P in upper tribs in relation to recommended USEPA criteria - bring copies of Table 5.1.15.3-3 to handout at meeting

Our data show it is likely that additional nutrients added from decomposing salmon carcasses would cause the nutrient concentrations in the tributaries to Lake Oroville to exceed the USEPA Recommended Ecoregional Nutrient Criteria (USEPA 2000b). These criteria are intended to provide for the **protection and propagation of aquatic life and recreation**, and set the total nitrogen criterion at 0.12 mg/L, and the total phosphorus criterion at 0.01 mg/L.

Pass out handout

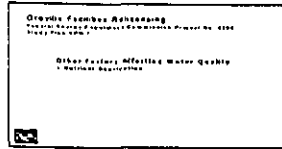
The handout lists the stations on the left column, criteria along the top. The table is color coded with orange, tan, and light green highlights.

Orange - represents samples exceeding their associated criteria

Tan - highlights those which are at the limit, and would exceed if additional nutrients are introduced.

Light green - highlights samples which are expected to exceed (used nutrient enrichment models)

As the handouts show nutrient data collected in these tributaries from September to December (the time at which salmon carcasses would be present) show that these criteria are already exceeded on various occasions throughout the watershed. There are also many times when the criteria are close to being exceeded.



Tom-

Direct measurements of nutrients in the water column limited

- nutrients stored in stream sediments, bed and bank
- enter the system from external sources (catastrophic events, land-use).

Nitrogen and phosphorus considered primary limiting factors

- no direct evidence under natural conditions
- algal bioassays through nutrient enrichment yield mixed results

Decomposing salmon carcasses = the most important source of nutrients for new growth and reproduction

- Diatom densities in upper tribs roughly equal to low flow channel
- some sites upstream from Lake Oroville occasionally had higher periphyton densities than the low flow channel

Periphyton data do not show an increase in periphyton density from salmon carcass decomposition in the low flow section

- one low-flow station showed a decrease when salmon carcasses were present
- periphyton densities are highly variable (artifact of the limited sampling data and techniques?)
- little difference are apparent between the upper tributaries and low flow channel

Comparison of periphyton in tributaries upstream from Lake Oroville with the low flow channel of the Feather River

- very similar communities = dominated by diatoms and followed in abundance by green and blue-green algae
- Diatom densities in the upper tributaries - 100 to 650 organisms per 40 cm<sup>2</sup>
- Diatom densities in the low flow channel - 100 to 875 organisms per 40 cm<sup>2</sup>

Every station displayed uncharacteristically high populations of diatoms occasionally (examples)

- May 2003 = 1,800 diatoms per 40 cm<sup>2</sup> from the North Fork
- June 2003 = 2,800 diatoms per 40 cm<sup>2</sup> from the Middle Fork
- December 2003 = 1,800 diatoms per 40 cm<sup>2</sup> from upstream of the Afterbay Outlet
- January 2004 = 1,900 diatoms per 40 cm<sup>2</sup> at Robinson Riffle

These diatom densities indicate that high periphyton densities are comparable in the upstream reaches of the Feather River to the low-flow section.

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Jerry - Aquatic macroinvertebrates can also be used to evaluate whether nutrients are limiting:

Aquatic macroinvertebrate communities display many similarities and some dissimilarities between monitoring sites US from L Oroville and those in low flow channel, which has the benefit of nutrients from decomposing salmon carcasses.

- Sampling sites in tributaries US L Oroville had greater taxonomic richness, cumulative taxa, and cumulative EPT (Ephemeroptera, Plecoptera, and Trichoptera) taxa than sampling sites in low flow channel.
- Other summary metrics (Shannon diversity, tolerance value, and percent chironomidae) were similar between tributary and low flow channel stations.
- Percent collectors, filterers, predators, and shredders were variable between the sites, but overall were similar between tributary and low flow channel stations.
- Percent grazers, however, were clearly more abundant in the tributary stations, which may indicate greater reliance on periphyton as a food source at these sites.
- With the exception of the Robinson Riffle monitoring station in the low flow channel, average abundances at the monitoring stations were similar.

Next slide



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	Average Abundance (organisms per sample)	Cumulative Taxa
North Fork Feather River	3580	37
Middle Fork Feather River	8292	44
South Fork Feather River	3435	38
West Branch Feather River	3834	45
Feather River at Hwy 102 bridge	7257	35
Feather River at Robinson Ridge	7652	27
East Fork Feather River at Highway Outlet	5084	23
Deer Creek at Upper Diversion Dam	6691	32
Deer Creek below Upper Falls	4025	51
Deer Creek at A-Line	5408	49
Mill Creek at Black Rock	4885	45
Mill Creek below Hwy 38	3262	29
Mill Creek at Hole-in-Ground	4274	36



Average macroinvertebrate abundances at the tributary stations are also similar to the abundances found in other higher elevation streams in which migrating salmonids have access.

- Deer and Mill Creek both support distinct spring and fall runs of Chinook salmon, which is similar to the Feather River prior to construction of Oroville Dam.
- Both average abundance and cumulative taxa indicate little difference between streams where salmonids have access and the tributaries upstream from Lake Oroville.
- Study Plan F1 evaluated Project effects to aquatic macroinvertebrates.
- The report concludes that “although data indicate that streams upstream of L Oroville contain low levels of nutrients, streams above the lake are not categorized as nutrient starved. The data also indicate that healthy populations of aquatic macroinvertebrates currently exist in the upstream tributaries.”
- This conclusion is supported by other studies on algal periphyton and nutrient limitations which found that nutrient flux, not the nutrients in the water column at any given moment, supports the benthic communities.
- Though decomposing salmon carcasses could be a major source of nutrients, the periphyton and macroinvertebrate data from the tributaries do not indicate that any lack of nutrients is depressing aquatic productivity.

Next slide

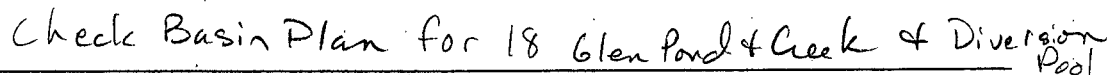
(However, additional data should be collected. When originally developed, the periphyton sampling program was meant only to provide data to be used as an indicator of water quality. The sampling methodology was appropriate for that purpose. Subsequently, however, the issue of nutrient deprivation arose. A more systematic and standardized sampling regime is necessary to present a more robust assessment of possible effects of nutrient enrichment or deprivation. The available data, however, do not indicate any adverse effects

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**SPW1 Project Effects on Water Quality Designated Beneficial Uses for Surface Waters**  
**Oroville Facilities P-2100 Relicensing**

use  
Lake Oroville for  
Factsheet



4-2

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bene  
uses

**Table 4.2.1-1. Monitoring site number system for maps.**

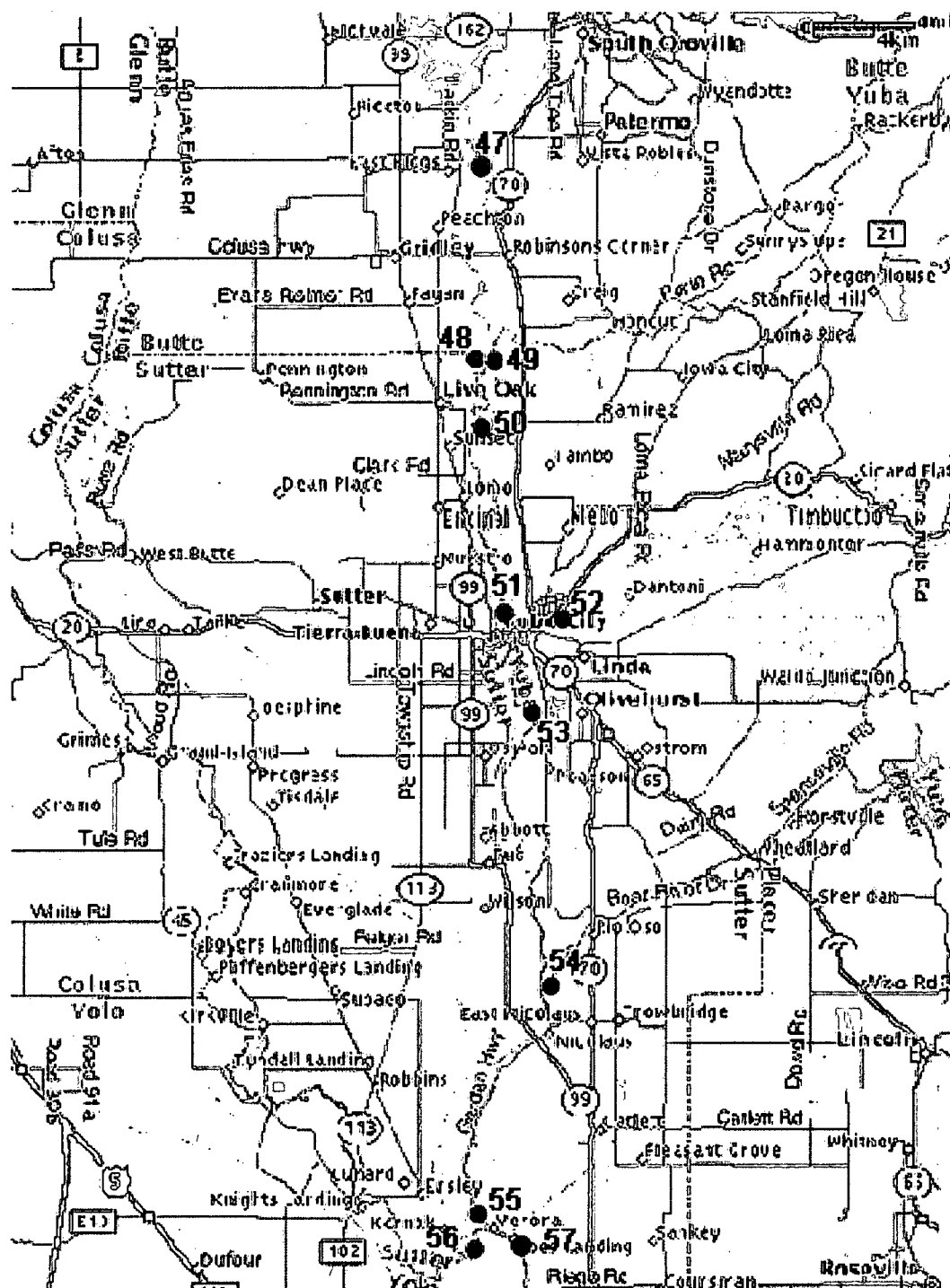
1. West Branch Feather River near Paradise	30. Robinson Riffle Pond
2. West Branch Feather River upstream from Lake Oroville	31. Upper Pacific Heights Pond
3. Concow Creek at Jordan Hill Road	32. Feather River upstream from Afterbay Outlet
4. North Fork Feather River upstream from Poe Power House	33. North Thermalito Forebay Creek
5. Poe Power House Discharge	34. Thermalito Forebay (north)
6. Middle Fork Feather River near Merrimac	35. Thermalito Forebay (south)
7. Fall River upstream from Feather Falls	36. Western Canal at Afterbay Outlet
8. South Fork Feather River upstream from Ponderosa Reservoir	37. Thermalito Afterbay (north)
9. South Fork Feather River downstream from Ponderosa Reservoir	38. Thermalito Afterbay (south)
10. Miners Ranch Canal	39. Sutter Buttes Canal at Afterbay Outlet
11. Sucker Run near Forbestown	40. Afterbay Outlet Canal to Feather River
12. North Fork Arm Lake Oroville	41. Feather River downstream from Afterbay Outlet
13. Middle Fork Arm Lake Oroville	42. Feather River downstream from SCOR Outlet
14. South Fork Arm Lake Oroville	43. Mile Long Pond
15. Lake Oroville Main Body	44. Feather River near Mile Long Pond
16. Lake Oroville near Dam	45. Lower Pacific Heights Pond
17. Thermalito Diversion Pool upstream from Kelly Ridge PH (US of Power Plant)	46. See's Pond
18. Thermalito Diversion Pool downstream from Kelly Ridge PH (DS of Power Plant)	47. Feather River downstream from Project boundary
19. Glen Creek upstream from Glen Pond	48. Feather River at Singh AB Riviera Rd.
20. Glen Pond	49. Honcut Creek at Pacific Ranch near Palermo
21. Morris Ravine	50. Feather River at Archer Ave (near Live Oak)
22. Thermalito Diversion Pool upstream of Dam	51. Feather River upstream from Yuba River
23. Feather River at Oroville	52. Yuba River at Mouth
24. Feather River upstream from Hatchery	53. Feather River at Shanghai Bend
25. Feather River Hatchery Settling Pond	54. Bear River near Mouth
26. Feather River downstream from Hatchery	55. Feather River near Verona
27. Feather River downstream from Hwy 162	56. Sacramento River upstream from Feather River
28. Oroville Fishing Pond	57. Sacramento River at Verona
29. Feather River at Robinson Riffle	

Monitoring of these tributaries at their confluences with the reservoir establishes a baseline for determining any changes in water quality induced by the Project.

Physical, chemical, and biological components of water quality were assessed in study area waters (Table 4.2.1-2). Some parameters, such as temperature, were obtained with recording instruments, while others (such as inorganic chemistry) were sampled during monthly visits to the monitoring site.

Thermalito AFBY OLA FE  
LO & Dam

Thermalito Forebay Cr. IN.  
Morris Ravine & Mouth



4-3



FIGURE II-1

# SURFACE WATER BODIES AND BENEFICIAL USES

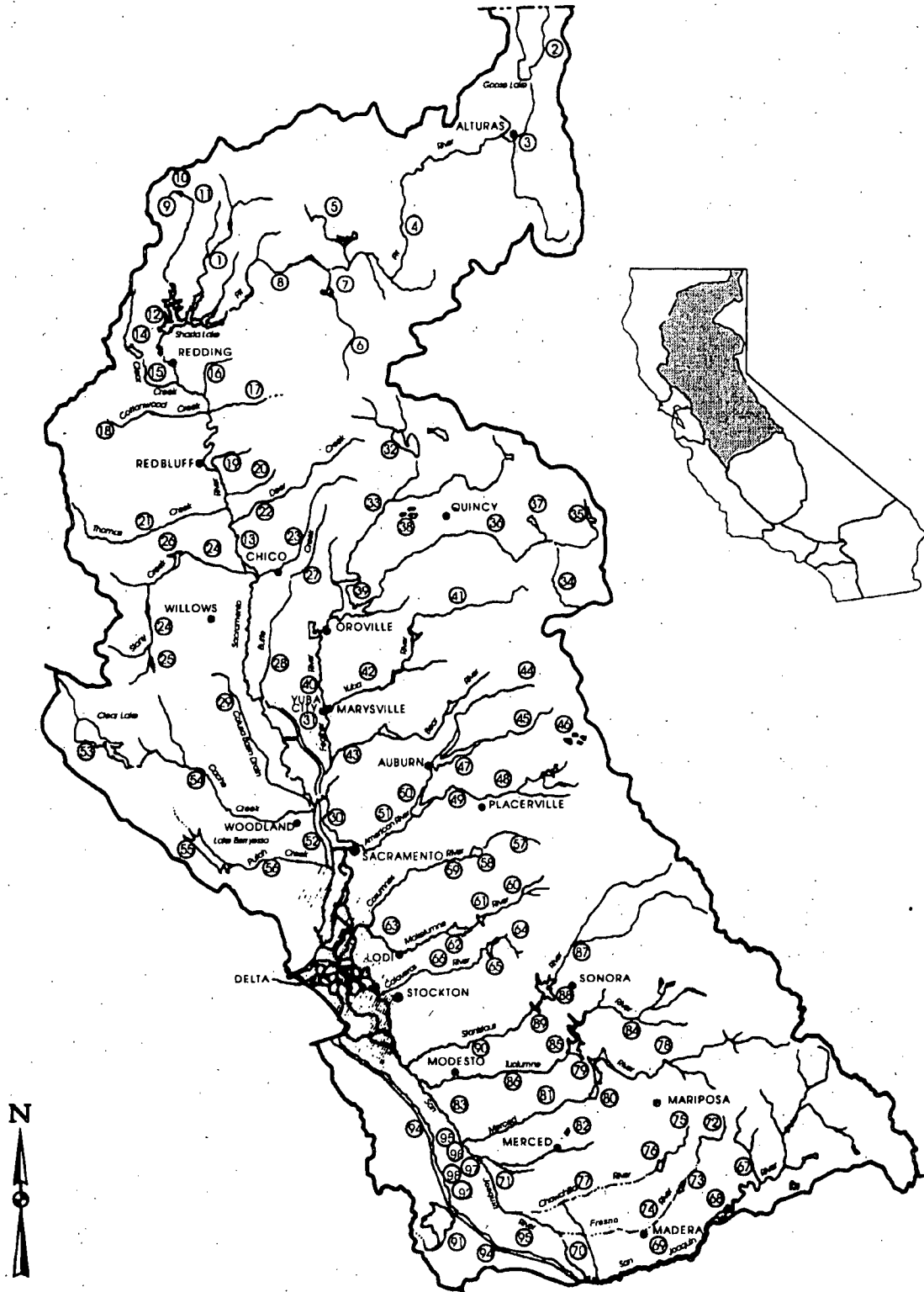


TABLE II-1

## SURFACE WATER BODIES AND BENEFICIAL USES

	SURFACE WATER BODIES (1)	HYDRO UNIT NUMBER	MUN	AGRI-CULTURE		INDUSTRY			RECREATION		FRESHWATER HABITAT (2)		MIGRATION		SPAWNING		WILD	NAV
				AGR	PROC	IND	POW	REC-1	REC-2	WARM	COLD	MIGR	SPWN					
														IRRIGATION	STOCK WATERING	SERVICE SUPPLY		
1	McCLOUD RIVER	505.	E	E	E			E	E	P	E	E	E			E	E	
2	GOOSE LAKE	527.20	E	E	E			E	E	E	E	E	E			E	E	
3	PIT RIVER	526.00	E	E	E			E	E	P	E	E	E			E	E	
4	NORTH FORK, SOUTH FORK, PIT RIVER	526.35	E	E	E			E	E	E	E	E	E			E	E	
5	CONFLUENCE OF FORKS TO HAT CREEK	526.41	E	E	E			E	E	E	E	E	E			E	E	
6	FALL RIVER	526.30	E	E	E			E	E	E	E	E	E			E	E	
7	HAT CREEK	526.34	E	E	E			E	E	E	E	E	E			E	E	
8	BAUM LAKE	526.	E	E	E			E	E	E	E	P	E			E	E	
9	MOUTH OF HAT CREEK TO SHASTA LAKE	525.22	E	E	E			E	E	E	E	E	E			E	E	
10	SACRAMENTO RIVER	525.22	E	E	E			E	E	E	E	E	E			E	E	
11	SOURCE TO BOX CANYON RESERVOIR	525.2	E	E	E			E	E	E	E	E	E			E	E	
12	LAKE SISKIYOU	506.10	E	E	E			E	E	E	E	E	E			E	E	
13	BOX CANYON DAM TO SHASTA LAKE	524.61	E	E	E		E	E	E	E	E	E	E	E	E	E	E	E
14	SHASTA LAKE	524.62	E	E	E			E	E	E	E	E	E			E	E	
15	SHASTA DAM TO COLUSA BASIN DRAIN	507.3	P	E	E			E	E	P	E	E	E			E	E	
16	WHISKEY TOWN RESERVOIR	507.12	E	E	E			E	E	E	E	E	E			E	E	
17	CLEAR CREEK BELOW WHISKEY TOWN RESERVOIR	524.3	E	E	E	P	P	P	E	E	E	E	E			E	E	
18	COW CREEK	509.63	E	E	E			E	E	E	E	E	E			E	E	
19	BATTLE CREEK	509.42	E	E	E			E	E	E	E	E	E			E	E	
20	COTTONWOOD CREEK	523.10	E	E	E			P	E	E	E	E	E			E	E	
21	ANTELOPE CREEK	509.20	E	E	E			E	E	E	E	E	E			E	E	
22	MILL CREEK	509.14		E	E				E	E	E	E	E			E	E	
23	THOMES CREEK	522.00		E	E				E	E	E	E	E			E	E	
24	DEER CREEK	522.33		E	E				E	E	E	E	P			E	E	
25	BIG CHICO CREEK	522.12		E	E				E	E	E	E	P			E	E	
26	STONY CREEK	521.30	E	E	E			E	E	E	E	E	E			E	E	
27	EAST PARK RESERVOIR	520.40	E	E	E			E	E	E	E	E	E			E	E	
28	BLACK BUTTE RESERVOIR	520.21	E	E	E			E	E	E	E	E	P			E	E	
29	BUTTE CREEK		E	E	E			E	E	E	E	E	E			E	E	
30	SOURCES TO CHICO		E	E	E			E	E	E	E	E	E			E	E	
31	BELOW CHICO, INCLUDING BUTTE SLOUGH		E	E	E			E	E	E	E	E	E			E	E	
32	COLUSA BASIN DRAIN		E	E	E			E	E	E	E	E	P			E	E	

## LEGEND

E = EXISTING BENEFICIAL USES

P = POTENTIAL BENEFICIAL USES

L = EXISTING LIMITED BENEFICIAL USE

## NOTE:

Surface waters with the beneficial uses of Groundwater Recharge (GWR), Freshwater Replenishment (FRSH), and Preservation of Rare and Endangered Species (RARE) have not been identified in this plan. Surface waters of the Sacramento and San Joaquin River Basins falling within these beneficial use categories will be identified in the future as part of the continuous planning process to be conducted by the State Water Resources Control Board.

TABLE II-1 (cont'd)

## SURFACE WATER BODIES AND BENEFICIAL USES

	SURFACE WATER BODIES (1)	HYDRO UNIT NUMBER	MUN	AGRI-CULTURE		INDUSTRY			RECREATION			FRESHWATER HABITAT (2)		MIGRATION		SPAWNING		WILD	NAV
				AGR	STOCK WATERING	PROC	IND	POW	REC-1		REC-2	WARM	COLD	MIGR		SPWN			
									CONTACT	CANOEING (1) AND RAFTING				OTHER NONCONTACT	WARM	COLD	WARM (3)		
30	COLUSA BASIN DRAIN TO EYE ("I") STREET BRIDGE	520.00	E	E					E	E	E	E	E	E	E	E	E	E	
31	SUTTER BYPASS	520.3	E	E					E	E	E	E	E	E	E	E	E	E	
32	FEATHER RIVER																		
32	LAKE ALMANOR	518.41						E	E			E	E			E	E	E	
33	NORTH FORK, FEATHER RIVER	518.4	E					E	E	E	E		E				E	E	
34	MIDDLE FORK, FEATHER RIVER	518.3																	
34	SOURCE TO LITTLE LAST CHANCE CREEK	518.35		E	E				E	E	E	E	P	E			E	E	
35	FRENCHMAN RESERVOIR	518.36							E	E	E	E					E	E	
36	LITTLE LAST CHANCE CREEK TO LAKE OROVILLE	518.3	E						E	E	E	E	E				E	E	
37	LAKE DAVIS	518.34							E		E	E	P	E			E	E	
38	LAKES BASIN LAKES	518.5							E		E	E		E			E	E	
39	LAKE OROVILLE	518.12	E	E				E	E		E	E	E	E		E	E	E	
40	FISH BARRIER DAM TO SACRAMENTO RIVER	515.	E	E					E	E	E	E	E	E	E	E	E	E	
41	YUBA RIVER																		
41	SOURCES TO ENGLEBRIGHT RESERVOIR	517.	E	E	E			E	E	E	E	E	E	E	E	E	E	E	
42	ENGLEBRIGHT DAM TO FEATHER RIVER	515.3		E	E			E	E	E	E	E	E	E	E	E	E	E	
43	BEAR RIVER	515.1	E	E	E			E	E	E	E	E	E	E	P	P	P	P	E
44	AMERICAN RIVER																		
44	NORTH FORK, SOURCE TO FOLSOM LAKE	514.5	E	E					E	E	E	P	E				E	E	
45	MIDDLE FORK, SOURCE TO FOLSOM LAKE	514.4	E	E	E			E	E	E	E	P	E				E	E	
46	DESOLATION VALLEY LAKES	514.4							E		E		E					E	
46	SOUTH FORK	514.3							E		E							E	
48	SOURCE TO PLACERVILLE	514.3	E					E	E	E	E	P	E				E	E	
49	PLACERVILLE TO FOLSOM LAKE	514.32	E	E				E	E	E	E	E	E	E				E	
50	FOLSOM LAKE	514.23	E	E			P	E	E	E	E	E	E	E	E	E	E	E	
51	FOLSOM DAM TO SACRAMENTO RIVER	519.21	E	E			E	E	E	E	E	E	E	E	E	E	E	E	
52	YOLO BYPASS	510.		E	E				E		E	E	E	P	E	E	E	E	
53	CACHE CREEK																		
53	CLEAR LAKE (a)	513.52	E	E	E				E		E	E	P				E	E	
54	CLEAR LAKE TO YOLO BYPASS	511/513	E	E	E	E	E		E	E	E	E	P				E	E	

(1) Shown for streams and rivers only with the implication that certain flows are required for this beneficial use.

(2) Resident does not include anadromous. Any Segments with both COLD and WARM beneficial use designations will be considered COLD water bodies for the application of water quality objectives.

(3) Striped bass, sturgeon, and shad.

(a) The following beneficial uses EXIST in addition to those noted in Table II-1

Mud Slough (north): COMM and SHELL  
Salt Slough: COMM, BIOL, and SHELL  
Wetland Water Supply Channels: BIOL  
Clear Lake: COMM

(4) Salmon and steelhead

(5) As a primary beneficial use.

(6) The indicated beneficial uses are to be protected for all waters except in specific cases where evidence indicates the appropriateness of additional or alternative beneficial use designations.

(7) Sport fishing is the only recreation activity permitted.

(8) Beneficial uses vary throughout the Delta and will be evaluated on a case-by-case basis.

(9) Per State Board Resolution No. 90-28, Marsh Creek and Marsh Creek Reservoir in Contra Costa County are assigned the following beneficial uses: REC1 and REC2

A/ Hidden Reservoir = Hensley Lake  
B/ Buchanan Reservoir = Eastman Lake

TABLE II-1 (cont'd)

## SURFACE WATER BODIES AND BENEFICIAL USES

	SURFACE WATER BODIES (1)	HYDRO UNIT NUMBER	MUN	AGRI-CULTURE		INDUSTRY			RECREATION			FRESHWATER HABITAT (2)		MIGRATION		SPAWNING		WILD	NAV
				AGR	STOCK WATERING	PROC	IND	POW	REC-1		REC-2	WARM	COLD	MIGR		SPWN			
									CONTACT	CANOEING (1) AND RAFTING				WARM (3)	COLD (4)	WARM (3)	COLD (4)		
			MUNICIPAL AND DOMESTIC SUPPLY	IRRIGATION							OTHER NONCONTACT							WILDLIFE HABITAT	NAVIGATION
55	PUTAH CREEK	512.21	E	E	E			P	E		E	E	E			E		E	
56	LAKE BERRYESSA	510/511	E	E	E				E	E	E	E	P			E		E	
	LAKE BERRYESSA TO YOLO BYPASS		E	E	E			E	E	E	E	E	E			E		E	
	OTHER LAKES AND RESERVOIRS IN SACRAMENTO R. BASIN 5A (6)		E	E	E	E		E	E	E	E	E	E			E		E	
	COSUMNES RIVER																		
57	SOURCES TO NASHVILLE RESERVOIR (PROPOSED)	532.	E	E					E		E	E	E			E		E	
58	NASHVILLE RESERVOIR (PROPOSED)	532.	P					P	P		P	P	P	P		P	P	P	
59	SOURCE TO DELTA	531/532	E	E	E				E	E	E	E	E	E	E	E	E	E	
	MOKELUMNE RIVER																		
60	SOURCES TO PARDEE RESERVOIR	532.6	E					E	E	E	E	E	E	E		E	E	E	
61	PARDEE RESERVOIR (7)	532.6	E					E	E	E	E	E	E	E		E	E	E	
62	CAMANCHE RESERVOIR	531.2	E	E	E				E	E	E	E	E	E	E	E	E	E	
63	CAMANCHE RESERVOIR TO DELTA	531.2		E	E				E	E	E	E	E	E	E	E	E	E	
	CALAVERAS RIVER																		
64	SOURCE TO NEW HOGAN RESERVOIR	533.							E	E	E	E	E	E		E	E	E	
65	NEW HOGAN RESERVOIR	533.1							E	E	E	E	E	E		E	E	E	
66	NEW HOGAN RESERVOIR TO DELTA	531.3	E	E	E	P	P		E	E	E	E	E	E	E	E	E	E	
	OTHER LAKES AND RESERVOIRS IN HYDRO UNIT NOS. 531, 532, 533, 543, 544 (6)		E	E	E	E		E	E		E	E	E			E	E	E	
	SAN JOAQUIN RIVER																		
67	SOURCES TO MILLERTON LAKE	540.	E	E	E			E	E	E	E	E	E					E	
68	MILLERTON LAKE	540.12	P	E	E				E		E	E	P					E	
69	FRIANT DAM TO MENDOTA POOL	545.	E	E	E	E			E	E	E	E	E	E	E	E	P	E	
70	MENDOTA DAM TO SACK DAM	545.1	P	E	E	E			E	E	E	E	E	E	E	E	P	E	
71	SACK DAM TO MOUTH OF MERCED RIVER	535.7	P	E	E	E			E	E	E	E		E	E	E	P	E	
	FRESNO RIVER																		
72	SOURCE TO HIDDEN RESERVOIR A/	539.31	E	E	E				E		E	E	E					E	
73	HIDDEN RESERVOIR A/	539.32	E	E	E				E		E	E	E					E	
74	HIDDEN RESERVOIR TO SAN JOAQUIN RIVER	545.	P	E	E				E	P	E	E	E					E	
	CHOWCHILLA RIVER																		
75	SOURCE TO BUCHANAN RESERVOIR B/	539.11			E				E		E	E	E					E	
76	BUCHANAN RESERVOIR B/	539.12	E	E	E				E		E	E	E					E	
77	BUCHANAN DAM TO SAN JOAQUIN RIVER	535/545	P	E		E			E	P	E	E	E					E	

(1) Shown for streams and rivers only with the implication that certain flows are required for this beneficial use.

(2) Resident does not include anadromous. Any Segments with both COLD and WARM beneficial use designations will be considered COLD water bodies for the application of water quality objectives.

(3) Striped bass, sturgeon, and shad.

(4) Salmon and steelhead

(5) As a primary beneficial use.

(6) The indicated beneficial uses are to be protected for all waters except in specific cases where evidence indicates the appropriateness of additional or alternative beneficial use designations.

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B/ Buchanan Reservoir = Eastman Lake

TABLE II-1 (cont'd)

## SURFACE WATER BODIES AND BENEFICIAL USES

	SURFACE WATER BODIES (1)	HYDRO UNIT NUMBER	MUN	AGRI-CULTURE		INDUSTRY			RECREATION			FRESHWATER HABITAT (2)		MIGRATION		SPAWNING		WILD	NAV
				AGR	PROC	IND	POW	REC-1		REC-2	WARM	COLD	MIGR		SPWN				
								IRRIGATION	STOCK WATERING				SERVICE SUPPLY	POWER	CONTACT	CANOEING (1) AND RAFTING	OTHER NONCONTACT		
78	MERCED RIVER	537.	P	E				E	E	E	E	E	E					E	
79	SOURCE TO McCLURE LAKE	537.22	P	E				E	E	E	E	E	E					E	
80	McCLURE LAKE	537.1	P	E				E	E	E	E	E	E					E	
81	McSWAIN RESERVOIR	535.	E		E	E	E	E	E	E	E	E	E	E	E	E	E	E	
82	YOSEMITE LAKE	535.9																	
83	MOUTH OF MERCED RIVER TO VERNALIS TUOLUMNE RIVER	535/541	P	E	E	E			E	E	E	E	E	E	E	E	E	E	
84	SOURCE TO [NEW] DON PEDRO RESERVOIR	536.	E	E	E			E	E	E	E	E	E					E	
85	NEW DON PEDRO RESERVOIR	536.32	P					E	E	E	E	E	E					E	
86	NEW DON PEDRO DAM TO SAN JOAQUIN RIVER	535.	P	E	E				E	E	E	E	E			E	E	E	
	STANISLAUS RIVER																		
87	SOURCE TO NEW MELONES RESERVOIR (PROPOSED)	534.	E	E	E			E	E	E	E	E	E					E	
88	NEW MELONES RESERVOIR	534.21	E	E	E			E	E	E	E	E	E					E	
89	TULLOCH RESERVOIR	534.22	P	E	E			E	E	E	E	E	E					E	
90	GOODWIN DAM TO SAN JOAQUIN RIVER	535.	P	E	E	E	E	E	E	E	E	E	E		E	E	E	E	
91	SAN LUIS RESERVOIR	542.32	E	E	E		E	E	E		E	E	E					E	
92	O'NEILL RESERVOIR	541.2	E	E	E			E	E		E	E	E					E	
93	OTHER LAKES AND RESERVOIRS IN SAN JOAQUIN R. BASIN, (EXCLUDING HYDRO UNIT NOS. 531-533, 543, 544) (6)		E					E	E		E	E	E				E	E	
94	CALIFORNIA AQUEDUCT	541.	E	E	E	E	E	E	E		E	E	E					E	
95	DELTA-MENDOTA CANAL	541/543	E	E	E				E		E	E	E					E	
	GRASSLAND WATERSHED [a]	541.2																	
96	MUD SLOUGH (NORTH)			L (b)	E				E		E	E	E				E	E	
97	SALT SLOUGH			E	E				E		E	E	E				E	E	
98	WETLAND WATER SUPPLY CHANNELS (10)			L (b)	E													E	
C	SACRAMENTO SAN JOAQUIN DELTA (8, 9)	544.	E	E	E	E	E		E		E	E	E	E	E	E	E	E	

(1) Shown for streams and rivers only with the implication that certain flows are required for this beneficial use.

(2) Resident does not include anadromous. Any Segments with both COLD and WARM beneficial use designations will be considered COLD water bodies for the application of water quality objectives.

(3) Striped bass, sturgeon, and shad.

(4) Salmon and steelhead

(5) As a primary beneficial use.

(6) The indicated beneficial uses are to be protected for all waters except in specific cases where evidence indicates the appropriateness of additional or alternative beneficial use designations.

(7) Sport fishing is the only recreation activity permitted.

(8) Beneficial uses vary throughout the Delta and will be evaluated on a case-by-case basis.

(9) Per State Board Resolution No. 90-28, Marsh Creek and Marsh Creek Reservoir in Contra Costa County are assigned the following beneficial uses: REC1 and REC2

(10) Wetland water supply channels for which beneficial uses are designated are defined in Appendix 40

(a) The following beneficial uses EXIST in addition to those noted in Table II-1

Mud Slough (north): COMM and SHELL  
Salt Slough: COMM, BIOL, and SHELL  
Wetland Water Supply Channels: BIOL  
Clear Lake: COMM

(b) Elevated natural salt and boron concentrations may limit this use to irrigation of salt and boron tolerant crops. Intermittent low flow conditions may also limit this use.

(c) Wetland channels can sustain aquatic life, but due to fluctuating flow regimes and habitat limitations, may not be suitable for nesting and/or propagation.



### III. WATER QUALITY OBJECTIVES

The Porter-Cologne Water Quality Control Act defines water quality objectives as "...the limits or levels of water quality constituents or characteristics which are established for the reasonable protection of beneficial uses of water or the prevention of nuisance within a specific area" [Water Code Section 13050(h)]. It also requires the Regional Water Board to establish water quality objectives, while acknowledging that it is possible for water quality to be changed to some degree without unreasonably affecting beneficial uses. In establishing water quality objectives, the Regional Water Board must consider, among other things, the following factors:

- Past, present, and probable future beneficial uses;
- Environmental characteristics of the hydrographic unit under consideration, including the quality of water available thereto;
- Water quality conditions that could reasonably be achieved through the coordinated control of all factors which affect water quality in the area;
- Economic considerations;
- The need for developing housing within the region;
- The need to develop and use recycled water. (Water Code Section 13241)

The Federal Clean Water Act requires a state to submit for approval of the Administrator of the U.S. Environmental Protection Agency (*USEPA*) all new or revised water quality standards which are established for surface and ocean waters. As noted earlier, California water quality standards consist of both beneficial uses (identified in Chapter II) and the water quality objectives based on those uses.

There are **seven important points** that apply to water quality objectives.

The **first point** is that water quality objectives can be revised through the basin plan amendment process. Objectives may apply region-wide or be specific to individual water bodies or parts of water bodies. Site-specific objectives may be developed whenever

the Regional Water Board believes they are appropriate. As indicated previously, federal regulations call for each state to review its water quality standards at least every three years. These Triennial Reviews provide one opportunity to evaluate changing water quality objectives, because they begin with an identification of potential and actual water quality problems, i.e., beneficial use impairments. Since impairments may be associated with water quality objectives being exceeded, the Regional Water Board uses the results of the Triennial Review to implement actions to assess, remedy, monitor, or otherwise address the impairments, as appropriate, in order to achieve objectives and protect beneficial uses. If a problem is found to occur because, for example, a water quality objective is too weak to protect beneficial uses, the Basin Plan should be amended to make the objective more stringent. (Better enforcement of the water quality objectives or adoption of certain policies or redirection of staff and resources may also be proper responses to water quality problems. See the Implementation chapter for further discussion.)

Changes to the objectives can also occur because of new scientific information on the effects of specific constituents. A major source of information is the USEPA which develops data on the effects of chemical and other constituent concentrations on particular aquatic species and human health. Other information sources for data on protection of beneficial uses include the National Academy of Science which has published data on bioaccumulation and the Federal Food and Drug Administration which has issued criteria for unacceptable levels of chemicals in fish and shellfish used for human consumption. The Regional Water Board may make use of those and other state or federal agency information sources in assessing the need for new water quality objectives.

The **second point** is that achievement of the objectives depends on applying them to controllable water quality factors. *Controllable water quality factors* are those actions, conditions, or circumstances resulting from human activities that may influence the quality of the waters of the State, that are subject to the authority of the State Water Board or the Regional Water Board, and that may be reasonably controlled. Controllable factors are not allowed to cause further degradation of water quality in instances where uncontrollable factors have

already resulted in water quality objectives being exceeded. The Regional Water Board recognizes that man made changes that alter flow regimes can affect water quality and impact beneficial uses.

The **third point** is that objectives are to be achieved primarily through the adoption of waste discharge requirements (including permits) and cleanup and abatement orders. When adopting requirements and ordering actions, the Regional Water Board considers the potential impact on beneficial uses within the area of influence of the discharge, the existing quality of receiving waters, and the appropriate water quality objectives. It can then make a finding as to the beneficial uses to be protected within the area of influence of the discharge and establish waste discharge requirements to protect those uses and to meet water quality objectives. The objectives contained in this plan, and any State or Federally promulgated objectives applicable to the basins covered by the plan, are intended to govern the levels of constituents and characteristics in the main water mass unless otherwise designated. They may not apply at or in the immediate vicinity of effluent discharges, but at the edge of the *mixing zone* if areas of dilution or criteria for diffusion or dispersion are defined in the waste discharge specifications.

The **fourth point** is that the Regional Water Board recognizes that immediate compliance with water quality objectives adopted by the Regional Water Board or the State Water Board, or with water quality criteria adopted by the USEPA, may not be feasible in all circumstances. Where the Regional Water Board determines it is infeasible for a discharger to comply immediately with such objectives or criteria, compliance shall be achieved in the shortest practicable period of time (determined by the Regional Water Board), not to exceed ten years after the adoption of applicable objectives or criteria. This policy shall apply to water quality objectives and water quality criteria adopted after the effective date of this amendment to the Basin Plan [25 September 1995].

The **fifth point** is that in cases where water quality objectives are formulated to preserve historic conditions, there may be insufficient data to determine completely the temporal and hydrologic variability representative of historic water quality. When violations of such objectives occur, the Regional Water Board judges the reasonableness of achieving those objectives through regulation of the controllable factors in the areas of concern.

The **sixth point** is that the State Water Board adopts policies and plans for water quality control which can specify water quality objectives or affect their implementation. Chief among the State Water Board's policies for water quality control is State Water Board Resolution No. 68-16 (Statement of Policy with Respect to Maintaining High Quality of Waters in California). It requires that wherever the existing quality of surface or ground waters is better than the objectives established for those waters in a basin plan, the existing quality will be maintained unless as otherwise provided by Resolution No. 68-16 or any revisions thereto. This policy and others establish general objectives. The State Water Board's water quality control plans applicable to the Sacramento and San Joaquin River Basins are the Thermal Plan and Water Quality Control Plan for Salinity. The Thermal Plan and its water quality objectives are in the Appendix. The Water Quality Control Plan for Salinity water quality objectives are listed as Table

III-5. The State Water Board's plans and policies that the Basin Plan must conform to are addressed in Chapter IV, Implementation.

The **seventh point** is that water quality objectives may be in numerical or narrative form. The enumerated milligram-per-liter (mg/l) limit for copper is an example of a numerical objective; the objective for color is an example of a narrative form.

Information on the application of water quality objectives is contained in the section, *Policy for Application of Water Quality Objectives*, in Chapter IV.

## WATER QUALITY OBJECTIVES FOR INLAND SURFACE WATERS

The objectives below are presented by categories which, like the Beneficial Uses of Chapter II, were standardized for uniformity among the Regional Water Boards. The water quality objectives apply to all surface waters in the Sacramento and San Joaquin River Basins, including the Delta, or as noted. (*The legal boundary of the Delta is contained in Section 12220 of the Water Code and identified in Figure III-1.*) The numbers in parentheses following specific water bodies are keyed to Figure II-1.

## Bacteria

In waters designated for contact recreation (REC-1), the fecal coliform concentration based on a minimum of not less than five samples for any 30-day period shall not exceed a geometric mean of 200/100 ml, nor shall more than ten percent of the total number of samples taken during any 30-day period exceed 400/100 ml.

For Folsom Lake (50), the fecal coliform concentration based on a minimum of not less than five samples for any 30-day period, shall not exceed a geometric mean of 100/100 ml, nor shall more than ten percent of the total number of samples taken during any 30-day period exceed 200/100 ml.

## Biostimulatory Substances

Water shall not contain biostimulatory substances which promote aquatic growths in concentrations that cause nuisance or adversely affect beneficial uses.

## Chemical Constituents

Waters shall not contain chemical constituents in concentrations that adversely affect beneficial uses. The chemical constituent objectives in Table III-1 apply to the water bodies specified. Metal objectives in the table are dissolved concentrations. Selenium,

molybdenum, and boron objectives are total concentrations. Water quality objectives are also contained in the Water Quality Control Plan for Salinity, adopted by the State Water Board in May 1991.

At a minimum, water designated for use as domestic or municipal supply (MUN) shall not contain concentrations of chemical constituents in excess of the maximum contaminant levels (MCLs) specified in the following provisions of Title 22 of the California Code of Regulations, which are incorporated by reference into this plan: Tables 64431-A (Inorganic Chemicals) and 64431-B (Fluoride) of Section 64431, Table 64444-A (Organic Chemicals) of Section 64444, and Tables 64449-A (Secondary Maximum Contaminant Levels-Consumer Acceptance Limits) and 64449-B (Secondary Maximum Contaminant Levels-Ranges) of Section 64449. This incorporation-by-reference is prospective, including future changes to the incorporated provisions as the changes take effect. At a minimum, water designated for use as domestic or municipal supply (MUN) shall not contain lead in excess of 0.015 mg/l. The Regional Water Board acknowledges that specific treatment requirements are imposed by state and federal drinking water regulations on the consumption of surface waters under specific circumstances. To protect all beneficial uses the Regional Water Board may apply limits more stringent than MCLs.

TABLE III-1  
TRACE ELEMENT WATER QUALITY OBJECTIVES

CONSTITUENT	MAXIMUM CONCENTRATION <sup>a</sup> (mg/l)	APPLICABLE WATER BODIES
Arsenic	0.01	Sacramento River from Keswick Dam to the I Street Bridge at City of Sacramento (13, 30); American River from Folsom Dam to the Sacramento River (51); Folsom Lake (50); and the Sacramento-San Joaquin Delta.
Barium	0.1	As noted above for Arsenic.
Boron	2.0 (15 March through 15 September) 0.8 (monthly mean, 15 March through 15 September)  2.6 (16 September through 14 March) 1.0 (monthly mean, 16 September through 14 March)  1.3 (monthly mean, critical year <sup>b</sup> )	San Joaquin River, mouth of the Merced River to Vernalis
Cadmium	0.00022 <sup>c</sup>	Sacramento River and its tributaries above State Hwy 32 bridge at Hamilton City

TABLE III-1 TRACE ELEMENT  
WATER QUALITY OBJECTIVES (Continued)

<u>CONSTITUENT</u>	<u>MAXIMUM CONCENTRATION</u> <sup>a</sup> (mg/l)	<u>APPLICABLE WATER BODIES</u>
Copper	0.0056 <sup>c</sup>	As noted above for Cadmium.
	0.01 <sup>d</sup>	As noted above for Arsenic. <sup>d</sup>
Cyanide	0.01	As noted above for Arsenic.
Iron	0.3	As noted above for Arsenic.
Manganese	0.05	As noted above for Arsenic.
Molybdenum	0.015	San Joaquin River, mouth of the Merced River to Vernalis
	0.010 (monthly mean)	
	0.050	Salt Slough, Mud Slough (north), San Joaquin River from Sack Dam to the mouth of Merced River
	0.019 (monthly mean)	
Selenium	0.012	San Joaquin River, mouth of the Merced River to Vernalis
	0.005 (4-day average)	
	0.020	Mud Slough (north), and the San Joaquin River from Sack Dam to the mouth of Merced River
	0.005 (4-day average)	
	0.020	Salt Slough and constructed and re-constructed water supply channels in the Grassland watershed listed in Appendix 40.
	0.002 (monthly mean)	
Silver	0.01	As noted above for Arsenic.
Zinc	0.1 <sup>d</sup>	As noted above for Arsenic. <sup>d</sup>
	0.016 <sup>c</sup>	As noted above for Cadmium.

a Metal objectives in this table are dissolved concentrations. Selenium, molybdenum, and boron objectives are total concentrations.

b See Table IV-3.

c The effects of these concentrations were measured by exposing test organisms to dissolved aqueous solutions of 40 mg/l hardness that had been filtered through a 0.45 micron membrane filter. Where deviations from 40 mg/l of water hardness occur, the objectives, in mg/l, shall be determined using the following formulas:

$$Cu = e (0.905) (\ln \text{ hardness}) - 1.612 \times 10^{-3}$$

$$Zn = e (0.830) (\ln \text{ hardness}) - 0.289 \times 10^{-3}$$

$$Cd = e (1.160) (\ln \text{ hardness}) - 5.777 \times 10^{-3}$$

d Does not apply to Sacramento River above State Hwy. 32 bridge at Hamilton City. See relevant objectives (\*) above.

## Color

Water shall be free of discoloration that causes nuisance or adversely affects beneficial uses.

## Dissolved Oxygen

Within the legal boundaries of the Delta, the dissolved oxygen concentration shall not be reduced below:

7.0 mg/l in the Sacramento River (below the I Street Bridge) and in all Delta waters west of the Antioch Bridge; 6.0 mg/l in the San Joaquin River (between Turner Cut and Stockton, 1 September through 30 November); and 5.0 mg/l in all other Delta waters except for those bodies of water which are constructed for special purposes and from which fish have been

excluded or where the fishery is not important as a beneficial use.

For surface water bodies outside the legal boundaries of the Delta, the monthly median of the mean daily dissolved oxygen (DO) concentration shall not fall below 85 percent of saturation in the main water mass, and the 95 percentile concentration shall not fall below 75 percent of saturation. The dissolved oxygen concentrations shall not be reduced below the following minimum levels at any time:

Waters designated WARM 5.0 mg/l  
Waters designated COLD 7.0 mg/l  
Waters designated SPWN 7.0 mg/l.

The more stringent objectives in Table III-2 apply to specific water bodies in the Sacramento and San Joaquin River Basins:

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**TABLE III-2**  
**SPECIFIC DISSOLVED OXYGEN WATER QUALITY OBJECTIVES**

<u>AMOUNT</u>	<u>TIME</u>	<u>PLACE</u>
9.0 mg/l *	1 June to 31 August	Sacramento River from Keswick Dam to Hamilton City (13)
8.0 mg/l	1 September to 31 May	Feather River from Fish Barrier Dam at Oroville to Honcut Creek (40)
8.0 mg/l	all year	Merced River from Cressy to New Exchequer Dam (78)
8.0 mg/l	15 October to 15 June	Tuolumne River from Waterford to La Grange (86)

\* When natural conditions lower dissolved oxygen below this level, the concentrations shall be maintained at or above 95 percent of saturation.

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## Floating Material

Water shall not contain floating material in amounts that cause nuisance or adversely affect beneficial uses.

## Methylmercury

For Clear Lake (53), the methylmercury concentration in fish tissue shall not exceed 0.09 and 0.19 mg methylmercury/kg wet weight of tissue in trophic level 3 and 4 fish, respectively. Compliance with these objectives shall be determined by analysis of fish

tissue as described in Chapter V, Surveillance and Monitoring.

## Oil and Grease

Waters shall not contain oils, greases, waxes, or other materials in concentrations that cause nuisance, result in a visible film or coating on the surface of the water or on objects in the water, or otherwise adversely affect beneficial uses.



## pH

The pH shall not be depressed below 6.5 nor raised above 8.5. Changes in normal ambient pH levels shall not exceed 0.5 in fresh waters with designated COLD or WARM beneficial uses. In determining compliance with the water quality objective for pH, appropriate averaging periods may be applied provided that beneficial uses will be fully protected.

The following site-specific objectives replace the general pH objective, above, in its entirety for the listed water bodies.

For Goose Lake (2), pH shall be less than 9.5 and greater than 7.5 at all times. For Deer Creek, source to Cosumnes River, pH shall not be depressed below 6.5 nor raised above 8.5.

## Pesticides

- No individual pesticide or combination of pesticides shall be present in concentrations that adversely affect beneficial uses.
- Discharges shall not result in pesticide concentrations in bottom sediments or aquatic life that adversely affect beneficial uses.
- Total identifiable persistent chlorinated hydrocarbon pesticides shall not be present in the water column at concentrations detectable within the accuracy of analytical methods approved by the Environmental Protection Agency or the Executive Officer.

- Pesticide concentrations shall not exceed those allowable by applicable antidegradation policies (see State Water Resources Control Board Resolution No. 68-16 and 40 C.F.R. Section 131.12.).
- Pesticide concentrations shall not exceed the lowest levels technically and economically achievable.
- Waters designated for use as domestic or municipal supply (MUN) shall not contain concentrations of pesticides in excess of the Maximum Contaminant Levels set forth in California Code of Regulations, Title 22, Division 4, Chapter 15.
- Waters designated for use as domestic or municipal supply (MUN) shall not contain concentrations of thiobencarb in excess of 1.0 µg/l.

Pesticide concentrations shall not exceed the levels identified in Table III-2A. Where more than one objective may be applicable, the most stringent objective applies.

For the purposes of this objective, the term pesticide shall include: (1) any substance, or mixture of substances which is intended to be used for defoliating plants, regulating plant growth, or for preventing, destroying, repelling, or mitigating any pest, which may infest or be detrimental to vegetation, man, animals, or households, or be present in any agricultural or nonagricultural environment whatsoever, or (2) any spray adjuvant,

TABLE III-2A

### SPECIFIC PESTICIDE OBJECTIVES

<u>PESTICIDE</u>	<u>MAXIMUM CONCENTRATION AND AVERAGING PERIOD</u>	<u>APPLICABLE WATER BODIES</u>
Diazinon	0.080 µg/L ; 1-hour average 0.050 µg/L ; 4-day average Not to be exceeded more than once every three years on average.	Sacramento River from Shasta Dam to Colusa Basin Drain (13) and the Sacramento River from the Colusa Basin Drain to I Street Bridge (30). Feather River from Fish Barrier Dam to Sacramento River (40).

or (3) any breakdown products of these materials that threaten beneficial uses. Note that discharges of "inert" ingredients included in pesticide formulations must comply with all applicable water quality objectives.

## Radioactivity

Radionuclides shall not be present in concentrations that are harmful to human, plant, animal or aquatic life nor that result in the accumulation of radionuclides in the food web to an extent that presents a hazard to human, plant, animal or aquatic life.

At a minimum, waters designated for use as domestic or municipal supply (MUN) shall not contain concentrations of radionuclides in excess of the maximum contaminant levels (MCLs) specified in Table 4 (MCL Radioactivity) of Section 64443 of Title 22 of the California Code of Regulations, which are incorporated by reference into this plan. This incorporation-by-reference is prospective, including future changes to the incorporated provisions as the changes take effect.

## Salinity

### **Electrical Conductivity and Total Dissolved Solids-- Special Cases in the Sacramento and San Joaquin River Basins Other Than the Delta**

The objectives for electrical conductivity and total dissolved solids in Table III-3 apply to the water bodies specified. To the extent of any conflict with the general Chemical Constituents water quality objectives, the more stringent shall apply.

### **Electrical Conductivity, Total Dissolved Solids, and Chloride--Delta Waters**

The objectives for salinity (electrical conductivity, total dissolved solids, and chloride) which apply to the Delta are listed in Table III-5 at the chapter's end. See Figure III-2 for an explanation of the hydrologic year type classification system. The objectives in Table III-5 were adopted by the State Water Board in May 1991 in the Water Quality Control Plan for Salinity.

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*Text continued on next page*

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Table III-3

## ELECTRICAL CONDUCTIVITY AND TOTAL DISSOLVED SOLIDS

<u>PARAMETER</u>	<u>WATER QUALITY OBJECTIVES</u>	<u>APPLICABLE WATER BODIES</u>
Electrical Conductivity (at 25°C)	Shall not exceed 230 micromhos/cm (50 percentile) or 235 micromhos/cm (90 percentile) at Knights Landing above Colusa Basin Drain; or 240 micromhos/cm (50 percentile) or 340 micromhos/cm (90 percentile) at I Street Bridge, based upon previous 10 years of record.	Sacramento River (13, 30)
	Shall not exceed 150 micromhos/cm (90 percentile) in well-mixed waters of the Feather River.	North Fork of the Feather River (33); Middle Fork of the Feather River from Little Last Chance Creek to Lake Oroville (36); Feather River from the Fish Barrier Dam at Oroville to Sacramento River (40)
	Shall not exceed 150 micromhos/cm from Friant Dam to Gravelly Ford (90 percentile).	San Joaquin River, Friant Dam to Mendota Pool (69)
Total Dissolved Solids	Shall not exceed 125 mg/l (90 percentile)	North Fork of the American River from the source to Folsom Lake (44); Middle Fork of the American River from the source to Folsom Lake (45); South Fork of the American River from the source to Folsom Lake (48, 49); American River from Folsom Dam to Sacramento River (51)
	Shall not exceed 100 mg/l (90 percentile)	Folsom Lake (50)
	Shall not exceed 1,300,000 tons	Goose Lake (2)

**Sediment**

The suspended sediment load and suspended sediment discharge rate of surface waters shall not be altered in such a manner as to cause nuisance or adversely affect beneficial uses.

**Settleable Material**

Waters shall not contain substances in concentrations that result in the deposition of material that causes nuisance or adversely affects beneficial uses.

**Suspended Material**

Waters shall not contain suspended material in concentrations that cause nuisance or adversely affect beneficial uses.

**Tastes and Odors**

Water shall not contain taste- or odor-producing substances in concentrations that impart undesirable tastes or odors to domestic or municipal water supplies or to fish flesh or other edible products of aquatic origin, or that cause nuisance, or otherwise adversely affect beneficial uses.

## Temperature

The natural receiving water temperature of intrastate waters shall not be altered unless it can be demonstrated to the satisfaction of the Regional Water Board that such alteration in temperature does not adversely affect beneficial uses.

Temperature objectives for COLD interstate waters, WARM interstate waters, and Enclosed Bays and Estuaries are as specified in the *Water Quality Control Plan for Control of Temperature in the Coastal and Interstate Waters and Enclosed Bays of California* including any revisions. There are also temperature objectives for the Delta in the State

Water Board's May 1991 *Water Quality Control Plan for Salinity*.

At no time or place shall the temperature of COLD or WARM intrastate waters be increased more than 5°F above natural receiving water temperature.

Temperature changes due to controllable factors shall be limited for the water bodies specified as described in Table III-4. To the extent of any conflict with the above, the more stringent objective applies.

In determining compliance with the water quality objectives for temperature, appropriate averaging periods may be applied provided that beneficial uses will be fully protected.

TABLE III-4  
SPECIFIC TEMPERATURE OBJECTIVES

### DATES

From 1 December to 15 March, the maximum temperature shall be 55°F. 12.778

From 16 March to 15 April, the maximum temperature shall be 60°F. 15.52

From 16 April to 15 May, the maximum temperature shall be 65°F. 18.19

From 16 May to 15 October, the maximum temperature shall be 70°F. 21.14

From 16 October to 15 November, the maximum temperature shall be 65°F. 18.19

From 16 November to 30 November, the maximum temperature shall be 60°F. 16.5

### APPLICABLE WATER BODY

Sacramento River from its source to Box Canyon Reservoir (9); Sacramento River from Box Canyon Dam to Shasta Lake (11)

The temperature in the epilimnion shall be less than or equal to 75°F or mean daily ambient air temperature, whichever is greater. 23.848

Lake Siskiyou (10)

The temperature shall not be elevated above 56°F in the reach from Keswick Dam to Hamilton City nor above 68°F in the reach from Hamilton City to the I Street Bridge during periods when temperature increases will be detrimental to the fishery.

Sacramento River from Shasta Dam to I Street Bridge (13, 30)

## Toxicity

All waters shall be maintained free of toxic substances in concentrations that produce detrimental physiological responses in human, plant, animal, or aquatic life. This objective applies regardless of whether the toxicity is caused by a single substance or the interactive effect of multiple substances. Compliance with this objective will be determined by analyses of indicator organisms, species diversity, population density, growth anomalies, and biotoxicity

tests of appropriate duration or other methods as specified by the Regional Water Board.

The Regional Water Board will also consider all material and relevant information submitted by the discharger and other interested parties and numerical criteria and guidelines for toxic substances developed by the State Water Board, the California Office of Environmental Health Hazard Assessment, the California Department of Health Services, the U.S. Food and Drug Administration, the National Academy of Sciences, the U.S. Environmental Protection Agency, and other appropriate

organizations to evaluate compliance with this objective.

The survival of aquatic life in surface waters subjected to a waste discharge or other controllable water quality factors shall not be less than that for the same water body in areas unaffected by the waste discharge, or, when necessary, for other control water that is consistent with the requirements for "experimental water" as described in *Standard Methods for the Examination of Water and Wastewater*, latest edition. As a minimum, compliance with this objective as stated in the previous sentence shall be evaluated with a 96-hour bioassay.

In addition, effluent limits based upon acute biotoxicity tests of effluents will be prescribed where appropriate; additional numerical receiving water quality objectives for specific toxicants will be established as sufficient data become available; and source control of toxic substances will be encouraged.

## Turbidity

Waters shall be free of changes in turbidity that cause nuisance or adversely affect beneficial uses. Increases in turbidity attributable to controllable water quality factors shall not exceed the following limits:

- Where natural turbidity is between 0 and 5 Nephelometric Turbidity Units (NTUs), increases shall not exceed 1 NTU.
- Where natural turbidity is between 5 and 50 NTUs, increases shall not exceed 20 percent.
- Where natural turbidity is between 50 and 100 NTUs, increases shall not exceed 10 NTUs.
- Where natural turbidity is greater than 100 NTUs, increases shall not exceed 10 percent.

In determining compliance with the above limits, appropriate averaging periods may be applied provided that beneficial uses will be fully protected.

Exceptions to the above limits will be considered when a dredging operation can cause an increase in turbidity. In those cases, an allowable zone of dilution within which turbidity in excess of the limits may be tolerated will be defined for the operation and prescribed in a discharge permit.

For Folsom Lake (50) and American River (Folsom Dam to Sacramento River) (51), except for periods of storm runoff, the turbidity shall be less than or equal 10 NTUs. To the extent of any conflict with the general turbidity objective, the more stringent applies.

For Delta waters, the general objectives for turbidity apply subject to the following: except for periods of storm runoff, the turbidity of Delta waters shall not exceed 50 NTUs in the waters of the Central Delta and 150 NTUs in other Delta waters. Exceptions to the Delta specific objectives will be considered when a dredging operation can cause an increase in turbidity. In this case, an allowable zone of dilution within which turbidity in excess of limits can be tolerated will be defined for the operation and prescribed in a discharge permit.

For Deer Creek, source to Cosumnes River:

- When the dilution ratio for discharges is less than 20:1 and where natural turbidity is less than 1 Nephelometric Turbidity Unit (NTU), discharges shall not cause the receiving water daily average turbidity to exceed 2 NTUs or daily maximum turbidity to exceed 5 NTUs. Where natural turbidity is between 1 and 5 NTUs, dischargers shall not cause receiving water daily average turbidity to increase more than 1 NTU or daily maximum turbidity to exceed 5 NTUs.
- Where discharge dilution ratio is 20:1 or greater, or where natural turbidity is greater than 5 NTUs, the general turbidity objectives shall apply.

## WATER QUALITY OBJECTIVES FOR GROUND WATERS

The following objectives apply to all ground waters of the Sacramento and San Joaquin River Basins, as the objectives are relevant to the protection of designated beneficial uses. These objectives do not require improvement over naturally occurring background concentrations. The ground water objectives contained in this plan are not required by the federal Clean Water Act.



## **Bacteria**

In ground waters used for domestic or municipal supply (MUN) the most probable number of coliform organisms over any seven-day period shall be less than 2.2/100 ml.

## **Chemical Constituents**

Ground waters shall not contain chemical constituents in concentrations that adversely affect beneficial uses.

At a minimum, ground waters designated for use as domestic or municipal supply (MUN) shall not contain concentrations of chemical constituents in excess of the maximum contaminant levels (MCLs) specified in the following provisions of Title 22 of the California Code of Regulations, which are incorporated by reference into this plan: Tables 64431-A (Inorganic Chemicals) and 64431-B (Fluoride) of Section 64431, Table 64444-A (Organic Chemicals) of Section 64444, and Tables 64449-A (Secondary Maximum Contaminant Levels-Consumer Acceptance Limits) and 64449-B (Secondary Maximum Contaminant Levels-Ranges) of Section 64449. This incorporation-by-reference is prospective, including future changes to the incorporated provisions as the changes take effect. At a minimum, water designated for use as domestic or municipal supply (MUN) shall not contain lead in excess of 0.015 mg/l. To protect all beneficial uses, the Regional Water Board may apply limits more stringent than MCLs.

## **Radioactivity**

At a minimum, ground waters designated for use as domestic or municipal supply (MUN) shall not contain concentrations of radionuclides in excess of the maximum contaminant levels (MCLs) specified in Table 4 (MCL Radioactivity) of Section 64443 of Title 22 of the California Code of Regulations, which are incorporated by reference into this plan. This incorporation-by-reference is prospective, including future changes to the incorporated provisions as the changes take effect.

## **Tastes and Odors**

Ground waters shall not contain taste- or odor-producing substances in concentrations that cause nuisance or adversely affect beneficial uses.

## **Toxicity**

Ground waters shall be maintained free of toxic substances in concentrations that produce detrimental physiological responses in human, plant, animal, or aquatic life associated with designated beneficial use(s). This objective applies regardless of whether the toxicity is caused by a single substance or the interactive effect of multiple substances.

**Table 4.2.1-2. Water quality monitoring schedule for the Oroville Relicensing Project.**

Station	Temperature (a)	Field Parameters (b)	Inorganic Chemistry (c)	Pesticides (d,f)	Coliform bacteria (t)	Phyto- & Zoo-plankton	Periphyton	Macro-Invertebrates	Aquatic Toxicity
1 West Branch near Paradise	R	m (e)(t)	m (t)	F & W	m(t)		m	l	o
2 Concow Creek at Jordan Hill Rd	R	m (t)	m (t)	F & W	m(t)		m	l	o
3 North Fork upstream Poe Power House	R	m (t)	m (t)	F & W	m(t)		m	l	o
Poe PH discharge		m	m	m	m				o
4 French Creek at Oroville Reservoir	R	m							
5 Middle Fork at Milsap Bar Rd	R	m (t)	m (t)	F & W	m (t)		m	l	o
6 Fall River u/s Feather Falls	R	m (t)	m (t)	F & W	m (t)		m	l	o
7 South Fork u/s Ponderosa Res	R	m (t)	m (t)	F & W	m (t)		m	l	o
8 Sucker Run nr Forbestown	R	m (t)	m (t)	F & W	m (t)		m	l	o
9 South Fork downstream from dam or Pond. Res. Intake Structure	P	m (t)	m (t)	F & W	m (t)				o
<b>Lake Oroville</b>									
10 North Fork Arm	P	m	m (r)	F & W (i)	m	m			
11 Middle Fork Arm	P	m	m (r)	F & W (i)	m	m			
12 South Fork Arm	P	m	m (r)	F & W (i)	m	m			
13 Main Body	P	m	m (r)	F & W (i)	m	m			
14 Dam	P	m	m (s)	F & W (i)	m	m			
<b>Diversion Pool</b>									
15 u/s from Kelly Ridge Power House	P	m	m	F & W (i)	m	m			
16 Kelly Ridge Power House discharge	R								
17 d/s from Kelly Ridge Power House	P	m	m	m	m				m
18 Glen Pond	P	m	m						
19 Glen Creek u/s Glenford	R	m	m	F & W	m		m	l	
20 Diversion Pool nr Div. Dam	P	m	m (r)	F & W (i)	m	m			
Fish Barrier Pool	P	m							
<b>Feather River in Project Boundary</b>									
21 nr Fish Barrier Dam	Ru	m (g,t,u)	m (g,t)	F & W	m (t)		m (g)	l	m
22 u/s from Hatchery	Ru	m (g,u)	m (g)		m		m (g)	l	
Hatchery Pond (downstream pond)	R	m	m		m				m
23 d/s from Hatchery	Ru	m (g,t,u)	m (g,t)	F & W	m (t)		m (g)	l	m
24 d/s from Hwy 162 bridge	Ru	m (g,u)	m (g)		m		m (g)	l	
25 Robinson Riffle	Ru	m (g,u)	m (g)		m		m (g)	l	
26 u/s from Afterbay Outlet	Ru	m (g,t,u)	m (g,t)	F & W	m (t)		m (g)	l	m
27 pool at Afterbay Outlet	u	u							
28 d/s from Afterbay Outlet	Ru	m (g,t,u)	m (g,t)	F & W	m (t)		m (g)	l	m
29 d/s from SCOR Outlet (q)	R	m (g,t)	m (g,t)	F & W	m (t)		m (g)	l	m
30 nr Mile Long Pond	Ru	m (g,t,u)	m (g,t)	F & W	m (t)		m (g)	l	
31 d/s from Project boundary	Ru	m (t,g,u)	m (g,t)	F & W	m (t)		m	l	m
32 nr Gridley	u	u							
33 Oroville Wildlife Area ponds (Fishing, Robinson Riffle, Mile Long, Upper and Lower Pacific Heights ponds)	P	m	m	F & W (i)	m	m		l	m (Fishing, Mile Long, Lower Pacific Heights)

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Table 4.2.1-2. Continued.

Station	Temperature (a)	Field Parameters (b)	Inorganic Chemistry (c)	Pesticides (d,f)	Coliform bacteria (t)	Phyto- & Zoo- plankton	Periphyton	Macro- Inverte- brates	Aquatic Toxicity
<b>Thermalito Complex</b>									
34 Outlet to Feather River	R	m	m	F & W (i)	m				m
35 Sutter Buttes Canal	R	m							
36 South Afterbay	P	m	m (r)	F & W (i)	m	m			
37 North Afterbay	P	m	m (r)	F & W (i)	m	m			
38 Western Canal	R	m							
39 South Forebay	P	m	m (r)	F & W (i)	m	m			
40 N Forebay Swim area creek	m	m	m		m				
41 North Forebay	P	m	m (r)	F & W (i)	m	m			
<b>Feather River Downstream from Project Boundary</b>									
42 FR A Singh AB Riviera Rd (u/s from Honcut Creek)	Rg,u	m(t,g,u)	m(t)	F & W	m (t)		m	I	
43 Honcut Creek	R	m(t)	m(t)	F & W	m (t)		m	I	
44 FR A Archer Ave (nr Live Oak)	Ru	m(t,u)	m(t)	F & W	m (t)		m	I	
45 u/s from Yuba River	Ru	m(t,u)	m(t)	F & W	m (t)		m	I	
46 Yuba River	R	m(t)	m(t)	F & W	m (t)			I	
47 at Shanghai Bend	Ru	m(t,u)	m(t)	F & W	m (t)			I	
48 at Star Bend	u	u							
49 Bear River	R	m(t)	m(t)	F & W	m (t)			I	
50 nr Nicolaus	u	u							
51 nr Verona	Ru	m(t,u)	m(t)	F & W	m (t)			I	
52 Sacramento R ab FR	R	m(t)	m(t)	F & W	m (t)			I	

- a. R = recorder, P = profile; from study plan SPW6  
b. includes dissolved oxygen, conductivity, pH, turbidity  
c. minerals (calcium, sodium, potassium, magnesium, sulfate, chloride, boron, and alkalinity), nutrients (nitrate plus nitrite, total and dissolved ammonia, dissolved orthophosphate, and total phosphorus), total and dissolved metals (aluminum arsenic, cadmium, chromium, copper, iron, lead, manganese, nickel, selenium, and zinc), total recoverable mercury, total methyl mercury, total and dissolved solids, total hardness, settleable and suspended materials (solids), color, floating material, oil and grease, taste and odor, and total and dissolved organic carbon  
d. includes chlorinated organic pesticides, organic phosphorus pesticides, chlorinated phenoxy acid herbicides, volatile organic pesticides, carbamate pesticides, and glyphosate.  
e. m = monthly measurement or sample collection  
f. F = fall (after significant runoff), W = winter (after dormant spray season)  
g. nutrients, field parameters, and periphyton at two week intervals from September through December  
i. surface samples  
l. benthic macroinvertebrate samples collected in September 2002  
o. seasonal analysis of toxicity (July, September, first flush, February, April/May)  
p. spring (April/May) and summer (July) toxicity analyses  
q. Sewerage Commission Oroville Region discharge 1/4 mile downstream from Afterbay Outlet  
r. surface and bottom samples  
s. surface, intake structure withdrawal elevation, and bottom  
t. additional samples during four storm events  
u. temperature and dissolved oxygen biweekly from May through October and monthly from November through April.

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**Appendix 1. Analytical methods and detection levels.**

Method	Analysis	Units	Reporting Limit
<b>Minerals</b>			
EPA 200.7 (D)	Dissolved Calcium	mg/L	1
EPA 200.7 (D)	Dissolved Sodium	mg/L	1
EPA 200.7 (D)	Dissolved Potassium	mg/L	0.5
EPA 200.7 (D)	Dissolved Magnesium	mg/L	1
EPA 300.0 (28d hold)	Dissolved Sulfate	mg/L	1
EPA 300.0 28d Hold	Dissolved Chloride	mg/L	1
EPA 200.7 (D)	Dissolved Boron	mg/L	0.1
Std Method 2320 B	Alkalinity	mg CaCO <sub>3</sub> /L	0.1
<b>Nutrients</b>			
Std Method 4500-NO <sub>3</sub> -F Modified	Dissolved Nitrite + Nitrate	mg/L as N	0.05
EPA 350.1	Dissolved Ammonia	mg/L as N	0.02
Std Method 4500-NH <sub>3</sub>	Total Ammonia	mg/L as N	0.02
EPA 365.1	Dissolved Ortho-phosphate	mg/L as P	0.01
EPA 365.4	Total Phosphorus	mg/L	0.01
<b>Metals</b>			
EPA 1631	Total Mercury	µg/L	0.0002
EPA 1631	Total Methyl Mercury	µg/L	0.005
EPA 1631	Dissolved Methyl Mercury	ug/L	0.005
EPA 1632	Total and Dissolved Arsenic	µg/L	0.004
Std Method 3500-Fe D	Total and Dissolved Iron	µg/L	2.2
EPA 1638	Total and Dissolved Aluminum	µg/L	0.4
EPA 1638	Total and Dissolved Cadmium	µg/L	0.003
EPA 1638	Total and Dissolved Chromium	µg/L	0.03
EPA 1638	Total and Dissolved Copper	µg/L	0.01
EPA 1638	Total and Dissolved Lead	µg/L	0.005
EPA 1638	Total and Dissolved Manganese	µg/L	0.02
EPA 1638	Total and Dissolved Nickel	µg/L	0.01
EPA 1638	Total Selenium	µg/L	0.1
EPA 1638	Total and Dissolved Zinc	µg/L	0.03

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**Appendix 1. Continued.**

<b>Method</b>	<b>Analysis</b>	<b>Units</b>	<b>Reporting Limit</b>
<b>Miscellaneous Parameters</b>			
Std Method 2540 D	Total Suspended Solids (Suspended material)	mg/L	1
Std Method 2540 C	Total Dissolved Solids	mg/L	1
Std Method 2540 F	Settleable Solids (Settleable material)	Mg/L	1
Std Method 2340 B	Hardness	mg/L as CaCO <sub>3</sub>	1
Std Method 5520	Oil and Grease	mg/L	
Std Method 2550 B 1, 2	Temperature	degree Celcius	0.1
Std Method 4500-O C	Dissolved oxygen	mg/L	0.1
Std Method 4500-H+ B	pH	pH units	0.1
Std Method 2510 B	Conductivity	umhos/cm	0.1
EPA 445.0	Chlorophyll	µg/L	
EPA 600-4-91-002	Toxicity		
Std Method 2120 B	Color	Units	1
Std Method 2150/2160	Taste and Odor	-	-
EPA 415.1 (D)	Dissolved Organic Carbon		
<b>Pathogens</b>			
Std Method 9222 B	Total Coliform bacteria	colonies/100 mL	0
Std Method 9222 D	Fecal Coliform bacteria	colonies/100 mL	0

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## Appendix 2a. Summary of physical parameter numerical limits for the upper Feather River.

### CONCOW CREEK AT JORDAN HILL ROAD (A5-2260.50)

	Dissolved Oxygen (ppm)	pH units	Conductivity		Alkalinity mg/L	Turbidity NTU
			(field) umhos/cm	(lab) umhos/cm		
Maximum detected	12.6	8.1	157	151	84.0	10.8
Minimum detected	7.4	7.3	85	86	6.0	0.3
Number of samples	28	28	28	28	27	28
Number of samples exceeding criteria or objectives						
Primary MCL <sup>1</sup>	-	-	-	-	-	2
Secondary MCL <sup>1</sup>	-	0	0	0	-	2
Agricultural Goal <sup>2</sup>	-	0	0	0	-	-
NAWQC <sup>3</sup> Humans	-	0	-	-	-	-
NAWQC <sup>3</sup> Aquatic Life	-	0	-	-	1 <sup>5</sup>	-
USEPA Recommended Ecoregional Nutrient Criteria <sup>4</sup>	-	-	-	-	-	2

### WEST BRANCH FEATHER RIVER NEAR PARADISE (A5-2250)

	Dissolved Oxygen (ppm)	pH units	Conductivity		Alkalinity mg/L	Turbidity NTU
			(field) umhos/cm	(lab) umhos/cm		
Maximum detected	13.1	8.1	126	127	66.0	53.3
Minimum detected	7.9	7.2	31	34	16.0	0.1
Number of samples	23	23	23	23	23	23
Number of samples exceeding criteria or objectives						
Primary MCL <sup>1</sup>	-	-	-	-	-	2
Secondary MCL <sup>1</sup>	-	0	0	0	-	2
Agricultural Goal <sup>2</sup>	-	0	0	0	-	-
NAWQC <sup>3</sup> Humans	-	0	-	-	-	-
NAWQC <sup>3</sup> Aquatic Life	-	0	-	-	4 <sup>5</sup>	-
USEPA Recommended Ecoregional Nutrient Criteria <sup>4</sup>	-	-	-	-	-	2

### WEST BRANCH FEATHER RIVER UPSTREAM OF LAKE OROVILLE (A5-2350.50)

	Dissolved Oxygen (ppm)	pH units	Conductivity		Alkalinity mg/L	Turbidity NTU
			(field) umhos/cm	(lab) umhos/cm		
Maximum detected	12	8.1	111	107	59.0	1.5
Minimum detected	4.9	7.2	35	47	23.0	0.5
Number of samples	6	6	6	6	5	5
Number of samples exceeding criteria or objectives						
Primary MCL <sup>1</sup>	-	-	-	-	-	0
Secondary MCL <sup>1</sup>	-	0	0	0	-	0
Agricultural Goal <sup>2</sup>	-	0	0	0	-	-
NAWQC <sup>3</sup> Humans	-	0	-	-	-	-
NAWQC <sup>3</sup> Aquatic Life	-	0	-	-	0	-
USEPA Recommended Ecoregional Nutrient Criteria <sup>4</sup>	-	-	-	-	-	0

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## Appendix 2a. Continued.

### NORTH FORK FEATHER RIVER UPSTREAM FROM POE POWERHOUSE (A5-3132.50)

	Dissolved Oxygen (ppm)	pH units	Conductivity		Alkalinity mg/L	Turbidity NTU
			(field) umhos/cm	(lab) umhos/cm		
Maximum detected	13.3	7.9	122	120	63.0	100.0
Minimum detected	7.7	7.4	55	56	26.0	0.3
Number of samples	24	24	24	24	23	24
Number of samples exceeding criteria or objectives						
Primary MCL <sup>1</sup>	-	-	-	-	-	3
Secondary MCL <sup>1</sup>	-	0	0	0	-	3
Agricultural Goal <sup>2</sup>	-	0	0	0	-	-
NAWQC <sup>3</sup> Humans	-	0	-	-	-	-
NAWQC <sup>3</sup> Aquatic Life	-	0	-	-	0	-
USEPA Recommended Ecoregional Nutrient Criteria <sup>4</sup>	-	-	-	-	-	3
Basin Plan for Feather River <sup>7</sup>	0	-	0	0	-	-

### POE POWERHOUSE DISCHARGE (A5-3931.50)

	Dissolved Oxygen (ppm)	pH units	Conductivity		Alkalinity mg/L	Turbidity NTU
			(field) umhos/cm	(lab) umhos/cm		
Maximum detected	16.7	8.1	113	114	60.0	121.0
Minimum detected	9.4	7.2	54	54	26.0	0.7
Number of samples	24	24	24	24	24	24
Number of samples exceeding criteria or objectives						
Primary MCL <sup>1</sup>	-	-	-	-	-	3
Secondary MCL <sup>1</sup>	-	0	0	0	-	3
Agricultural Goal <sup>2</sup>	-	0	0	0	-	-
NAWQC <sup>3</sup> Humans	-	0	-	-	-	-
NAWQC <sup>3</sup> Aquatic Life	-	0	-	-	0	-
USEPA Recommended Ecoregional Nutrient Criteria <sup>4</sup>	-	-	-	-	-	3
Basin Plan for Feather River <sup>7</sup>	0	-	0	0	-	-

### FEATHER RIVER MIDDLE FORK NEAR MERRIMAC (A5-5100.00)

	Dissolved Oxygen (ppm)	pH units	Conductivity		Alkalinity mg/L	Turbidity NTU
			(field) umhos/cm	(lab) umhos/cm		
Maximum detected	13.2	8.4	169	171	75.0	23.2
Minimum detected	8.9	7.2	63	64	30.0	0.2
Number of samples	27	27	27	27	27	27
Number of samples exceeding criteria or objectives						
Primary MCL <sup>1</sup>	-	-	-	-	-	1
Secondary MCL <sup>1</sup>	-	0	0	0	-	1
Agricultural Goal <sup>2</sup>	-	0	0	0	-	-
NAWQC <sup>3</sup> Humans	-	0	-	-	-	-
NAWQC <sup>3</sup> Aquatic Life	-	0	-	-	0	-
USEPA Recommended Ecoregional Nutrient Criteria <sup>4</sup>	-	-	-	-	-	2
Basin Plan for Feather River <sup>7</sup>	0	-	6	6	-	-

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## Appendix 2a. Continued.

### FALL RIVER UPSTREAM OF FEATHER FALLS (A5-5050.50)

	Dissolved Oxygen (ppm)	pH units	Conductivity		Alkalinity mg/L	Turbidity NTU
			(field) umhos/cm	(lab) umhos/cm		
Maximum detected	13.5	7.9	127	125	30.0	21.4
Minimum detected	8.3	7	28	22	13.0	0.1
Number of samples	28	28	28	28	27	28
Number of samples exceeding criteria or objectives						
Primary MCL <sup>1</sup>	-	-	-	-		2
Secondary MCL <sup>1</sup>	-	0	0	0		2
Agricultural Goal <sup>2</sup>	-	0	0	0		
NAWQC <sup>3</sup> Humans	-	0	-	-		
NAWQC <sup>3</sup> Aquatic Life	-	0	-	-	7 <sup>5</sup>	
USEPA Recommended Ecoregional Nutrient Criteria <sup>4</sup>	-	-	-	-		2
Basin Plan for Feather River <sup>7</sup>	0	-	0	0		

### SUCKER RUN CREEK NEAR FORBESTOWN (A5-6075.00)

	Dissolved Oxygen (ppm)	pH units	Conductivity		Alkalinity mg/L	Turbidity NTU
			(field) umhos/cm	(lab) umhos/cm		
Maximum detected	14	7.9	158	160	48.0	40.1
Minimum detected	8	7.3	45	46	22.0	0.3
Number of samples	28	28	28	28	27	28
Number of samples exceeding criteria or objectives						
Primary MCL <sup>1</sup>	-	-	-	-	-	4
Secondary MCL <sup>1</sup>	-	0	0	0	-	4
Agricultural Goal <sup>2</sup>	-	0	0	0	-	
NAWQC <sup>3</sup> Humans	-	0	-	-	-	
NAWQC <sup>3</sup> Aquatic Life	-	0	-	-	0	
USEPA Recommended Ecoregional Nutrient Criteria <sup>4</sup>	-	-	-	-	-	4

### SOUTH FORK FEATHER RIVER UPSTREAM FROM PONDEROSA RESERVOIR (A5-6110.50)

	Dissolved Oxygen (ppm)	pH units	Conductivity		Alkalinity mg/L	Turbidity NTU
			(field) umhos/cm	(lab) umhos/cm		
Maximum detected	15	7.9	86	86	42.0	37.0
Minimum detected	8.3	7.1	43	46	22.0	0.3
Number of samples	28	28	28	28	27	28
Number of samples exceeding criteria or objectives						
Primary MCL <sup>1</sup>	-	-	-	-	-	4
Secondary MCL <sup>1</sup>	-	0	0	0	-	4
Agricultural Goal <sup>2</sup>	-	0	0	0	-	
NAWQC <sup>3</sup> Humans	-	0	-	-	-	
NAWQC <sup>3</sup> Aquatic Life	-	0	-	-	0	
USEPA Recommended Ecoregional Nutrient Criteria <sup>4</sup>	-	-	-	-	-	4

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## Appendix 2a. Continued.

### MINERS RANCH CANAL (A5-6925.00) AND SOUTH FORK FEATHER RIVER DOWNSTREAM FROM PONDEROSA RESERVOIR (A5-6050.50)

	Dissolved Oxygen (ppm)	pH units	Conductivity		Alkalinity mg/L	Turbidity NTU
			(field) umhos/cm	(lab) umhos/cm		
Maximum detected	12.6	7.9	56	56	26.0	37.0
Minimum detected	8.3	7	36	38	19.0	0.3
Number of samples	24	24	24	24	23	24
Number of samples exceeding criteria or objectives						
Primary MCL <sup>1</sup>	-	-	-	-		5
Secondary MCL <sup>1</sup>	-	0	0	0		5
Agricultural Goal <sup>2</sup>	-	0	0	0		
NAWQC <sup>3</sup> Humans	-	0	-	-		
NAWQC <sup>3</sup> Aquatic Life	-	0	-	-	2 <sup>5</sup>	
USEPA Recommended Ecoregional Nutrient Criteria <sup>4</sup>	-	-	-	-		6

#### Footnotes

1. California Department of Health Services, California Code of Regulations, Title 22, Division 4, Chapter 15, Domestic Water Quality and Monitoring
2. Food and Agriculture Organization of the United Nations, 1985. Water Quality for Agriculture.
3. U.S. Environmental Protection Agency, Quality Criteria for Water, 1986 (May 1986) [The Gold Book] plus updates (various dates)
4. U.S. Environmental Protection Agency, Ambient Water Quality Criteria Recommendations for both Rivers and Streams in Ecoregion 1. 2001. EPA 822-B-01-012
5. Chronic (4 day average)
6. Acute (1 hr average)
7. The Water Quality Control Plan (Basin Plan) for the California Regional Water Quality Control Board, Central Valley Region, Fourth edition. The Sacramento River Basin and the San Joaquin River Basin. Central Valley Regional Water Quality Control Board. Sacramento, California.
8. Waters designated WARM (not <5.0 mg/L)
9. Waters designated COLD/SPAWN (not <7.0 mg/L)

## Appendix 2b. Summary of physical parameter numerical limits for Lake Oroville.

### Lake Oroville North Fork Sfc (A5R93761296)

	Dissolved Oxygen (ppm)	pH units	Conductivity		Alkalinity mg/L	Turbidity NTU	Secchi Depth (m)
			(field) umhos/cm	(lab) umhos/cm			
Maximum detected	11.5	8.5	114	106	52.0	4.7	5.6
Minimum detected	6.5	7.2	71	71	39.0	0.5	1.8
Number of samples	29	22	23	20	17	19	16
Number of samples exceeding criteria or objectives							
Primary MCL <sup>1</sup>	-	-	-	-	-	0	-
Secondary MCL <sup>1</sup>	0	0	0	0	-	0	-
Agricultural Goal <sup>2</sup>	0	0	0	0	-	-	-
NAWQC <sup>3</sup> Humans	0	-	-	-	-	-	-
NAWQC <sup>3</sup> Aquatic Life	0	-	-	-	0	-	-
USEPA Recommended Ecoregional Nutrient Criteria <sup>4</sup>	-	-	-	-	-	-	11
Basin Plan for the Feather River <sup>7</sup>	3.9	-	-	-	-	-	-

### Lake Oroville North Fork Btm (A5R93761296)

	Dissolved Oxygen (ppm)	pH units	Conductivity		Alkalinity mg/L	Turbidity NTU
			(field) umhos/cm	(lab) umhos/cm		
Maximum detected	11.9	7.6	114	99	48.0	28.4
Minimum detected	0	6.8	79	82	38.0	0.4
Number of samples	28	23	22	18	10	17
Number of samples exceeding criteria or objectives						
Primary MCL <sup>1</sup>	-	-	-	-	-	4
Secondary MCL <sup>1</sup>	0	0	0	0	-	4
Agricultural Goal <sup>2</sup>	0	0	0	0	-	-
NAWQC <sup>3</sup> Humans	0	-	-	-	-	-
NAWQC <sup>3</sup> Aquatic Life	0	-	-	-	0	-
Basin Plan for the Feather River <sup>7</sup>	1.8.9	-	-	-	-	-

### Lake Oroville Middle Fork Sfc (A5R93351272)

	Dissolved Oxygen (ppm)	pH units	Conductivity		Alkalinity mg/L	Turbidity NTU	Secchi Depth (m)
			(field) umhos/cm	(lab) umhos/cm			
Maximum detected	11.4	8.3	113	115	52.0	5.2	9.5
Minimum detected	5.9	6.6	68	69	39.0	0.4	0.3
Number of samples	29	23	23	20	17	20	21
Number of samples exceeding criteria or objectives							
Primary MCL <sup>1</sup>	-	-	-	-	-	1	-
Secondary MCL <sup>1</sup>	0	0	0	0	-	1	-
Agricultural Goal <sup>2</sup>	0	0	0	0	-	-	-
NAWQC <sup>3</sup> Humans	0	-	-	-	-	-	-
NAWQC <sup>3</sup> Aquatic Life	0	-	-	-	0	-	-
USEPA Recommended Ecoregional Nutrient Criteria <sup>4</sup>	-	-	-	-	-	-	13
Basin Plan for the Feather River <sup>7</sup>	1.8.9	0	-	-	-	-	-

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## Appendix 2b. Continued.

### Lake Oroville Middle Fork Btm (A5R93351272)

	Dissolved Oxygen (ppm)	pH units	Conductivity		Alkalinity mg/L	Turbidity NTU
			(field) umhos/cm	(lab) umhos/cm		
Maximum detected	11.3	7.8	92	96	46.0	7.6
Minimum detected	4.9	6.3	75	72	37.0	0.5
Number of samples	29	20	19	19	15	18
Number of samples exceeding criteria or objectives						
Primary MCL <sup>1</sup>	-	-	-	-	-	1
Secondary MCL <sup>1</sup>	0	0	0	0	-	1
Agricultural Goal <sup>2</sup>	0	0	0	0	-	-
NAWQC <sup>3</sup> Humans	0	-	-	-	-	-
NAWQC <sup>3</sup> Aquatic Life	0	-	-	-	0	-
Basin Plan for the Feather River <sup>7</sup>	1 <sup>6</sup> , 6 <sup>9</sup>	-	-	-	-	-

### Lake Oroville South Fork Sfc (A5R93221226)

	Dissolved Oxygen (ppm)	pH units	Conductivity		Alkalinity mg/L	Turbidity NTU	Secchi Depth (m)
			(field) umhos/cm	(lab) umhos/cm			
Maximum detected	11.7	8.3	106	92	47.0	14.0	10.5
Minimum detected	6.5	7.3	64	61	35.0	0.4	10.3
Number of samples	28	22	23	19	18	18	21
Number of samples exceeding criteria or objectives							
Primary MCL <sup>1</sup>	-	-	-	-	-	3	-
Secondary MCL <sup>1</sup>	0	0	0	0	-	3	-
Agricultural Goal <sup>2</sup>	0	0	0	0	-	-	-
NAWQC <sup>3</sup> Humans	0	-	-	-	-	-	-
NAWQC <sup>3</sup> Aquatic Life	0	-	-	-	0	-	-
USEPA Recommended Ecoregional Nutrient Criteria <sup>4</sup>	-	-	-	-	-	-	16
Basin Plan for the Feather River <sup>7</sup>	1 <sup>9</sup>	-	-	-	-	-	-

### Lake Oroville South Fork Btm (A5R93221226)

	Dissolved Oxygen (ppm)	pH units	Conductivity		Alkalinity mg/L	Turbidity NTU
			(field) umhos/cm	(lab) umhos/cm		
Maximum detected	10.7	7.9	103	94	45.0	31.0
Minimum detected	1.0	6.5	55	69	30.0	0
Number of samples	26	23	20	19	18	19
Number of samples exceeding criteria or objectives						
Primary MCL <sup>1</sup>	-	-	-	-	-	7
Secondary MCL <sup>1</sup>	0	0	0	0	-	7
Agricultural Goal <sup>2</sup>	0	0	0	0	-	-
NAWQC <sup>3</sup> Humans	0	-	-	-	-	-
NAWQC <sup>3</sup> Aquatic Life	0	-	-	-	0	-
Basin Plan for the Feather River <sup>7</sup>	3 <sup>8</sup> , 12 <sup>9</sup>	-	-	-	-	-

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## Appendix 2b. Continued.

### Lake Oroville Main Body Sfc (A5R93401274)

	Dissolved Oxygen (ppm)	pH units	Conductivity		Alkalinity mg/L	Turbidity NTU	Secchi Depth (m)
			(field) umhos/cm	(lab) umhos/cm			
Maximum detected	10.9	8.3	109	104	49.0	4.0	8.0
Minimum detected	7.5	7.3	71	67	38.0	0.4	11.8
Number of samples	29	23	22	15	15	16	10
Number of samples exceeding criteria or objectives							
Primary MCL <sup>1</sup>	-	-	-	-	-	0	
Secondary MCL <sup>1</sup>	-	0	0	0	-	0	
Agricultural Goal <sup>2</sup>	-	0	0	0	-	-	
NAWQC <sup>3</sup> Humans	-	0	-	-	-	-	
NAWQC <sup>3</sup> Aquatic Life	-	0	-	-	0	-	
USEPA Recommended Ecoregional Nutrient Criteria <sup>4</sup>	-	-	-	-	-	-	7
Basin Plan for the Feather River <sup>7</sup>	0	-	-	-	-	-	

### Lake Oroville Main Body Btm (A5R93401274)

	Dissolved Oxygen (ppm)	pH units	Conductivity		Alkalinity mg/L	Turbidity NTU	
			(field) umhos/cm	(lab) umhos/cm			
Maximum detected	11.2	7.8	113	98	47.0	6.1	
Minimum detected	6.9	6.5	78	74	42.0	0.5	
Number of samples	21	18	18	12	9	12	
Number of samples exceeding criteria or objectives							
Primary MCL <sup>1</sup>		-	-	-	-	1	
Secondary MCL <sup>1</sup>		0	0	0	-	1	
Agricultural Goal <sup>2</sup>		0	0	0	-		
NAWQC <sup>3</sup> Humans		0	-	-	-		
NAWQC <sup>3</sup> Aquatic Life		0	-	-	0		
Basin Plan for the Feather River <sup>7</sup>	1.0	-	-	-	-		

### Lake Oroville At Dam Sfc (A5R93251286)

	Dissolved Oxygen (ppm)	pH units	Conductivity		Alkalinity mg/L	Turbidity NTU	Secchi Depth (m)
			(field) umhos/cm	(lab) umhos/cm			
Maximum detected	11.0	8.4	109	105	50.0	4.0	11.6
Minimum detected	6.4	7.3	72	79	38.0	0.4	2.3
Number of samples	30	25	23	21	18	18	17
Number of samples exceeding criteria or objectives							
Primary MCL <sup>1</sup>		-	-	-	-	0	
Secondary MCL <sup>1</sup>		0	0	0	-	0	
Agricultural Goal <sup>2</sup>		0	0	0	-	-	
NAWQC <sup>3</sup> Humans		0	-	-	-	-	
NAWQC <sup>3</sup> Aquatic Life		0	-	-	0	-	
USEPA Recommended Ecoregional Nutrient Criteria <sup>4</sup>		-	-	-	-	-	10
Basin Plan for the Feather River <sup>7</sup>	1.0	-	-	-	-	-	

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## Appendix 2b. Continued.

### Lake Oroville At Dam Mid (A5R93251286)

	Dissolved Oxygen (ppm)	pH units	Conductivity		Alkalinity mg/L	Turbidity NTU
			(field) umhos/cm	(lab) umhos/cm		
Maximum detected	9.5	7.4	112	96	45.0	2.9
Minimum detected	7	6.9	8	83	39.0	0.3
Number of samples	15	17	14	15	11	12
Number of samples exceeding criteria or objectives						
Primary MCL <sup>1</sup>	-	-	-	-	-	0
Secondary MCL <sup>1</sup>	-	0	0	0	-	0
Agricultural Goal <sup>2</sup>	-	0	0	0	-	-
NAWQC <sup>3</sup> Humans	-	0	-	-	-	-
NAWQC <sup>3</sup> Aquatic Life	-	0	-	-	0	-
Basin Plan for the Feather River <sup>7</sup>	0	-	-	-	-	-

### Lake Oroville At Dam Btm (A5R93251286)

	Dissolved Oxygen (ppm)	pH units	Conductivity		Alkalinity mg/L	Turbidity NTU
			(field) umhos/cm	(lab) umhos/cm		
Maximum detected	11.7	7.8	112	105	50.0	3.8
Minimum detected	0.7	6.9	78	82	42.0	0.4
Number of samples	29	21	20	18	13	15
Number of samples exceeding criteria or objectives						
Primary MCL <sup>1</sup>	-	-	-	-	-	0
Secondary MCL <sup>1</sup>	0	0	0	0	-	0
Agricultural Goal <sup>2</sup>	0	0	0	0	-	-
NAWQC <sup>3</sup> Humans	0	-	-	-	-	-
NAWQC <sup>3</sup> Aquatic Life	0	-	-	-	0	-
Basin Plan for the Feather River <sup>7</sup>	1 <sup>6</sup> 4 <sup>9</sup>	-	-	-	-	-

#### Footnotes

1. California Department of Health Services, California Code of Regulations, Title 22, Division 4, Chapter 15, Domestic Water Quality and Monitoring
2. Food and Agriculture Organization of the United Nations, 1985. Water Quality for Agriculture.
3. U.S. Environmental Protection Agency, Quality Criteria for Water, 1986 (May 1986) [The Gold Book] plus updates (various dates)
4. U.S. Environmental Protection Agency, Ambient Water Quality Criteria Recommendations for both Rivers and Streams in Ecoregion 2.  
2001. EPA 822-B-01-012
5. Chronic (4 day average)
6. Acute (1 hr average)
7. The Water Quality Control Plan (Basin Plan) for the California Regional Water Quality Control Board, Central Valley Region,  
Fourth edition. The Sacramento River Basin and the San Joaquin River Basin. Central Valley Regional Water Quality Control Board.  
Sacramento, California.
8. Water designated WARM (<5.0 mg/L)
9. Water designated COLD/SPAWN (<7.0 mg/L)

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## Appendix 2c. Summary of physical parameter numerical limits for the lower Feather River.

### Oroville Diversion Pool US PP Sfc (A5R93191294)

	Dissolved Oxygen (ppm)	pH units	Conductivity (field) umhos/cm	Conductivity (lab) umhos/cm	Alkalinity mg/L	Turbidity NTU	Secchi depth (m)
Maximum detected	13.0	7.7	96	103	48	4.6	5.6
Minimum detected	8.0	6.8	60	76	38	0.3	2.6
Number of samples	27	24	23	23	22	23	3
Number of samples exceeding criteria or objectives							
Primary MCL <sup>1</sup>	-	-	-	-	-	0	-
Secondary MCL <sup>1</sup>	-	0	0	0	-	0	-
Agricultural Goal <sup>2</sup>	-	0	0	0	-	-	-
NAWQC <sup>3</sup> Humans	-	0	-	-	-	-	-
NAWQC <sup>3</sup> Aquatic Life	-	0	-	-	0	-	-
USEPA Recommended Ecoregional Nutrient Criteria <sup>4</sup>	0	-	-	-	-	-	-
Basin Plan <sup>7</sup>	0	-	-	-	-	-	-

### Oroville Diversion Pool US PP Btm (A5R93191294)

	Dissolved Oxygen (ppm)	pH units	Conductivity (field) umhos/cm	Conductivity (lab) umhos/cm	Alkalinity mg/L	Turbidity NTU
Maximum detected	10.8	7.4	86	92	45	0.9
Minimum detected	8.1	7.0	81	92	45	0.9
Number of samples	5	4	3	1	1	1
Number of samples exceeding criteria or objectives						
Primary MCL <sup>1</sup>	-	-	-	-	-	0
Secondary MCL <sup>1</sup>	-	0	0	0	-	0
Agricultural Goal <sup>2</sup>	-	0	0	0	-	-
NAWQC <sup>3</sup> Humans	-	0	-	-	-	-
NAWQC <sup>3</sup> Aquatic Life	-	0	-	-	0	-
USEPA Recommended Ecoregional Nutrient Criteria <sup>4</sup>	-	-	-	-	-	-
Basin Plan <sup>7</sup>	0	-	-	-	-	-

### Oroville Diversion Pool DS PP Sfc (A5R93191297)

	Dissolved Oxygen (ppm)	pH units	Conductivity (field) umhos/cm	Conductivity (lab) umhos/cm	Alkalinity mg/L	Turbidity NTU	Secchi depth (m)
Maximum detected	12.9	7.7	93	96	45	5.3	3.5
Minimum detected	8.7	6.8	60	71	37	0.5	2.4
Number of samples	21	17	18	14	15	15	2
Number of samples exceeding criteria or objectives							
Primary MCL <sup>1</sup>	-	-	-	-	-	1	-
Secondary MCL <sup>1</sup>	-	0	0	0	-	1	-
Agricultural Goal <sup>2</sup>	-	0	0	0	-	-	-
NAWQC <sup>3</sup> Humans	-	0	-	-	-	-	-
NAWQC <sup>3</sup> Aquatic Life	-	0	-	-	0	-	-
USEPA Recommended Ecoregional Nutrient Criteria <sup>4</sup>	-	-	-	-	-	-	-
Basin Plan <sup>7</sup>	0	-	-	-	-	-	-

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## Appendix 2c. Continued.

### Oroville Diversion Pool DS PP Btm (A5R93191297)

	Dissolved Oxygen (ppm)	pH units	Conductivity (field) umhos/cm	Conductivity (lab) umhos/cm	Alkalinity mg/L	Turbidity NTU
Maximum detected	10.9	7.3	79	-	-	-
Minimum detected	9.3	7.2	76	-	-	-
Number of samples	4	2	2	0	0	0
Number of samples exceeding criteria or objectives						
Primary MCL <sup>1</sup>	-	-	-	-	-	0
Secondary MCL <sup>1</sup>	-	0	0	0	-	0
Agricultural Goal <sup>2</sup>	-	0	0	0	-	-
NAWQC <sup>3</sup> Humans	-	0	-	-	-	-
NAWQC <sup>3</sup> Aquatic Life	-	0	-	-	0	-
USEPA Recommended Ecoregional Nutrient Criteria <sup>4</sup>	-	-	-	-	-	-
Basin Plan <sup>7</sup>	0	-	-	-	-	-

### Glen C US Glen Pd (A5-3050)

	Dissolved Oxygen (ppm)	pH units	Conductivity (field) umhos/cm	Conductivity (lab) umhos/cm	Alkalinity mg/L	Turbidity NTU
Maximum detected	11.5	8.4	263	268	120	49.1
Minimum detected	7.4	7.2	122	121	59	0.7
Number of samples	23	23	22	23	21	22
Number of samples exceeding criteria or objectives						
Primary MCL <sup>1</sup>	-	-	-	-	-	5
Secondary MCL <sup>1</sup>	-	0	0	0	-	5
Agricultural Goal <sup>2</sup>	-	0	0	0	-	-
NAWQC <sup>3</sup> Humans	-	0	-	-	-	-
NAWQC <sup>3</sup> Aquatic Life	-	0	-	-	0	-
USEPA Recommended Ecoregional Nutrient Criteria <sup>4</sup>	-	-	-	-	-	-
Basin Plan <sup>7</sup>	0	-	-	-	-	-

### Glen Pond (A5L93221307)

	Dissolved Oxygen (ppm)	pH units	Conductivity (field) umhos/cm	Conductivity (lab) umhos/cm	Alkalinity mg/L	Turbidity NTU	Secchi depth (m)
Maximum detected	13.5	8.4	247	253	109	21.3	0.7
Minimum detected	8.7	6.9	100	104	43	1.4	0.7
Number of samples	24	24	24	21	20	21	1
Number of samples exceeding criteria or objectives							
Primary MCL <sup>1</sup>	-	-	-	-	-	9	-
Secondary MCL <sup>1</sup>	-	0	0	0	-	9	-
Agricultural Goal <sup>2</sup>	-	0	0	0	-	-	-
NAWQC <sup>3</sup> Humans	-	0	-	-	-	-	-
NAWQC <sup>3</sup> Aquatic Life	-	0	-	-	0	-	-
USEPA Recommended Ecoregional Nutrient Criteria <sup>4</sup>	-	-	-	-	-	-	-
Basin Plan <sup>7</sup>	0	-	-	-	-	-	-

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## Appendix 2c. Continued.

### Morris Ravine A Mouth (A5-1850)

	Dissolved Oxygen (ppm)	pH units	Conductivity (field) umhos/cm	Conductivity (lab) umhos/cm	Alkalinity mg/L	Turbidity NTU
Maximum detected	11.0	8.1	597	582	322	99.7
Minimum detected	8.0	7.3	189	98	47	10.8
Number of samples	9	9	8	8	10	8
Number of samples exceeding criteria or objectives						
Primary MCL <sup>1</sup>	-	-	-	-	-	4
Secondary MCL <sup>1</sup>	-	0	0	0	-	4
Agricultural Goal <sup>2</sup>	-	0	0	0	-	-
NAWQC <sup>3</sup> Humans	-	0	-	-	-	-
NAWQC <sup>3</sup> Aquatic Life	-	0	-	-	0	-
USEPA Recommended Ecoregional Nutrient Criteria <sup>4</sup>	-	-	-	-	-	-
Basin Plan <sup>7</sup>	0	-	-	-	-	-

### Oroville Diversion Pool US Dam Sfc (A5R93191326)

	Dissolved Oxygen (ppm)	pH units	Conductivity (field) umhos/cm	Conductivity (lab) umhos/cm	Alkalinity mg/L	Turbidity NTU	Secchi depth (m)
Maximum detected	12.7	7.7	106	107	46	8.0	7.7
Minimum detected	7.4	6.8	63	74	36	0.5	1.3
Number of samples	27	26	27	22	20	29	23
Number of samples exceeding criteria or objectives							
Primary MCL <sup>1</sup>	-	-	-	-	-	2	-
Secondary MCL <sup>1</sup>	-	0	0	0	-	2	-
Agricultural Goal <sup>2</sup>	-	0	0	0	-	-	-
NAWQC <sup>3</sup> Humans	-	0	-	-	-	-	-
NAWQC <sup>3</sup> Aquatic Life	-	0	-	-	0	-	-
USEPA Recommended Ecoregional Nutrient Criteria <sup>4</sup>	-	-	-	-	-	-	-
Basin Plan <sup>7</sup>	0	-	-	-	-	-	-

### Oroville Diversion Pool US Dam Btm (A5R93191326)

	Dissolved Oxygen (ppm)	pH units	Conductivity (field) umhos/cm	Conductivity (lab) umhos/cm	Alkalinity mg/L	Turbidity NTU
Maximum detected	13.6	7.9	106	106	45	5.8
Minimum detected	7.0	6.6	62	71	37	0.7
Number of samples	25	25	24	23	20	20
Number of samples exceeding criteria or objectives						
Primary MCL <sup>1</sup>	-	-	-	-	-	1
Secondary MCL <sup>1</sup>	-	0	0	0	-	1
Agricultural Goal <sup>2</sup>	-	0	0	0	-	-
NAWQC <sup>3</sup> Humans	-	0	-	-	-	-
NAWQC <sup>3</sup> Aquatic Life	-	0	-	-	0	-
USEPA Recommended Ecoregional Nutrient Criteria <sup>4</sup>	-	-	-	-	-	-
Basin Plan <sup>7</sup>	0	-	-	-	-	-

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## Appendix 2c. Continued.

### Feather R A Oroville (A5-1800.00)

	Dissolved Oxygen (ppm)	pH units	Conductivity		Alkalinity mg/L	Turbidity NTU
			(field) umhos/cm	(lab) umhos/cm		
Maximum detected	12.5	7.7	194	102	50	23.1
Minimum detected	7.9	6.9	73	58	38	0.5
Number of samples	30	30	30	30	28	30
Number of samples exceeding criteria or objectives						
Primary MCL <sup>1</sup>	-	-	-	-	-	1
Secondary MCL <sup>1</sup>	-	0	0	0	-	1
Agricultural Goal <sup>2</sup>	-	0	0	0	-	-
NAWQC <sup>3</sup> Humans	-	0	-	-	-	-
NAWQC <sup>3</sup> Aquatic Life	-	0	-	-	0	-
USEPA Recommended Ecoregional Nutrient Criteria <sup>4</sup>	-	-	-	-	-	2
Basin Plan <sup>7</sup>	0	0	1	0	-	-

### Feather R US Hatchery (A5-1789.50)

	Dissolved Oxygen (ppm)	pH units	Conductivity		Alkalinity mg/L	Turbidity NTU
			(field) umhos/cm	(lab) umhos/cm		
Maximum detected	13.9	7.5	104	100	50	20.5
Minimum detected	9.3	7	74	59	37	0.4
Number of samples	31	31	31	31	29	31
Number of samples exceeding criteria or objectives						
Primary MCL <sup>1</sup>	-	-	-	-	-	2
Secondary MCL <sup>1</sup>	-	0	0	0	-	2
Agricultural Goal <sup>2</sup>	-	0	0	0	-	-
NAWQC <sup>3</sup> Humans	-	0	-	-	-	-
NAWQC <sup>3</sup> Aquatic Life	-	0	-	-	0	-
USEPA Recommended Ecoregional Nutrient Criteria <sup>4</sup>	-	-	-	-	-	2
Basin Plan <sup>7</sup>	0	0	0	0	-	-

### Feather R Hatchery Settling Pond (A5R93101333)

	Dissolved Oxygen (ppm)	pH units	Conductivity		Alkalinity mg/L	Turbidity NTU
			(field) umhos/cm	(lab) umhos/cm		
Maximum detected	12.7	7.5	398	436	52	34.2
Minimum detected	7.7	6.9	74	23	35	0.5
Number of samples	27	27	27	27	26	27
Number of samples exceeding criteria or objectives						
Primary MCL <sup>1</sup>	-	-	-	-	-	4
Secondary MCL <sup>1</sup>	-	0	0	0	-	4
Agricultural Goal <sup>2</sup>	-	0	0	0	-	-
NAWQC <sup>3</sup> Humans	-	0	-	-	-	-
NAWQC <sup>3</sup> Aquatic Life	-	0	-	-	0	-
USEPA Recommended Ecoregional Nutrient Criteria <sup>4</sup>	-	-	-	-	-	4
Basin Plan <sup>7</sup>	0	0	1	1	-	-

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## Appendix 2c. Continued.

### Feather R DS Hatchery (A5-1780.50)

	Dissolved Oxygen (ppm)	pH units	Conductivity (field) umhos/cm	(lab) umhos/cm	Alkalinity mg/L	Turbidity NTU
Maximum detected	13	7.5	151	108	50	9.4
Minimum detected	5.4	6.8	76	23	38	0.5
Number of samples	30	30	30	29	28	30
Number of samples exceeding criteria or objectives						
Primary MCL <sup>1</sup>	-	-	-	-	-	4
Secondary MCL <sup>1</sup>	0	0	0	0	-	4
Agricultural Goal <sup>2</sup>	0	0	0	0	-	-
NAWQC <sup>3</sup> Humans	0	-	-	-	-	-
NAWQC <sup>3</sup> Aquatic Life	0	-	-	0	-	-
USEPA Recommended Ecoregional Nutrient Criteria <sup>4</sup>	-	-	-	-	-	5
Basin Plan <sup>7</sup>	9.10	0	1	0	-	-

### Feather R DS HWY 162 (A5-1740.50)

	Dissolved Oxygen (ppm)	pH units	Conductivity (field) umhos/cm	(lab) umhos/cm	Alkalinity mg/L	Turbidity NTU
Maximum detected	12	7.5	111	106	52	8.2
Minimum detected	8.4	7.1	79	61	40	0.6
Number of samples	30	30	30	30	28	30
Number of samples exceeding criteria or objectives						
Primary MCL <sup>1</sup>	-	-	-	-	-	3
Secondary MCL <sup>1</sup>	-	0	0	0	-	3
Agricultural Goal <sup>2</sup>	-	0	0	0	-	-
NAWQC <sup>3</sup> Humans	-	0	-	-	-	-
NAWQC <sup>3</sup> Aquatic Life	-	0	-	-	0	-
USEPA Recommended Ecoregional Nutrient Criteria <sup>4</sup>	-	-	-	-	-	3
Basin Plan <sup>7</sup>	0	0	0	0	-	-

### Oroville Fishing Pond (A5L92951347)

	Dissolved Oxygen (ppm)	pH units	Conductivity (field) umhos/cm	(lab) umhos/cm	Alkalinity mg/L	Turbidity NTU	Secchi depth (m)
Maximum detected	13.5	8.7	395	386	182.0	12.0	2.8
Minimum detected	4.4	7.4	340	315	146.0	1.3	0.4
Number of samples	36	26	26	26	23	21	28
Number of samples exceeding criteria or objectives							
Primary MCL <sup>1</sup>	-	-	-	-	-	7	-
Secondary MCL <sup>1</sup>	-	0	0	0	-	7	-
Agricultural Goal <sup>2</sup>	-	0	0	0	-	-	-
NAWQC <sup>3</sup> Humans	-	0	-	-	-	-	-
NAWQC <sup>3</sup> Aquatic Life	-	0	-	-	0	-	-
USEPA Recommended Ecoregional Nutrient Criteria <sup>4</sup>	-	-	-	-	-	-	-

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## Appendix 2c. Continued.

### Robinson Riffle Pond (A5L92821359)

	Dissolved Oxygen (ppm)	pH units	Conductivity (field) umhos/cm	Conductivity (lab) umhos/cm	Alkalinity mg/L	Turbidity NTU	Secchi depth (m)
Maximum detected	13.5	9.0	388	313	162.0	47.5	2.3
Minimum detected	0.4	6.8	125	129	59.0	1.2	0
Number of samples	35	25	25	24	21	23	12
Number of samples exceeding criteria or objectives							
Primary MCL <sup>1</sup>	-	-	-	-	-	14	-
Secondary MCL <sup>1</sup>	-	1	0	0	-	14	-
Agricultural Goal <sup>2</sup>	-	1	0	0	-	-	-
NAWQC <sup>3</sup> Humans	-	0	-	-	-	-	-
NAWQC <sup>3</sup> Aquatic Life	-	0	-	-	0	-	-
USEPA Recommended Ecoregional Nutrient Criteria <sup>4</sup>	-	-	-	-	-	-	-

### Feather R A Robinson Riffle (A5-1712.50)

	Dissolved Oxygen (ppm)	pH units	Conductivity (field) umhos/cm	Conductivity (lab) umhos/cm	Alkalinity mg/L	Turbidity NTU
Maximum detected	13.1	8.1	114	107	50	23.1
Minimum detected	7.6	7	80	62	37	0.4
Number of samples	30	30	30	30	28	30
Number of samples exceeding criteria or objectives						
Primary MCL <sup>1</sup>	-	-	-	-	-	3
Secondary MCL <sup>1</sup>	-	0	0	0	-	3
Agricultural Goal <sup>2</sup>	-	0	0	0	-	-
NAWQC <sup>3</sup> Humans	-	0	-	-	-	-
NAWQC <sup>3</sup> Aquatic Life	-	0	-	-	0	-
USEPA Recommended Ecoregional Nutrient Criteria <sup>4</sup>	-	-	-	-	-	3
Basin Plan <sup>7</sup>	1.10	0	0	0	-	-

### Upper Pacific Heights Pond (A5L92771367)

	Dissolved Oxygen (ppm)	pH units	Conductivity (field) umhos/cm	Conductivity (lab) umhos/cm	Alkalinity mg/L	Turbidity NTU	Secchi depth (m)
Maximum detected	12.5	8.1	106	106	50.0	6.9	5.5
Minimum detected	0.4	7.2	85	84	42.0	0.3	2.6
Number of samples	37	27	27	26	23	26	30
Number of samples exceeding criteria or objectives							
Primary MCL <sup>1</sup>	-	-	-	-	-	0	-
Secondary MCL <sup>1</sup>	-	0	0	0	-	0	-
Agricultural Goal <sup>2</sup>	-	0	0	0	-	-	-
NAWQC <sup>3</sup> Humans	-	0	-	-	-	-	-
NAWQC <sup>3</sup> Aquatic Life	-	0	-	-	0	-	-
USEPA Recommended Ecoregional Nutrient Criteria <sup>4</sup>	-	-	-	-	-	8	-

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## Appendix 2c. Continued.

### Feather R US from Afterbay Outlet (A5-1695.50)

	Dissolved Oxygen (ppm)	pH units	Conductivity (field) umhos/cm	Conductivity (lab) umhos/cm	Alkalinity mg/L	Turbidity NTU
Maximum detected	14.8	8.1	109	104	50	11.4
Minimum detected	8.7	7.2	80	65	40	0.6
Number of samples	31	30	30	30	29	30
Number of samples exceeding criteria or objectives						
Primary MCL <sup>1</sup>	-	-	-	-	-	3
Secondary MCL <sup>1</sup>	-	0	0	0	-	3
Agricultural Goal <sup>2</sup>	-	0	0	0	-	-
NAWQC <sup>3</sup> Humans	-	0	-	-	-	-
NAWQC <sup>3</sup> Aquatic Life	-	0	-	-	0	-
USEPA Recommended Ecoregional Nutrient Criteria <sup>4</sup>	-	-	-	-	-	3
Basin Plan <sup>7</sup>	0	0	0	0	-	-

### Thermalito Forebay Creek, N Sfc (A5-5185)

	Dissolved Oxygen (ppm)	pH units	Conductivity (field) umhos/cm	Conductivity (lab) umhos/cm	Alkalinity mg/L	Turbidity NTU
Maximum detected	11.7	8.4	360	166	86	40.3
Minimum detected	7.8	6.8	66	68	32	0.9
Number of samples	22	22	22	22	22	22
Number of samples exceeding criteria or objectives						
Primary MCL <sup>1</sup>	-	-	-	-	-	5
Secondary MCL <sup>1</sup>	-	0	0	0	-	5
Agricultural Goal <sup>2</sup>	-	0	0	0	-	-
NAWQC <sup>3</sup> Humans	-	0	-	-	-	-
NAWQC <sup>3</sup> Aquatic Life	-	0	-	-	0	-
USEPA Recommended Ecoregional Nutrient Criteria <sup>4</sup>	-	-	-	-	-	-
Basin Plan <sup>7</sup>	0	-	-	-	-	-

### Thermalito Forebay, North Sfc (A5R93161366)

	Dissolved Oxygen (ppm)	pH units	Conductivity (field) umhos/cm	Conductivity (lab) umhos/cm	Alkalinity mg/L	Turbidity NTU	Secchi depth (m)
Maximum detected	11.5	7.7	94	101	53	6.7	6.3
Minimum detected	8.5	6.8	66	61	34	0.4	1.2
Number of samples	27	27	27	25	25	25	23
Number of samples exceeding criteria or objectives							
Primary MCL <sup>1</sup>	-	-	-	-	-	1	-
Secondary MCL <sup>1</sup>	-	0	0	0	-	1	-
Agricultural Goal <sup>2</sup>	-	0	0	0	-	-	-
NAWQC <sup>3</sup> Humans	-	0	-	-	-	-	-
NAWQC <sup>3</sup> Aquatic Life	-	0	-	-	0	-	-
USEPA Recommended Ecoregional Nutrient Criteria <sup>4</sup>	-	-	-	-	-	-	-
Basin Plan <sup>7</sup>	0	-	-	-	-	-	-

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## Appendix 2c. Continued.

### Thermalito Forebay, North Btm (A5R93161366)

	Dissolved Oxygen (ppm)	pH units	Conductivity		Alkalinity mg/L	Turbidity NTU
			(field) umhos/cm	(lab) umhos/cm		
Maximum detected	10.8	7.6	94	101	52	8.1
Minimum detected	8.1	6.8	59	61	36	0.3
Number of samples	27	27	27	25	24	26
Number of samples exceeding criteria or objectives						
Primary MCL <sup>1</sup>	-	-	-	-	-	2
Secondary MCL <sup>1</sup>	-	0	0	0	-	2
Agricultural Goal <sup>2</sup>	-	0	0	0	-	
NAWQC <sup>3</sup> Humans	-	0	-	-	-	
NAWQC <sup>3</sup> Aquatic Life	-	0	-	-	0	
USEPA Recommended Ecoregional Nutrient Criteria <sup>4</sup>	-	-	-	-	-	
Basin Plan <sup>7</sup>	0	-	-	-	-	

### Thermalito Forebay, South Sfc (A5R93111370)

	Dissolved Oxygen (ppm)	pH units	Conductivity		Alkalinity mg/L	Turbidity NTU	Secchi depth (m)
			(field) umhos/cm	(lab) umhos/cm			
Maximum detected	11.4	8.1	94	100	52	4.1	6
Minimum detected	8.9	6.8	65	66	36	0.3	1.2
Number of samples	26	26	26	24	26	24	24
Number of samples exceeding criteria or objectives							
Primary MCL <sup>1</sup>	-	-	-	-	-	0	-
Secondary MCL <sup>1</sup>	-	0	0	0	-	0	-
Agricultural Goal <sup>2</sup>	-	0	0	0	-	-	-
NAWQC <sup>3</sup> Humans	-	0	-	-	-	-	-
NAWQC <sup>3</sup> Aquatic Life	-	0	-	-	0	-	-
USEPA Recommended Ecoregional Nutrient Criteria <sup>4</sup>	-	-	-	-	-	-	-
Basin Plan <sup>7</sup>	0	-	-	-	-	-	-

### Thermalito Forebay, South Btm (A5R93111370)

	Dissolved Oxygen (ppm)	pH units	Conductivity		Alkalinity mg/L	Turbidity NTU
			(field) umhos/cm	(lab) umhos/cm		
Maximum detected	11.0	7.8	94	100	52	6.3
Minimum detected	8.3	6.8	63	65	35	0.5
Number of samples	25	26	26	24	24	24
Number of samples exceeding criteria or objectives						
Primary MCL <sup>1</sup>	-	-	-	-	-	1
Secondary MCL <sup>1</sup>	-	0	0	0	-	
Agricultural Goal <sup>2</sup>	-	0	0	0	-	
NAWQC <sup>3</sup> Humans	-	0	-	-	-	
NAWQC <sup>3</sup> Aquatic Life	-	0	-	-	0	
USEPA Recommended Ecoregional Nutrient Criteria <sup>4</sup>	-	-	-	-	-	
Basin Plan <sup>7</sup>	0	-	-	-	-	

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## Appendix 2c. Continued.

### Thermalito Afterbay, North Sfc (A5R93011411)

	Dissolved Oxygen (ppm)	pH units	Conductivity (field) umhos/cm	Conductivity (lab) umhos/cm	Alkalinity mg/L	Turbidity NTU	Secchi depth (m)
Maximum detected	12.0	8.2	94	99	51.0	5.2	5
Minimum detected	8.8	6.8	66	64	34.0	0.5	1.1
Number of samples	26	26	26	26	26	26	24
Number of samples exceeding criteria or objectives							
Primary MCL <sup>1</sup>	-	-	-	-	-	1	-
Secondary MCL <sup>1</sup>	-	0	0	0	-	1	-
Agricultural Goal <sup>2</sup>	-	0	0	0	-	-	-
NAWQC <sup>3</sup> Humans	-	0	-	-	-	-	-
NAWQC <sup>3</sup> Aquatic Life	-	0	-	-	0	-	-
USEPA Recommended Ecoregional Nutrient Criteria <sup>4</sup>	-	-	-	-	-	-	-
Basin Plan <sup>7</sup>	0	-	-	-	-	-	-

### Thermalito Afterbay, North Btm (A5R93011411)

	Dissolved Oxygen (ppm)	pH units	Conductivity (field) umhos/cm	Conductivity (lab) umhos/cm	Alkalinity mg/L	Turbidity NTU
Maximum detected	11.4	7.9	94	101	52.0	3.8
Minimum detected	6.4	6.8	66	66	37.0	0.6
Number of samples	26	26	26	26	26	26
Number of samples exceeding criteria or objectives						
Primary MCL <sup>1</sup>	-	-	-	-	-	0
Secondary MCL <sup>1</sup>	0	0	0	0	-	0
Agricultural Goal <sup>2</sup>	0	0	0	0	-	-
NAWQC <sup>3</sup> Humans	0	-	-	-	-	-
NAWQC <sup>3</sup> Aquatic Life	0	-	-	-	0	-
USEPA Recommended Ecoregional Nutrient Criteria <sup>4</sup>	-	-	-	-	-	-
Basin Plan <sup>7</sup>	2 <sup>8</sup>	-	-	-	-	-

### Thermalito Afterbay, South Sfc (A5R92921412)

	Dissolved Oxygen (ppm)	pH units	Conductivity (field) umhos/cm	Conductivity (lab) umhos/cm	Alkalinity mg/L	Turbidity NTU	Secchi depth (m)
Maximum detected	10.9	8.1	93	100	52	5.1	5.3
Minimum detected	8.1	7.1	66	66	35	0.5	1.2
Number of samples	26	26	26	26	26	26	24
Number of samples exceeding criteria or objectives							
Primary MCL <sup>1</sup>	-	-	-	-	-	1	-
Secondary MCL <sup>1</sup>	-	0	0	0	-	1	-
Agricultural Goal <sup>2</sup>	-	0	0	0	-	-	-
NAWQC <sup>3</sup> Humans	-	0	-	-	-	-	-
NAWQC <sup>3</sup> Aquatic Life	-	0	-	-	0	-	-
USEPA Recommended Ecoregional Nutrient Criteria <sup>4</sup>	-	-	-	-	-	-	-
Basin Plan <sup>7</sup>	0	-	-	-	-	-	-

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## Appendix 2c. Continued.

### Thermalito Afterbay, South Btm (A5R92921412)

	Dissolved Oxygen (ppm)	pH units	Conductivity		Alkalinity mg/L	Turbidity NTU
			(field) umhos/cm	(lab) umhos/cm		
Maximum detected	11.6	7.9	93	100	52	25.9
Minimum detected	8.1	7.2	66	65	37	0.7
Number of samples	26	26	26	26	26	26
Number of samples exceeding criteria or objectives						
Primary MCL <sup>1</sup>	-	-	-	-	-	2
Secondary MCL <sup>1</sup>	-	0	0	0	-	2
Agricultural Goal <sup>2</sup>	-	0	0	0	-	-
NAWQC <sup>3</sup> Humans	-	0	-	-	-	-
NAWQC <sup>3</sup> Aquatic Life	-	0	-	-	0	-
USEPA Recommended Ecoregional Nutrient Criteria <sup>4</sup>	-	-	-	-	-	-
Basin Plan <sup>7</sup>	0	-	-	-	-	-

### Afterbay Outlet Canal to Feather R (A5C92751383)

	Dissolved Oxygen (ppm)	pH units	Conductivity		Alkalinity mg/L	Turbidity NTU
			(field) umhos/cm	(lab) umhos/cm		
Maximum detected	12.6	8.1	125	97	49	10.0
Minimum detected	9.2	6.3	68	60	38	1.2
Number of samples	28	29	29	28	27	26
Number of samples exceeding criteria or objectives						
Primary MCL <sup>1</sup>	-	-	-	-	-	5
Secondary MCL <sup>1</sup>	-	0	0	0	-	5
Agricultural Goal <sup>2</sup>	-	0	0	0	-	-
NAWQC <sup>3</sup> Humans	-	0	-	-	-	-
NAWQC <sup>3</sup> Aquatic Life	-	0	-	-	0	-
USEPA Recommended Ecoregional Nutrient Criteria <sup>4</sup>	-	-	-	-	-	10
Basin Plan <sup>7</sup>	0	0	0	0	-	-

### Feather R DS from Afterbay Outlet (A5-1687.70)

	Dissolved Oxygen (ppm)	pH units	Conductivity		Alkalinity mg/L	Turbidity NTU
			(field) umhos/cm	(lab) umhos/cm		
Maximum detected	13.9	8.1	104	99	50	7.1
Minimum detected	9.7	7.2	75	61	39	0.8
Number of samples	31	30	30	30	29	31
Number of samples exceeding criteria or objectives						
Primary MCL <sup>1</sup>	-	-	-	-	-	4
Secondary MCL <sup>1</sup>	-	0	0	0	-	4
Agricultural Goal <sup>2</sup>	-	0	0	0	-	-
NAWQC <sup>3</sup> Humans	-	0	-	-	-	-
NAWQC <sup>3</sup> Aquatic Life	-	0	-	-	0	-
USEPA Recommended Ecoregional Nutrient Criteria <sup>4</sup>	-	-	-	-	-	6
Basin Plan <sup>7</sup>	0	0	0	0	-	-

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## Appendix 2c. Continued.

### Feather R DS from SCOR Outlet (A5-1687.20)

	Dissolved Oxygen (ppm)	pH units	Conductivity (field) umhos/cm	Conductivity (lab) umhos/cm	Alkalinity mg/L	Turbidity NTU
Maximum detected	12.8	8.1	118	105	48	5.6
Minimum detected	9.5	7.1	62	62	39	1.1
Number of samples	28	30	29	28	28	29
Number of samples exceeding criteria or objectives						
Primary MCL <sup>1</sup>	-	-	-	-	-	2
Secondary MCL <sup>1</sup>	-	0	0	0	-	2
Agricultural Goal <sup>2</sup>	-	0	0	0	-	-
NAWQC <sup>3</sup> Humans	-	0	-	-	-	-
NAWQC <sup>3</sup> Aquatic Life	-	0	-	-	0	-
USEPA Recommended Ecoregional Nutrient Criteria <sup>4</sup>	-	-	-	-	-	2
Basin Plan <sup>7</sup>	0	0	0	0	-	-

### Mile Long Pond - Sfc (A5L92541377)

	Dissolved Oxygen (ppm)	pH units	Conductivity (field) umhos/cm	Conductivity (lab) umhos/cm	Alkalinity mg/L	Turbidity NTU	Secchi depth (m)
Maximum detected	16.7	8.1	113	114	60.0	121.0	4.4
Minimum detected	9.4	7.2	54	54	26.0	0.7	0.6
Number of samples	24	24	24	24	24	24	29
Number of samples exceeding criteria or objectives							
Primary MCL <sup>1</sup>	-	-	-	-	-	3	-
Secondary MCL <sup>1</sup>	-	0	0	0	-	3	-
Agricultural Goal <sup>2</sup>	-	0	0	0	-	-	-
NAWQC <sup>3</sup> Humans	-	0	-	-	-	-	-
NAWQC <sup>3</sup> Aquatic Life	-	0	-	-	0	-	-
USEPA Recommended Ecoregional Nutrient Criteria <sup>4</sup>	-	-	-	-	-	3	-

### Mile Long Pond - Btm (A5L92541377)

	Dissolved Oxygen (ppm)	pH units	Conductivity (field) umhos/cm	Conductivity (lab) umhos/cm	Alkalinity mg/L	Turbidity NTU
Maximum detected	13.2	8.4	169	171	75.0	23.2
Minimum detected	8.9	7.2	63	64	30.0	0.2
Number of samples	27	27	27	27	27	27
Number of samples exceeding criteria or objectives						
Primary MCL <sup>1</sup>	-	-	-	-	-	1
Secondary MCL <sup>1</sup>	-	0	0	0	-	1
Agricultural Goal <sup>2</sup>	-	0	0	0	-	-
NAWQC <sup>3</sup> Humans	-	0	-	-	-	-
NAWQC <sup>3</sup> Aquatic Life	-	0	-	-	0	-
USEPA Recommended Ecoregional Nutrient Criteria <sup>4</sup>	-	-	-	-	-	2

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## Appendix 2c. Continued.

### Feather R NR Mile Long Pond (A5-1662.50)

	Dissolved Oxygen (ppm)	pH units	Conductivity (field) umhos/cm	Conductivity (lab) umhos/cm	Alkalinity mg/L	Turbidity NTU
Maximum detected	14.5	8.3	104	100	52	6.2
Minimum detected	9.7	7.2	78	60	38	0.7
Number of samples	30	30	29	30	28	29
Number of samples exceeding criteria or objectives						
Primary MCL <sup>1</sup>	-	-	-	-	-	1
Secondary MCL <sup>1</sup>	-	0	0	0	-	1
Agricultural Goal <sup>2</sup>	-	0	0	0	-	-
NAWQC <sup>3</sup> Humans	-	0	-	-	-	-
NAWQC <sup>3</sup> Aquatic Life	-	0	-	-	0	-
USEPA Recommended Ecoregional Nutrient Criteria <sup>4</sup>	-	-	-	-	-	2
Basin Plan <sup>7</sup>	0	0	0	0	-	-

### Sees Pond - SFC (A5L92571372)

	Dissolved Oxygen (ppm)	pH units	Conductivity (field) umhos/cm	Conductivity (lab) umhos/cm	Alkalinity mg/L	Turbidity NTU	Secchi depth (m)
Maximum detected	8.0	7.3	270	286	142	32.5	3.2
Minimum detected	0.6	6.8	162	151	108	0.5	0.2
Number of samples	35	22	22	24	6	23	27
Number of samples exceeding criteria or objectives							
Primary MCL <sup>1</sup>	-	-	-	-	-	0	-
Secondary MCL <sup>1</sup>	-	0	0	0	-	0	-
Agricultural Goal <sup>2</sup>	-	0	0	0	-	-	-
NAWQC <sup>3</sup> Humans	-	0	-	-	-	-	-
NAWQC <sup>3</sup> Aquatic Life	-	0	-	-	0	-	-
USEPA Recommended Ecoregional Nutrient Criteria <sup>4</sup>	-	-	-	-	-	0	-

### Lower Pacific Heights Pond (A5L92551372)

	Dissolved Oxygen (ppm)	pH units	Conductivity (field) umhos/cm	Conductivity (lab) umhos/cm	Alkalinity mg/L	Turbidity NTU	Secchi depth (m)
Maximum detected	13.3	7.9	122	120	63.0	100.0	3.5
Minimum detected	7.7	7.4	55	56	26.0	0.3	1.1
Number of samples	24	24	24	24	23	24	29
Number of samples exceeding criteria or objectives							
Primary MCL <sup>1</sup>	-	-	-	-	-	3	-
Secondary MCL <sup>1</sup>	-	0	0	0	-	3	-
Agricultural Goal <sup>2</sup>	-	0	0	0	-	-	-
NAWQC <sup>3</sup> Humans	-	0	-	-	-	-	-
NAWQC <sup>3</sup> Aquatic Life	-	0	-	-	0	-	-
USEPA Recommended Ecoregional Nutrient Criteria <sup>4</sup>	-	-	-	-	-	3	-

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## Appendix 2c. Continued.

### Feather R DS from Project Boundary (A5-1645.50)

	Dissolved Oxygen (ppm)	pH units	Conductivity		Alkalinity mg/L	Turbidity NTU
			(field) umhos/cm	(lab) umhos/cm		
Maximum detected	13	8.2	107	104	51	9.2
Minimum detected	6.5	7.1	76	60	39	0.9
Number of samples	30	31	31	30	29	31
Number of samples exceeding criteria or objectives						
Primary MCL <sup>1</sup>		-	-	-	-	3
Secondary MCL <sup>1</sup>		0	0	0	-	3
Agricultural Goal <sup>2</sup>		0	0	0	-	
NAWQC <sup>3</sup> Humans		0	-	-	-	
NAWQC <sup>3</sup> Aquatic Life		0	-	-	0	
USEPA Recommended Ecoregional Nutrient Criteria <sup>4</sup>		-	-	-	-	4
Basin Plan <sup>7</sup>		0	0	0	-	

### Feather R at Singh AB Riviera Rd, (A5-1556.50)

	Dissolved Oxygen (ppm)	pH units	Conductivity		Alkalinity mg/L	Turbidity NTU
			(field) umhos/cm	(lab) umhos/cm		
Maximum detected	12.8	8.1	122	116	57	5.2
Minimum detected	6.8	7	80	62	40	0.9
Number of samples	28	29	28	29	28	29
Number of samples exceeding criteria or objectives						
Primary MCL <sup>1</sup>		-	-	-	-	1
Secondary MCL <sup>1</sup>		0	0	0	-	1
Agricultural Goal <sup>2</sup>		0	0	0	-	
NAWQC <sup>3</sup> Humans		0	-	-	-	
NAWQC <sup>3</sup> Aquatic Life		0	-	-	0	
USEPA Recommended Ecoregional Nutrient Criteria <sup>4</sup>		-	-	-	-	5
Basin Plan <sup>7</sup>		0	0	0	-	

### Honcut C at Pacific Ranch NR Palermo (A5-7010.50)

	Dissolved Oxygen (ppm)	pH units	Conductivity		Alkalinity mg/L	Turbidity NTU
			(field) umhos/cm	(lab) umhos/cm		
Maximum detected	11.4	7.9	339	328	100	48.3
Minimum detected	2.3	7	83	81	33	1.1
Number of samples	28	28	28	29	27	29
Number of samples exceeding criteria or objectives						
Primary MCL <sup>1</sup>	-	-	-	-	-	16
Secondary MCL <sup>1</sup>	-	0	0	0	-	16
Agricultural Goal <sup>2</sup>	-	0	0	0	-	
NAWQC <sup>3</sup> Humans	-	0	-	-	-	
NAWQC <sup>3</sup> Aquatic Life	-	0	-	-	0	
USEPA Recommended Ecoregional Nutrient Criteria <sup>4</sup>	-	-	-	-	-	17
Basin Plan <sup>7</sup>	-	0	-	-	-	

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## Appendix 2c. Continued.

### Feather R A Archer Ave. (A5-1516.50)

	Dissolved Oxygen (ppm)	pH units	Conductivity		Alkalinity mg/L	Turbidity NTU
			(field) umhos/cm	(lab) umhos/cm		
Maximum detected	13.2	7.5	120	113	53	33.6
Minimum detected	8.7	7.1	79	67	36	12
Number of samples	29	29	28	29	28	29
Number of samples exceeding criteria or objectives						
Primary MCL <sup>1</sup>	-	-	-	-	-	7
Secondary MCL <sup>1</sup>	-	0	0	0	-	7
Agricultural Goal <sup>2</sup>	-	0	0	0	-	-
NAWQC <sup>3</sup> Humans	-	0	-	-	-	-
NAWQC <sup>3</sup> Aquatic Life	-	0	-	-	0	-
USEPA Recommended Ecoregional Nutrient Criteria <sup>4</sup>	-	-	-	-	-	10
Basin Plan <sup>7</sup>	0	0	0	0	-	-

### Feather R US from Yuba R (A5-1425.50)

	Dissolved Oxygen (ppm)	pH units	Conductivity		Alkalinity mg/L	Turbidity NTU
			(field) umhos/cm	(lab) umhos/cm		
Maximum detected	13.6	7.5	118	117	54	63.4
Minimum detected	8.6	7.1	72	65	34	12
Number of samples	30	30	29	30	29	30
Number of samples exceeding criteria or objectives						
Primary MCL <sup>1</sup>	-	-	-	-	-	12
Secondary MCL <sup>1</sup>	-	0	0	0	-	12
Agricultural Goal <sup>2</sup>	-	0	0	0	-	-
NAWQC <sup>3</sup> Humans	-	0	-	-	-	-
NAWQC <sup>3</sup> Aquatic Life	-	0	-	-	0	-
USEPA Recommended Ecoregional Nutrient Criteria <sup>4</sup>	-	-	-	-	-	15
Basin Plan <sup>7</sup>	0	0	0	0	-	-

### Yuba R at Mouth (A6-1010.50)

	Dissolved Oxygen (ppm)	pH units	Conductivity		Alkalinity mg/L	Turbidity NTU
			(field) umhos/cm	(lab) umhos/cm		
Maximum detected	14.2	7.4	128	117	49	17.2
Minimum detected	8.4	7.1	76	60	36	0.5
Number of samples	30	30	29	30	29	30
Number of samples exceeding criteria or objectives						
Primary MCL <sup>1</sup>	-	-	-	-	-	8
Secondary MCL <sup>1</sup>	-	0	0	0	-	8
Agricultural Goal <sup>2</sup>	-	0	0	0	-	-
NAWQC <sup>3</sup> Humans	-	0	-	-	-	-
NAWQC <sup>3</sup> Aquatic Life	-	0	-	-	0	-
USEPA Recommended Ecoregional Nutrient Criteria <sup>4</sup>	-	-	-	-	-	9
Basin Plan <sup>7</sup>	-	0	-	-	-	-

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## Appendix 2c. Continued.

### Feather R at Shanghai Bend (A5-1389.50)

	Dissolved Oxygen (ppm)	pH units	Conductivity		Alkalinity mg/L	Turbidity NTU
			(field) umhos/cm	(lab) umhos/cm		
Maximum detected	13.2	7.5	112	112	54	70.1
Minimum detected	8.9	7.2	76	61	33	1.6
Number of samples	30	29	29	30	29	30
Number of samples exceeding criteria or objectives						
Primary MCL <sup>1</sup>	-	-	-	-	-	13
Secondary MCL <sup>1</sup>	-	0	0	0	-	13
Agricultural Goal <sup>2</sup>	-	0	0	0	-	-
NAWQC <sup>3</sup> Humans	-	0	-	-	-	-
NAWQC <sup>3</sup> Aquatic Life	-	0	-	-	0	-
USEPA Recommended Ecoregional Nutrient Criteria <sup>4</sup>	-	-	-	-	-	18
Basin Plan <sup>7</sup>	0	0	0	0	-	-

### Bear R near Mouth (A6-5010.50)

	Dissolved Oxygen (ppm)	pH units	Conductivity		Alkalinity mg/L	Turbidity NTU
			(field) umhos/cm	(lab) umhos/cm		
Maximum detected	13.4	7.5	236	233	81	58
Minimum detected	6.7	6.8	84	83	31	2.2
Number of samples	28	29	28	29	28	29
Number of samples exceeding criteria or objectives						
Primary MCL <sup>1</sup>	-	-	-	-	-	28
Secondary MCL <sup>1</sup>	-	0	0	0	-	28
Agricultural Goal <sup>2</sup>	-	0	0	0	-	-
NAWQC <sup>3</sup> Humans	-	0	-	-	-	-
NAWQC <sup>3</sup> Aquatic Life	-	0	-	-	0	-
USEPA Recommended Ecoregional Nutrient Criteria <sup>4</sup>	-	-	-	-	-	28
Basin Plan <sup>7</sup>	-	0	-	-	-	-

### Feather R near Verona (A5-1010.50)

	Dissolved Oxygen (ppm)	pH units	Conductivity		Alkalinity mg/L	Turbidity NTU
			(field) umhos/cm	(lab) umhos/cm		
Maximum detected	13.4	7.5	141	117	55	60.0
Minimum detected	8.5	7.1	76	61	35	1.7
Number of samples	30	30	28	30	29	30
Number of samples exceeding criteria or objectives						
Primary MCL <sup>1</sup>	-	-	-	-	-	16
Secondary MCL <sup>1</sup>	-	0	0	0	-	16
Agricultural Goal <sup>2</sup>	-	0	0	0	-	-
NAWQC <sup>3</sup> Humans	-	0	-	-	-	-
NAWQC <sup>3</sup> Aquatic Life	-	0	-	-	0	-
USEPA Recommended Ecoregional Nutrient Criteria <sup>4</sup>	-	-	-	-	-	19
Basin Plan <sup>7</sup>	0	0	0	0	-	-

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## Appendix 2c. Continued.

### Sacramento R US from Feather R (A0-2157.50)

	Dissolved Oxygen (ppm)	pH units	Conductivity		Alkalinity mg/L	Turbidity NTU
			(field) umhos/cm	(lab) umhos/cm		
Maximum detected	11.8	8	244	237	109	214
Minimum detected	8	6.7	95	94	37	1.8
Number of samples	28	28	27	28	27	28
Number of samples exceeding criteria or objectives						
Primary MCL <sup>1</sup>	-	-	-	-	-	26
Secondary MCL <sup>1</sup>	-	0	0	0	-	26
Agricultural Goal <sup>2</sup>	-	0	0	0	-	
NAWQC <sup>3</sup> Humans	-	0	-	-	-	
NAWQC <sup>3</sup> Aquatic Life	-	0	-	-	0	
USEPA Recommended Ecoregional Nutrient Criteria <sup>4</sup>	-	-	-	-	-	27
Basin Plan <sup>7</sup>	0	0	0	0	-	

#### Footnotes

1. California Department of Health Services, California Code of Regulations, Title 22, Division 4, Chapter 15, Domestic Water Quality and Monitoring.
2. Food and Agriculture Organization of the United Nations, 1985. Water Quality for Agriculture.
3. U.S. Environmental Protection Agency, Quality Criteria for Water, 1986 (May 1986) [The Gold Book] plus updates (various dates)
4. U.S. Environmental Protection Agency, Ambient Water Quality Criteria Recommendations for both Rivers and Streams in Ecoregion 1. 2001. EPA 822-B-01-012
5. Chronic (4 day average)
6. Acute (1 hr average)
7. The Water Quality Control Plan (Basin Plan) for the California Regional Water Quality Control Board, Central Valley Region, Fourth edition. The Sacramento River Basin and the San Joaquin River Basin. Central Valley Regional Water Quality Control Board. Sacramento, California.
8. For Waters designated WARM (not <5.0 mg/L).
9. For Waters designated COLD/SPAWN (not <7.0 mg/L).
10. For the Feather River from Fish Barrier Dam at Oroville to Honcut Creek (September 1 to May 31) (not <8.0 mg/L).

# **Appendix 3a-1. Summary of nutrient numerical limits for the Upper Feather River (mg/L).**

## **CONCOW CREEK AT JORDAN HILL ROAD (A5-2260.50)**

	Ammonia		Nitrate + Nitrite D	Ortho-phosphate D	Phosphorus T	Organic Carbon	
	T	D				T	D
Maximum detected	0.24	0.02	0.15	0.02	0.5	4.5	2.6
Minimum detected	<0.10	<0.01	0.1	<0.01	<0.01	1.0	1.0
Number of samples	28	28	28	28	28	28	28
Number of samples exceeding criteria or objectives							
Tastes and odors <sup>1</sup>	0	-	-	-		-	-
Primary MCL <sup>2</sup>	-	-	0	-		-	-
NAWQC <sup>3</sup> Aquatic Life	0	-	-	-		-	-
USEPA Recommended Ecoregional Nutrient Criteria <sup>4</sup>	-	-	-	-	11	-	-
USEPA Draft Health Advisory <sup>5</sup>	0	-	-	-		-	-
California Public Health Goal <sup>6</sup>	-	-	0	-		-	-

## **WEST BRANCH FEATHER RIVER NEAR PARADISE (A5-2600.00)**

	Ammonia		Nitrate + Nitrite D	Ortho-phosphate D	Phosphorus T	Organic Carbon	
	T	D				T	D
Maximum detected	0.11	0.01	1.55	0.06	0.13	3.2	5.5
Minimum detected	<0.1	<0.01	<0.01	<0.01	<0.01	0.4	0.7
Number of samples	23	23	23	23	23	23	23
Number of samples exceeding criteria or objectives							
Tastes and odors <sup>1</sup>	0	-	-	-		-	-
Primary MCL <sup>2</sup>	-	-	0	-		-	-
NAWQC <sup>3</sup> Aquatic Life	0	-	-	-		-	-
USEPA Recommended Ecoregional Nutrient Criteria <sup>4</sup>	-	-	-	-	12	-	-
USEPA Draft Health Advisory <sup>5</sup>	0	-	-	-		-	-
California Public Health Goal <sup>6</sup>	-	-	0	-		-	-

## **WEST BRANCH FEATHER RIVER UPSTREAM OF LAKE OROVILLE (A5-2350.50)**

	Ammonia		Nitrate + Nitrite D	Ortho-phosphate D	Phosphorus T	Organic Carbon	
	T	D				T	D
Maximum detected		<0.02	0.01	<0.1	0.06	2.5	1.0
Minimum detected		<0.01	<0.05	<0.01	<0.01	0.9	0.7
Number of samples	0	4	4	4	5	3	3
Number of samples exceeding criteria or objectives							
Tastes and odors <sup>1</sup>	-	-	-	-		-	-
Primary MCL <sup>2</sup>	-	-	0	-		-	-
NAWQC <sup>3</sup> Aquatic Life	0	-	-	-		-	-
USEPA Recommended Ecoregional Nutrient Criteria <sup>4</sup>	-	-	-	-	2	-	-
USEPA Draft Health Advisory <sup>5</sup>	0	-	-	-		-	-
California Public Health Goal <sup>6</sup>	-	-	0	-		-	-

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## Appendix 3a-1. Continued.

### NORTH FORK FEATHER RIVER UPSTREAM FROM POE POWERHOUSE (A5-3132.50)

	Ammonia		Nitrate + Nitrite D	Ortho-phosphate	Phosphorus	Organic Carbon	
	T	D		D	T	T	D
Maximum detected	0.17	0.02	0.17	0.02	0.26	18.9	3.8
Minimum detected	<0.1	<0.01	<0.01	<0.01	<0.01	1.2	0.9
Number of samples	24	24	24	24	24	24	24
Number of samples exceeding criteria or objectives							
Tastes and odors <sup>1</sup>	0	-	-	-	-	-	-
Primary MCL <sup>2</sup>	-	-	0	-	-	-	-
NAWQC <sup>3</sup> Aquatic Life	0	-	-	-	-	-	-
USEPA Recommended Ecoregional Nutrient Criteria <sup>4</sup>	-	-	-	-	12	-	-
USEPA Draft Health Advisory <sup>5</sup>	0	-	-	-	-	-	-
California Public Health Goal <sup>6</sup>	-	-	0	-	-	-	-

### POE POWERHOUSE DISCHARGE (A5-3931.50)

	Ammonia		Nitrate + Nitrite D	Ortho-phosphate	Phosphorus	Organic Carbon	
	T	D		D	T	T	D
Maximum detected	<0.10	0.02	0.16	0.02	0.26	15.0	4.3
Minimum detected	<0.082	<0.01	<0.01	<0.01	0.01	1.2	1.1
Number of samples	24	24	24	24	24	24	24
Number of samples exceeding criteria or objectives							
Tastes and odors <sup>1</sup>	0	-	-	-	-	-	-
Primary MCL <sup>2</sup>	-	-	0	-	-	-	-
NAWQC <sup>3</sup> Aquatic Life	0	-	-	-	-	-	-
USEPA Recommended Ecoregional Nutrient Criteria <sup>4</sup>	-	-	-	-	16	-	-
USEPA Draft Health Advisory <sup>5</sup>	0	-	-	-	-	-	-
California Public Health Goal <sup>6</sup>	-	-	0	-	-	-	-

### FEATHER RIVER MIDDLE FORK NEAR MERRIMAC (A5-5100.00)

	Ammonia		Nitrate + Nitrite D	Ortho-phosphate	Phosphorus	Organic Carbon	
	T	D		D	T	T	D
Maximum detected	0.17	0.03	0.71	0.01	0.09	6.2	3.4
Minimum detected	<0.10	<0.01	<0.01	<0.01	<0.01	1	0.6
Number of samples	27	27	27	27	27	27	27
Number of samples exceeding criteria or objectives							
Tastes and odors <sup>1</sup>	0	-	-	-	-	-	-
Primary MCL <sup>2</sup>	-	-	0	-	-	-	-
NAWQC <sup>3</sup> Aquatic Life	0	-	-	-	-	-	-
USEPA Recommended Ecoregional Nutrient Criteria <sup>4</sup>	-	-	-	-	13	-	-
USEPA Draft Health Advisory <sup>5</sup>	0	-	-	-	-	-	-
California Public Health Goal <sup>6</sup>	-	-	0	-	-	-	-

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## Appendix 3a-1. Continued.

### SOUTH FORK FEATHER RIVER UPSTREAM FROM PONDEROSA RESERVOIR (A5-6110.50)

	Ammonia		Nitrate + Nitrite D	Ortho-phosphate D	Phosphorus T	Organic Carbon	
	T	D				T	D
Maximum detected	<0.1	<0.01	0.07	0.01	0.10	9.3	4.1
Minimum detected	<0.02	<0.01	<0.01	<0.01	<0.01	0.7	0.5
Number of samples	28	28	28	28	28	28	28
Number of samples exceeding criteria or objectives							
Tastes and odors <sup>1</sup>	0	-	-	-	-	-	-
Primary MCL <sup>2</sup>	-	-	0	-	-	-	-
NAWQC <sup>3</sup> Aquatic Life	0	-	-	-	-	-	-
USEPA Recommended Ecoregional Nutrient Criteria <sup>4</sup>	-	-	-	-	13	-	-
USEPA Draft Health Advisory <sup>5</sup>	0	-	-	-	-	-	-
California Public Health Goal <sup>6</sup>	-	-	0	-	-	-	-

### MINERS RANCH CANAL(A5-6925.00) AND SOUTH FORK FEATHER RIVER DOWNSTREAM FROM PONDEROSA RESERVOIR(A5-6050.50)

	Ammonia		Nitrate + Nitrite D	Ortho-phosphate D	Phosphorus T	Organic Carbon	
	T	D				T	D
Maximum detected	<0.1	0.01	0.03	0.01	0.04	3.5	1.8
Minimum detected	<0.02	<0.01	<0.01	<0.01	<0.01	0.7	0.5
Number of samples	24	24	24	24	24	24	24
Number of samples exceeding criteria or objectives							
Tastes and odors <sup>1</sup>	0	-	-	-	-	-	-
Primary MCL <sup>2</sup>	-	-	0	-	-	-	-
NAWQC <sup>3</sup> Aquatic Life	0	-	-	-	-	-	-
USEPA Recommended Ecoregional Nutrient Criteria <sup>4</sup>	-	-	-	-	9	-	-
USEPA Draft Health Advisory <sup>5</sup>	0	-	-	-	-	-	-
California Public Health Goal <sup>6</sup>	-	-	0	-	-	-	-

### SUCKER RUN CREEK NEAR FORBESTOWN (A5-6075.00)

	Ammonia		Nitrate + Nitrite D	Ortho-phosphate D	Phosphorus T	Organic Carbon	
	T	D				T	D
Maximum detected	<0.10	0.02	0.1	0.02	0.07	12.6	5.2
Minimum detected	<0.02	<0.01	<0.01	<0.01	<0.01	0.6	0.6
Number of samples	28	28	28	28	28	28	28
Number of samples exceeding criteria or objectives							
Tastes and odors <sup>1</sup>	0	-	0	-	-	-	-
Primary MCL <sup>2</sup>	-	-	0	-	-	-	-
NAWQC <sup>3</sup> Aquatic Life	0	-	-	-	-	-	-
USEPA Recommended Ecoregional Nutrient Criteria <sup>4</sup>	-	-	-	-	16	-	-
USEPA Draft Health Advisory <sup>5</sup>	-	-	-	-	-	-	-
California Public Health Goal <sup>6</sup>	-	-	0	-	-	-	-

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## Appendix 3a-1. Continued.

### FALL RIVER UPSTREAM OF FEATHER FALLS (A5-5050.50)

	Ammonia		Nitrate + Nitrite	Ortho-phosphate	Phosphorus	Organic Carbon	
	T	D	D	D	T	T	D
Maximum detected	0.09	0.01	0.02	0.05	0.17	7.1	2.5
Minimum detected	<0.10	<0.01	<0.01	<0.01	0.01	0.6	0.4
Number of samples	28	28	28	28	27	28	28
Number of samples exceeding criteria or objectives							
Tastes and Odors <sup>1</sup>	0	-	-	-		-	-
Primary MCL <sup>2</sup>	-	-	0	-		-	-
NAWQC <sup>3</sup> Aquatic Life	0	-	-	-		-	-
USEPA Recommended Ecoregional Nutrient Criteria <sup>4</sup>	-	-	-	-	19	-	-
USEPA Draft Health Advisory <sup>5</sup>	-	-	-	-		-	-
California Public Health Goal <sup>6</sup>	-	-	0	-		-	-

#### Footnotes

1. J.E. Amoores and E. Hautala. Odor as an aid to chemical safety: Odor thresholds compared with threshold limit values and volatilities for 214 industrial chemicals in air and water dilution. Journal of Applied Toxicology, 3(6):272-290. 1983
2. California Department of Health Services, California Code of Regulations, Title 22, Division 4, Chapter 15, Domestic Water Quality and Monitoring
3. U.S. Environmental Protection Agency, Quality Criteria for Water, 1986 (May 1986) [The Gold Book] plus updates (various dates)
4. U.S. Environmental Protection Agency, Ambient Water Quality Criteria Recommendations for both Rivers and Streams in Ecoregion 1. 2001. EPA 822-B-01-012
5. U.S. Environmental Protection Agency, Office of Water, 2004 Edition of the Drinking Water Standards and Health Advisories. (Winter 2004). EPA 822-R-04-005.
6. California Environmental Protection Agency (Cal/EPA), Office of Environmental Health Hazard Assessment, Public Health Goals for Chemicals in Drinking Water (various dates), <http://www.oehha.org/water.phg/>.
7. Chronic (4 day average)
8. Acute (1 hr average)



## Appendix 3a-2. Summary of nutrient numerical limits for Lake Oroville (mg/L).

### Lake Oroville North Fork Sfc (A5R93761296)

	Ammonia		Nitrate + Nitrite	Ortho-phosphate	Phosphorus	Organic Carbon	
	T	D	D	D	T	T	D
Maximum detected	<0.10	0.02	0.2	0.04	1.0	2.9	4.8
Minimum detected	<0.01	<0.08	<0.01	<0.01	<0.01	1.3	1.1
Number of samples	19	22	23	23	23	23	23
Number of samples exceeding criteria or objectives							
Tastes and Odors <sup>1</sup>	0	-	-	-	-	-	-
Primary MCL <sup>2</sup>	-	-	0	-	-	-	-
NAWQC <sup>3</sup> Aquatic Life	0	-	-	-	-	-	-
USEPA Recommended Ecoregional Nutrient Criteria <sup>4</sup>	-	-	-	-	1	-	-
USEPA Draft Health Advisory <sup>5</sup>	0	-	-	-	-	-	-
California Public Health Goal <sup>6</sup>	-	-	0	-	-	-	-

### Lake Oroville North Fork Btm (A5R93761296)

	Ammonia		Nitrate + Nitrite	Ortho-phosphate	Phosphorus	Organic Carbon	
	T	D	D	D	T	T	D
Maximum detected	<0.10	0.02	3.32	0.03	0.80	2.9	12.7
Minimum detected	<0.08	<0.01	<0.1	<0.01	<0.01	1.2	1
Number of samples	19	19	22	21	21	21	21
Number of samples exceeding criteria or objectives							
Tastes and Odors <sup>1</sup>	0	-	-	-	-	-	-
Primary MCL <sup>2</sup>	-	-	0	-	-	-	-
NAWQC <sup>3</sup> Aquatic Life	0	-	-	-	-	-	-
USEPA Recommended Ecoregional Nutrient Criteria <sup>4</sup>	-	-	-	-	1	-	-
USEPA Draft Health Advisory <sup>5</sup>	0	-	-	-	-	-	-
California Public Health Goal <sup>6</sup>	-	-	0	-	-	-	-

### Lake Oroville Middle Fork Sfc (A5R93351272)

	Ammonia		Nitrate + Nitrite	Ortho-phosphate	Phosphorus	Organic Carbon	
	T	D	D	D	T	T	D
Maximum detected	<0.10	0.02	0.32	0.01	0.25	2.6	8.8
Minimum detected	<0.08	<0.01	<0.01	<0.01	<0.01	1.1	1.2
Number of samples	20	25	25	25	25	25	25
Number of samples exceeding criteria or objectives							
Tastes and Odors <sup>1</sup>	0	-	-	-	-	-	-
Primary MCL <sup>2</sup>	-	-	0	-	-	-	-
NAWQC <sup>3</sup> Aquatic Life	0	-	-	-	-	-	-
USEPA Recommended Ecoregional Nutrient Criteria <sup>4</sup>	-	-	-	-	1	-	-
USEPA Draft Health Advisory <sup>5</sup>	0	-	-	-	-	-	-
California Public Health Goal <sup>6</sup>	-	-	0	-	-	-	-

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## Appendix 3a-2. Continued.

### Lake Oroville Middle Fork Btm (A5R93351272)

	Ammonia		Nitrate + Nitrite D	Ortho- phosphate D	Phosphorus T	Organic Carbon	
	T	D				T	D
Maximum detected	<0.10	<0.02	0.3	0.02	0.04	2.8	4.8
Minimum detected	<0.08	<0.01	<0.01	<0.01	<0.01	1.1	1.1
Number of samples	20	24	24	24	24	24	24
Number of samples exceeding criteria or objectives							
Tastes and Odors <sup>1</sup>	0	-	-	-	-	-	-
Primary MCL <sup>2</sup>	-	-	0	-	-	-	-
NAWQC <sup>3</sup> Aquatic Life	0	-	-	-	-	-	-
USEPA Recommended Ecoregional Nutrient Criteria <sup>4</sup>	-	-	-	-	0	-	-
USEPA Draft Health Advisory <sup>5</sup>	0	-	-	-	-	-	-
California Public Health Goal <sup>6</sup>	-	-	0	-	-	-	-

### Lake Oroville South Fork Sfc (A5R93221226)

	Ammonia		Nitrate + Nitrite D	Ortho- phosphate D	Phosphorus T	Organic Carbon	
	T	D				T	D
Maximum detected	<0.10	0.1	0.06	0.02	0.10	2.6	3.1
Minimum detected	<0.08	<0.01	0.01	<0.01	<0.01	1.2	1.2
Number of samples	20	24	23	24	23	24	24
Number of samples exceeding criteria or objectives							
Tastes and Odors <sup>1</sup>	0	-	-	-	-	-	-
Primary MCL <sup>2</sup>	-	-	0	-	-	-	-
NAWQC <sup>3</sup> Aquatic Life	0	-	-	-	-	-	-
USEPA Recommended Ecoregional Nutrient Criteria <sup>4</sup>	-	-	-	-	2	-	-
USEPA Draft Health Advisory <sup>5</sup>	0	-	-	-	-	-	-
California Public Health Goal <sup>6</sup>	-	-	0	-	-	-	-

### Lake Oroville South Fork Btm (A5R93221226)

	Ammonia		Nitrate + Nitrite D	Ortho- phosphate D	Phosphorus T	Organic Carbon	
	T	D				T	D
Maximum detected	<0.10	0.02	0.21	0.05	1.00	2.2	2.5
Minimum detected	<0.08	<0.01	<0.01	<0.01	<0.01	1.1	1
Number of samples	20	23	23	23	23	23	23
Number of samples exceeding criteria or objectives							
Tastes and Odors <sup>1</sup>	0	-	-	-	-	-	-
Primary MCL <sup>2</sup>	-	-	0	-	-	-	-
NAWQC <sup>3</sup> Aquatic Life	0	-	-	-	-	-	-
USEPA Recommended Ecoregional Nutrient Criteria <sup>4</sup>	-	-	-	-	1	-	-
USEPA Draft Health Advisory <sup>5</sup>	0	-	-	-	-	-	-
California Public Health Goal <sup>6</sup>	-	-	0	-	-	-	-

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## Appendix 3a-2. Continued.

### Lake Oroville Main Body Sfc (A5R93401274)

	Ammonia		Nitrate + Nitrite D	Ortho- phosphate D	Phosphorus T	Organic Carbon	
	T	D				T	D
Maximum detected	0.14	0.04	0.38	0.01	0.03	4.7	14.9
Minimum detected	<0.08	<0.01	<0.01	<0.01	0.01	1.3	1.2
Number of samples	19	24	24	24	24	24	24
Number of samples exceeding criteria or objectives							
Tastes and Odors <sup>1</sup>	0	-	-	-	-	-	-
Primary MCL <sup>2</sup>	-	-	0	-	-	-	-
NAWQC <sup>3</sup> Aquatic Life	0	-	-	-	-	-	-
USEPA Recommended Ecoregional Nutrient Criteria <sup>4</sup>	-	-	-	-	0	-	-
USEPA Draft Health Advisory <sup>5</sup>	0	-	-	-	-	-	-
California Public Health Goal <sup>6</sup>	-	-	0	-	-	-	-

### Lake Oroville Main Body Btm (A5R93401274)

	Ammonia		Nitrate + Nitrite D	Ortho- phosphate D	Phosphorus T	Organic Carbon	
	T	D				T	D
Maximum detected	0.15	0.02	2.7	0.17	0.26	2.7	14.8
Minimum detected	<0.08	<0.01	<0.01	<0.01	<0.01	1.2	0.9
Number of samples	20	23	23	23	23	23	22
Number of samples exceeding criteria or objectives							
Tastes and Odors <sup>1</sup>	0	-	-	-	-	-	-
Primary MCL <sup>2</sup>	-	-	0	-	-	-	-
NAWQC <sup>3</sup> Aquatic Life	0	-	-	-	-	-	-
USEPA Recommended Ecoregional Nutrient Criteria <sup>4</sup>	-	-	-	-	2	-	-
USEPA Draft Health Advisory <sup>5</sup>	0	-	-	-	-	-	-
California Public Health Goal <sup>6</sup>	-	-	0	-	-	-	-

### Lake Oroville At Dam Sfc (A5R93251286)

	Ammonia		Nitrate + Nitrite D	Ortho- phosphate D	Phosphorus T	Organic Carbon	
	T	D				T	D
Maximum detected	<0.25	0.02	0.1	0.02	0.13	3.0	14.6
Minimum detected	<0.08	<0.01	<0.01	<0.01	<0.01	1.3	1.1
Number of samples	18	23	23	23	23	23	23
Number of samples exceeding criteria or objectives							
Tastes and Odors <sup>1</sup>	0	-	-	-	-	-	-
Primary MCL <sup>2</sup>	-	-	0	-	-	-	-
NAWQC <sup>3</sup> Aquatic Life	0	-	-	-	-	-	-
USEPA Recommended Ecoregional Nutrient Criteria <sup>4</sup>	-	-	-	-	1	-	-
USEPA Draft Health Advisory <sup>5</sup>	0	-	-	-	-	-	-
California Public Health Goal <sup>6</sup>	-	-	0	-	-	-	-

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## Appendix 3a-2. Continued.

### Lake Oroville At Dam Mid (A5R93251286)

	Ammonia		Nitrate + Nitrite	Ortho-phosphate	Phosphorus	Organic Carbon	
	T	D	D	D	T	T	D
Maximum detected	<0.10	0.01	0.2	0.04	0.30	3.0	10.5
Minimum detected	<0.08	<0.01	<0.01	<0.01	<0.01	1.1	1.1
Number of samples	18	20	22	22	22	22	22
Number of samples exceeding criteria or objectives							
Tastes and Odors <sup>1</sup>	0	-	-	-	-	-	-
Primary MCL <sup>2</sup>	-	-	0	-	-	-	-
NAWQC <sup>3</sup> Aquatic Life	0	-	-	-	-	-	-
USEPA Recommended Ecoregional Nutrient Criteria <sup>4</sup>	-	-	-	-	-	-	-
USEPA Draft Health Advisory <sup>5</sup>	0	-	-	-	-	-	-
California Public Health Goal <sup>6</sup>	-	-	0	-	-	-	-

### Lake Oroville At Dam Btm (A5R93251286)

	Ammonia		Nitrate + Nitrite	Ortho-phosphate	Phosphorus	Organic Carbon	
	T	D	D	D	T	T	D
Maximum detected	<0.10	0.02	0.2	0.02	0.08	3.0	11.3
Minimum detected	<0.08	<0.01	<0.01	<0.01	<0.01	1	1.1
Number of samples	18	22	22	22	22	22	22
Number of samples exceeding criteria or objectives							
Tastes and Odors <sup>1</sup>	0	-	-	-	-	-	-
Primary MCL <sup>2</sup>	-	-	0	-	-	-	-
NAWQC <sup>3</sup> Aquatic Life	0	-	-	-	-	-	-
USEPA Recommended Ecoregional Nutrient Criteria <sup>4</sup>	-	-	-	-	0	-	-
USEPA Draft Health Advisory <sup>5</sup>	0	-	-	-	-	-	-
California Public Health Goal <sup>6</sup>	-	-	0	-	-	-	-

#### Footnotes

1. J.E. Amore and E. Hautala. Odor as an aid to chemical safety: Odor thresholds compared with threshold limit values and volatilities for 214 industrial chemicals in air and water dilution. Journal of Applied Toxicology, 3(6):272-290. 1983
2. California Department of Health Services, California Code of Regulations, Title 22, Division 4, Chapter 15, Domestic Water Quality and Monitoring
3. U.S. Environmental Protection Agency, Quality Criteria for Water, 1986 (May 1986) [The Gold Book] plus updates (various dates)
4. U.S. Environmental Protection Agency, Ambient Water Quality Criteria Recommendations for both Rivers and Streams in Ecoregion 1. 2001. EPA 822-B-01-012
5. U.S. Environmental Protection Agency, Office of Water, 2004 Edition of the Drinking Water Standards and Health Advisories. (Winter 2004). EPA 822-R-04-005.
6. California Environmental Protection Agency (Cal/EPA), Office of Environmental Health Hazard Assessment, Public Health Goals for Chemicals in Drinking Water (various dates), <http://www.oehha.org/water.phg/>.
7. Chronic (4 day average)
8. Acute (1 hr average)

### **Appendix 3a-3. Summary of nutrient numerical limits for the Lower Feather River (mg/L).**

#### **Thermalito Diversion Pool US of Power Plant (A5R93191294)**

	Ammonia		Nitrate + Nitrite	Ortho-phosphate	Phosphorus	Organic Carbon	
	T	D	D	D	T	T	D
Maximum detected	0.14	<0.1	1.21	0.1	0.24	2.4	2.4
Minimum detected	<0.082	<0.01	0.02	<0.01	<0.01	1.1	1
Number of samples	25	26	26	26	26	25	25
Number of samples exceeding criteria or objectives							
Tastes and Odors <sup>1</sup>	0	-	-	-	-	-	-
Primary MCL <sup>2</sup>	-	-	0	-	-	-	-
NAWQC <sup>3</sup> Aquatic Life	0	-	-	-	-	-	-
USEPA Recommended Ecoregional Nutrient Criteria <sup>4</sup>	-	-	-	-	-	-	-
USEPA Draft Health Advisory <sup>5</sup>	0	-	-	-	-	-	-
California Public Health Goal <sup>6</sup>	-	-	0	-	-	-	-

#### **Thermalito Diversion Pool DS of Power Plant (A5R93191297)**

	Ammonia		Nitrate + Nitrite	Ortho-phosphate	Phosphorus	Organic Carbon	
	T	D	D	D	T	T	D
Maximum detected	0.15	0.02	2.28	0.01	0.03	2.4	3.2
Minimum detected	<0.10	<0.01	0.03	<0.01	<0.01	1.1	1.3
Number of samples	14	14	14	14	14	14	14
Number of samples exceeding criteria or objectives							
Tastes and Odors <sup>1</sup>	0	-	-	-	-	-	-
Primary MCL <sup>2</sup>	-	-	0	-	-	-	-
NAWQC <sup>3</sup> Aquatic Life	0	-	-	-	-	-	-
USEPA Recommended Ecoregional Nutrient Criteria <sup>4</sup>	-	-	-	-	-	-	-
USEPA Draft Health Advisory <sup>5</sup>	0	-	-	-	-	-	-
California Public Health Goal <sup>6</sup>	-	-	0	-	-	-	-

#### **Glen C US from Glen Pond (A5-3050)**

	Ammonia		Nitrate + Nitrite	Ortho-phosphate	Phosphorus	Organic Carbon	
	T	D	D	D	T	T	D
Maximum detected	0.17	0.02	2.2	0.15	0.80	13.2	9.3
Minimum detected	<0.082	<0.01	<0.01	<0.01	<0.01	1.2	1.1
Number of samples	19	26	27	27	27	25	25
Number of samples exceeding criteria or objectives							
Tastes and Odors <sup>1</sup>	0	-	-	-	-	-	-
Primary MCL <sup>2</sup>	-	-	0	-	-	-	-
NAWQC <sup>3</sup> Aquatic Life	0	-	-	-	-	-	-
USEPA Recommended Ecoregional Nutrient Criteria <sup>4</sup>	-	-	-	-	0	-	-
USEPA Draft Health Advisory <sup>5</sup>	0	-	-	-	-	-	-
California Public Health Goal <sup>6</sup>	-	-	0	-	-	-	-

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### Appendix 3a-3. Continued.

#### Glen Pond (A5L93221307)

	Ammonia		Nitrate + Nitrite	Ortho-phosphate	Phosphorus	Organic Carbon	
	T	D	D	D	T	T	D
Maximum detected	0.14	0.03	2	0.23	0.10	13.4	8.9
Minimum detected	<0.082	<0.01	<0.01	<0.01	0.02	1.9	1.5
Number of samples	20	26	27	27	27	26	26
Number of samples exceeding criteria or objectives							
Tastes and Odors <sup>1</sup>	0	-	-	-	-	-	-
Primary MCL <sup>2</sup>	-	-	0	-	-	-	-
NAWQC <sup>3</sup> Aquatic Life	0	-	-	-	-	-	-
USEPA Recommended Ecoregional Nutrient Criteria <sup>4</sup>	-	-	-	-	-	-	-
USEPA Draft Health Advisory <sup>5</sup>	0	-	-	-	-	-	-
California Public Health Goal <sup>6</sup>	-	-	0	-	-	-	-

#### Morris Ravine at Mouth (A5-1850)

	Ammonia		Nitrate + Nitrite	Ortho-phosphate	Phosphorus	Organic Carbon	
	T	D	D	D	T	T	D
Maximum detected	0.11	0.04	0.7	0.12	0.21	8.7	4.6
Minimum detected	<0.10	<0.01	0.03	<0.01	0.02	1.6	1
Number of samples	10	12	12	12	12	12	12
Number of samples exceeding criteria or objectives							
Tastes and Odors <sup>1</sup>	0	-	-	-	-	-	-
Primary MCL <sup>2</sup>	-	-	0	-	-	-	-
NAWQC <sup>3</sup> Aquatic Life	0	-	-	-	-	-	-
USEPA Recommended Ecoregional Nutrient Criteria <sup>4</sup>	-	-	-	-	0	-	-
USEPA Draft Health Advisory <sup>5</sup>	0	-	-	-	-	-	-
California Public Health Goal <sup>6</sup>	-	-	0	-	-	-	-

#### Thermalito Diversion Pool US of Dam Surface (A5R93191326)

	Ammonia		Nitrate + Nitrite	Ortho-phosphate	Phosphorus	Organic Carbon	
	T	D	D	D	T	T	D
Maximum detected	0.1	0.01	0.58	0.14	0.45	3.1	3.2
Minimum detected	<0.082	<0.01	0.02	<0.01	<0.01	1	1
Number of samples	21	24	26	26	26	25	25
Number of samples exceeding criteria or objectives							
Tastes and Odors <sup>1</sup>	0	-	-	-	-	-	-
Primary MCL <sup>2</sup>	-	-	0	-	-	-	-
NAWQC <sup>3</sup> Aquatic Life	0	-	-	-	-	-	-
USEPA Recommended Ecoregional Nutrient Criteria <sup>4</sup>	-	-	-	-	-	-	-
USEPA Draft Health Advisory <sup>5</sup>	0	-	-	-	-	-	-
California Public Health Goal <sup>6</sup>	-	-	0	-	-	-	-

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## Appendix 3a-3. Continued.

### Thermalito Diversion Pool US of Dam BOTTOM (A5R93191326)

	Ammonia		Nitrate + Nitrite	Ortho-phosphate	Phosphorus	Organic Carbon	
	T	D	D	D	T	T	D
Maximum detected	0.11	0.01	0.2	0.11	0.11	3.2	2.6
Minimum detected	<0.082	<0.01	0.02	<0.01	<0.01	1.2	1
Number of samples	21	24	25	25	25	25	25
Number of samples exceeding criteria or objectives							
Tastes and Odors <sup>1</sup>	0	-	-	-	-	-	-
Primary MCL <sup>2</sup>	-	-	0	-	-	-	-
NAWQC <sup>3</sup> Aquatic Life	0	-	-	-	-	-	-
USEPA Recommended Ecoregional Nutrient Criteria <sup>4</sup>	-	-	-	-	-	-	-
USEPA Draft Health Advisory <sup>5</sup>	0	-	-	-	-	-	-
California Public Health Goal <sup>6</sup>	-	-	0	-	-	-	-

### Feather R A Oroville (A5-1800.00)

	Ammonia		Nitrate + Nitrite	Ortho-phosphate	Phosphorus	Organic Carbon	
	T	D	D	D	T	T	D
Maximum detected	0.24	0.02	0.2	0.01	1.80	3.6	2.2
Minimum detected	<0.02	<0.01	0.02	<0.01	<0.01	1.4	.1
Number of samples	30	29	30	30	30	28	28
Number of samples exceeding criteria or objectives							
Tastes and Odors <sup>1</sup>	0	-	-	-	-	-	-
Primary MCL <sup>2</sup>	-	-	0	-	-	-	-
NAWQC <sup>3</sup> Aquatic Life	0	-	-	-	-	-	-
USEPA Recommended Ecoregional Nutrient Criteria <sup>4</sup>	-	-	-	-	0	-	-
USEPA Draft Health Advisory <sup>5</sup>	0	-	-	-	-	-	-
California Public Health Goal <sup>6</sup>	-	-	0	-	-	-	-

### Feather R US Hatchery (A5-1789.50)

	Ammonia		Nitrate + Nitrite	Ortho-phosphate	Phosphorus	Organic Carbon	
	T	D	D	D	T	T	D
Maximum detected	0.12	0.02	0.2	0.02	0.07	2.9	2.2
Minimum detected	<0.02	<0.01	0.02	<0.01	<0.01	1.4	1
Number of samples	30	30	31	31	31	29	29
Number of samples exceeding criteria or objectives							
Tastes and Odors <sup>1</sup>	0	-	-	-	-	-	-
Primary MCL <sup>2</sup>	-	-	0	-	-	-	-
NAWQC <sup>3</sup> Aquatic Life	0	-	-	-	-	-	-
USEPA Recommended Ecoregional Nutrient Criteria <sup>4</sup>	-	-	-	-	0	-	-
USEPA Draft Health Advisory <sup>5</sup>	0	-	-	-	-	-	-
California Public Health Goal <sup>6</sup>	-	-	0	-	-	-	-

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## Appendix 3a-3. Continued.

### Feather R Hatchery Settling Pond (A5R93101333)

	Ammonia		Nitrate + Nitrite	Ortho-phosphate	Phosphorus	Organic Carbon	
	T	D	D	D	T	T	D
Maximum detected	0.4	0.3	0.3	0.12	0.18	4.2	2.5
Minimum detected	<0.02	0.02	0.02	<0.01	0.02	1.4	1.1
Number of samples	26	26	27	27	27	27	27
Number of samples exceeding criteria or objectives							
Tastes and Odors <sup>1</sup>	0	-	-	-	-	-	-
Primary MCL <sup>2</sup>	-	-	0	-	-	-	-
NAWQC <sup>3</sup> Aquatic Life	0	-	-	-	-	-	-
USEPA Recommended Ecoregional Nutrient Criteria <sup>4</sup>	-	-	-	-	-	-	-
USEPA Draft Health Advisory <sup>5</sup>	0	-	-	-	-	-	-
California Public Health Goal <sup>6</sup>	-	-	0	-	-	-	-

### Feather R DS Hatchery (A5-1780.50)

	Ammonia		Nitrate + Nitrite	Ortho-phosphate	Phosphorus	Organic Carbon	
	T	D	D	D	T	T	D
Maximum detected	0.2	0.15	0.49	0.06	1.71	2.7	2.2
Minimum detected	<0.02	<0.01	0.1	<0.01	0.02	1.3	0.9
Number of samples	30	29	30	30	30	28	28
Number of samples exceeding criteria or objectives							
Tastes and Odors <sup>1</sup>	0	-	-	-	-	-	-
Primary MCL <sup>2</sup>	-	-	0	-	-	-	-
NAWQC <sup>3</sup> Aquatic Life	0	-	-	-	-	-	-
USEPA Recommended Ecoregional Nutrient Criteria <sup>4</sup>	-	-	-	-	0	-	-
USEPA Draft Health Advisory <sup>5</sup>	0	-	-	-	-	-	-
California Public Health Goal <sup>6</sup>	-	-	0	-	-	-	-

### Feather R DS HWY 162 (A5-1740.50)

	Ammonia		Nitrate + Nitrite	Ortho-phosphate	Phosphorus	Organic Carbon	
	T	D	D	D	T	T	D
Maximum detected	0.2	0.05	0.2	0.02	0.10	12.0	2.2
Minimum detected	<0.02	<0.01	0.01	<0.01	<0.01	1.2	1.1
Number of samples	30	29	30	30	30	28	28
Number of samples exceeding criteria or objectives							
Tastes and Odors <sup>1</sup>	0	-	-	-	-	-	-
Primary MCL <sup>2</sup>	-	-	0	-	-	-	-
NAWQC <sup>3</sup> Aquatic Life	0	-	-	-	-	-	-
USEPA Recommended Ecoregional Nutrient Criteria <sup>4</sup>	-	-	-	-	0	-	-
USEPA Draft Health Advisory <sup>5</sup>	0	-	-	-	-	-	-
California Public Health Goal <sup>6</sup>	-	-	0	-	-	-	-

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### Appendix 3a-3. Continued.

#### Oroville Fishing Pond (A5L92951347)

	Ammonia		Nitrate + Nitrite D	Ortho- phosphate D	Phosphorus T	Organic Carbon	
	T	D				T	D
Maximum detected	0.25	0.16	1.5	0.06	0.2	12.3	6.7
Minimum detected	<0.08	<0.01	<0.01	<0.01	0.02	3.0	2.4
Number of samples	24	24	24	24	24	23	23
Number of samples exceeding criteria or objectives							
Tastes and odors <sup>1</sup>	0	-	-	-	-	-	-
Primary MCL <sup>2</sup>	-	-	0	-	-	-	-
NAWQC <sup>3</sup> Aquatic Life	0	-	-	-	-	-	-
USEPA Recommended Ecoregional Nutrient Criteria <sup>4</sup>	-	-	-	-	-	-	-
USEPA Draft Health Advisory <sup>5</sup>	0	-	-	-	-	-	-
California Public Health Goal <sup>6</sup>	-	-	0	-	-	-	-

#### Feather R A Robinson Riffle (A5-1712.50)

	Ammonia		Nitrate + Nitrite D	Ortho- phosphate D	Phosphorus T	Organic Carbon	
	T	D				T	D
Maximum detected	0.2	0.09	0.39	0.06	0.08	3.1	2.5
Minimum detected	<0.02	<0.01	<0.01	<0.01	<0.01	1.2	1.1
Number of samples	30	29	30	30	30	27	28
Number of samples exceeding criteria or objectives							
Tastes and Odors <sup>1</sup>	0	-	-	-	-	-	-
Primary MCL <sup>2</sup>	-	-	0	-	-	-	-
NAWQC <sup>3</sup> Aquatic Life	0	-	-	-	-	-	-
USEPA Recommended Ecoregional Nutrient Criteria <sup>4</sup>	-	-	-	-	0	-	-
USEPA Draft Health Advisory <sup>5</sup>	0	-	-	-	-	-	-
California Public Health Goal <sup>6</sup>	-	-	0	-	-	-	-

#### Robinson Riffle Pond (A5L92821359)

	Ammonia		Nitrate + Nitrite D	Ortho- phosphate D	Phosphorus T	Organic Carbon	
	T	D				T	D
Maximum detected	0.2	0.04	0.12	0.01	0.51	39.8	6.7
Minimum detected	<0.08	<0.01	<0.01	<0.01	0.02	3.2	2.7
Number of samples	24	24	24	24	24	23	23
Number of samples exceeding criteria or objectives							
Tastes and odors <sup>1</sup>	0	-	-	-	-	-	-
Primary MCL <sup>2</sup>	-	-	0	-	-	-	-
NAWQC <sup>3</sup> Aquatic Life	0	-	-	-	-	-	-
USEPA Recommended Ecoregional Nutrient Criteria <sup>4</sup>	-	-	-	-	-	-	-
USEPA Draft Health Advisory <sup>5</sup>	0	-	-	-	-	-	-
California Public Health Goal <sup>6</sup>	-	-	0	-	-	-	-

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## Appendix 3a-3. Continued.

### Upper Pacific Heights Pond (A5L92771367)

	Ammonia		Nitrate + Nitrite	Ortho-phosphate	Phosphorus	Organic Carbon	
	T	D	D	D	T	T	D
Maximum detected	0.13	0.1	0.09	<0.1	0.70	2.7	1.9
Minimum detected	<0.02	<0.01	<0.01	<0.01	<0.01	1.5	1.1
Number of samples	24	24	24	24	24	23	23
Number of samples exceeding criteria or objectives							
Tastes and odors <sup>1</sup>	-	-	-	-	-	-	-
Primary MCL <sup>2</sup>	-	-	0	-	-	-	-
NAWQC <sup>3</sup> Aquatic Life	0	-	-	-	-	-	-
USEPA Recommended Ecoregional Nutrient Criteria <sup>4</sup>	-	-	-	-	-	-	-
USEPA Draft Health Advisory <sup>5</sup>	0	-	-	-	-	-	-
California Public Health Goal <sup>6</sup>	-	-	0	-	-	-	-

### Feather R US from Afterbay Outlet (A5-1695.50)

	Ammonia		Nitrate + Nitrite	Ortho-phosphate	Phosphorus	Organic Carbon	
	T	D	D	D	T	T	D
Maximum detected	0.1	0.07	0.24	0.03	0.45	3.3	3.0
Minimum detected	<0.02	<0.01	<0.01	<0.01	<0.01	1.3	1.1
Number of samples	30	30	31	31	31	29	29
Number of samples exceeding criteria or objectives							
Tastes and Odors <sup>1</sup>	0	-	-	-	-	-	-
Primary MCL <sup>2</sup>	-	-	0	-	-	-	-
NAWQC <sup>3</sup> Aquatic Life	0	-	-	-	-	-	-
USEPA Recommended Ecoregional Nutrient Criteria <sup>4</sup>	-	-	-	-	0	-	-
USEPA Draft Health Advisory <sup>5</sup>	0	-	-	-	-	-	-
California Public Health Goal <sup>6</sup>	-	-	0	-	-	-	-

### North Forebay C (A5-5185)

	Ammonia		Nitrate + Nitrite	Ortho-phosphate	Phosphorus	Organic Carbon	
	T	D	D	D	T	T	D
Maximum detected	0.13	0.02	0.72	0.07	0.28	10.4	7.5
Minimum detected	<0.082	<0.01	<0.01	<0.01	0.02	1.3	1
Number of samples	18	20	19	20	19	20	19
Number of samples exceeding criteria or objectives							
Tastes and Odors <sup>1</sup>	0	-	-	-	-	-	-
Primary MCL <sup>2</sup>	-	-	0	-	-	-	-
NAWQC <sup>3</sup> Aquatic Life	0	-	-	-	-	-	-
USEPA Recommended Ecoregional Nutrient Criteria <sup>4</sup>	-	-	-	-	0	-	-
USEPA Draft Health Advisory <sup>5</sup>	0	-	-	-	-	-	-
California Public Health Goal <sup>6</sup>	-	-	0	-	-	-	-

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## Appendix 3a-3. Continued.

### Thermalito N Forebay Surface (A5R93161366)

	Ammonia		Nitrate + Nitrite	Ortho-phosphate	Phosphorus	Organic Carbon	
	T	D	D	D	T	T	D
Maximum detected	0.12	0.01	2	0.13	0.19	4.0	3.1
Minimum detected	<0.082	<0.01	0.01	<0.01	<0.01	1.1	1.1
Number of samples	19	24	25	25	25	24	23
Number of samples exceeding criteria or objectives							
Tastes and Odors <sup>1</sup>	0	-	-	-	-	-	-
Primary MCL <sup>2</sup>	-	-	0	-	-	-	-
NAWQC <sup>3</sup> Aquatic Life	0	-	-	-	-	-	-
USEPA Recommended Ecoregional Nutrient Criteria <sup>4</sup>	-	-	-	-	-	-	-
USEPA Draft Health Advisory <sup>5</sup>	0	-	-	-	-	-	-
California Public Health Goal <sup>6</sup>	-	-	0	-	-	-	-

### Thermalito N Forebay Bottom (A5R93161366)

	Ammonia		Nitrate + Nitrite	Ortho-phosphate	Phosphorus	Organic Carbon	
	T	D	D	D	T	T	D
Maximum detected	0.16	<0.02	0.44	0.01	0.40	4.4	3.8
Minimum detected	<0.082	<0.01	0.02	<0.01	<0.01	1.1	1
Number of samples	19	23	24	24	23	24	23
Number of samples exceeding criteria or objectives							
Tastes and Odors <sup>1</sup>	0	-	-	-	-	-	-
Primary MCL <sup>2</sup>	-	-	0	-	-	-	-
NAWQC <sup>3</sup> Aquatic Life	0	-	-	-	-	-	-
USEPA Recommended Ecoregional Nutrient Criteria <sup>4</sup>	-	-	-	-	-	-	-
USEPA Draft Health Advisory <sup>5</sup>	0	-	-	-	-	-	-
California Public Health Goal <sup>6</sup>	-	-	0	-	-	-	-

### Thermalito S Forebay Surface (A5R93111370)

	Ammonia		Nitrate + Nitrite	Ortho-phosphate	Phosphorus	Organic Carbon	
	T	D	D	D	T	T	D
Maximum detected	<0.10	0.01	0.8	0.01	0.31	2.5	2.1
Minimum detected	<0.082	<0.01	0.01	<0.01	<0.01	1.2	1.2
Number of samples	19	24	25	25	25	24	23
Number of samples exceeding criteria or objectives							
Tastes and Odors <sup>1</sup>	0	-	-	-	-	-	-
Primary MCL <sup>2</sup>	-	-	0	-	-	-	-
NAWQC <sup>3</sup> Aquatic Life	0	-	-	-	-	-	-
USEPA Recommended Ecoregional Nutrient Criteria <sup>4</sup>	-	-	-	-	-	-	-
USEPA Draft Health Advisory <sup>5</sup>	0	-	-	-	-	-	-
California Public Health Goal <sup>6</sup>	-	-	0	-	-	-	-

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## Appendix 3a-3. Continued.

### Thermalito S Forebay Bottom (A5R93111370)

	Ammonia		Nitrate + Nitrite D	Ortho- phosphate D	Phosphorus T	Organic Carbon	
	T	D				T	D
Maximum detected	<0.10	0.01	0.2	0.29	0.08	2.5	2.0
Minimum detected	<0.082	<0.01	0.01	<0.01	<0.01	1.2	1
Number of samples	20	22	24	24	22	23	22
Number of samples exceeding criteria or objectives							
Tastes and Odors <sup>1</sup>	0	-	-	-	-	-	-
Primary MCL <sup>2</sup>	-	-	0	-	-	-	-
NAWQC <sup>3</sup> Aquatic Life	0	-	-	-	-	-	-
USEPA Recommended Ecoregional Nutrient Criteria <sup>4</sup>	-	-	-	-	-	-	-
USEPA Draft Health Advisory <sup>5</sup>	0	-	-	-	-	-	-
California Public Health Goal <sup>6</sup>	-	-	0	-	-	-	-

### Thermalito N Afterbay Surface (A5R93011411)

	Ammonia		Nitrate + Nitrite D	Ortho- phosphate D	Phosphorus T	Organic Carbon	
	T	D				T	D
Maximum detected	<0.10	0.02	1.27	0.02	0.07	3.5	2.0
Minimum detected	<0.082	<0.01	<0.01	<0.01	<0.01	1.3	1.1
Number of samples	20	24	24	24	25	24	24
Number of samples exceeding criteria or objectives							
Tastes and Odors <sup>1</sup>	0	-	-	-	-	-	-
Primary MCL <sup>2</sup>	-	-	0	-	-	-	-
NAWQC <sup>3</sup> Aquatic Life	0	-	-	-	-	-	-
USEPA Recommended Ecoregional Nutrient Criteria <sup>4</sup>	-	-	-	-	-	-	-
USEPA Draft Health Advisory <sup>5</sup>	0	-	-	-	-	-	-
California Public Health Goal <sup>6</sup>	-	-	0	-	-	-	-

### Thermalito N Afterbay Bottom (A5R93011411)

	Ammonia		Nitrate + Nitrite D	Ortho- phosphate D	Phosphorus T	Organic Carbon	
	T	D				T	D
Maximum detected	0.12	0.01	0.48	0.02	0.35	2.6	2.2
Minimum detected	<0.082	<0.01	<0.01	<0.01	<0.01	1.3	1.1
Number of samples	21	24	24	24	23	24	23
Number of samples exceeding criteria or objectives							
Tastes and Odors <sup>1</sup>	0	-	-	-	-	-	-
Primary MCL <sup>2</sup>	-	-	0	-	-	-	-
NAWQC <sup>3</sup> Aquatic Life	0	-	-	-	-	-	-
USEPA Recommended Ecoregional Nutrient Criteria <sup>4</sup>	-	-	-	-	-	-	-
USEPA Draft Health Advisory <sup>5</sup>	0	-	-	-	-	-	-
California Public Health Goal <sup>6</sup>	-	-	0	-	-	-	-

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## Appendix 3a-3. Continued.

### Thermalito S Afterbay Surface (A5R92921412)

	Ammonia		Nitrate + Nitrite D	Ortho- phosphate D	Phosphorus T	Organic Carbon	
	T	D				T	D
Maximum detected	<0.10	0.01	3.4	0.02	0.25	2.4	2.4
Minimum detected	<0.082	<0.01	<0.01	<0.01	<0.01	1.2	1
Number of samples	20	24	24	24	23	24	24
Number of samples exceeding criteria or objectives							
Tastes and Odors <sup>1</sup>	0	-	-	-	-	-	-
Primary MCL <sup>2</sup>	-	-	0	-	-	-	-
NAWQC <sup>3</sup> Aquatic Life	0	-	-	-	-	-	-
USEPA Recommended Ecoregional Nutrient Criteria <sup>4</sup>	-	-	-	-	-	-	-
USEPA Draft Health Advisory <sup>5</sup>	0	-	-	-	-	-	-
California Public Health Goal <sup>6</sup>	-	-	0	-	-	-	-

### Thermalito S Afterbay Bottom (A5R92921412)

	Ammonia		Nitrate + Nitrite D	Ortho- phosphate D	Phosphorus T	Organic Carbon	
	T	D				T	D
Maximum detected	<0.10	0.01	0.65	0.09	0.03	2.3	2.5
Minimum detected	<0.082	<0.01	<0.01	<0.01	<0.01	1.3	1
Number of samples	20	24	24	24	23	24	24
Number of samples exceeding criteria or objectives							
Tastes and Odors <sup>1</sup>	0	-	-	-	-	-	-
Primary MCL <sup>2</sup>	-	-	0	-	-	-	-
NAWQC <sup>3</sup> Aquatic Life	0	-	-	-	-	-	-
USEPA Recommended Ecoregional Nutrient Criteria <sup>4</sup>	-	-	-	-	-	-	-
USEPA Draft Health Advisory <sup>5</sup>	0	-	-	-	-	-	-
California Public Health Goal <sup>6</sup>	-	-	0	-	-	-	-

### Afterbay Outlet Canal to Feather R (A5C92751383)

	Ammonia		Nitrate + Nitrite D	Ortho- phosphate D	Phosphorus T	Organic Carbon	
	T	D				T	D
Maximum detected	<0.10	0.02	0.09	0.02	0.51	3.3	2.8
Minimum detected	<0.082	<0.01	<0.01	<0.01	<0.01	1.3	1.1
Number of samples	17	28	28	28	27	27	26
Number of samples exceeding criteria or objectives							
Tastes and Odors <sup>1</sup>	0	-	-	-	-	-	-
Primary MCL <sup>2</sup>	-	-	0	-	-	-	-
NAWQC <sup>3</sup> Aquatic Life	0	-	-	-	-	-	-
USEPA Recommended Ecoregional Nutrient Criteria <sup>4</sup>	-	-	-	-	-	-	-
USEPA Draft Health Advisory <sup>5</sup>	0	-	-	-	-	-	-
California Public Health Goal <sup>6</sup>	-	-	0	-	-	-	-

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## Appendix 3a-3. Continued.

### Feather R DS from Afterbay Outlet (A5-1687.70)

	Ammonia		Nitrate + Nitrite	Ortho-phosphate	Phosphorus	Organic Carbon	
	T	D	D	D	T	T	D
Maximum detected	0.12	0.03	0.2	0.01	0.70	2.7	2.2
Minimum detected	<0.02	<0.01	<0.01	<0.01	<0.01	1.3	1
Number of samples	30	30	31	31	31	29	29
Number of samples exceeding criteria or objectives							
Tastes and Odors <sup>1</sup>	0	-	-	-	-	-	-
Primary MCL <sup>2</sup>	-	-	0	-	-	-	-
NAWQC <sup>3</sup> Aquatic Life	0	-	-	-	-	-	-
USEPA Recommended Ecoregional Nutrient Criteria <sup>4</sup>	-	-	-	-	0	-	-
USEPA Draft Health Advisory <sup>5</sup>	0	-	-	-	-	-	-
California Public Health Goal <sup>6</sup>	-	-	0	-	-	-	-

### Feather R DS from SCOR Outlet (A5-1687.20)

	Ammonia		Nitrate + Nitrite	Ortho-phosphate	Phosphorus	Organic Carbon	
	T	D	D	D	T	T	D
Maximum detected	0.4	0.13	0.24	0.07	0.16	2.9	2.0
Minimum detected	<0.02	<0.01	<0.01	<0.01	<0.01	1.3	1.1
Number of samples	30	30	30	30	30	28	28
Number of samples exceeding criteria or objectives							
Tastes and Odors <sup>1</sup>	0	-	-	-	-	-	-
Primary MCL <sup>2</sup>	-	-	0	-	-	-	-
NAWQC <sup>3</sup> Aquatic Life	0	-	-	-	-	-	-
USEPA Recommended Ecoregional Nutrient Criteria <sup>4</sup>	-	-	-	-	0	-	-
USEPA Draft Health Advisory <sup>5</sup>	0	-	-	-	-	-	-
California Public Health Goal <sup>6</sup>	-	-	0	-	-	-	-

### Lower Pacific Heights Pond (A5L92551372)

	Ammonia		Nitrate + Nitrite	Ortho-phosphate	Phosphorus	Organic Carbon	
	T	D	D	D	T	T	D
Maximum detected	0.52	0.01	0.02	0.02	0.05	6.7	4.9
Minimum detected	<0.02	<0.01	<0.01	<0.01	<0.01	3.2	3.0
Number of samples	24	24	23	24	24	23	23
Number of samples exceeding criteria or objectives							
Tastes and odors <sup>1</sup>	0	-	-	-	-	-	-
Primary MCL <sup>2</sup>	-	-	0	-	-	-	-
NAWQC <sup>3</sup> Aquatic Life	0	-	-	-	-	-	-
USEPA Recommended Ecoregional Nutrient Criteria <sup>4</sup>	-	-	-	-	0	-	-
USEPA Draft Health Advisory <sup>5</sup>	0	-	-	-	-	-	-
California Public Health Goal <sup>6</sup>	-	-	0	-	-	-	-

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## Appendix 3a-3. Continued.

### Mile Long Pond Surface (A59L92541377)

	Ammonia		Nitrate + Nitrite	Ortho-phosphate	Phosphorus	Organic Carbon	
	T	D	D	D	T	T	D
Maximum detected	0.23	<0.2	0.19	0.02	0.20	3.8	3.0
Minimum detected	<0.02	<0.01	<0.01	<0.01	<0.01	2.0	1.3
Number of samples	23	24	24	24	24	23	23
Number of samples exceeding criteria or objectives							
Tastes and Odors <sup>1</sup>	0	-	-	-	-	-	-
Primary MCL <sup>2</sup>	-	-	0	-	-	-	-
NAWQC <sup>3</sup> Aquatic Life	0	-	-	-	-	-	-
USEPA Recommended Ecoregional Nutrient Criteria <sup>4</sup>	-	-	-	-	-	-	-
USEPA Draft Health Advisory <sup>5</sup>	-	-	-	-	-	-	-
California Public Health Goal <sup>6</sup>	-	-	0	-	-	-	-

### Mile Long Pond Bottom (A59L92541377)

	Ammonia		Nitrate + Nitrite	Ortho-phosphate	Phosphorus	Organic Carbon	
	T	D	D	D	T	T	D
Maximum detected	0.2	0.20	0.01	0.2	0.11	5.0	2.7
Minimum detected	<0.02	<0.01	<0.01	<0.01	0.01	2.0	1.3
Number of samples	23	24	24	24	23	23	23
Number of samples exceeding criteria or objectives							
Tastes and Odors <sup>1</sup>	0	-	-	-	-	-	-
Primary MCL <sup>2</sup>	-	-	0	-	-	-	-
NAWQC <sup>3</sup> Aquatic Life	0	-	-	-	-	-	-
USEPA Recommended Ecoregional Nutrient Criteria <sup>4</sup>	-	-	-	-	-	-	-
USEPA Draft Health Advisory <sup>5</sup>	-	-	-	-	-	-	-
California Public Health Goal <sup>6</sup>	-	-	0	-	-	-	-

### Feather R NR Mile Long Pond (A5-1662.50)

	Ammonia		Nitrate + Nitrite	Ortho-phosphate	Phosphorus	Organic Carbon	
	T	D	D	D	T	T	D
Maximum detected	0.1	0.04	0.2	0.14	0.11	2.5	2.8
Minimum detected	<0.02	<0.01	<0.01	<0.01	<0.01	1.2	0.8
Number of samples	30	29	30	30	30	28	28
Number of samples exceeding criteria or objectives							
Tastes and Odors <sup>1</sup>	0	-	-	-	-	-	-
Primary MCL <sup>2</sup>	-	-	0	-	-	-	-
NAWQC <sup>3</sup> Aquatic Life	0	-	-	-	-	-	-
USEPA Recommended Ecoregional Nutrient Criteria <sup>4</sup>	-	-	-	-	0	-	-
USEPA Draft Health Advisory <sup>5</sup>	0	-	-	-	-	-	-
California Public Health Goal <sup>6</sup>	-	-	0	-	-	-	-

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## Appendix 3a-3. Continued.

### Feather R DS from Project Boundary (A5-1645.50)

	Ammonia		Nitrate + Nitrite D	Ortho-phosphate D	Phosphorus T	Organic Carbon	
	T	D				T	D
Maximum detected	0.63	0.07	0.2	0.04	0.11	2.8	2.2
Minimum detected	<0.02	<0.01	<0.01	<0.01	<0.01	1.2	1.1
Number of samples	30	30	31	31	31	29	29
Number of samples exceeding criteria or objectives							
Tastes and Odors <sup>1</sup>	0	-	-	-	-	-	-
Primary MCL <sup>2</sup>	-	-	0	-	-	-	-
NAWQC <sup>3</sup> Aquatic Life	0	-	-	-	-	-	-
USEPA Recommended Ecoregional Nutrient Criteria <sup>4</sup>	-	-	-	-	0	-	-
USEPA Draft Health Advisory <sup>5</sup>	0	-	-	-	-	-	-
California Public Health Goal <sup>6</sup>	-	-	0	-	-	-	-

### Feather R at Singh AB Riviera Rd. (A5-1556.50)

	Ammonia		Nitrate + Nitrite D	Ortho-phosphate D	Phosphorus T	Organic Carbon	
	T	D				T	D
Maximum detected	0.12	0.05	0.2	0.03	0.12	2.9	3.1
Minimum detected	<0.02	<0.01	0.01	<0.01	<0.01	1.2	1
Number of samples	28	28	29	29	29	28	28
Number of samples exceeding criteria or objectives							
Tastes and Odors <sup>1</sup>	0	-	-	-	-	-	-
Primary MCL <sup>2</sup>	-	-	0	-	-	-	-
NAWQC <sup>3</sup> Aquatic Life	0	-	-	-	-	-	-
USEPA Recommended Ecoregional Nutrient Criteria <sup>4</sup>	-	-	-	-	0	-	-
USEPA Draft Health Advisory <sup>5</sup>	0	-	-	-	-	-	-
California Public Health Goal <sup>6</sup>	-	-	0	-	-	-	-

### Honcut C at Pacific Ranch NR Palermo (A5-7010.50)

	Ammonia		Nitrate + Nitrite D	Ortho-phosphate D	Phosphorus T	Organic Carbon	
	T	D				T	D
Maximum detected	0.1	0.1	0.56	0.06	0.21	11.6	9.5
Minimum detected	<0.02	<0.01	0.02	<0.01	<0.01	1	1
Number of samples	28	28	29	29	29	28	28
Number of samples exceeding criteria or objectives							
Tastes and Odors <sup>1</sup>	0	-	-	-	-	-	-
Primary MCL <sup>2</sup>	-	-	0	-	-	-	-
NAWQC <sup>3</sup> Aquatic Life	0	-	-	-	-	-	-
USEPA Recommended Ecoregional Nutrient Criteria <sup>4</sup>	-	-	-	-	0	-	-
USEPA Draft Health Advisory <sup>5</sup>	0	-	-	-	-	-	-
California Public Health Goal <sup>6</sup>	-	-	0	-	-	-	-

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### Appendix 3a-3. Continued.

#### Feather R A Archer Ave. (A5-1516.50)

	Ammonia		Nitrate + Nitrite D	Ortho- phosphate D	Phosphorus T	Organic Carbon	
	T	D				T	D
Maximum detected	0.12	0.05	1.7	0.03	0.80	5.5	4.0
Minimum detected	<0.02	<0.01	0.01	<0.01	<0.01	1.2	1.1
Number of samples	29	28	29	29	29	27	28
Number of samples exceeding criteria or objectives							
Tastes and Odors <sup>1</sup>	0	-	-	-	-	-	-
Primary MCL <sup>2</sup>	-	-	0	-	-	-	-
NAWQC <sup>3</sup> Aquatic Life	0	-	-	-	-	-	-
USEPA Recommended Ecoregional Nutrient Criteria <sup>4</sup>	-	-	-	-	0	-	-
USEPA Draft Health Advisory <sup>5</sup>	0	-	-	-	-	-	-
California Public Health Goal <sup>6</sup>	-	-	0	-	-	-	-

#### Feather R US from Yuba R (A5-1425.50)

	Ammonia		Nitrate + Nitrite D	Ortho- phosphate D	Phosphorus T	Organic Carbon	
	T	D				T	D
Maximum detected	0.2	0.06	1.14	0.03	0.14	7.5	4.8
Minimum detected	<0.02	<0.01	0.01	<0.01	0.02	1.4	1.1
Number of samples	29	29	30	30	30	29	29
Number of samples exceeding criteria or objectives							
Tastes and Odors <sup>1</sup>	0	-	-	-	-	-	-
Primary MCL <sup>2</sup>	-	-	0	-	-	-	-
NAWQC <sup>3</sup> Aquatic Life	0	-	-	-	-	-	-
USEPA Recommended Ecoregional Nutrient Criteria <sup>4</sup>	-	-	-	-	0	-	-
USEPA Draft Health Advisory <sup>5</sup>	0	-	-	-	-	-	-
California Public Health Goal <sup>6</sup>	-	-	0	-	-	-	-

#### Yuba R at Mouth (A6-1010.50)

	Ammonia		Nitrate + Nitrite D	Ortho- phosphate D	Phosphorus T	Organic Carbon	
	T	D				T	D
Maximum detected	0.15	0.09	0.2	0.03	0.08	3.6	2.4
Minimum detected	<0.02	<0.01	<0.01	<0.01	<0.01	0.8	0.7
Number of samples	29	29	30	30	30	29	29
Number of samples exceeding criteria or objectives							
Tastes and Odors <sup>1</sup>	0	-	-	-	-	-	-
Primary MCL <sup>2</sup>	-	-	0	-	-	-	-
NAWQC <sup>3</sup> Aquatic Life	0	-	-	-	-	-	-
USEPA Recommended Ecoregional Nutrient Criteria <sup>4</sup>	-	-	-	-	0	-	-
USEPA Draft Health Advisory <sup>5</sup>	0	-	-	-	-	-	-
California Public Health Goal <sup>6</sup>	-	-	0	-	-	-	-

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## Appendix 3a-3. Continued.

### Feather R at Shanghai Bend (A5-1389.50)

	Ammonia		Nitrate + Nitrite	Ortho-phosphate	Phosphorus	Organic Carbon	
	T	D	D	D	T	T	D
Maximum detected	0.1	0.06	0.28	0.04	0.19	7.5	4.7
Minimum detected	<0.02	<0.01	<0.01	<0.01	0.02	1.4	1.1
Number of samples	29	29	29	30	30	29	29
Number of samples exceeding criteria or objectives							
Tastes and Odors <sup>1</sup>	0	-	-	-	-	-	-
Primary MCL <sup>2</sup>	-	-	0	-	-	-	-
NAWQC <sup>3</sup> Aquatic Life	0	-	-	-	-	-	-
USEPA Recommended Ecoregional Nutrient Criteria <sup>4</sup>	-	-	-	-	0	-	-
USEPA Draft Health Advisory <sup>5</sup>	0	-	-	-	-	-	-
California Public Health Goal <sup>6</sup>	-	-	0	-	-	-	-

### Bear R near Mouth (A6-5010.50)

	Ammonia		Nitrate + Nitrite	Ortho-phosphate	Phosphorus	Organic Carbon	
	T	D	D	D	T	T	D
Maximum detected	0.2	0.08	0.58	0.07	0.28	14.3	9.2
Minimum detected	<0.02	<0.01	<0.01	<0.01	0.03	2	2
Number of samples	29	28	28	29	29	28	28
Number of samples exceeding criteria or objectives							
Tastes and Odors <sup>1</sup>	0	-	-	-	-	-	-
Primary MCL <sup>2</sup>	-	-	0	-	-	-	-
NAWQC <sup>3</sup> Aquatic Life	0	-	-	-	-	-	-
USEPA Recommended Ecoregional Nutrient Criteria <sup>4</sup>	-	-	-	-	0	-	-
USEPA Draft Health Advisory <sup>5</sup>	0	-	-	-	-	-	-
California Public Health Goal <sup>6</sup>	-	-	0	-	-	-	-

### Feather R near Verona (A5-1010.50)

	Ammonia		Nitrate + Nitrite	Ortho-phosphate	Phosphorus	Organic Carbon	
	T	D	D	D	T	T	D
Maximum detected	0.2	0.06	0.28	0.06	0.12	7.2	4.0
Minimum detected	<0.02	<0.01	<0.1	<0.1	<0.2	1.3	1.1
Number of samples	29	29	30	30	30	29	29
Number of samples exceeding criteria or objectives							
Tastes and Odors <sup>1</sup>	0	-	-	-	-	-	-
Primary MCL <sup>2</sup>	-	-	0	-	-	-	-
NAWQC <sup>3</sup> Aquatic Life	0	-	-	-	-	-	-
USEPA Recommended Ecoregional Nutrient Criteria <sup>4</sup>	-	-	-	-	0	-	-
USEPA Draft Health Advisory <sup>5</sup>	0	-	-	-	-	-	-
California Public Health Goal <sup>6</sup>	-	-	0	-	-	-	-



## Appendix 3a-3. Continued.

### Sacramento R US from Feather R (A0-2157.50)

	Ammonia		Nitrate + Nitrite	Ortho-phosphate	Phosphorus	Organic Carbon	
	T	D	D	D	T	T	D
Maximum detected	0.1	0.03	0.47	0.3	0.24	8.1	5.0
Minimum detected	<0.02	<0.01	<0.1	<0.1	<0.2	1.3	1.1
Number of samples	28	27	28	28	28	27	27
Number of samples exceeding criteria or objectives							
Tastes and Odors <sup>1</sup>	0	-	-	-	-	-	-
Primary MCL <sup>2</sup>	-	-	0	-	-	-	-
NAWQC <sup>3</sup> Aquatic Life	0	-	-	-	-	-	-
USEPA Recommended Ecoregional Nutrient Criteria <sup>4</sup>	-	-	-	-	0	-	-
USEPA Draft Health Advisory <sup>5</sup>	0	-	-	-	-	-	-
California Public Health Goal <sup>6</sup>	-	-	0	-	-	-	-

#### Footnotes

1. J.E. Amoore and E. Hautala. Odor as an aid to chemical safety: Odor thresholds compared with threshold limit values and volatilities for 214 industrial chemicals in air and water dilution. *Journal of Applied Toxicology*, 3(6):272-290. 1983
2. California Department of Health Services, California Code of Regulations, Title 22, Division 4, Chapter 15, Domestic Water Quality and Monitoring
3. U.S. Environmental Protection Agency, Quality Criteria for Water, 1986 (May 1986) [The Gold Book] plus updates (various dates)
4. U.S. Environmental Protection Agency, Ambient Water Quality Criteria Recommendations for both Rivers and Streams in Ecoregion 1. 2001. EPA 822-B-01-012
5. U.S. Environmental Protection Agency, Office of Water, 2004 Edition of the Drinking Water Standards and Health Advisories. (Winter 2004). EPA 822-R-04-005.
6. California Environmental Protection Agency (Cal/EPA), Office of Environmental Health Hazard Assessment, Public Health Goals for Chemicals in Drinking Water (various dates), <http://www.oehha.org/water.phg/>.
7. Chronic (4 day average)
8. Acute (1 hr average)

## **Appendix 3b-1. Summary of mineral numerical limits for the Upper Feather River (mg/L).**

### **CONCOW CREEK AT JORDAN HILL ROAD (A5-2260.50)**

	Calcium		Magnesium		Sodium	Potassium	Sulfate	Chloride	Boron	Hardness	
	T	D	T	D	D	D	D	D	D	T	D
Maximum detected	9	9	14	14	3	0.7	2	2	<0.1	78	78
Minimum detected	4	4	8	8	2	<0.5	<1	<1	<0.1	43	43
Number of samples	28	28	28	28	28	28	28	28	28	28	28
Number of samples exceeding criteria or objectives											
USEPA - Taste and odor threshold <sup>1</sup>	-	-	-	-	0	-	-	-	-	-	-
Secondary MCL <sup>2</sup>	-	-	-	-	-	-	0	0	-	-	-
Agricultural Goal <sup>3</sup>	-	-	-	-	0	-	-	0	0	-	-
NAWQC <sup>4</sup> Aquatic Life	-	-	-	-	-	-	-	0	-	-	-
USEPA IRIS Reference Dose <sup>5</sup>	-	-	-	-	-	-	-	-	0	-	-
California DHS Action Level for drinking water <sup>6</sup>	-	-	-	-	-	-	-	-	0	-	-
USEPA draft Drinking Water Advisory <sup>1</sup>	-	-	-	-	0	-	-	-	-	-	-
USEPA Proposed MCL Goal <sup>1</sup>	-	-	-	-	-	-	0	-	-	-	-

### **WEST BRANCH FEATHER RIVER NEAR PARADISE (A5-2600.00)**

	Calcium		Magnesium		Sodium	Potassium	Sulfate	Chloride	Boron	Hardness	
	T	D	T	D	D	D	D	D	D	T	D
Maximum detected	10	10	8	8	4	0.9	2	2	<0.1	58	58
Minimum detected	3	2	2	2	1	<0.5	<1	<1	<0.1	16	13
Number of samples	23	23	23	23	23	23	23	23	23	23	23
Number of samples exceeding criteria or objectives											
USEPA - Taste and odor threshold <sup>1</sup>	-	-	-	-	0	-	-	-	-	-	-
Secondary MCL <sup>2</sup>	-	-	-	-	-	-	0	0	-	-	-
Agricultural Goal <sup>3</sup>	-	-	-	-	0	-	-	0	0	-	-
NAWQC <sup>4</sup> Aquatic Life	-	-	-	-	-	-	-	0	-	-	-
USEPA IRIS Reference Dose <sup>5</sup>	-	-	-	-	-	-	-	-	0	-	-
California DHS Action Level for drinking water <sup>6</sup>	-	-	-	-	-	-	-	-	0	-	-
USEPA draft Drinking Water Advisory <sup>1</sup>	-	-	-	-	0	-	-	-	-	-	-
USEPA Proposed MCL Goal <sup>1</sup>	-	-	-	-	-	-	0	-	-	-	-

### **WEST BRANCH FEATHER RIVER UPSTREAM OF LAKE OROVILLE (A5-2350.50)**

	Calcium		Magnesium		Sodium	Potassium	Sulfate	Chloride	Boron	Hardness	
	T	D	T	D	D	D	D	D	D	T	D
Maximum detected	10	9	6	8	4	0.9	2	<1	<0.1	47	50
Minimum detected	4	4	2	2	2	<0.5	<1	<1	<0.1	18	18
Number of samples	4	4	4	4	4	4	4	4	4	4	4
Number of samples exceeding criteria or objectives											
USEPA - Taste and odor threshold <sup>1</sup>	-	-	-	-	0	-	-	-	-	-	-
Secondary MCL <sup>2</sup>	-	-	-	-	-	-	0	0	-	-	-
Agricultural Goal <sup>3</sup>	-	-	-	-	0	-	-	0	0	-	-
NAWQC <sup>4</sup> Aquatic Life	-	-	-	-	-	-	-	0	-	-	-
USEPA IRIS Reference Dose <sup>5</sup>	-	-	-	-	-	-	-	-	0	-	-
California DHS Action Level for drinking water <sup>6</sup>	-	-	-	-	-	-	-	-	0	-	-
USEPA draft Drinking Water Advisory <sup>1</sup>	-	-	-	-	0	-	-	-	-	-	-
USEPA Proposed MCL Goal <sup>1</sup>	-	-	-	-	-	-	0	-	-	-	-

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## Appendix 3b-1. Continued.

### NORTH FORK FEATHER RIVER UPSTREAM FROM POE POWERHOUSE (A5-3132.50)

	Calcium		Magnesium		Sodium	Potassium	Sulfate	Chloride	Boron	Hardness	
	T	D	T	D	D	D	D	D	D	T	D
Maximum detected	11	12	10	8	5	1.5	3	2	<0.1	66	55
Minimum detected	6	5	4	3	2	0.7	1	<1	<0.1	31	25
Number of samples	24	24	24	24	24	24	24	24	24	24	24
Number of samples exceeding criteria or objectives											
USEPA - Taste and odor threshold <sup>1</sup>	-	-	-	-	0	-	-	-	-	-	-
Secondary MCL <sup>2</sup>	-	-	-	-	-	-	0	0	-	-	-
Agricultural Goal <sup>3</sup>	-	-	-	-	0	-	-	0	0	-	-
NAWQC <sup>4</sup> Aquatic Life	-	-	-	-	-	-	-	0	-	-	-
USEPA IRIS Reference Dose <sup>5</sup>	-	-	-	-	-	-	-	-	0	-	-
California DHS Action Level for drinking water <sup>6</sup>	-	-	-	-	-	-	-	-	0	-	-
USEPA draft Drinking Water Advisory <sup>1</sup>	-	-	-	-	0	-	-	-	-	-	-
USEPA Proposed MCL Goal <sup>1</sup>	-	-	-	-	-	-	0	-	-	-	-

### POE POWERHOUSE DISCHARGE (A5-3931.50)

	Calcium		Magnesium		Sodium	Potassium	Sulfate	Chloride	Boron	Hardness	
	T	D	T	D	D	D	D	D	D	T	D
Maximum detected	12	12	6	5	5	1	3	2	<0.1	51	51
Minimum detected	6	5	3	3	2	0.6	1	<1	<0.1	31	25
Number of samples	24	24	24	24	24	24	24	24	24	24	24
Number of samples exceeding criteria or objectives											
USEPA - Taste and odor threshold <sup>1</sup>	-	-	-	-	0	-	-	-	-	-	-
Secondary MCL <sup>2</sup>	-	-	-	-	-	-	0	0	-	-	-
Agricultural Goal <sup>3</sup>	-	-	-	-	0	-	-	0	0	-	-
NAWQC <sup>4</sup> Aquatic Life	-	-	-	-	-	-	-	0	-	-	-
USEPA IRIS Reference Dose <sup>5</sup>	-	-	-	-	-	-	-	-	0	-	-
California DHS Action Level for drinking water <sup>6</sup>	-	-	-	-	-	-	-	-	0	-	-
USEPA draft Drinking Water Advisory <sup>1</sup>	-	-	-	-	0	-	-	-	-	-	-
USEPA Proposed MCL Goal <sup>1</sup>	-	-	-	-	-	-	0	-	-	-	-

### FEATHER RIVER MIDDLE FORK NEAR MERRIMAC (A5-5100.00)

	Calcium		Magnesium		Sodium	Potassium	Sulfate	Chloride	Boron	Hardness	
	T	D	T	D	D	D	D	D	D	T	D
Maximum detected	20	19	5	5	8	1.1	8	4	<0.1	71	68
Minimum detected	7	7	2	2	2	0.5	2	<1	<0.1	31	28
Number of samples	27	27	27	27	27	27	27	27	27	27	27
Number of samples exceeding criteria or objectives											
USEPA - Taste and odor threshold <sup>1</sup>	-	-	-	-	0	-	-	-	-	-	-
Secondary MCL <sup>2</sup>	-	-	-	-	-	-	0	0	-	-	-
Agricultural Goal <sup>3</sup>	-	-	-	-	0	-	-	0	0	-	-
NAWQC <sup>4</sup> Aquatic Life	-	-	-	-	-	-	-	0	-	-	-
USEPA IRIS Reference Dose <sup>5</sup>	-	-	-	-	-	-	-	-	0	-	-
California DHS Action Level for drinking water <sup>6</sup>	-	-	-	-	-	-	-	-	0	-	-
USEPA draft Drinking Water Advisory <sup>1</sup>	-	-	-	-	0	-	-	-	-	-	-
USEPA Proposed MCL Goal <sup>1</sup>	-	-	-	-	-	-	0	-	-	-	-

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## Appendix 3b-1. Continued.

### SOUTH FORK FEATHER RIVER UPSTREAM FROM PONDEROSA RESERVOIR (A5-6110.50)

	Calcium		Magnesium		Sodium	Potassium	Sulfate	Chloride	Boron	Hardness	
	T	D	T	D	D	D	D	D	D	T	D
Maximum detected	6	6	6	6	4	0.5	4	2	0.3	41	112
Minimum detected	3	3	2	2	2	<0.5	1	<1	<0.1	18	18
Number of samples	28	28	28	28	28	28	28	28	28	28	28
Number of samples exceeding criteria or objectives											
USEPA - Taste and odor threshold <sup>1</sup>	-	-	-	-	0	-	-	-	-	-	-
Secondary MCL <sup>2</sup>	-	-	-	-	-	-	0	0	-	-	-
Agricultural Goal <sup>3</sup>	-	-	-	-	0	-	-	0	0	-	-
NAWQC <sup>4</sup> Aquatic Life	-	-	-	-	-	-	-	0	-	-	-
USEPA IRIS Reference Dose <sup>5</sup>	-	-	-	-	-	-	-	-	0	-	-
California DHS Action Level for drinking water <sup>6</sup>	-	-	-	-	-	-	-	-	0	-	-
USEPA draft Drinking Water Advisory <sup>1</sup>	-	-	-	-	0	-	-	-	-	-	-
USEPA Proposed MCL Goal <sup>1</sup>	-	-	-	-	-	-	0	-	-	-	-

### MINERS RANCH CANAL (A5-6925.00) AND SOUTH FORK FEATHER RIVER DOWNSTREAM FROM PONDEROSA RESERVOIR (A5-6050.50)

	Calcium		Magnesium		Sodium	Potassium	Sulfate	Chloride	Boron	Hardness	
	T	D	T	D	D	D	D	D	D	T	D
Maximum detected	5	5	3	3	3	<0.5	2	1	<0.1	22	22
Minimum detected	4	3	1	1	2	<0.5	<1	<0.1	<0.1	14	12
Number of samples	24	24	24	24	24	24	24	24	24	24	24
Number of samples exceeding criteria or objectives											
USEPA - Taste and odor threshold <sup>1</sup>	-	-	-	-	0	-	-	-	-	-	-
Secondary MCL <sup>2</sup>	-	-	-	-	-	-	0	0	-	-	-
Agricultural Goal <sup>3</sup>	-	-	-	-	0	-	-	0	0	-	-
NAWQC <sup>4</sup> Aquatic Life	-	-	-	-	-	-	-	0	-	-	-
USEPA IRIS Reference Dose <sup>5</sup>	-	-	-	-	-	-	-	-	0	-	-
California DHS Action Level for drinking water <sup>6</sup>	-	-	-	-	-	-	-	-	0	-	-
USEPA draft Drinking Water Advisory <sup>1</sup>	-	-	-	-	0	-	-	-	-	-	-
USEPA Proposed MCL Goal <sup>1</sup>	-	-	-	-	-	-	0	-	-	-	-

### SUCKER RUN CREEK NEAR FORBESTOWN (A5-6075.00)

	Calcium		Magnesium		Sodium	Potassium	Sulfate	Chloride	Boron	Hardness	
	T	D	T	D	D	D	D	D	D	T	D
Maximum detected	11	11	4	4	14	2	16	10	0.2	44	44
Minimum detected	4	4	2	2	3	0.6	1	<1	<0.1	14	18
Number of samples	28	28	28	28	28	28	28	28	28	28	28
Number of samples exceeding criteria or objectives											
USEPA - Taste and odor threshold <sup>1</sup>	-	-	-	-	0	-	-	-	-	-	-
Secondary MCL <sup>2</sup>	-	-	-	-	-	-	0	0	-	-	-
Agricultural Goal <sup>3</sup>	-	-	-	-	0	-	-	0	0	-	-
NAWQC <sup>4</sup> Aquatic Life	-	-	-	-	-	-	-	0	-	-	-
USEPA IRIS Reference Dose <sup>5</sup>	-	-	-	-	-	-	-	-	0	-	-
California DHS Action Level for drinking water <sup>6</sup>	-	-	-	-	-	-	-	-	0	-	-
USEPA draft Drinking Water Advisory <sup>1</sup>	-	-	-	-	0	-	-	-	-	-	-
USEPA Proposed MCL Goal <sup>1</sup>	-	-	-	-	-	-	0	-	-	-	-

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## Appendix 3b-1. Continued.

### FALL RIVER UPSTREAM FROM FEATHER FALLS (A5-5050.50)

	Calcium		Magnesium		Sodium	Potassium	Sulfate	Chloride	Boron	Hardness	
	T	D	T	D	D	D	D	D	D	T	D
Maximum detected	10	9	3	2	12	1.1	15	10	0.5	33	31
Minimum detected	3	2	1	1	2	<0.5	<1	1	<0.1	11	9
Number of samples	28	28	28	28	28	28	28	28	28	28	28
Number of samples exceeding criteria or objectives											
USEPA - Taste and odor threshold <sup>1</sup>	-	-	-	-	0	-	-	-	-	-	-
Secondary MCL <sup>2</sup>	-	-	-	-	-	-	0	0	-	-	-
Agricultural Goal <sup>3</sup>	-	-	-	-	0	-	-	0	0	-	-
NAWQC <sup>4</sup> Aquatic Life	-	-	-	-	-	-	-	0	-	-	-
USEPA IRIS Reference Dose <sup>5</sup>	-	-	-	-	-	-	-	-	0	-	-
California DHS Action Level for drinking water <sup>6</sup>	-	-	-	-	-	-	-	-	0	-	-
USEPA draft Drinking Water Advisory <sup>1</sup>	-	-	-	-	0	-	-	-	-	-	-
USEPA Proposed MCL Goal <sup>1</sup>	-	-	-	-	-	-	0	-	-	-	-

#### Footnotes

1. U.S. Environmental Protection Agency, Office of Water, 2004 Edition of the Drinking Water Standards and Health Advisories. (Winter 2004). EPA 822-R-04-005.
2. California Department of Health Services, California Code of Regulations, Title 22, Division 4, Chapter 15, Domestic Water Quality and Monitoring
3. Food and Agriculture Organization of the United Nations, 1985. Water Quality for Agriculture.
4. U.S. Environmental Protection Agency, Quality Criteria for Water, 1986 (May 1986) [The Gold Book] plus updates (various dates).
5. U.S. Environmental Protection Agency, Integrated Risk Information System [IRIS] database
6. California Department of Health Services, Division of Drinking Water and Environmental Management, Drinking Water Action Levels (6 June 2003), <http://www.dhs.cahwnet.gov/ps/ddwem>.
7. Chronic (4 day average)
8. Acute (1 hr average)

## Appendix 3b-2. Summary of mineral numerical limits for Lake Oroville (mg/L).

### Lake Oroville North Fork Sfc (A5R93761296)

	Calcium		Magnesium		Sodium	Potassium	Sulfate	Chloride	Boron	Hardness	
	T	D	T	D	D	D	D	D	D	T	D
Maximum detected	10	10	4	4	4	1.0	3	1	<0.1	41	41
Minimum detected	8	7	4	3	3	0.7	2	<1	<0.1	36	30
Number of samples	24	24	24	24	24	24	24	24	24	24	24
Number of samples exceeding criteria or objectives											
USEPA - Taste and odor threshold <sup>1</sup>	-	-	-	-	0	-	-	-	-	-	-
Secondary MCL <sup>2</sup>	-	-	-	-	-	-	0	0	-	-	-
Agricultural Goal <sup>3</sup>	-	-	-	-	0	-	-	0	0	-	-
NAWQC <sup>4</sup> Aquatic Life	-	-	-	-	-	-	-	0	-	-	-
USEPA IRIS Reference Dose <sup>5</sup>	-	-	-	-	-	-	-	-	0	-	-
California DHS Action Level for drinking water <sup>6</sup>	-	-	-	-	-	-	-	-	0	-	-
USEPA draft Drinking Water Advisory <sup>1</sup>	-	-	-	-	0	-	-	-	-	-	-
USEPA Proposed MCL Goal <sup>1</sup>	-	-	-	-	-	-	0	-	-	-	-

### Lake Oroville North Fork Btm (A5R93761296)

	Calcium		Magnesium		Sodium	Potassium	Sulfate	Chloride	Boron	Hardness	
	T	D	T	D	D	D	D	D	D	T	D
Maximum detected	10	10	5	4	4	0.9	2	1	<0.1	46	41
Minimum detected	8	8	4	4	3	0.8	2	<1	<0.1	36	36
Number of samples	24	24	24	24	24	24	24	24	24	24	24
Number of samples exceeding criteria or objectives											
USEPA - Taste and odor threshold <sup>1</sup>	-	-	-	-	0	-	-	-	-	-	-
Secondary MCL <sup>2</sup>	-	-	-	-	-	-	0	0	-	-	-
Agricultural Goal <sup>3</sup>	-	-	-	-	0	-	-	0	0	-	-
NAWQC <sup>4</sup> Aquatic Life	-	-	-	-	-	-	-	0	-	-	-
USEPA IRIS Reference Dose <sup>5</sup>	-	-	-	-	-	-	-	-	0	-	-
California DHS Action Level for drinking water <sup>6</sup>	-	-	-	-	-	-	-	-	0	-	-
USEPA draft Drinking Water Advisory <sup>1</sup>	-	-	-	-	0	-	-	-	-	-	-
USEPA Proposed MCL Goal <sup>1</sup>	-	-	-	-	-	-	0	-	-	-	-

### Lake Oroville Middle Fork Sfc (A5R93351272)

	Calcium		Magnesium		Sodium	Potassium	Sulfate	Chloride	Boron	Hardness	
	T	D	T	D	D	D	D	D	D	T	D
Maximum detected	13	12	5	4	5	1.0	4	2	<0.1	53	46
Minimum detected	8	8	3	3	3	0.6	2	<1	<0.1	32	27
Number of samples	24	24	24	24	24	24	24	24	24	24	24
Number of samples exceeding criteria or objectives											
USEPA - Taste and odor threshold <sup>1</sup>	-	-	-	-	0	-	-	-	-	-	-
Secondary MCL <sup>2</sup>	-	-	-	-	-	-	0	0	-	-	-
Agricultural Goal <sup>3</sup>	-	-	-	-	0	-	-	0	0	-	-
NAWQC <sup>4</sup> Aquatic Life	-	-	-	-	-	-	-	0	-	-	-
USEPA IRIS Reference Dose <sup>5</sup>	-	-	-	-	-	-	-	-	0	-	-
California DHS Action Level for drinking water <sup>6</sup>	-	-	-	-	-	-	-	-	0	-	-
USEPA draft Drinking Water Advisory <sup>1</sup>	-	-	-	-	0	-	-	-	-	-	-
USEPA Proposed MCL Goal <sup>1</sup>	-	-	-	-	-	-	0	-	-	-	-

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## Appendix 3b-2. Continued.

### Lake Oroville Middle Fork Btm (A5R93351272)

	Calcium		Magnesium		Sodium	Potassium	Sulfate	Chloride	Boron	Hardness	
	T	D	T	D	D	D	D	D	D	T	D
Maximum detected	10	10	4	4	4	0.8	3	2	<0.1	41	41
Minimum detected	8	8	3	3	3	0.6	2	<1	<0.01	32	32
Number of samples	23	23	23	23	23	23	23	23	22	23	23
Number of samples exceeding criteria or objectives											
USEPA - Taste and odor threshold <sup>1</sup>	-	-	-	-	0	-	-	-	-	-	-
Secondary MCL <sup>2</sup>	-	-	-	-	-	-	0	0	-	-	-
Agricultural Goal <sup>3</sup>	-	-	-	-	0	-	-	0	0	-	-
NAWQC <sup>4</sup> Aquatic Life	-	-	-	-	-	-	-	0	-	-	-
USEPA IRIS Reference Dose <sup>5</sup>	-	-	-	-	-	-	-	-	0	-	-
California DHS Action Level for drinking water <sup>6</sup>	-	-	-	-	-	-	-	-	0	-	-
USEPA draft Drinking Water Advisory <sup>1</sup>	-	-	-	-	0	-	-	-	-	-	-
USEPA Proposed MCL Goal <sup>1</sup>	-	-	-	-	-	-	0	-	-	-	-

### Lake Oroville South Fork Sfc (A5R93221226)

	Calcium		Magnesium		Sodium	Potassium	Sulfate	Chloride	Boron	Hardness	
	T	D	T	D	D	D	D	D	D	T	D
Maximum detected	9	9	4	4	4	1.0	2	2	<0.1	39	39
Minimum detected	7	7	3	3	3	0.6	2	<1	<0.1	30	30
Number of samples	23	24	23	24	24	24	24	24	23	23	24
Number of samples exceeding criteria or objectives											
USEPA - Taste and odor threshold <sup>1</sup>	-	-	-	-	0	-	-	-	-	-	-
Secondary MCL <sup>2</sup>	-	-	-	-	-	-	0	0	-	-	-
Agricultural Goal <sup>3</sup>	-	-	-	-	0	-	-	0	0	-	-
NAWQC <sup>4</sup> Aquatic Life	-	-	-	-	-	-	-	0	-	-	-
USEPA IRIS Reference Dose <sup>5</sup>	-	-	-	-	-	-	-	-	0	-	-
California DHS Action Level for drinking water <sup>6</sup>	-	-	-	-	-	-	-	-	0	-	-
USEPA draft Drinking Water Advisory <sup>1</sup>	-	-	-	-	0	-	-	-	-	-	-
USEPA Proposed MCL Goal <sup>1</sup>	-	-	-	-	-	-	0	-	-	-	-

### Lake Oroville South Fork Btm (A5R93221226)

	Calcium		Magnesium		Sodium	Potassium	Sulfate	Chloride	Boron	Hardness	
	T	D	T	D	D	D	D	D	D	T	D
Maximum detected	10	10	4	4	4	0.9	2	2	<0.1	41	41
Minimum detected	5	6	3	2	3	0.6	2	<1	<0.1	25	23
Number of samples	23	23	23	23	23	23	23	23	22	23	22
Number of samples exceeding criteria or objectives											
USEPA - Taste and odor threshold <sup>1</sup>	-	-	-	-	0	-	-	-	-	-	-
Secondary MCL <sup>2</sup>	-	-	-	-	-	-	0	0	-	-	-
Agricultural Goal <sup>3</sup>	-	-	-	-	0	-	-	0	0	-	-
NAWQC <sup>4</sup> Aquatic Life	-	-	-	-	-	-	-	0	-	-	-
USEPA IRIS Reference Dose <sup>5</sup>	-	-	-	-	-	-	-	-	0	-	-
California DHS Action Level for drinking water <sup>6</sup>	-	-	-	-	-	-	-	-	0	-	-
USEPA draft Drinking Water Advisory <sup>1</sup>	-	-	-	-	0	-	-	-	-	-	-
USEPA Proposed MCL Goal <sup>1</sup>	-	-	-	-	-	-	0	-	-	-	-

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## Appendix 3b-2. Continued.

### Lake Oroville Main Body Sfc (A5R93401274)

	Calcium		Magnesium		Sodium	Potassium	Sulfate	Chloride	Boron	Hardness	
	T	D	T	D	D	D	D	D	D	T	D
Maximum detected	10	10	4	4	4	1.1	2	1	<0.1	41	41
Minimum detected	8	7	3	3	3	0.7	2	<1	<0.1	32	30
Number of samples	24	24	24	24	24	24	24	24	24	24	24
Number of samples exceeding criteria or objectives											
USEPA - Taste and odor threshold <sup>1</sup>	-	-	-	-	0	-	-	-	-	-	-
Secondary MCL <sup>2</sup>	-	-	-	-	-	-	0	0	-	-	-
Agricultural Goal <sup>3</sup>	-	-	-	-	0	-	-	0	0	-	-
NAWQC <sup>4</sup> Aquatic Life	-	-	-	-	-	-	-	0	-	-	-
USEPA IRIS Reference Dose <sup>5</sup>	-	-	-	-	-	-	-	-	0	-	-
California DHS Action Level for drinking water <sup>6</sup>	-	-	-	-	-	-	-	-	0	-	-
USEPA draft Drinking Water Advisory <sup>1</sup>	-	-	-	-	0	-	-	-	-	-	-
USEPA Proposed MCL Goal <sup>1</sup>	-	-	-	-	-	-	0	-	-	-	-

### Lake Oroville Main Body Btm (A5R93401274)

	Calcium		Magnesium		Sodium	Potassium	Sulfate	Chloride	Boron	Hardness	
	T	D	T	D	D	D	D	D	D	T	D
Maximum detected	10	10	5	4	4	1.0	3	1	<0.1	46	41
Minimum detected	8	8	3	4	3	0.7	2	<1	<0.1	32	36
Number of samples	23	23	23	23	23	23	23	23	23	23	23
Number of samples exceeding criteria or objectives											
USEPA - Taste and odor threshold <sup>1</sup>	-	-	-	-	0	-	-	-	-	-	-
Secondary MCL <sup>2</sup>	-	-	-	-	-	-	0	0	-	-	-
Agricultural Goal <sup>3</sup>	-	-	-	-	0	-	-	0	0	-	-
NAWQC <sup>4</sup> Aquatic Life	-	-	-	-	-	-	-	0	-	-	-
USEPA IRIS Reference Dose <sup>5</sup>	-	-	-	-	-	-	-	-	0	-	-
California DHS Action Level for drinking water <sup>6</sup>	-	-	-	-	-	-	-	-	0	-	-
USEPA draft Drinking Water Advisory <sup>1</sup>	-	-	-	-	0	-	-	-	-	-	-
USEPA Proposed MCL Goal <sup>1</sup>	-	-	-	-	-	-	0	-	-	-	-

### Lake Oroville At Dam Sfc (A5R93251286)

	Calcium		Magnesium		Sodium	Potassium	Sulfate	Chloride	Boron	Hardness	
	T	D	T	D	D	D	D	D	D	T	D
Maximum detected	11	10	5	4	4	1.0	2	2	<0.1	48	41
Minimum detected	8	7	3	3	3	0.7	2	<1	<0.1	32	30
Number of samples	24	24	24	24	24	24	24	24	24	24	24
Number of samples exceeding criteria or objectives											
USEPA - Taste and odor threshold <sup>1</sup>	-	-	-	-	0	-	-	-	-	-	-
Secondary MCL <sup>2</sup>	-	-	-	-	-	-	0	0	-	-	-
Agricultural Goal <sup>3</sup>	-	-	-	-	0	-	-	0	0	-	-
NAWQC <sup>4</sup> Aquatic Life	-	-	-	-	-	-	-	0	-	-	-
USEPA IRIS Reference Dose <sup>5</sup>	-	-	-	-	-	-	-	-	0	-	-
California DHS Action Level for drinking water <sup>6</sup>	-	-	-	-	-	-	-	-	0	-	-
USEPA draft Drinking Water Advisory <sup>1</sup>	-	-	-	-	0	-	-	-	-	-	-
USEPA Proposed MCL Goal <sup>1</sup>	-	-	-	-	-	-	0	-	-	-	-

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## Appendix 3b-2. Continued.

### Lake Oroville At Dam Mid (A5R93251286)

	Calcium		Magnesium		Sodium	Potassium	Sulfate	Chloride	Boron	Hardness	
	T	D	T	D	D	D	D	D	D	T	D
Maximum detected	10	10	4	5	4	1.0	2	2	<0.1	41	46
Minimum detected	8	8	4	4	3	0.8	2	<1	<0.1	36	36
Number of samples	23	24	23	24	24	24	24	24	24	23	24
Number of samples exceeding criteria or objectives											
USEPA - Taste and odor threshold <sup>1</sup>	-	-	-	-	0	-	-	-	-	-	-
Secondary MCL <sup>2</sup>	-	-	-	-	-	-	0	0	-	-	-
Agricultural Goal <sup>3</sup>	-	-	-	-	0	-	-	0	0	-	-
NAWQC <sup>4</sup> Aquatic Life	-	-	-	-	-	-	-	0	-	-	-
USEPA IRIS Reference Dose <sup>5</sup>	-	-	-	-	-	-	-	-	0	-	-
California DHS Action Level for drinking water <sup>6</sup>	-	-	-	-	-	-	-	-	0	-	-
USEPA draft Drinking Water Advisory <sup>7</sup>	-	-	-	-	0	-	-	-	-	-	-
USEPA Proposed MCL Goal <sup>1</sup>	-	-	-	-	-	-	0	-	-	-	-

### Lake Oroville At Dam Btm (A5R93251286)

	Calcium		Magnesium		Sodium	Potassium	Sulfate	Chloride	Boron	Hardness	
	T	D	T	D	D	D	D	D	D	T	D
Maximum detected	10	10	5	5	4	1.0	2	2	<0.1	46	46
Minimum detected	8	8	4	4	3	0.8	2	<1	<0.1	36	36
Number of samples	24	24	24	24	24	24	24	24	24	24	24
Number of samples exceeding criteria or objectives											
USEPA - Taste and odor threshold <sup>1</sup>	-	-	-	-	0	-	-	-	-	-	-
Secondary MCL <sup>2</sup>	-	-	-	-	-	-	0	0	-	-	-
Agricultural Goal <sup>3</sup>	-	-	-	-	0	-	-	0	0	-	-
NAWQC <sup>4</sup> Aquatic Life	-	-	-	-	-	-	-	0	-	-	-
USEPA IRIS Reference Dose <sup>5</sup>	-	-	-	-	-	-	-	-	0	-	-
California DHS Action Level for drinking water <sup>6</sup>	-	-	-	-	-	-	-	-	0	-	-
USEPA draft Drinking Water Advisory <sup>7</sup>	-	-	-	-	0	-	-	-	-	-	-
USEPA Proposed MCL Goal <sup>1</sup>	-	-	-	-	-	-	0	-	-	-	-

#### Footnotes

1. U.S. Environmental Protection Agency, Office of Water, 2004 Edition of the Drinking Water Standards and Health Advisories. (Winter 2004). EPA 822-R-04-005.
2. California Department of Health Services, California Code of Regulations, Title 22, Division 4, Chapter 15, Domestic Water Quality and Monitoring
3. Food and Agriculture Organization of the United Nations, 1985. Water Quality for Agriculture.
4. U.S. Environmental Protection Agency, Quality Criteria for Water, 1986 (May 1986) [The Gold Book] plus updates (various dates).
5. U.S. Environmental Protection Agency, Integrated Risk Information System [IRIS] database
6. California Department of Health Services, Division of Drinking Water and Environmental Management, Drinking Water Action Levels (6 June 2003), <http://www.dhs.cahwnet.gov/ps/ddwem>.
7. Chronic (4 day average)
8. Acute (1 hr average)

## **Appendix 3b-3. Summary of mineral numerical limits for the Lower Feather River (mg/L).**

### **Thermalito Diversion Pool US of Power Plant (A5R93191294)**

	Calcium		Magnesium		Sodium	Potassium	Sulfate	Chloride	Boron	Hardness	
	T	D	T	D	D	D	D	D	D	T	D
Maximum detected	10	10	4	4	4	1.1	2	1	<0.1	41	41
Minimum detected	7	7	3	3	3	0.6	2	<1.0	<0.1	32	30
Number of samples	26	26	26	26	26	26	26	26	26	26	26
Number of samples exceeding criteria or objectives											
USEPA - Taste and odor threshold <sup>1</sup>	-	-	-	-	0	-	-	-	-	-	-
Secondary MCL <sup>2</sup>	-	-	-	-	-	-	0	0	-	-	-
Agricultural Goal <sup>3</sup>	-	-	-	-	0	-	-	0	0	-	-
NAWQC <sup>4</sup> Aquatic Life	-	-	-	-	-	-	-	0	-	-	-
USEPA IRIS Reference Dose <sup>5</sup>	-	-	-	-	-	-	-	-	0	-	-
California DHS Action Level for drinking water <sup>6</sup>	-	-	-	-	-	-	-	-	0	-	-
USEPA draft Drinking Water Advisory <sup>1</sup>	-	-	-	-	0	-	-	-	-	-	-
USEPA Proposed MCL Goal <sup>1</sup>	-	-	-	-	-	-	0	-	-	-	-

### **Thermalito Diversion Pool DS of Power Plant (A5R93191297)**

	Calcium		Magnesium		Sodium	Potassium	Sulfate	Chloride	Boron	Hardness	
	T	D	T	D	D	D	D	D	D	T	D
Maximum detected	9	9	4	4	4	0.9	2	1	<0.1	39	39
Minimum detected	7	7	3	3	3	0.6	2	<1.0	<0.1	30	30
Number of samples	14	14	14	14	14	14	14	14	14	14	14
Number of samples exceeding criteria or objectives											
USEPA - Taste and odor threshold <sup>1</sup>	-	-	-	-	0	-	-	-	-	-	-
Secondary MCL <sup>2</sup>	-	-	-	-	-	-	0	0	-	-	-
Agricultural Goal <sup>3</sup>	-	-	-	-	0	-	-	0	0	-	-
NAWQC <sup>4</sup> Aquatic Life	-	-	-	-	-	-	-	0	-	-	-
USEPA IRIS Reference Dose <sup>5</sup>	-	-	-	-	-	-	-	-	0	-	-
California DHS Action Level for drinking water <sup>6</sup>	-	-	-	-	-	-	-	-	0	-	-
USEPA draft Drinking Water Advisory <sup>1</sup>	-	-	-	-	0	-	-	-	-	-	-
USEPA Proposed MCL Goal <sup>1</sup>	-	-	-	-	-	-	0	-	-	-	-

### **Glen C US from Glen Pond (A5-3050)**

	Calcium		Magnesium		Sodium	Potassium	Sulfate	Chloride	Boron	Hardness	
	T	D	T	D	D	D	D	D	D	T	D
Maximum detected	21	21	17	17	9	1.2	21	8	0.0	122	122
Minimum detected	8	8	7	7	5	<0.5	3	2	<0.1	53	53
Number of samples	26	26	26	26	26	26	26	26	26	26	26
Number of samples exceeding criteria or objectives											
USEPA - Taste and odor threshold <sup>1</sup>	-	-	-	-	0	-	-	-	-	-	-
Secondary MCL <sup>2</sup>	-	-	-	-	-	-	0	0	-	-	-
Agricultural Goal <sup>3</sup>	-	-	-	-	0	-	-	0	0	-	-
NAWQC <sup>4</sup> Aquatic Life	-	-	-	-	-	-	-	0	-	-	-
USEPA IRIS Reference Dose <sup>5</sup>	-	-	-	-	-	-	-	-	0	-	-
California DHS Action Level for drinking water <sup>6</sup>	-	-	-	-	-	-	-	-	0	-	-
USEPA draft Drinking Water Advisory <sup>1</sup>	-	-	-	-	0	-	-	-	-	-	-
USEPA Proposed MCL Goal <sup>1</sup>	-	-	-	-	-	-	0	-	-	-	-

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## Appendix 3b-3. Continued.

### Glen Pond (A5L93221307)

	Calcium		Magnesium		Sodium	Potassium	Sulfate	Chloride	Boron	Hardness	
	T	D	T	D	D	D	D	D	D	T	D
Maximum detected	20	19	17	17	9	1.4	14	7	0.0	116	115
Minimum detected	8	8	5	5	4	<0.5	3	2	<0.1	43	43
Number of samples	27	27	27	27	27	27	27	27	27	27	27
Number of samples exceeding criteria or objectives											
USEPA - Taste and odor threshold <sup>1</sup>	-	-	-	-	0	-	-	-	-	-	-
Secondary MCL <sup>2</sup>	-	-	-	-	-	-	0	0	-	-	-
Agricultural Goal <sup>3</sup>	-	-	-	-	0	-	-	0	0	-	-
NAWQC <sup>4</sup> Aquatic Life	-	-	-	-	-	-	-	0	-	-	-
USEPA IRIS Reference Dose <sup>5</sup>	-	-	-	-	-	-	-	-	0	-	-
California DHS Action Level for drinking water <sup>6</sup>	-	-	-	-	-	-	-	-	0	-	-
USEPA draft Drinking Water Advisory <sup>1</sup>	-	-	-	-	0	-	-	-	-	-	-
USEPA Proposed MCL Goal <sup>1</sup>	-	-	-	-	-	-	0	-	-	-	-

### Morris Ravine at Mouth (A5-1850)

	Calcium		Magnesium		Sodium	Potassium	Sulfate	Chloride	Boron	Hardness	
	T	D	T	D	D	D	D	D	D	T	D
Maximum detected	56	58	41	41	18	1.3	8	12	0.1	306	310
Minimum detected	9	9	6	5	4	0.5	1	<1	<0.1	47	43
Number of samples	12	12	12	12	12	12	12	12	12	12	12
Number of samples exceeding criteria or objectives											
USEPA - Taste and odor threshold <sup>1</sup>	-	-	-	-	0	-	-	-	-	-	-
Secondary MCL <sup>2</sup>	-	-	-	-	-	-	0	0	-	-	-
Agricultural Goal <sup>3</sup>	-	-	-	-	0	-	-	0	0	-	-
NAWQC <sup>4</sup> Aquatic Life	-	-	-	-	-	-	-	0	-	-	-
USEPA IRIS Reference Dose <sup>5</sup>	-	-	-	-	-	-	-	-	0	-	-
California DHS Action Level for drinking water <sup>6</sup>	-	-	-	-	-	-	-	-	0	-	-
USEPA draft Drinking Water Advisory <sup>1</sup>	-	-	-	-	0	-	-	-	-	-	-
USEPA Proposed MCL Goal <sup>1</sup>	-	-	-	-	-	-	0	-	-	-	-

### Thermalito Diversion Pool US of Dam Surface (A5R93191326)

	Calcium		Magnesium		Sodium	Potassium	Sulfate	Chloride	Boron	Hardness	
	T	D	T	D	D	D	D	D	D	T	D
Maximum detected	10	10	4	4	4	1.0	2	1	<0.1	41	41
Minimum detected	7	7	3	3	3	0.6	<1.0	<1.0	<0.1	30	30
Number of samples	26	26	26	26	26	26	26	26	26	26	26
Number of samples exceeding criteria or objectives											
USEPA - Taste and odor threshold <sup>1</sup>	-	-	-	-	0	-	-	-	-	-	-
Secondary MCL <sup>2</sup>	-	-	-	-	-	-	0	0	-	-	-
Agricultural Goal <sup>3</sup>	-	-	-	-	0	-	-	0	0	-	-
NAWQC <sup>4</sup> Aquatic Life	-	-	-	-	-	-	-	0	-	-	-
USEPA IRIS Reference Dose <sup>5</sup>	-	-	-	-	-	-	-	-	0	-	-
California DHS Action Level for drinking water <sup>6</sup>	-	-	-	-	-	-	-	-	0	-	-
USEPA draft Drinking Water Advisory <sup>1</sup>	-	-	-	-	0	-	-	-	-	-	-
USEPA Proposed MCL Goal <sup>1</sup>	-	-	-	-	-	-	0	-	-	-	-

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## Appendix 3b-3. Continued.

### Thermalito Diversion Pool US of Dam BOTTOM (A5R93191326)

	Calcium		Magnesium		Sodium	Potassium	Sulfate	Chloride	Boron	Hardness	
	T	D	T	D	D	D	D	D	D	T	D
Maximum detected	10	10	4	4	4	1.0	2	1	<0.1	41	41
Minimum detected	7	7	3	3	3	0.6	2	<1.0	<0.1	30	30
Number of samples	25	25	25	25	25	25	25	25	25	25	25
Number of samples exceeding criteria or objectives											
USEPA - Taste and odor threshold <sup>1</sup>	-	-	-	-	0	-	-	-	-	-	-
Secondary MCL <sup>2</sup>	-	-	-	-	-	-	0	0	-	-	-
Agricultural Goal <sup>3</sup>	-	-	-	-	0	-	-	0	0	-	-
NAWQC <sup>4</sup> Aquatic Life	-	-	-	-	-	-	-	0	-	-	-
USEPA IRIS Reference Dose <sup>5</sup>	-	-	-	-	-	-	-	-	0	-	-
California DHS Action Level for drinking water <sup>6</sup>	-	-	-	-	-	-	-	-	0	-	-
USEPA draft Drinking Water Advisory <sup>1</sup>	-	-	-	-	0	-	-	-	-	-	-
USEPA Proposed MCL Goal <sup>1</sup>	-	-	-	-	-	-	0	-	-	-	-

### Feather R A Oroville (A5-1800.00)

	Calcium		Magnesium		Sodium	Potassium	Sulfate	Chloride	Boron	Hardness	
	T	D	T	D	D	D	D	D	D	T	D
Maximum detected	9	10	4.33	4	4	1.0	3	2	<0.1	46	41
Minimum detected	7	7	3	3	3	0.6	2	<1.0	<0.1	30	30
Number of samples	17	29	17	29	29	29	29	29	29	29	29
Number of samples exceeding criteria or objectives											
USEPA - Taste and odor threshold <sup>1</sup>	-	-	-	-	0	-	-	-	-	-	-
Secondary MCL <sup>2</sup>	-	-	-	-	-	-	0	0	-	-	-
Agricultural Goal <sup>3</sup>	-	-	-	-	0	-	-	0	0	-	-
NAWQC <sup>4</sup> Aquatic Life	-	-	-	-	-	-	-	0	-	-	-
USEPA IRIS Reference Dose <sup>5</sup>	-	-	-	-	-	-	-	-	0	-	-
California DHS Action Level for drinking water <sup>6</sup>	-	-	-	-	-	-	-	-	0	-	-
USEPA draft Drinking Water Advisory <sup>1</sup>	-	-	-	-	0	-	-	-	-	-	-
USEPA Proposed MCL Goal <sup>1</sup>	-	-	-	-	-	-	0	-	-	-	-

### Feather R US Hatchery (A5-1789.50)

	Calcium		Magnesium		Sodium	Potassium	Sulfate	Chloride	Boron	Hardness	
	T	D	T	D	D	D	D	D	D	T	D
Maximum detected	9	10	4	4	4	1.0	2	1	<0.1	41	41
Minimum detected	7	7	3	3	3	0.6	2	<1.0	<0.1	30	30
Number of samples	18	30	18	29	30	30	30	30	30	30	30
Number of samples exceeding criteria or objectives											
USEPA - Taste and odor threshold <sup>1</sup>	-	-	-	-	0	-	-	-	-	-	-
Secondary MCL <sup>2</sup>	-	-	-	-	-	-	0	0	-	-	-
Agricultural Goal <sup>3</sup>	-	-	-	-	0	-	-	0	0	-	-
NAWQC <sup>4</sup> Aquatic Life	-	-	-	-	-	-	-	0	-	-	-
USEPA IRIS Reference Dose <sup>5</sup>	-	-	-	-	-	-	-	-	0	-	-
California DHS Action Level for drinking water <sup>6</sup>	-	-	-	-	-	-	-	-	0	-	-
USEPA draft Drinking Water Advisory <sup>1</sup>	-	-	-	-	0	-	-	-	-	-	-
USEPA Proposed MCL Goal <sup>1</sup>	-	-	-	-	-	-	0	-	-	-	-

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## Appendix 3b-3. Continued.

### Feather R Hatchery Settling Pond (A5R93101333)

	Calcium		Magnesium		Sodium	Potassium	Sulfate	Chloride	Boron	Hardness	
	T	D	T	D	D	D	D	D	D	T	D
Maximum detected	9	10	4	4	81	1.0	2	132	<0.1	41	41
Minimum detected	7	7	3	3	3	0.6	2	<1.0	<0.1	30	30
Number of samples	15	27	15	27	26	27	27	26	27	27	27
Number of samples exceeding criteria or objectives											
USEPA - Taste and odor threshold <sup>1</sup>	-	-	-	-	1	-	-	-	-	-	-
Secondary MCL <sup>2</sup>	-	-	-	-	-	-	0	0	-	-	-
Agricultural Goal <sup>3</sup>	-	-	-	-	1	-	-	0	0	-	-
NAWQC <sup>4</sup> Aquatic Life	-	-	-	-	-	-	-	0	-	-	-
USEPA IRIS Reference Dose <sup>5</sup>	-	-	-	-	-	-	-	-	0	-	-
California DHS Action Level for drinking water <sup>6</sup>	-	-	-	-	-	-	-	-	0	-	-
USEPA draft Drinking Water Advisory <sup>1</sup>	-	-	-	-	1	-	-	-	-	-	-
USEPA Proposed MCL Goal <sup>1</sup>	-	-	-	-	-	-	0	-	-	-	-

### Feather R DS Hatchery (A5-1780.50)

	Calcium		Magnesium		Sodium	Potassium	Sulfate	Chloride	Boron	Hardness	
	T	D	T	D	D	D	D	D	D	T	D
Maximum detected	9	10	5	4	13	2.0	3	22	<0.1	46	41
Minimum detected	7	7	3	3	3	0.6	1	<1.0	<0.1	30	30
Number of samples	17	29	17	29	29	29	29	29	29	29	29
Number of samples exceeding criteria or objectives											
USEPA - Taste and odor threshold <sup>1</sup>	-	-	-	-	0	-	-	-	-	-	-
Secondary MCL <sup>2</sup>	-	-	-	-	-	-	0	0	-	-	-
Agricultural Goal <sup>3</sup>	-	-	-	-	0	-	-	0	0	-	-
NAWQC <sup>4</sup> Aquatic Life	-	-	-	-	-	-	-	0	-	-	-
USEPA IRIS Reference Dose <sup>5</sup>	-	-	-	-	-	-	-	-	0	-	-
California DHS Action Level for drinking water <sup>6</sup>	-	-	-	-	-	-	-	-	0	-	-
USEPA draft Drinking Water Advisory <sup>1</sup>	-	-	-	-	0	-	-	-	-	-	-
USEPA Proposed MCL Goal <sup>1</sup>	-	-	-	-	-	-	0	-	-	-	-

### Feather R DS HWY 162 (A5-1740.50)

	Calcium		Magnesium		Sodium	Potassium	Sulfate	Chloride	Boron	Hardness	
	T	D	T	D	D	D	D	D	D	T	D
Maximum detected	9	10	5	4	4	1.0	3	2	<0.1	46	46
Minimum detected	7	7	3	3	3	0.6	2	<1.0	<0.1	30	30
Number of samples	17	29	17	29	29	29	29	29	29	29	29
Number of samples exceeding criteria or objectives											
USEPA - Taste and odor threshold <sup>1</sup>	-	-	-	-	0	-	-	-	-	-	-
Secondary MCL <sup>2</sup>	-	-	-	-	-	-	0	0	-	-	-
Agricultural Goal <sup>3</sup>	-	-	-	-	0	-	-	0	0	-	-
NAWQC <sup>4</sup> Aquatic Life	-	-	-	-	-	-	-	0	-	-	-
USEPA IRIS Reference Dose <sup>5</sup>	-	-	-	-	-	-	-	-	0	-	-
California DHS Action Level for drinking water <sup>6</sup>	-	-	-	-	-	-	-	-	0	-	-
USEPA draft Drinking Water Advisory <sup>1</sup>	-	-	-	-	0	-	-	-	-	-	-
USEPA Proposed MCL Goal <sup>1</sup>	-	-	-	-	-	-	0	-	-	-	-

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## Appendix 3b-3. Continued.

### Oroville Fishing Pond (A5L92951347)

	Calcium		Magnesium		Sodium	Potassium	Sulfate	Chloride	Boron	Hardness	
	T	D	T	D	D	D	D	D	D	T	D
Maximum detected	31	30	28	27	13	1.7	6	22	0.1	218	178
Minimum detected	20	20	21	19	10	1.4	2	12	<0.1	149	143
Number of samples	24	24	24	24	24	24	24	24	24	24	24
Number of samples exceeding criteria or objectives											
USEPA - Taste and odor threshold <sup>1</sup>	-	-	-	-	0	-	-	-	-	-	-
Secondary MCL <sup>2</sup>	-	-	-	-	-	-	0	0	-	-	-
Agricultural Goal <sup>3</sup>	-	-	-	-	0	-	-	0	0	-	-
NAWQC <sup>4</sup> Aquatic Life	-	-	-	-	-	-	-	0	-	-	-
USEPA IRIS Reference Dose <sup>5</sup>	-	-	-	-	-	-	-	-	0	-	-
California DHS Action Level for drinking water <sup>6</sup>	-	-	-	-	-	-	-	-	0	-	-
USEPA draft Drinking Water Advisory <sup>1</sup>	-	-	-	-	0	-	-	-	-	-	-
USEPA Proposed MCL Goal <sup>1</sup>	-	-	-	-	-	-	0	-	-	-	-

### Feather R A Robinson Riffle (A5-1712.50)

	Calcium		Magnesium		Sodium	Potassium	Sulfate	Chloride	Boron	Hardness	
	T	D	T	D	D	D	D	D	D	T	D
Maximum detected	9	10	5	5	5	1.1	3	3	<0.1	43	43
Minimum detected	7	7	3	3	3	0.6	2	<1.0	<0.1	32	30
Number of samples	17	29	17	29	29	29	29	29	29	29	29
Number of samples exceeding criteria or objectives											
USEPA - Taste and odor threshold <sup>1</sup>	-	-	-	-	0	-	-	-	-	-	-
Secondary MCL <sup>2</sup>	-	-	-	-	-	-	0	0	-	-	-
Agricultural Goal <sup>3</sup>	-	-	-	-	0	-	-	0	0	-	-
NAWQC <sup>4</sup> Aquatic Life	-	-	-	-	-	-	-	0	-	-	-
USEPA IRIS Reference Dose <sup>5</sup>	-	-	-	-	-	-	-	-	0	-	-
California DHS Action Level for drinking water <sup>6</sup>	-	-	-	-	-	-	-	-	0	-	-
USEPA draft Drinking Water Advisory <sup>1</sup>	-	-	-	-	0	-	-	-	-	-	-
USEPA Proposed MCL Goal <sup>1</sup>	-	-	-	-	-	-	0	-	-	-	-

### Robinson Riffle Pond (A5L92821359)

	Calcium		Magnesium		Sodium	Potassium	Sulfate	Chloride	Boron	Hardness	
	T	D	T	D	D	D	D	D	D	T	D
Maximum detected	29	28	21	22	9	3.0	4	9	<0.1	159	161
Minimum detected	9	9	7	7	4	<0.5	<1.0	2	<0.1	51	51
Number of samples	24	24	24	24	24	24	24	24	24	24	24
Number of samples exceeding criteria or objectives											
USEPA - Taste and odor threshold <sup>1</sup>	-	-	-	-	0	-	-	-	-	-	-
Secondary MCL <sup>2</sup>	-	-	-	-	-	-	0	0	-	-	-
Agricultural Goal <sup>3</sup>	-	-	-	-	0	-	-	0	0	-	-
NAWQC <sup>4</sup> Aquatic Life	-	-	-	-	-	-	-	0	-	-	-
USEPA IRIS Reference Dose <sup>5</sup>	-	-	-	-	-	-	-	-	0	-	-
California DHS Action Level for drinking water <sup>6</sup>	-	-	-	-	-	-	-	-	0	-	-
USEPA draft Drinking Water Advisory <sup>1</sup>	-	-	-	-	0	-	-	-	-	-	-
USEPA Proposed MCL Goal <sup>1</sup>	-	-	-	-	-	-	0	-	-	-	-

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## Appendix 3b-3. Continued.

### Upper Pacific Heights Pond (A5L92771367)

	Calcium		Magnesium		Sodium	Potassium	Sulfate	Chloride	Boron	Hardness	
	T	D	T	D	D	D	D	D	D	T	D
Maximum detected	10	10	5	5	4	1.1	2	2	<0.1	46	46
Minimum detected	8	8	4	4	3	0.5	2	<1	<0.1	36	36
Number of samples	24	24	24	24	24	24	24	24	24	24	24
Number of samples exceeding criteria or objectives											
USEPA - Taste and odor threshold <sup>1</sup>	-	-	-	-	0	-	-	-	-	-	-
Secondary MCL <sup>2</sup>	-	-	-	-	-	-	0	0	-	-	-
Agricultural Goal <sup>3</sup>	-	-	-	-	0	-	-	0	0	-	-
NAWQC <sup>4</sup> Aquatic Life	-	-	-	-	-	-	-	0	-	-	-
USEPA IRIS Reference Dose <sup>5</sup>	-	-	-	-	-	-	-	-	0	-	-
California DHS Action Level for drinking water <sup>6</sup>	-	-	-	-	-	-	-	-	0	-	-
USEPA draft Drinking Water Advisory <sup>1</sup>	-	-	-	-	0	-	-	-	-	-	-
USEPA Proposed MCL Goal <sup>1</sup>	-	-	-	-	-	-	0	-	-	-	-

### Feather R US from Afterbay Outlet (A5-1695.50)

	Calcium		Magnesium		Sodium	Potassium	Sulfate	Chloride	Boron	Hardness	
	T	D	T	D	D	D	D	D	D	T	D
Maximum detected	9	10	5	5	4	1.1	3	2	<0.1	46	43
Minimum detected	7	7	3	3	3	0.7	2	<1.0	<0.1	30	30
Number of samples	18	30	18	30	30	30	30	30	30	30	30
Number of samples exceeding criteria or objectives											
USEPA - Taste and odor threshold <sup>1</sup>	-	-	-	-	0	-	-	-	-	-	-
Secondary MCL <sup>2</sup>	-	-	-	-	-	-	0	0	-	-	-
Agricultural Goal <sup>3</sup>	-	-	-	-	0	-	-	0	0	-	-
NAWQC <sup>4</sup> Aquatic Life	-	-	-	-	-	-	-	0	-	-	-
USEPA IRIS Reference Dose <sup>5</sup>	-	-	-	-	-	-	-	-	0	-	-
California DHS Action Level for drinking water <sup>6</sup>	-	-	-	-	-	-	-	-	0	-	-
USEPA draft Drinking Water Advisory <sup>1</sup>	-	-	-	-	0	-	-	-	-	-	-
USEPA Proposed MCL Goal <sup>1</sup>	-	-	-	-	-	-	0	-	-	-	-

### North Forebay C (A5-5185)

	Calcium		Magnesium		Sodium	Potassium	Sulfate	Chloride	Boron	Hardness	
	T	D	T	D	D	D	D	D	D	T	D
Maximum detected	16	15	9	8	6	1.7	4	2	<0.1	77	70
Minimum detected	6	6	3	3	3	0.7	1	<1.0	<0.1	27	27
Number of samples	20	20	20	20	20	20	20	20	20	20	20
Number of samples exceeding criteria or objectives											
USEPA - Taste and odor threshold <sup>1</sup>	-	-	-	-	0	-	-	-	-	-	-
Secondary MCL <sup>2</sup>	-	-	-	-	-	-	0	0	-	-	-
Agricultural Goal <sup>3</sup>	-	-	-	-	0	-	-	0	0	-	-
NAWQC <sup>4</sup> Aquatic Life	-	-	-	-	-	-	-	0	-	-	-
USEPA IRIS Reference Dose <sup>5</sup>	-	-	-	-	-	-	-	-	0	-	-
California DHS Action Level for drinking water <sup>6</sup>	-	-	-	-	-	-	-	-	0	-	-
USEPA draft Drinking Water Advisory <sup>1</sup>	-	-	-	-	0	-	-	-	-	-	-
USEPA Proposed MCL Goal <sup>1</sup>	-	-	-	-	-	-	0	-	-	-	-

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## Appendix 3b-3. Continued.

### Thermalito N Forebay Surface (A5R93161366)

	Calcium		Magnesium		Sodium	Potassium	Sulfate	Chloride	Boron	Hardness	
	T	D	T	D	D	D	D	D	D	T	D
Maximum detected	9	9	4	4	4	1.0	2	1	<0.1	39	39
Minimum detected	7	7	3	3	3	0.6	2	<1.0	<0.1	30	30
Number of samples	25	25	25	25	25	25	25	25	25	25	25
Number of samples exceeding criteria or objectives											
USEPA - Taste and odor threshold <sup>1</sup>	-	-	-	-	0	-	-	-	-	-	-
Secondary MCL <sup>2</sup>	-	-	-	-	-	-	0	0	-	-	-
Agricultural Goal <sup>3</sup>	-	-	-	-	0	-	-	0	0	-	-
NAWQC <sup>4</sup> Aquatic Life	-	-	-	-	-	-	-	0	-	-	-
USEPA IRIS Reference Dose <sup>5</sup>	-	-	-	-	-	-	-	-	0	-	-
California DHS Action Level for drinking water <sup>6</sup>	-	-	-	-	-	-	-	-	0	-	-
USEPA draft Drinking Water Advisory <sup>1</sup>	-	-	-	-	0	-	-	-	-	-	-
USEPA Proposed MCL Goal <sup>1</sup>	-	-	-	-	-	-	0	-	-	-	-

### Thermalito N Forebay Bottom (A5R93161366)

	Calcium		Magnesium		Sodium	Potassium	Sulfate	Chloride	Boron	Hardness	
	T	D	T	D	D	D	D	D	D	T	D
Maximum detected	9	9	4	4	4	0.9	2	1	<0.1	39	39
Minimum detected	7	7	3	3	3	0.6	2	<1.0	<0.1	30	30
Number of samples	24	24	24	24	24	24	24	24	24	24	24
Number of samples exceeding criteria or objectives											
USEPA - Taste and odor threshold <sup>1</sup>	-	-	-	-	0	-	-	-	-	-	-
Secondary MCL <sup>2</sup>	-	-	-	-	-	-	0	0	-	-	-
Agricultural Goal <sup>3</sup>	-	-	-	-	0	-	-	0	0	-	-
NAWQC <sup>4</sup> Aquatic Life	-	-	-	-	-	-	-	0	-	-	-
USEPA IRIS Reference Dose <sup>5</sup>	-	-	-	-	-	-	-	-	0	-	-
California DHS Action Level for drinking water <sup>6</sup>	-	-	-	-	-	-	-	-	0	-	-
USEPA draft Drinking Water Advisory <sup>1</sup>	-	-	-	-	0	-	-	-	-	-	-
USEPA Proposed MCL Goal <sup>1</sup>	-	-	-	-	-	-	0	-	-	-	-

### Thermalito S Forebay Surface (A5R93111370)

	Calcium		Magnesium		Sodium	Potassium	Sulfate	Chloride	Boron	Hardness	
	T	D	T	D	D	D	D	D	D	T	D
Maximum detected	9	9	4	4	4	1.0	2	1	<0.1	39	39
Minimum detected	7	6	3	3	3	0.6	2	<1.0	<0.1	30	27
Number of samples	25	25	25	25	25	25	25	25	25	25	25
Number of samples exceeding criteria or objectives											
USEPA - Taste and odor threshold <sup>1</sup>	-	-	-	-	0	-	-	-	-	-	-
Secondary MCL <sup>2</sup>	-	-	-	-	-	-	0	0	-	-	-
Agricultural Goal <sup>3</sup>	-	-	-	-	0	-	-	0	0	-	-
NAWQC <sup>4</sup> Aquatic Life	-	-	-	-	-	-	-	0	-	-	-
USEPA IRIS Reference Dose <sup>5</sup>	-	-	-	-	-	-	-	-	0	-	-
California DHS Action Level for drinking water <sup>6</sup>	-	-	-	-	-	-	-	-	0	-	-
USEPA draft Drinking Water Advisory <sup>1</sup>	-	-	-	-	0	-	-	-	-	-	-
USEPA Proposed MCL Goal <sup>1</sup>	-	-	-	-	-	-	0	-	-	-	-

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## Appendix 3b-3. Continued.

### Thermalito S Forebay Bottom (A5R93111370)

	Calcium		Magnesium		Sodium	Potassium	Sulfate	Chloride	Boron	Hardness	
	T	D	T	D	D	D	D	D	D	T	D
Maximum detected	10	9	4	4	4	0.8	2	1	0.0	39	39
Minimum detected	7	7	3	3	3	0.6	2	<1	<0.1	30	30
Number of samples	24	24	24	24	24	24	24	24	24	24	24
Number of samples exceeding criteria or objectives											
USEPA - Taste and odor threshold <sup>1</sup>	-	-	-	-	0	-	-	-	-	-	-
Secondary MCL <sup>2</sup>	-	-	-	-	-	-	0	0	-	-	-
Agricultural Goal <sup>3</sup>	-	-	-	-	0	-	-	0	0	-	-
NAWQC <sup>4</sup> Aquatic Life	-	-	-	-	-	-	-	0	-	-	-
USEPA IRIS Reference Dose <sup>5</sup>	-	-	-	-	-	-	-	-	0	-	-
California DHS Action Level for drinking water <sup>6</sup>	-	-	-	-	-	-	-	-	0	-	-
USEPA draft Drinking Water Advisory <sup>1</sup>	-	-	-	-	0	-	-	-	-	-	-
USEPA Proposed MCL Goal <sup>1</sup>	-	-	-	-	-	-	0	-	-	-	-

### Thermalito N Afterbay Surface (A5R93011411)

	Calcium		Magnesium		Sodium	Potassium	Sulfate	Chloride	Boron	Hardness	
	T	D	T	D	D	D	D	D	D	T	D
Maximum detected	10	10	4	4	4	1.0	2	1	<0.1	62	41
Minimum detected	7	7	3	3	3	0.6	2	<1.0	<0.1	30	30
Number of samples	25	25	25	25	25	25	25	25	25	25	25
Number of samples exceeding criteria or objectives											
USEPA - Taste and odor threshold <sup>1</sup>	-	-	-	-	0	-	-	-	-	-	-
Secondary MCL <sup>2</sup>	-	-	-	-	-	-	0	0	-	-	-
Agricultural Goal <sup>3</sup>	-	-	-	-	0	-	-	0	0	-	-
NAWQC <sup>4</sup> Aquatic Life	-	-	-	-	-	-	-	0	-	-	-
USEPA IRIS Reference Dose <sup>5</sup>	-	-	-	-	-	-	-	-	0	-	-
California DHS Action Level for drinking water <sup>6</sup>	-	-	-	-	-	-	-	-	0	-	-
USEPA draft Drinking Water Advisory <sup>1</sup>	-	-	-	-	0	-	-	-	-	-	-
USEPA Proposed MCL Goal <sup>1</sup>	-	-	-	-	-	-	0	-	-	-	-

### Thermalito N Afterbay Bottom (A5R93011411)

	Calcium		Magnesium		Sodium	Potassium	Sulfate	Chloride	Boron	Hardness	
	T	D	T	D	D	D	D	D	D	T	D
Maximum detected	10	10	4	4	4	0.9	2	1	<0.1	41	41
Minimum detected	7	7	3	3	3	0.6	2	<1.0	<0.1	30	30
Number of samples	24	24	24	24	24	24	24	24	24	24	24
Number of samples exceeding criteria or objectives											
USEPA - Taste and odor threshold <sup>1</sup>	-	-	-	-	0	-	-	-	-	-	-
Secondary MCL <sup>2</sup>	-	-	-	-	-	-	0	0	-	-	-
Agricultural Goal <sup>3</sup>	-	-	-	-	0	-	-	0	0	-	-
NAWQC <sup>4</sup> Aquatic Life	-	-	-	-	-	-	-	0	-	-	-
USEPA IRIS Reference Dose <sup>5</sup>	-	-	-	-	-	-	-	-	0	-	-
California DHS Action Level for drinking water <sup>6</sup>	-	-	-	-	-	-	-	-	0	-	-
USEPA draft Drinking Water Advisory <sup>1</sup>	-	-	-	-	0	-	-	-	-	-	-
USEPA Proposed MCL Goal <sup>1</sup>	-	-	-	-	-	-	0	-	-	-	-

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## Appendix 3b-3. Continued.

### Thermalito S Afterbay Surface (A5R92921412)

	Calcium		Magnesium		Sodium	Potassium	Sulfate	Chloride	Boron	Hardness	
	T	D	T	D	D	D	D	D	D	T	D
Maximum detected	9	9	4	4	4	1.0	2	1	<0.1	39	39
Minimum detected	7	7	3	3	3	0.6	2	<1.0	<0.1	30	30
Number of samples	25	25	25	25	25	25	25	25	25	25	25
Number of samples exceeding criteria or objectives											
USEPA - Taste and odor threshold <sup>1</sup>	-	-	-	-	0	-	-	-	-	-	-
Secondary MCL <sup>2</sup>	-	-	-	-	-	-	0	0	-	-	-
Agricultural Goal <sup>3</sup>	-	-	-	-	0	-	-	0	0	-	-
NAWQC <sup>4</sup> Aquatic Life	-	-	-	-	-	-	-	0	-	-	-
USEPA IRIS Reference Dose <sup>5</sup>	-	-	-	-	-	-	-	-	0	-	-
California DHS Action Level for drinking water <sup>6</sup>	-	-	-	-	-	-	-	-	0	-	-
USEPA draft Drinking Water Advisory <sup>1</sup>	-	-	-	-	0	-	-	-	-	-	-
USEPA Proposed MCL Goal <sup>1</sup>	-	-	-	-	-	-	0	-	-	-	-

### Thermalito S Afterbay Bottom (A5R92921412)

	Calcium		Magnesium		Sodium	Potassium	Sulfate	Chloride	Boron	Hardness	
	T	D	T	D	D	D	D	D	D	T	D
Maximum detected	9	10	4	4	4	1.0	2	1	<0.1	39	41
Minimum detected	7	7	3	3	3	0.6	2	<1.0	<0.1	30	30
Number of samples	24	24	24	24	24	24	24	24	24	24	24
Number of samples exceeding criteria or objectives											
USEPA - Taste and odor threshold <sup>1</sup>	-	-	-	-	0	-	-	-	-	-	-
Secondary MCL <sup>2</sup>	-	-	-	-	-	-	0	0	-	-	-
Agricultural Goal <sup>3</sup>	-	-	-	-	0	-	-	0	0	-	-
NAWQC <sup>4</sup> Aquatic Life	-	-	-	-	-	-	-	0	-	-	-
USEPA IRIS Reference Dose <sup>5</sup>	-	-	-	-	-	-	-	-	0	-	-
California DHS Action Level for drinking water <sup>6</sup>	-	-	-	-	-	-	-	-	0	-	-
USEPA draft Drinking Water Advisory <sup>1</sup>	-	-	-	-	0	-	-	-	-	-	-
USEPA Proposed MCL Goal <sup>1</sup>	-	-	-	-	-	-	0	-	-	-	-

### Afterbay Outlet Canal to Feather R (A5C92751383)

	Calcium		Magnesium		Sodium	Potassium	Sulfate	Chloride	Boron	Hardness	
	T	D	T	D	D	D	D	D	D	T	D
Maximum detected	10	10	4	4	4	1.1	3	1	<0.1	41	41
Minimum detected	4	7	3	3	3	0.6	2	<1.0	<0.1	30	30
Number of samples	30	30	30	30	30	30	30	30	30	30	30
Number of samples exceeding criteria or objectives											
USEPA - Taste and odor threshold <sup>1</sup>	-	-	-	-	0	-	-	-	-	-	-
Secondary MCL <sup>2</sup>	-	-	-	-	-	-	0	0	-	-	-
Agricultural Goal <sup>3</sup>	-	-	-	-	0	-	-	0	0	-	-
NAWQC <sup>4</sup> Aquatic Life	-	-	-	-	-	-	-	0	-	-	-
USEPA IRIS Reference Dose <sup>5</sup>	-	-	-	-	-	-	-	-	0	-	-
California DHS Action Level for drinking water <sup>6</sup>	-	-	-	-	-	-	-	-	0	-	-
USEPA draft Drinking Water Advisory <sup>1</sup>	-	-	-	-	0	-	-	-	-	-	-
USEPA Proposed MCL Goal <sup>1</sup>	-	-	-	-	-	-	0	-	-	-	-

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## Appendix 3b-3. Continued.

### Feather R DS from Afterbay Outlet (A5-1687.70)

	Calcium		Magnesium		Sodium	Potassium	Sulfate	Chloride	Boron	Hardness	
	T	D	T	D	D	D	D	D	D	T	D
Maximum detected	9	10	4	4	4	1.0	2	2	<0.1	41	41
Minimum detected	7	7	3	3	3	0.6	2	<1.0	<0.1	30	30
Number of samples	18	30	18	30	30	30	30	30	30	30	30
Number of samples exceeding criteria or objectives											
USEPA - Taste and odor threshold <sup>1</sup>	-	-	-	-	0	-	-	-	-	-	-
Secondary MCL <sup>2</sup>	-	-	-	-	-	-	0	0	-	-	-
Agricultural Goal <sup>3</sup>	-	-	-	-	0	-	-	0	0	-	-
NAWQC <sup>4</sup> Aquatic Life	-	-	-	-	-	-	-	0	-	-	-
USEPA IRIS Reference Dose <sup>5</sup>	-	-	-	-	-	-	-	-	0	-	-
California DHS Action Level for drinking water <sup>6</sup>	-	-	-	-	-	-	-	-	0	-	-
USEPA draft Drinking Water Advisory <sup>1</sup>	-	-	-	-	0	-	-	-	-	-	-
USEPA Proposed MCL Goal <sup>1</sup>	-	-	-	-	-	-	0	-	-	-	-

### Feather R DS from SCOR Outlet (A5-1687.20)

	Calcium		Magnesium		Sodium	Potassium	Sulfate	Chloride	Boron	Hardness	
	T	D	T	D	D	D	D	D	D	T	D
Maximum detected	9	10	4	4	5	1.1	3	3	<0.1	41	41
Minimum detected	7	7	3	3	3	0.7	2	<1.0	<0.1	30	30
Number of samples	17	29	17	29	29	29	29	29	29	29	29
Number of samples exceeding criteria or objectives											
USEPA - Taste and odor threshold <sup>1</sup>	-	-	-	-	0	-	-	-	-	-	-
Secondary MCL <sup>2</sup>	-	-	-	-	-	-	0	0	-	-	-
Agricultural Goal <sup>3</sup>	-	-	-	-	0	-	-	0	0	-	-
NAWQC <sup>4</sup> Aquatic Life	-	-	-	-	-	-	-	0	-	-	-
USEPA IRIS Reference Dose <sup>5</sup>	-	-	-	-	-	-	-	-	0	-	-
California DHS Action Level for drinking water <sup>6</sup>	-	-	-	-	-	-	-	-	0	-	-
USEPA draft Drinking Water Advisory <sup>1</sup>	-	-	-	-	0	-	-	-	-	-	-
USEPA Proposed MCL Goal <sup>1</sup>	-	-	-	-	-	-	0	-	-	-	-

### Lower Pacific Heights Pond (A5L92551372)

	Calcium		Magnesium		Sodium	Potassium	Sulfate	Chloride	Boron	Hardness	
	T	D	T	D	D	D	D	D	D	T	D
Maximum detected	22	22	20	20	7	2.5	2	3	<0.1	127	125
Minimum detected	9	11	4	7	4	<0.5	<1.0	1	<0.1	39	39
Number of samples	24	24	24	24	24	24	24	24	24	24	24
Number of samples exceeding criteria or objectives											
USEPA - Taste and odor threshold <sup>1</sup>	-	-	-	-	0	-	-	-	-	-	-
Secondary MCL <sup>2</sup>	-	-	-	-	-	-	0	0	-	-	-
Agricultural Goal <sup>3</sup>	-	-	-	-	0	-	-	0	0	-	-
NAWQC <sup>4</sup> Aquatic Life	-	-	-	-	-	-	-	0	-	-	-
USEPA IRIS Reference Dose <sup>5</sup>	-	-	-	-	-	-	-	-	0	-	-
California DHS Action Level for drinking water <sup>6</sup>	-	-	-	-	-	-	-	-	0	-	-
USEPA draft Drinking Water Advisory <sup>1</sup>	-	-	-	-	0	-	-	-	-	-	-
USEPA Proposed MCL Goal <sup>1</sup>	-	-	-	-	-	-	0	-	-	-	-

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## Appendix 3b-3. Continued.

### Mile Long Pond Surface (A59L92541377)

	Calcium		Magnesium		Sodium	Potassium	Sulfate	Chloride	Boron	Hardness	
	T	D	T	D	D	D	D	D	D	T	D
Maximum detected	12	12	6	6	5	1.2	2	2	<0.1	52	52
Minimum detected	8	8	4	4	3	<0.5	1	1	<0.1	39	36
Number of samples	24	24	24	24	24	24	24	24	24	24	24
Number of samples exceeding criteria or objectives											
USEPA - Taste and odor threshold <sup>1</sup>	-	-	-	-	0	-	-	-	-	-	-
Secondary MCL <sup>2</sup>	-	-	-	-	-	-	0	0	-	-	-
Agricultural Goal <sup>3</sup>	-	-	-	-	0	-	-	0	0	-	-
NAWQC <sup>4</sup> Aquatic Life	-	-	-	-	-	-	-	0	-	-	-
USEPA IRIS Reference Dose <sup>5</sup>	-	-	-	-	-	-	-	-	0	-	-
California DHS Action Level for drinking water <sup>6</sup>	-	-	-	-	-	-	-	-	0	-	-
USEPA draft Drinking Water Advisory <sup>1</sup>	-	-	-	-	0	-	-	-	-	-	-
USEPA Proposed MCL Goal <sup>1</sup>	-	-	-	-	-	-	0	-	-	-	-

### Mile Long Pond Bottom (A59L92541377)

	Calcium		Magnesium		Sodium	Potassium	Sulfate	Chloride	Boron	Hardness	
	T	D	T	D	D	D	D	D	D	T	D
Maximum detected	14	14	10	10	6	1.5	2	4	<0.1	76	76
Minimum detected	8	8	4	4	3	<0.5	<1.0	1	<0.1	41	36
Number of samples	24	24	24	24	24	24	24	24	24	24	24
Number of samples exceeding criteria or objectives											
USEPA - Taste and odor threshold <sup>1</sup>	-	-	-	-	0	-	-	-	-	-	-
Secondary MCL <sup>2</sup>	-	-	-	-	-	-	0	0	-	-	-
Agricultural Goal <sup>3</sup>	-	-	-	-	0	-	-	0	0	-	-
NAWQC <sup>4</sup> Aquatic Life	-	-	-	-	-	-	-	0	-	-	-
USEPA IRIS Reference Dose <sup>5</sup>	-	-	-	-	-	-	-	-	0	-	-
California DHS Action Level for drinking water <sup>6</sup>	-	-	-	-	-	-	-	-	0	-	-
USEPA draft Drinking Water Advisory <sup>1</sup>	-	-	-	-	0	-	-	-	-	-	-
USEPA Proposed MCL Goal <sup>1</sup>	-	-	-	-	-	-	0	-	-	-	-

### Feather R NR Mile Long Pond (A5-1662.50)

	Calcium		Magnesium		Sodium	Potassium	Sulfate	Chloride	Boron	Hardness	
	T	D	T	D	D	D	D	D	D	T	D
Maximum detected	9	9	4	4	4	1.1	4	2	<0.1	41	39
Minimum detected	7	7	3	3	3	0.6	2	<1.0	<0.1	30	30
Number of samples	17	29	17	29	29	29	29	29	29	29	29
Number of samples exceeding criteria or objectives											
USEPA - Taste and odor threshold <sup>1</sup>	-	-	-	-	0	-	-	-	-	-	-
Secondary MCL <sup>2</sup>	-	-	-	-	-	-	0	0	-	-	-
Agricultural Goal <sup>3</sup>	-	-	-	-	0	-	-	0	0	-	-
NAWQC <sup>4</sup> Aquatic Life	-	-	-	-	-	-	-	0	-	-	-
USEPA IRIS Reference Dose <sup>5</sup>	-	-	-	-	-	-	-	-	0	-	-
California DHS Action Level for drinking water <sup>6</sup>	-	-	-	-	-	-	-	-	0	-	-
USEPA draft Drinking Water Advisory <sup>1</sup>	-	-	-	-	0	-	-	-	-	-	-
USEPA Proposed MCL Goal <sup>1</sup>	-	-	-	-	-	-	0	-	-	-	-

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## Appendix 3b-3. Continued.

### Feather R DS from Project Boundary (A5-1645.50)

	Calcium		Magnesium		Sodium	Potassium	Sulfate	Chloride	Boron	Hardness	
	T	D	T	D	D	D	D	D	D	T	D
Maximum detected	9	9	4	4	4	1.0	3	2	<0.1	46	39
Minimum detected	7	7	3	3	3	0.6	2	<1.0	<0.1	30	30
Number of samples	18	30	18	30	30	30	30	30	30	30	30
Number of samples exceeding criteria or objectives											
USEPA - Taste and odor threshold <sup>1</sup>	-	-	-	-	0	-	-	-	-	-	-
Secondary MCL <sup>2</sup>	-	-	-	-	-	-	0	0	-	-	-
Agricultural Goal <sup>3</sup>	-	-	-	-	0	-	-	0	0	-	-
NAWQC <sup>4</sup> Aquatic Life	-	-	-	-	-	-	-	0	-	-	-
USEPA IRIS Reference Dose <sup>5</sup>	-	-	-	-	-	-	-	-	0	-	-
California DHS Action Level for drinking water <sup>6</sup>	-	-	-	-	-	-	-	-	0	-	-
USEPA draft Drinking Water Advisory <sup>1</sup>	-	-	-	-	0	-	-	-	-	-	-
USEPA Proposed MCL Goal <sup>1</sup>	-	-	-	-	-	-	0	-	-	-	-

### Feather R at Singh AB Riviera Rd, (A5-1556.50)

	Calcium		Magnesium		Sodium	Potassium	Sulfate	Chloride	Boron	Hardness	
	T	D	T	D	D	D	D	D	D	T	D
Maximum detected	10	10	6	5	5	1.1	3	2	<0.1	50	46
Minimum detected	7	7	3	3	3	0.6	2	<1	<0.1	30	30
Number of samples	17	29	17	29	29	29	29	29	29	29	29
Number of samples exceeding criteria or objectives											
USEPA - Taste and odor threshold <sup>1</sup>	-	-	-	-	0	-	-	-	-	-	-
Secondary MCL <sup>2</sup>	-	-	-	-	-	-	0	0	-	-	-
Agricultural Goal <sup>3</sup>	-	-	-	-	0	-	-	0	0	-	-
NAWQC <sup>4</sup> Aquatic Life	-	-	-	-	-	-	-	0	-	-	-
USEPA IRIS Reference Dose <sup>5</sup>	-	-	-	-	-	-	-	-	0	-	-
California DHS Action Level for drinking water <sup>6</sup>	-	-	-	-	-	-	-	-	0	-	-
USEPA draft Drinking Water Advisory <sup>1</sup>	-	-	-	-	0	-	-	-	-	-	-
USEPA Proposed MCL Goal <sup>1</sup>	-	-	-	-	-	-	0	-	-	-	-

### Honcut C at Pacific Ranch NR Palermo (A5-7010.50)

	Calcium		Magnesium		Sodium	Potassium	Sulfate	Chloride	Boron	Hardness	
	T	D	T	D	D	D	D	D	D	T	D
Maximum detected	21	21	16	16	16	4.0	18	35	<0.1	118	118
Minimum detected	6	5	4	3	4	0.6	3	2	<0.1	31	25
Number of samples	17	29	17	29	29	29	29	29	29	29	29
Number of samples exceeding criteria or objectives											
USEPA - Taste and odor threshold <sup>1</sup>	-	-	-	-	0	-	-	-	-	-	-
Secondary MCL <sup>2</sup>	-	-	-	-	-	-	0	0	-	-	-
Agricultural Goal <sup>3</sup>	-	-	-	-	0	-	-	0	0	-	-
NAWQC <sup>4</sup> Aquatic Life	-	-	-	-	-	-	-	0	-	-	-
USEPA IRIS Reference Dose <sup>5</sup>	-	-	-	-	-	-	-	-	0	-	-
California DHS Action Level for drinking water <sup>6</sup>	-	-	-	-	-	-	-	-	0	-	-
USEPA draft Drinking Water Advisory <sup>1</sup>	-	-	-	-	0	-	-	-	-	-	-
USEPA Proposed MCL Goal <sup>1</sup>	-	-	-	-	-	-	0	-	-	-	-

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## Appendix 3b-3. Continued.

### Feather R A Archer Ave. (A5-1516.50)

	Calcium		Magnesium		Sodium	Potassium	Sulfate	Chloride	Boron	Hardness	
	T	D	T	D	D	D	D	D	D	T	D
Maximum detected	10	10	5	5	5	1.4	5	4	<0.1	46	46
Minimum detected	7	6	4	3	3	0.6	2	<1.0	<0.1	34	30
Number of samples	16	29	16	29	29	29	29	29	29	29	29
Number of samples exceeding criteria or objectives											
USEPA - Taste and odor threshold <sup>1</sup>	-	-	-	-	0	-	-	-	-	-	-
Secondary MCL <sup>2</sup>	-	-	-	-	-	-	0	0	-	-	-
Agricultural Goal <sup>3</sup>	-	-	-	-	0	-	-	0	0	-	-
NAWQC <sup>4</sup> Aquatic Life	-	-	-	-	-	-	-	0	-	-	-
USEPA IRIS Reference Dose <sup>5</sup>	-	-	-	-	-	-	-	-	0	-	-
California DHS Action Level for drinking water <sup>6</sup>	-	-	-	-	-	-	-	-	0	-	-
USEPA draft Drinking Water Advisory <sup>1</sup>	-	-	-	-	0	-	-	-	-	-	-
USEPA Proposed MCL Goal <sup>1</sup>	-	-	-	-	-	-	0	-	-	-	-

### Feather R US from Yuba R (A5-1425.50)

	Calcium		Magnesium		Sodium	Potassium	Sulfate	Chloride	Boron	Hardness	
	T	D	T	D	D	D	D	D	D	T	D
Maximum detected	10	10	6	5	5	1.5	5	4	<0.1	50	46
Minimum detected	7	6	3	3	3	0.6	2	<1	<0.1	30	27
Number of samples	16	30	16	30	30	30	30	30	30	29	29
Number of samples exceeding criteria or objectives											
USEPA - Taste and odor threshold <sup>1</sup>	-	-	-	-	0	-	-	-	-	-	-
Secondary MCL <sup>2</sup>	-	-	-	-	-	-	0	0	-	-	-
Agricultural Goal <sup>3</sup>	-	-	-	-	0	-	-	0	0	-	-
NAWQC <sup>4</sup> Aquatic Life	-	-	-	-	-	-	-	0	-	-	-
USEPA IRIS Reference Dose <sup>5</sup>	-	-	-	-	-	-	-	-	0	-	-
California DHS Action Level for drinking water <sup>6</sup>	-	-	-	-	-	-	-	-	0	-	-
USEPA draft Drinking Water Advisory <sup>1</sup>	-	-	-	-	0	-	-	-	-	-	-
USEPA Proposed MCL Goal <sup>1</sup>	-	-	-	-	-	-	0	-	-	-	-

### Yuba R at Mouth (A6-1010.50)

	Calcium		Magnesium		Sodium	Potassium	Sulfate	Chloride	Boron	Hardness	
	T	D	T	D	D	D	D	D	D	T	D
Maximum detected	11	11	4	4	4	0.8	6	3	<0.1	44	44
Minimum detected	8	4	3	3	2	<0.5	3	<1.0	<0.1	32	30
Number of samples	16	30	16	30	30	30	30	30	30	29	29
Number of samples exceeding criteria or objectives											
USEPA - Taste and odor threshold <sup>1</sup>	-	-	-	-	0	-	-	-	-	-	-
Secondary MCL <sup>2</sup>	-	-	-	-	-	-	0	0	-	-	-
Agricultural Goal <sup>3</sup>	-	-	-	-	0	-	-	0	0	-	-
NAWQC <sup>4</sup> Aquatic Life	-	-	-	-	-	-	-	0	-	-	-
USEPA IRIS Reference Dose <sup>5</sup>	-	-	-	-	-	-	-	-	0	-	-
California DHS Action Level for drinking water <sup>6</sup>	-	-	-	-	-	-	-	-	0	-	-
USEPA draft Drinking Water Advisory <sup>1</sup>	-	-	-	-	0	-	-	-	-	-	-
USEPA Proposed MCL Goal <sup>1</sup>	-	-	-	-	-	-	0	-	-	-	-

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## Appendix 3b-3. Continued.

### Feather R at Shanghai Bend (A5-1389.50)

	Calcium		Magnesium		Sodium	Potassium	Sulfate	Chloride	Boron	Hardness	
	T	D	T	D	D	D	D	D	D	T	D
Maximum detected	10	10	5	5	5	1.5	5	4	<0.1	46	46
Minimum detected	7	2	3	2	3	0.6	2	<1.0	<0.1	30	27
Number of samples	16	30	16	30	30	30	30	30	30	30	30
Number of samples exceeding criteria or objectives											
USEPA - Taste and odor threshold <sup>1</sup>	-	-	-	-	0	-	-	-	-	-	-
Secondary MCL <sup>2</sup>	-	-	-	-	-	-	0	0	-	-	-
Agricultural Goal <sup>3</sup>	-	-	-	-	0	-	-	0	0	-	-
NAWQC <sup>4</sup> Aquatic Life	-	-	-	-	-	-	-	0	-	-	-
USEPA IRIS Reference Dose <sup>5</sup>	-	-	-	-	-	-	-	-	0	-	-
California DHS Action Level for drinking water <sup>6</sup>	-	-	-	-	-	-	-	-	0	-	-
USEPA draft Drinking Water Advisory <sup>1</sup>	-	-	-	-	0	-	-	-	-	-	-
USEPA Proposed MCL Goal <sup>1</sup>	-	-	-	-	-	-	0	-	-	-	-

### Bear R near Mouth (A6-5010.50)

	Calcium		Magnesium		Sodium	Potassium	Sulfate	Chloride	Boron	Hardness	
	T	D	T	D	D	D	D	D	D	T	D
Maximum detected	13	17	8	10	16	7.0	8	21	<0.1	84	84
Minimum detected	7	6	4	3	4	0.7	3	<1.0	<0.1	30	27
Number of samples	16	29	16	29	29	29	29	29	29	29	29
Number of samples exceeding criteria or objectives											
USEPA - Taste and odor threshold <sup>1</sup>	-	-	-	-	0	-	-	-	-	-	-
Secondary MCL <sup>2</sup>	-	-	-	-	-	-	0	0	-	-	-
Agricultural Goal <sup>3</sup>	-	-	-	-	0	-	-	0	0	-	-
NAWQC <sup>4</sup> Aquatic Life	-	-	-	-	-	-	-	0	-	-	-
USEPA IRIS Reference Dose <sup>5</sup>	-	-	-	-	-	-	-	-	0	-	-
California DHS Action Level for drinking water <sup>6</sup>	-	-	-	-	-	-	-	-	0	-	-
USEPA draft Drinking Water Advisory <sup>1</sup>	-	-	-	-	0	-	-	-	-	-	-
USEPA Proposed MCL Goal <sup>1</sup>	-	-	-	-	-	-	0	-	-	-	-

### Feather R near Verona (A5-1010.50)

	Calcium		Magnesium		Sodium	Potassium	Sulfate	Chloride	Boron	Hardness	
	T	D	T	D	D	D	D	D	D	T	D
Maximum detected	10	11	4	5	6	1.7	5	4	<0.1	48	48
Minimum detected	7	7	3	3	3	0.5	2	<1.0	<0.1	30	30
Number of samples	16	30	16	30	30	30	30	30	30	30	30
Number of samples exceeding criteria or objectives											
USEPA - Taste and odor threshold <sup>1</sup>	-	-	-	-	0	-	-	-	-	-	-
Secondary MCL <sup>2</sup>	-	-	-	-	-	-	0	0	-	-	-
Agricultural Goal <sup>3</sup>	-	-	-	-	0	-	-	0	0	-	-
NAWQC <sup>4</sup> Aquatic Life	-	-	-	-	-	-	-	0	-	-	-
USEPA IRIS Reference Dose <sup>5</sup>	-	-	-	-	-	-	-	-	0	-	-
California DHS Action Level for drinking water <sup>6</sup>	-	-	-	-	-	-	-	-	0	-	-
USEPA draft Drinking Water Advisory <sup>1</sup>	-	-	-	-	0	-	-	-	-	-	-
USEPA Proposed MCL Goal <sup>1</sup>	-	-	-	-	-	-	0	-	-	-	-

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## Appendix 3b-3. Continued.

### Sacramento R US from Feather R (A0-2157.50)

	Calcium		Magnesium		Sodium	Potassium	Sulfate	Chloride	Boron	Hardness	
	T	D	T	D	D	D	D	D	D	T	D
Maximum detected	18	18	11	11	17	2.6	18	8	<0.1	90	88
Minimum detected	10	7	6	4	4	1.0	4	<1.0	<0.1	52	34
Number of samples	15	28	15	28	28	28	28	28	28	28	28
Number of samples exceeding criteria or objectives											
USEPA - Taste and odor threshold <sup>1</sup>	-	-	-	-	0	-	-	-	-	-	-
Secondary MCL <sup>2</sup>	-	-	-	-	-	-	0	0	-	-	-
Agricultural Goal <sup>3</sup>	-	-	-	-	0	-	-	0	0	-	-
NAWQC <sup>4</sup> Aquatic Life	-	-	-	-	-	-	-	0	-	-	-
USEPA IRIS Reference Dose <sup>5</sup>	-	-	-	-	-	-	-	-	0	-	-
California DHS Action Level for drinking water <sup>6</sup>	-	-	-	-	-	-	-	-	0	-	-
USEPA draft Drinking Water Advisory <sup>7</sup>	-	-	-	-	0	-	-	-	-	-	-
USEPA Proposed MCL Goal <sup>8</sup>	-	-	-	-	-	-	0	-	-	-	-

#### Footnotes

1. U.S. Environmental Protection Agency, Office of Water, 2004 Edition of the Drinking Water Standards and Health Advisories. (Winter 2004). EPA 822-R-04-005.
2. California Department of Health Services, California Code of Regulations, Title 22, Division 4, Chapter 15, Domestic Water Quality and Monitoring
3. Food and Agriculture Organization of the United Nations, 1985. Water Quality for Agriculture.
4. U.S. Environmental Protection Agency, Quality Criteria for Water, 1986 (May 1986) [The Gold Book] plus updates (various dates).
5. U.S. Environmental Protection Agency, Integrated Risk Information System [IRIS] database
6. California Department of Health Services, Division of Drinking Water and Environmental Management, Drinking Water Action Levels (6 June 2003), <http://www.dhs.cahwnet.gov/ps/ddwem>.
7. Chronic (4 day average)
8. Acute (1 hr average)

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## Appendix 3c-1. Summary of metal numerical limits for the Upper Feather River (µg/L).

### CONCOW CREEK AT JORDAN HILL ROAD (A5-2950)

	Aluminum		Arsenic		Cadmium		Chromium		Copper		Iron		Mercury	Methyl Mercury	Manganese		Nickel		Lead		Selenium		Silver		Zinc	
	T	D	T	D	T	D	T	D	T	D	T	D	T	T	T	D	T	D	T	D	T	D	T	D	T	D
Maximum detected	407	405	0.272	0.15	0.020	0.001	1.91	1.31	1.35	0.925	476	429	0.00291	0.00005	219	118	8.21	7.09	0.162	0.062	0.09	0.282	0.162	0.11	0.9	0.40
Minimum detected	4.2	<1.5	<0.03	0.03	<0.003	<0.003	0.13	<0.07	0.30	0.229	0.34	<3.31	0.00051	<0.00002	1.64	0.08	1.12	0.65	<0.01	<0.01	<0.04	<0.04	<0.197	<0.024	<0.1	<0.1
Number of samples	29	27	29	27	29	27	29	27	29	27	29	27	28	27	29	27	29	27	29	27	29	27	13	13	29	27
Number of samples exceeding criteria or objectives																										
Public Health Goal <sup>1</sup>	0	-	-	-	0	-	-	-	0	-	-	-	0	-	0	-	0	-	0	-	-	-	-	-	-	-
Primary MCL <sup>2</sup>	0	-	0	-	0	-	0	-	0	-	-	-	0	-	-	-	0	-	0	-	0	-	-	-	-	-
Secondary MCL <sup>2</sup>	3	-	-	-	-	-	-	-	0	-	1	-	-	-	-	-	-	-	-	-	-	-	0	-	0	-
Agricultural Goal <sup>3</sup>	0	-	0	-	0	-	0	-	0	-	0	-	-	-	1	-	0	-	0	-	0	-	-	-	0	-
Cal/EPA Cancer Potency Factor <sup>4</sup>	-	-	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CTR <sup>5</sup> Humans	-	-	-	-	-	-	-	-	0	-	-	-	0	-	-	-	0	-	-	-	-	-	-	-	-	-
CTR <sup>5</sup> Aquatic Life	-	-	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0	-	-	0	0	0	0	0
NTR <sup>6</sup>	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-
NAWQC <sup>7</sup> Humans	-	-	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NAWQC <sup>7</sup> Aquatic Life	5 <sup>9</sup>	-	-	-	-	-	-	-	-	-	0	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-
USEPA IRIS Reference Dose <sup>8</sup>	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	0	-	0	-

### WEST BRANCH FEATHER RIVER NEAR PARADISE (A5-2250)

	Aluminum		Arsenic		Cadmium		Chromium		Copper		Iron		Mercury	Methyl Mercury	Manganese		Nickel		Lead		Selenium		Silver		Zinc	
	T	D	T	D	T	D	T	D	T	D	T	D	T	T	T	D	T	D	T	D	T	D	T	D	T	D
Maximum detected	2588	569	0.999	0.826	0.007	<0.031	8.33	5.41	4.92	1.34	1792	392	0.00502	0.00035	62	9.31	15.2	5.06	0.428	0.073	0.23	0.18	0.024	0.138	4.17	3.97
Minimum detected	6.2	2	0.081	0.08	<0.008	<0.003	0.29	0.12	0.17	0.165	5.4	<3.5	0.0003	<0.00002	0.31	0.038	0.38	0.3	<0.01	<0.01	<0.04	<0.04	<0.123	<0.001	<0.1	<0.1
Number of samples	23	22	23	22	23	22	23	22	23	22	23	22	23	22	23	22	23	22	23	22	23	22	13	13	23	22
Number of samples exceeding criteria or objectives																										
Public Health Goal <sup>1</sup>	2	-	-	-	0	-	-	-	0	-	-	-	0	-	0	-	1	-	0	-	-	-	-	-	-	-
Primary MCL <sup>2</sup>	2	-	0	-	0	-	0	-	0	-	-	-	0	-	-	-	0	-	0	-	0	-	-	-	-	-
Secondary MCL <sup>2</sup>	2	-	-	-	-	-	-	-	0	-	2	-	-	-	-	-	-	-	-	-	-	-	0	-	0	-
Agricultural Goal <sup>3</sup>	0	-	0	-	0	-	0	-	0	-	0	-	-	-	0	-	0	-	0	-	0	-	-	-	0	-
Cal/EPA Cancer Potency Factor <sup>4</sup>	-	-	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CTR <sup>5</sup> Humans	-	-	-	-	-	-	-	-	0	-	-	-	0	-	-	-	0	-	-	-	-	-	-	-	-	-
CTR <sup>5</sup> Aquatic Life	-	-	0	0	0	0	0	0	1 <sup>9</sup>	0	-	-	-	-	-	-	0	0	0	-	-	0	0	0	0	0
NTR <sup>6</sup>	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-
NAWQC <sup>7</sup> Humans	-	-	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NAWQC <sup>7</sup> Aquatic Life	3 <sup>9</sup> 2 <sup>10</sup>	-	-	-	-	-	-	-	-	-	0	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-
USEPA IRIS Reference Dose <sup>8</sup>	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	0	-	0	-

Preliminary Information – Subject to Revision – For Collaborative Process Purposes Only

# Appendix 3c-1. Continued.

## WEST BRANCH FEATHER RIVER UPSTREAM OF LAKE OROVILLE (A5-2350.50)

	Aluminum		Arsenic		Cadmium		Chromium		Copper		Iron		Mercury	Methyl Mercury	Manganese		Nickel		Lead		Selenium		Silver		Zinc	
	T	D	T	D	T	D	T	D	T	D	T	D	T	T	T	D	T	D	T	D	T	D	T	D	T	D
Maximum detected	79	17	0.697	0.714	0.003	0.002	0.61	0.32	0.62	0.51	88.4	19.3	0.00087	0.00009	22	11	1.12	0.75	0.011	<0.002	<0.18	<0.18			0.29	0.14
Minimum detected	36.7	8.4	0.112	0.083	<0.002	<0.002	0.2	0.13	0.31	0.24	34.6	10.2	0.00054	0.00001	1.38	0.52	0.36	0.27	<0.002	<0.002	<0.07	<0.07			0.1	0.1
Number of samples	4	3	4	3	4	3	4	3	4	3	4	3	4	3	4	4	4	4	4	4	4	4	0	0	4	3
Number of samples exceeding criteria or objectives																										
Public Health Goal <sup>1</sup>	0	-	-	-	0	-	-	-	0	-	-	-	0	-	0	-	0	-	0	-	-	-	-	-	-	-
Primary MCL <sup>2</sup>	0	-	0	-	0	-	0	-	0	-	-	-	0	-	-	-	0	-	0	-	0	-	-	-	-	-
Secondary MCL <sup>2</sup>	0	-	0	-	-	-	-	-	0	-	0	-	-	-	1	-	-	-	-	-	-	-	0	-	0	-
Agricultural Goal <sup>3</sup>	0	-	0	-	0	-	0	-	0	-	0	-	-	-	0	-	0	-	0	-	0	-	-	-	0	-
Cal/EPA Cancer Potency Factor <sup>4</sup>	-	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CTR <sup>5</sup> Humans	-	-	-	-	-	-	-	-	0	-	-	-	0	-	-	-	0	-	-	-	-	-	-	-	-	-
CTR <sup>5</sup> Aquatic Life	-	-	-	0	0	0	-	0	0	0	-	-	-	-	-	-	0	-	0	-	-	-	0	0	0	0
NTR <sup>6</sup>	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-	-
NAWQC <sup>7</sup> Humans	-	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NAWQC <sup>7</sup> Aquatic Life	0	-	-	-	-	-	-	-	-	-	0	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-
USEPA IRIS Reference Dose <sup>8</sup>	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	0	-	0	-	0	-	-

## NORTH FORK FEATHER RIVER UPSTREAM FROM POE POWERHOUSE (A5-3130)

	Aluminum		Arsenic		Cadmium		Chromium		Copper		Iron		Mercury	Methyl Mercury	Manganese		Nickel		Lead		Selenium		Silver		Zinc	
	T	D	T	D	T	D	T	D	T	D	T	D	T	T	T	D	T	D	T	D	T	D	T	D	T	D
Maximum detected	2157	1423	3.84	1.69	0.065	0.001	8.29	6.42	15.5	4.17	3445	1289	0.0263	0.00004	277	37.8	60.8	7.76	2.450	0.66	0.12	0.24	0.038	<0.025	12.5	2.95
Minimum detected	8.78	<1.5	0.44	0.33	<0.008	<0.008	<0.07	<0.07	0.37	0.34	11.2	3.90	0.00027	<0.00002	2.6	0.137	0.5	0.4	<0.01	<0.01	<0.04	<0.06	<0.025	<0.001	<0.1	<0.1
Number of samples	24	23	24	23	24	23	24	23	24	23	24	23	24	23	24	23	24	23	24	23	24	23	13	13	24	23
Number of samples exceeding criteria or objectives																										
Public Health Goal <sup>1</sup>	2	-	-	-	0	-	-	-	0	-	-	-	0	-	0	-	0	-	1	-	-	-	-	-	-	-
Primary MCL <sup>2</sup>	2	-	0	-	0	-	0	-	0	-	-	-	0	-	-	-	0	-	0	-	0	-	-	-	-	-
Secondary MCL <sup>2</sup>	3	-	-	-	-	-	-	-	0	-	3	-	-	-	2	-	-	-	-	-	-	-	0	-	0	-
Agricultural Goal <sup>3</sup>	0	-	0	-	0	-	0	-	0	-	0	-	-	-	1	-	0	-	0	-	0	-	-	-	0	-
Cal/EPA Cancer Potency Factor <sup>4</sup>	-	-	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CTR <sup>5</sup> Humans	-	-	-	-	-	-	-	-	0	-	-	-	0	-	-	-	0	-	-	-	-	-	-	-	-	-
CTR <sup>5</sup> Aquatic Life	-	-	-	0	0	0	-	0	2	0	-	-	-	-	-	-	-	-	0	0	-	-	0	0	0	0
NTR <sup>6</sup>	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-	-
NAWQC <sup>7</sup> Humans	-	-	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NAWQC <sup>7</sup> Aquatic Life	3	2	-	-	-	-	-	-	-	-	2	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-
USEPA IRIS Reference Dose <sup>8</sup>	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	0	-	0	-	0	-	-

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# Appendix 3c-1. Continued.

## POE POWERHOUSE DISCHARGE (A5-3931.50)

	Aluminum		Arsenic		Cadmium		Chromium		Copper		Iron		Mercury	Methyl Mercury	Manganese		Nickel		Lead		Selenium		Silver		Zinc	
	T	D	T	D	T	D	T	D	T	D	T	D	T	T	T	D	T	D	T	D	T	D	T	D	T	D
Maximum detected	4302	1631	546	2.01	0.116	0.002	12.70	5.91	23.6	4.31	6847	1416	0.0293	0.00035	477	41.6	36.4	7.1	3.93	0.599	0.11	0.14	0.187	0.014	22.6	3.49
Minimum detected	17.2	<1.5	0.62	0.41	<0.003	<0.003	<0.07	<0.07	0.27	0.24	40.4	4.30	0.00024	<0.00002	6.15	0.06	0.5	<0.04	<0.01	<0.01	<0.04	<0.06	<0.123	<0.001	0.09	<0.1
Number of samples	25	24	25	24	25	24	25	24	25	24	25	24	25	24	25	24	25	24	25	24	25	24	14	14	25	24
Number of samples exceeding criteria or objectives																										
Public Health Goal <sup>1</sup>	2	-	-	-	1	-	-	-	0	-	-	-	0	-	0	-	0	-	1	-	-	-	-	-	-	-
Primary MCL <sup>2</sup>	2	-	0	-	0	-	0	-	0	-	-	-	0	-	-	-	0	-	0	-	0	-	-	-	-	-
Secondary MCL <sup>2</sup>	4	-	-	-	-	-	-	-	0	-	4	-	-	-	2	-	-	-	-	-	-	0	-	0	-	-
Agricultural Goal <sup>3</sup>	0	-	0	-	0	-	0	-	0	-	1	-	-	-	1	-	0	-	0	-	0	-	-	0	-	-
Cal/EPA Cancer Potency Factor <sup>4</sup>	-	-	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CTR <sup>5</sup> Humans	-	-	-	-	-	-	-	-	0	-	-	-	0	-	-	-	0	-	-	-	-	-	-	-	-	-
CTR <sup>5</sup> Aquatic Life	-	-	0	0	0	0	-	0	2 <sup>9</sup>	0	-	-	-	-	-	-	0	-	0	0	-	-	0	0	0	0
NTR <sup>6</sup>	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-	-
NAWQC <sup>7</sup> Humans	-	-	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NAWQC <sup>7</sup> Aquatic Life	8 <sup>9</sup> 2 <sup>10</sup>	-	-	-	-	-	-	-	-	-	2	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-
USEPA IRIS Reference Dose <sup>8</sup>	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	0	-	0	-	0	-	-

## FEATHER RIVER MIDDLE FORK NEAR MERRIMAC (A5-5100.00)

	Aluminum		Arsenic		Cadmium		Chromium		Copper		Iron		Mercury	Methyl Mercury	Manganese		Nickel		Lead		Selenium		Silver		Zinc	
	T	D	T	D	T	D	T	D	T	D	T	D	T	T	T	D	T	D	T	D	T	D	T	D	T	D
Maximum detected	1472	835	1.2	1.2	0.018	0.007	3.54	2.77	4.87	1.60	1805	531	0.00446	0.00008	116	15.1	9.23	3.28	1.440	0.371	0.27	0.26	0.293	0.128	5.68	1.32
Minimum detected	5.76	<1.5	0.31	0.30	<0.008	<0.008	0.07	<0.07	0.25	0.19	11.3	<3.5	0.00027	<0.00002	1.05	0.12	0.25	0.1	<0.01	<0.01	<0.04	<0.06	<0.123	<0.001	0.07	0.05
Number of samples	31	27	31	27	31	27	31	27	31	27	31	27	31	27	31	27	31	27	31	27	31	27	13	13	31	27
Number of samples exceeding criteria or objectives																										
Public Health Goal <sup>1</sup>	2	-	-	-	0	-	-	-	0	-	-	-	0	-	0	-	0	-	0	-	-	-	-	-	-	-
Primary MCL <sup>2</sup>	1	-	0	-	0	-	0	-	0	-	-	-	0	-	-	-	0	-	0	-	0	-	-	-	-	-
Secondary MCL <sup>2</sup>	2	-	0	-	-	-	-	-	0	-	2	-	-	-	2	-	-	-	-	-	-	-	0	-	0	-
Agricultural Goal <sup>3</sup>	-	-	0	-	0	-	0	-	0	-	0	-	-	-	0	-	0	-	0	-	0	-	-	-	0	-
Cal/EPA Cancer Potency Factor <sup>4</sup>	-	-	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CTR <sup>5</sup> Humans	-	-	-	-	-	-	-	-	0	-	-	-	0	-	-	-	0	-	-	-	-	-	-	-	-	-
CTR <sup>5</sup> Aquatic Life	-	-	0	0	0	0	-	0	0	0	-	-	-	-	-	-	0	0	0	0	-	-	0	0	0	0
NTR <sup>6</sup>	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-	-
NAWQC <sup>7</sup> Humans	-	-	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NAWQC <sup>7</sup> Aquatic Life	7 <sup>9</sup> 2 <sup>10</sup>	-	-	-	-	-	-	-	-	-	2 <sup>9</sup>	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-
USEPA IRIS Reference Dose <sup>8</sup>	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	0	-	0	-	0	-	-

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# Appendix 3c-1. Continued.

## FALL RIVER UPSTREAM FROM FEATHER FALLS (A5-5200)

	Aluminum		Arsenic		Cadmium		Chromium		Copper		Iron		Mercury	Methyl Mercury	Manganese		Nickel		Lead		Selenium		Silver		Zinc	
	T	D	T	D	T	D	T	D	T	D	T	D	T	T	T	D	T	D	T	D	T	D	T	D	T	D
Maximum detected	1480	455	1.5	1.5	0.024	0.029	2.70	1.77	2.58	0.40	1340	167	0.00502	0.00005	51.9	5.77	2.47	0.76	0.468	0.086	0.16	0.39	0.169	0.374	4.01	0.39
Minimum detected	5.9	1.7	0.11	0.11	<0.008	<0.008	<0.04	<0.04	0.09	0.06	5.1	<3.5	0.0002	<0.00002	0.55	0.092	0.11	0.05	<0.002	<0.01	<0.04	<0.06	<0.16	<0.001	0.1	0.04
Number of samples	29	26	29	26	29	26	29	26	29	26	29	26	27	27	29	26	29	26	29	26	29	26	13	13	29	16
Number of samples exceeding criteria or objectives																										
Public Health Goal <sup>1</sup>	2	-	-	-	0	-	-	-	0	-	-	-	0	-	0	-	0	-	0	-	-	-	-	-	-	-
Primary MCL <sup>2</sup>	2	-	0	-	0	-	0	-	0	-	-	-	0	-	-	-	0	-	0	-	0	-	-	-	-	-
Secondary MCL <sup>2</sup>	2	-	0	-	-	-	-	-	0	-	2	-	-	-	1	-	-	-	-	-	-	-	0	-	0	-
Agricultural Goal <sup>3</sup>	0	-	0	-	0	-	0	-	0	-	0	-	-	-	0	-	0	-	0	-	0	-	-	-	0	-
Cal/EPA Cancer Potency Factor <sup>4</sup>	-	-	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CTR <sup>5</sup> Humans	-	-	-	-	-	-	-	-	0	-	-	-	0	-	-	-	0	-	-	-	-	-	-	-	-	-
CTR <sup>5</sup> Aquatic Life	-	-	-	0	0	0	-	0	0	0	-	-	-	-	-	-	0	0	0	0	-	-	0	0	0	0
NTR <sup>6</sup>	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-
NAWQC <sup>7</sup> Humans	-	-	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NAWQC <sup>7</sup> Aquatic Life	2 <sup>9,10</sup>	-	-	-	-	-	-	-	-	-	2 <sup>9</sup>	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-
USEPA IRIS Reference Dose <sup>8</sup>	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	0	-	0	-

## SUCKER RUN CREEK NEAR FORBESTOWN (A5-6075.00)

	Aluminum		Arsenic		Cadmium		Chromium		Copper		Iron		Mercury	Methyl Mercury	Manganese		Nickel		Lead		Selenium		Silver		Zinc	
	T	D	T	D	T	D	T	D	T	D	T	D	T	T	T	D	T	D	T	D	T	D	T	D	T	D
Maximum detected	1601	1305	4.73	4.3	0.010	0.002	2.40	1.55	12.5	1.50	1566	1102	0.183	0.00128	59.3	11.2	3.19	2.32	0.646	0.322	0.20	<0.06	0.043	0.023	4.16	1.33
Minimum detected	5.6	<1.5	1.23	0.859	<0.008	<0.001	<0.05	<0.05	0.09	0.14	40.3	12	0.0004	0.00021	0.77	0.156	0.04	0.04	<0.01	<0.01	<0.04	<0.06	<0.123	<0.001	0.1	0.1
Number of samples	31	27	31	27	31	27	31	27	31	27	31	27	28	28	31	27	31	27	31	27	31	27	13	13	31	27
Number of samples exceeding criteria or objectives																										
Public Health Goal <sup>1</sup>	2	-	-	-	0	-	-	-	0	-	-	-	0	-	0	-	0	-	0	-	-	-	-	-	-	-
Primary MCL <sup>2</sup>	2	-	0	-	0	-	0	-	0	-	-	-	0	-	-	-	0	-	0	-	0	-	-	-	-	-
Secondary MCL <sup>2</sup>	4	-	0	-	-	-	-	-	0	-	3	-	-	-	1	-	-	-	-	-	-	-	0	-	0	-
Agricultural Goal <sup>3</sup>	0	-	0	-	0	-	0	-	0	-	0	-	-	-	0	-	0	-	0	-	0	-	-	-	0	-
Cal/EPA Cancer Potency Factor <sup>4</sup>	-	-	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CTR <sup>5</sup> Humans	-	-	-	-	-	-	-	-	0	-	-	-	1	-	-	-	0	-	-	-	-	-	-	-	-	-
CTR <sup>5</sup> Aquatic Life	-	-	-	0	0	0	-	0	0	0	-	-	-	-	-	-	0	1 <sup>6</sup>	0	0	-	-	0	0	0	0
NTR <sup>6</sup>	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-	-
NAWQC <sup>7</sup> Humans	-	-	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NAWQC <sup>7</sup> Aquatic Life	11 <sup>9,2</sup>	-	-	-	-	-	-	-	-	-	2	-	1 <sup>9</sup>	-	-	-	-	-	-	-	-	-	-	-	-	-
USEPA IRIS Reference Dose <sup>8</sup>	-	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	-	0	-	0	-	0	-	-

Preliminary Information – Subject to Revision – For Collaborative Process Purposes Only

# Appendix 3c-1. Continued.

## SOUTH FORK FEATHER RIVER UPSTREAM FROM PONDEROSA RESERVOIR (A5-6110.50)

	Aluminum		Arsenic		Cadmium		Chromium		Copper		Iron		Mercury	Methyl Mercury	Manganese		Nickel		Lead		Selenium		Silver		Zinc	
	T	D	T	D	T	D	T	D	T	D	T	D	T	T	T	D	T	D	T	D	T	D	T	D	T	D
Maximum detected	1021	1021	0.87	0.64	0.016	0.001	5.34	1.86	2.81	0.95	1390	844	0.00647	0.00013	122	7.62	22.5	6.48	0.356	0.085	0.07	0.06	0.051	0.02	3.38	0.60
Minimum detected	6.7	<1.5	0.16	0.15	<0.008	<0.008	<0.05	0.07	0.11	0.14	14.3	8.20	0.0003	0.00003	1.08	0.133	1.11	1.0	<0.01	<0.01	<0.04	<0.06	<0.012	<0.001	0.07	0.02
Number of samples	31	28	31	28	31	28	31	28	31	28	31	28	28	28	31	28	31	28	31	28	31	28	13	13	31	28
Number of samples exceeding criteria or objectives																										
Public Health Goal <sup>1</sup>	3	-	-	-	0	-	-	-	0	-	-	-	0	-	0	-	1	-	0	-	-	-	-	-	-	-
Primary MCL <sup>2</sup>	2	-	0	-	0	-	0	-	0	-	-	-	0	-	-	-	0	-	0	-	-	-	-	-	-	-
Secondary MCL <sup>2</sup>	3	-	-	-	-	-	-	-	0	-	3	-	-	-	1	-	-	-	-	-	-	-	0	-	0	-
Agricultural Goal <sup>3</sup>	0	-	0	-	0	-	0	-	0	-	0	-	-	-	0	-	0	-	0	-	-	-	-	-	0	-
Cal/EPA Cancer Potency Factor <sup>4</sup>	-	-	3.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CTR <sup>5</sup> Humans	-	-	-	-	-	-	-	-	0	-	-	-	0	-	-	-	0	-	-	-	-	-	-	-	-	-
CTR <sup>5</sup> Aquatic Life	-	-	-	0	0	0	-	0	2.9	2.9	-	-	-	-	-	-	0	0	0	-	-	-	0	0	0	0
NTR <sup>6</sup>	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-	-
NAWQC <sup>7</sup> Humans	-	-	3.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NAWQC <sup>7</sup> Aquatic Life	7.9	2.10	-	-	-	-	-	-	-	-	1	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-
USEPA IRIS Reference Dose <sup>8</sup>	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	0	-	-	0	-	0	-

## MINERS RANCH CANAL (A5-6925.00) AND SOUTH FORK FEATHER RIVER DOWNSTREAM FROM PONDEROSA RESERVOIR (A5-6050.50)

	Aluminum		Arsenic		Cadmium		Chromium		Copper		Iron		Mercury	Methyl Mercury	Manganese		Nickel		Lead		Selenium		Silver		Zinc	
	T	D	T	D	T	D	T	D	T	D	T	D	T	T	T	D	T	D	T	D	T	D	T	D	T	D
Maximum detected	597	420	0.519	0.43	0.006	<0.008	1.64	1.13	2.05	0.84	581	488	0.00406	0.00003	77.8	40.9	6.93	5.4	0.440	0.102	<0.30	<0.30	0.063	0.09	1.33	0.56
Minimum detected	10.5	<1.5	0.092	0.05	<0.008	<0.008	<0.07	<0.07	0.08	0.11	16	<3.3	0.0002	<0.000025	4.44	0.11	0.51	0.3	<0.01	<0.01	<0.15	<0.08	<0.01	<0.001	0.09	0.06
Number of samples	24	23	24	23	24	23	24	23	24	23	24	23	24	23	24	23	24	23	24	23	24	23	13	13	24	23
Number of samples exceeding criteria or objectives																										
Public Health Goal <sup>1</sup>	0	-	-	-	0	-	-	-	0	-	-	-	0	-	0	-	0	-	0	-	-	-	-	-	-	-
Primary MCL <sup>2</sup>	0	-	0	-	0	-	0	-	0	-	-	-	0	-	-	-	0	-	0	-	-	-	-	-	-	-
Secondary MCL <sup>2</sup>	1	-	0	-	-	-	-	-	0	-	1	-	-	-	1	-	-	-	-	-	-	-	0	-	0	-
Agricultural Goal <sup>3</sup>	0	-	0	-	0	-	0	-	0	-	0	-	-	-	0	-	0	-	0	-	-	-	-	-	0	-
Cal/EPA Cancer Potency Factor <sup>4</sup>	-	-	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CTR <sup>5</sup> Humans	-	-	-	-	-	-	-	-	0	-	-	-	0	-	-	-	0	-	-	-	-	-	-	-	-	-
CTR <sup>5</sup> Aquatic Life	-	-	-	0	0	0	-	0	1.9	1.9	-	-	-	-	-	-	0	0	0	-	-	-	0	0	0	0
NTR <sup>6</sup>	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-	-
NAWQC <sup>7</sup> Humans	-	-	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NAWQC <sup>7</sup> Aquatic Life	7.9	-	-	-	-	-	-	-	-	-	0	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-
USEPA IRIS Reference Dose <sup>8</sup>	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	0	-	-	0	-	0	-

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## Appendix 3c-2. Summary of metal numerical limits for Lake Oroville (µg/L)

### Lake Oroville North Fork Sfc (A5R93761296)

	Aluminum		Arsenic		Cadmium		Chromium		Copper		Iron		Mercury	Methyl Mercury	Manganese		Nickel		Lead		Selenium		Silver		Zinc	
	T	D	T	D	T	D	T	D	T	D	T	D	T	T	T	D	T	D	T	D	T	D	T	D	T	D
Maximum detected	144	33	0.878	0.740	0.010	0.19	8.0	0.52	1.49	1.1	215	71	0.00111	0.0000013	8.73	2.24	1.37	0.88	0.042	0.002	0.08	0.08	0.109	0.054	0.41	0.22
Minimum detected	1.1	1.90	0.30	0.226	<0.002	<0.001	0.06	<0.039	0.44	0.42	4.0	3.20	<0.00015	<0.000001	1.14	0.042	0.28	0.16	<0.001	<0.001	<0.033	<0.033	<0.006	<0.004	<0.035	<0.031
Number of samples	24	24	24	24	24	24	24	24	24	24	22	24	23	23	24	24	24	24	24	24	24	24	12	12	24	24
Number of samples exceeding criteria or objectives																										
Public Health Goal <sup>1</sup>	0	-	-	-	0	-	-	-	0	-	-	-	0	-	0	-	0	-	0	-	-	-	-	-	-	-
Primary MCL <sup>2</sup>	0	-	0	-	-	-	0	-	0	-	-	-	0	-	-	-	0	-	0	-	0	-	-	-	-	-
Secondary MCL <sup>2</sup>	0	-	-	-	-	-	-	-	0	-	0	-	-	-	0	-	-	-	-	-	-	-	0	-	0	-
Agricultural Goal <sup>3</sup>	0	-	0	-	0	-	0	-	0	-	0	-	-	-	0	-	0	-	0	-	0	-	-	-	0	-
Cal/EPA Cancer Potency Factor <sup>4</sup>	-	-	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CTR <sup>5</sup> Humans	-	-	-	-	-	-	-	-	0	-	-	-	0	-	-	-	0	-	-	-	-	-	-	-	-	-
CTR <sup>5</sup> Aquatic Life	-	-	0	0	0	-	0	0	0	0	-	-	-	-	-	-	0	0	0	-	-	0	0	0	0	0
NTR <sup>6</sup>	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-
NAWQC <sup>7</sup> Humans	-	-	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NAWQC <sup>7</sup> Aquatic Life	10	-	-	-	-	-	-	-	-	-	0	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-
USEPA IRIS Reference Dose <sup>8</sup>	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	0	-	0	-

### Lake Oroville North Fork Btm (A5R93761296)

	Aluminum		Arsenic		Cadmium		Chromium		Copper		Iron		Mercury	Methyl Mercury	Manganese		Nickel		Lead		Selenium		Silver		Zinc	
	T	D	T	D	T	D	T	D	T	D	T	D	T	T	T	D	T	D	T	D	T	D	T	D	T	D
Maximum detected	999	129	0.812	0.703	0.064	0.096	3.05	0.52	3.78	0.89	1230	70.5	0.00338	0.000013	66.9	59.2	3.94	1.4	0.326	0.023	0.13	0.12	0.235	0.068	3.35	1.09
Minimum detected	10.1	2.5	0.395	0.044	0.003	0.001	<0.056	<0.039	0.45	0.4	4	3.2	0.00024	0.000008	1.85	0.036	0.62	0.15	<0.002	<0.001	0.069	<0.056	<0.006	<0.001	<0.035	<0.013
Number of samples	20	22	20	22	20	22	20	22	20	21	20	22	23	23	19	22	19	22	19	22	19	22	10	12	19	22
Number of samples exceeding criteria or objectives																										
Public Health Goal <sup>1</sup>	1	-	-	-	0	-	-	-	0	-	-	-	0	-	0	-	0	-	0	-	-	-	-	-	-	-
Primary MCL <sup>2</sup>	0	-	0	-	-	-	0	-	0	-	-	-	0	-	-	-	0	-	0	-	0	-	-	-	-	-
Secondary MCL <sup>2</sup>	1	-	-	-	-	-	-	-	0	-	1	-	-	-	1	-	-	-	-	-	-	-	0	-	0	-
Agricultural Goal <sup>3</sup>	0	-	0	-	0	-	0	-	0	-	0	-	-	-	0	-	0	-	0	-	0	-	-	-	0	-
Cal/EPA Cancer Potency Factor <sup>4</sup>	-	-	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CTR <sup>5</sup> Humans	-	-	-	-	-	-	-	-	0	-	-	-	0	-	-	-	0	-	-	-	-	-	-	-	-	-
CTR <sup>5</sup> Aquatic Life	-	-	0	0	0	-	0	0	0	0	-	-	-	-	-	-	0	0	0	-	-	0	0	0	0	0
NTR <sup>6</sup>	2	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-
NAWQC <sup>7</sup> Humans	-	-	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NAWQC <sup>7</sup> Aquatic Life	5, 11	-	-	-	-	-	-	-	-	-	0	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-
USEPA IRIS Reference Dose <sup>8</sup>	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	0	-	0	-

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## Appendix 3c-2. Continued.

### Lake Oroville Middle Fork Sfc (A5R93351272)

	Aluminum		Arsenic		Cadmium		Chromium		Copper		Iron		Mercury	Methyl Mercury	Manganese		Nickel		Lead		Selenium		Silver		Zinc	
	T	D	T	D	T	D	T	D	T	D	T	D	T	T	T	D	T	D	T	D	T	D	T	D	T	D
Minimum detected	407	55.5	0.868	0.925	0.002	0.001	2.9	0.71	1.24	0.97	483	54	0.00217	0.00319	30.1	1.56	1.17	0.82	0.373	0.039	0.076	0.182	0.136	0.048	2.58	0.4
	10.8	2.2	0.244	0.257	<0.001	<0.001	0.04	<0.039	0.07	<0.22	2.9	1.5	<0.00015	<0.000025	0.74	0.07	<0.04	<0.04	0.003	<0.002	0.076	<0.056	<0.014	<0.005	<0.02	<0.013
Number of samples	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	12	12	25	25
Number of samples exceeding criteria or objectives																										
Public Health Goal <sup>1</sup>	0	-	-	-	0	-	-	-	0	-	-	-	0	-	0	-	0	-	0	-	-	-	-	-	-	-
Primary MCL <sup>2</sup>	0	-	0	-	-	-	0	-	0	-	-	-	0	-	-	-	0	-	-	-	-	-	-	-	-	-
Secondary MCL <sup>2</sup>	1	-	-	-	-	-	-	-	0	-	1	-	-	-	0	-	-	-	-	-	-	-	0	-	0	-
Agricultural Goal <sup>3</sup>	0	-	0	-	0	-	0	-	0	-	0	-	-	-	0	-	0	-	0	-	0	-	-	-	0	-
Cal/EPA Cancer Potency Factor <sup>4</sup>	-	-	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CTR <sup>5</sup> Humans	-	-	-	-	-	-	-	-	0	-	-	-	0	-	-	-	0	-	-	-	-	-	-	-	-	-
CTR <sup>5</sup> Aquatic Life	-	-	-	0	0	0	-	0	0	0	-	-	-	-	-	-	0	0	0	-	-	-	0	0	0	0
NTR <sup>6</sup>	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-
NAWQC <sup>7</sup> Humans	-	-	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NAWQC <sup>7</sup> Aquatic Life	3 <sup>9</sup>	-	-	-	-	-	-	-	-	-	0	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-
USEPA IRIS Reference Dose <sup>8</sup>	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	0	-	0	-	0	-	-

### Lake Oroville Middle Fork Btm (A5R93351272)

	Aluminum		Arsenic		Cadmium		Chromium		Copper		Iron		Mercury	Methyl Mercury	Manganese		Nickel		Lead		Selenium		Silver		Zinc	
	T	D	T	D	T	D	T	D	T	D	T	D	T	T	T	D	T	D	T	D	T	D	T	D	T	D
Maximum detected	1160	102	2.03	1.27	0.023	0.054	2.98	0.67	4.65	4.29	1740	135	0.0232	0.000056	115	42.1	5.05	1.24	1.721	0.181	0.17	0.155	0.086	0.086	3.61	0.26
Minimum detected	4.6	4.6	0.358	0.293	<0.005	<0.001	0.05	<0.039	0.31	0.28	8.1	<1.33	0.00034	0.000012	0.68	0.336	0.07	0.15	0.003	0.001	0.11	0.09	0.057	0.016	0.05	0.012
Number of samples	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	12	12	24	24
Number of samples exceeding criteria or objectives																										
Public Health Goal <sup>1</sup>	0	-	-	-	0	-	-	-	0	-	-	-	0	-	0	-	0	-	0	-	-	-	-	-	-	-
Primary MCL <sup>2</sup>	0	-	0	-	-	-	0	-	0	-	-	-	0	-	-	-	0	-	0	-	-	-	-	-	-	-
Secondary MCL <sup>2</sup>	0	-	-	-	-	-	-	-	0	-	4	-	-	-	2	-	-	-	0	-	-	-	0	-	0	-
Agricultural Goal <sup>3</sup>	0	-	0	-	0	-	0	-	0	-	0	-	-	-	0	-	0	-	0	-	0	-	-	-	0	-
Cal/EPA Cancer Potency Factor <sup>4</sup>	-	-	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CTR <sup>5</sup> Humans	-	-	-	-	-	-	-	-	0	-	-	-	0	-	-	-	0	-	-	-	-	-	-	-	-	-
CTR <sup>5</sup> Aquatic Life	-	-	-	0	0	0	-	0	1 <sup>9</sup>	0	-	-	-	-	-	-	0	1 <sup>9</sup>	0	-	-	-	0	0	0	0
NTR <sup>6</sup>	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-	-
NAWQC <sup>7</sup> Humans	-	-	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NAWQC <sup>7</sup> Aquatic Life	0 <sup>9</sup>	1	-	-	-	-	-	-	-	-	1 <sup>9</sup>	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-
USEPA IRIS Reference Dose <sup>8</sup>	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	0	-	0	-	0	-	-

Preliminary Information – Subject to Revision – For Collaborative Process Purposes Only

## Appendix 3c-2. Continued.

### Lake Oroville South Fork Sfc (A5R93221226)

	Aluminum		Arsenic		Cadmium		Chromium		Copper		Iron		Mercury	Methyl Mercury	Manganese		Nickel		Lead		Selenium		Silver		Zinc	
	T	D	T	D	T	D	T	D	T	D	T	D	T	T	T	D	T	D	T	D	T	D	T	D	T	D
Maximum detected	850	116	0.559	0.604	0.002	0.003	1.82	0.625	1.74	1.7	939	54.8	0.00306	0.00005	78.1	17.3	1.81	0.83	0.407	0.019	0.18	0.11	0.195	0.056	1.97	0.35
Minimum detected	15.6	3.5	0.263	0.234	<0.002	<0.001	0.039	<0.02	0.26	0.31	<2.93	<1.02	<0.0001	<0.000005	0.56	0.06	<0.04	<0.04	0.002	<0.002	<0.07	<0.07	<0.006	<0.005	<0.035	<0.013
Number of samples	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	12	12	25	25
Number of samples exceeding criteria or objectives																										
Public Health Goal <sup>1</sup>	1	-	-	-	0	-	-	-	0	-	-	-	0	-	0	-	0	-	0	-	-	-	-	-	-	-
Primary MCL <sup>2</sup>	0	-	0	-	-	-	0	-	0	-	-	-	0	-	-	-	0	-	0	-	0	-	-	-	-	-
Secondary MCL <sup>2</sup>	2	-	-	-	-	-	-	-	0	-	1	-	-	-	1	-	-	-	-	-	-	-	0	-	0	-
Agricultural Goal <sup>3</sup>	0	-	0	-	0	-	0	-	0	-	0	-	-	-	0	-	0	-	0	-	0	-	-	-	0	-
Cal/EPA Cancer Potency Factor <sup>4</sup>	-	-	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CTR <sup>5</sup> Humans	-	-	-	-	-	-	-	-	0	-	-	-	0	-	-	-	0	-	-	-	-	-	-	-	-	-
CTR <sup>5</sup> Aquatic Life	-	-	-	0	0	0	-	0	0	0	-	-	-	-	-	-	0	0	0	-	-	0	0	0	0	0
NTR <sup>6</sup>	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-	-
NAWQC <sup>7</sup> Humans	-	-	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NAWQC <sup>7</sup> Aquatic Life	9 <sup>8</sup> , 1 <sup>1</sup>	-	-	-	-	-	-	-	-	-	0	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-
USEPA IRIS Reference Dose <sup>8</sup>	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	0	-	0	-	0	-	-

### Lake Oroville South Fork Btm (A5R93221226)

	Aluminum		Arsenic		Cadmium		Chromium		Copper		Iron		Mercury	Methyl Mercury	Manganese		Nickel		Lead		Selenium		Silver		Zinc	
	T	D	T	D	T	D	T	D	T	D	T	D	T	T	T	D	T	D	T	D	T	D	T	D	T	D
Maximum detected	714	53	0.564	0.524	0.002	0.004	1.08	0.68	5.38	2.85	749	40.6	0.0026	0.000046	156	111	1.65	1.22	0.349	0.027	0.17	0.189	0.086	0.09	1.85	0.485
Minimum detected	21.6	5.52	0.312	0.248	<0.002	<0.001	0.039	0.03	0.36	0.29	5.6	<1.02	0.00011	<0.000009	0.88	0.12	0.48	<0.04	0.004	<0.002	<0.07	<0.056	<0.006	<0.005	<0.035	<0.013
Number of samples	17	20	17	20	17	20	17	20	17	19	17	20	16	19	17	20	17	20	17	20	17	20	11	11	17	20
Number of samples exceeding criteria or objectives																										
Public Health Goal <sup>1</sup>	1	-	-	-	0	-	-	-	0	-	-	-	0	-	0	-	0	-	0	-	-	-	-	-	-	-
Primary MCL <sup>2</sup>	0	-	0	-	-	-	0	-	0	-	-	-	0	-	-	-	0	-	0	-	0	-	-	-	-	-
Secondary MCL <sup>2</sup>	3	-	-	-	-	-	-	-	0	-	1	-	-	-	1	-	-	-	-	-	-	-	0	-	0	-
Agricultural Goal <sup>3</sup>	0	-	0	-	0	-	0	-	0	-	0	-	-	-	0	-	0	-	0	-	0	-	-	-	0	-
Cal/EPA Cancer Potency Factor <sup>4</sup>	-	-	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CTR <sup>5</sup> Humans	-	-	-	-	-	-	-	-	0	-	-	-	0	-	-	-	0	-	-	-	-	-	-	-	-	-
CTR <sup>5</sup> Aquatic Life	-	-	-	0	0	0	-	0	1 <sup>5</sup>	0	-	-	-	-	-	-	0	0	0	-	-	0	0	0	0	0
NTR <sup>6</sup>	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-	-
NAWQC <sup>7</sup> Humans	-	-	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NAWQC <sup>7</sup> Aquatic Life	4 <sup>8</sup>	-	-	-	-	-	-	-	-	-	0	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-
USEPA IRIS Reference Dose <sup>8</sup>	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	0	-	0	-	0	-	-

Preliminary Information – Subject to Revision – For Collaborative Process Purposes Only

## Appendix 3c-2. Continued.

### Lake Oroville Main Body Sfc (A5R93401274)

	Aluminum		Arsenic		Cadmium		Chromium		Copper		Iron		Mercury	Methyl Mercury	Manganese		Nickel		Lead		Selenium		Silver		Zinc	
	T	D	T	D	T	D	T	D	T	D	T	D	T	T	T	D	T	D	T	D	T	D	T	D	T	D
Maximum detected	148	60.9	1.08	0.754	0.012	0.382	0.6	0.53	1.5	1.04	233	35.2	0.00096	0.00002	8.42	2.39	1.28	0.8	0.048	0.021	0.12	0.12	0.184	0.134	0.78	0.55
Minimum detected	8.16	2.1	0.047	0.371	0.001	<0.001	<0.03	<0.039	0.36	0.36	<3.1	<1.06	<0.00015	<0.00002	0.93	<0.006	0.14	0.06	<0.001	<0.001	<0.03	<0.04	<0.006	<0.001	<0.035	<0.013
Number of samples	24	24	24	24	24	24	24	24	24	24	24	24	23	23	24	24	24	24	24	24	24	24	12	12	24	24
Number of samples exceeding criteria or objectives																										
Public Health Goal <sup>1</sup>	0	-	-	-	0	-	-	-	0	-	-	-	0	-	0	-	0	-	0	-	-	-	-	-	-	-
Primary MCL <sup>2</sup>	0	-	0	-	-	-	0	-	0	-	-	-	0	-	-	-	0	-	0	-	0	-	-	-	-	-
Secondary MCL <sup>2</sup>	0	-	-	-	-	-	-	-	0	-	0	-	-	-	0	-	-	-	-	-	-	-	0	-	0	-
Agricultural Goal <sup>3</sup>	0	-	0	-	0	-	0	-	0	-	0	-	-	-	0	-	0	-	0	-	0	-	-	-	0	-
Cal/EPA Cancer Potency Factor <sup>4</sup>	-	-	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CTR <sup>5</sup> Humans	-	-	-	-	-	-	-	-	0	-	-	-	0	-	-	-	0	-	-	-	-	-	-	-	-	-
CTR <sup>5</sup> Aquatic Life	-	-	0	0	0	0	0	0	0	0	-	-	-	0	-	-	0	0	0	0	-	-	0	0	0	0
NTR <sup>6</sup>	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-
NAWQC <sup>7</sup> Humans	-	-	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NAWQC <sup>7</sup> Aquatic Life	2	-	-	-	-	-	-	-	-	-	0	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-
USEPA IRIS Reference Dose <sup>8</sup>	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	0	-	0	-

### Lake Oroville Main Body Btm (A5R93401274)

	Aluminum		Arsenic		Cadmium		Chromium		Copper		Iron		Mercury	Methyl Mercury	Manganese		Nickel		Lead		Selenium		Silver		Zinc	
	T	D	T	D	T	D	T	D	T	D	T	D	T	T	T	D	T	D	T	D	T	D	T	D	T	D
Maximum detected	647	32.1	0.919	0.784	0.011	0.002	2.56	0.63	2.73	2.32	1120	31.7	0.00168	0.000011	78.5	10.4	3.12	1.03	0.607	0.598	0.13	0.275	0.095	0.117	1.88	0.31
Minimum detected	9.22	1.6	0.404	<0.012	0.002	<0.002	0.05	<0.039	0.43	0.39	8	<1.33	0.00022	<0.000007	0.82	0.127	0.39	0.29	<0.002	<0.002	<0.05	<0.04	<0.006	<0.005	<0.035	<0.013
Number of samples	20	21	20	21	20	21	20	21	20	21	20	21	20	21	20	21	20	21	20	21	20	21	10	12	20	21
Number of samples exceeding criteria or objectives																										
Public Health Goal <sup>1</sup>	0	-	-	-	0	-	-	-	0	-	-	-	0	-	0	-	0	-	0	-	-	-	-	-	-	-
Primary MCL <sup>2</sup>	0	-	0	-	-	-	0	-	0	-	-	-	0	-	-	-	0	-	0	-	0	-	-	-	-	-
Secondary MCL <sup>2</sup>	1	-	-	-	-	-	-	-	0	-	1	-	-	-	1	-	-	-	-	-	-	-	0	-	0	-
Agricultural Goal <sup>3</sup>	0	-	0	-	0	-	0	-	0	-	0	-	-	-	0	-	0	-	0	-	0	-	-	-	0	-
Cal/EPA Cancer Potency Factor <sup>4</sup>	-	-	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CTR <sup>5</sup> Humans	-	-	-	-	-	-	-	-	0	-	-	-	0	-	-	-	0	-	-	-	-	-	-	-	-	-
CTR <sup>5</sup> Aquatic Life	-	-	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0	0	-	-	0	0	0	0
NTR <sup>6</sup>	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-
NAWQC <sup>7</sup> Humans	-	-	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NAWQC <sup>7</sup> Aquatic Life	3	-	-	-	-	-	-	-	-	-	6	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-
USEPA IRIS Reference Dose <sup>8</sup>	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	0	-	0	-

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## Appendix 3c-2. Continued.

### Lake Oroville At Dam Sfc (A5R93251286)

	Aluminum		Arsenic		Cadmium		Chromium		Copper		Iron		Mercury	Methyl Mercury	Manganese		Nickel		Lead		Selenium		Silver		Zinc	
	T	D	T	D	T	D	T	D	T	D	T	D	T	T	T	D	T	D	T	D	T	D	T	D	T	D
Maximum detected	121	30.9	1.13	0.848	0.116	0.003	1.57	0.655	3.23	1.03	202	35.6	0.0008	0.000015	8.93	2.03	1.18	0.89	0.043	0.009	0.14	0.07	0.139	0.008	0.31	0.52
Minimum detected	10	2.7	0.322	0.332	0.001	<0.001	<0.07	<0.039	0.43	0.39	<3.1	<1.06	<0.000015	<0.000007	0.96	0.034	0.21	<0.04	<0.001	<0.001	<0.03	<0.04	<0.006	<0.001	<0.035	<0.013
Number of samples	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	12	12	24	24
Number of samples exceeding criteria or objectives																										
Public Health Goal <sup>1</sup>	0	-	-	-	0	-	-	-	0	-	-	-	0	-	0	-	0	-	0	-	-	-	-	-	-	-
Primary MCL <sup>2</sup>	0	-	0	-	-	-	0	-	0	-	-	-	0	-	-	-	0	-	0	-	-	-	-	-	-	-
Secondary MCL <sup>2</sup>	0	-	-	-	-	-	-	-	0	-	0	-	-	-	0	-	-	-	-	-	-	-	0	-	0	-
Agricultural Goal <sup>3</sup>	0	-	0	-	0	-	0	-	0	-	0	-	-	-	0	-	0	-	0	-	0	-	-	-	0	-
Cal/EPA Cancer Potency Factor <sup>4</sup>	-	-	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CTR <sup>5</sup> Humans	-	-	-	-	-	-	-	-	0	-	-	-	0	-	-	-	0	-	-	-	-	-	-	-	-	-
CTR <sup>5</sup> Aquatic Life	-	-	0	0	0	-	0	0	0	0	-	-	-	-	-	-	0	0	0	-	-	-	0	0	0	0
NTR <sup>6</sup>	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-
NAWQC <sup>7</sup> Humans	-	-	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NAWQC <sup>7</sup> Aquatic Life	2	-	-	-	-	-	-	-	-	-	0	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-
USEPA IRIS Reference Dose <sup>8</sup>	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	0	-	0	-

### Lake Oroville At Dam Mid (A5R93251286)

	Aluminum		Arsenic		Cadmium		Chromium		Copper		Iron		Mercury	Methyl Mercury	Manganese		Nickel		Lead		Selenium		Silver		Zinc	
	T	D	T	D	T	D	T	D	T	D	T	D	T	T	T	D	T	D	T	D	T	D	T	D	T	D
Maximum detected	104	89	0.903	0.766	0.05	0.009	1.38	0.782	1.32	1.13	131	45.1	0.00107	0.000019	7.51	1.4	1.34	1.23	0.042	0.038	0.13	0.11	0.21	0.133	0.45	0.85
Minimum detected	6	2.1	0.376	0.328	0.003	<0.002	0.056	<0.039	0.52	0.37	<2.93	<1.06	<0.00015	<0.000007	0.59	0.072	0.05	<0.04	<0.002	<0.002	0.038	<0.04	<0.006	<0.001	0.03	0.05
Number of samples	23	23	23	23	23	23	23	23	14	14	23	23	23	23	23	23	23	23	23	23	23	23	12	12	23	23
Number of samples exceeding criteria or objectives																										
Public Health Goal <sup>1</sup>	0	-	-	-	0	-	-	-	0	-	-	-	0	-	0	-	0	-	0	-	-	-	-	-	-	-
Primary MCL <sup>2</sup>	0	-	0	-	-	-	0	-	0	-	-	-	0	-	-	-	0	-	0	-	-	-	-	-	-	-
Secondary MCL <sup>2</sup>	0	-	-	-	-	-	-	-	0	-	0	-	-	-	0	-	-	-	-	-	-	-	0	-	0	-
Agricultural Goal <sup>3</sup>	0	-	0	-	0	-	0	-	0	-	0	-	-	-	0	-	0	-	0	-	0	-	-	-	0	-
Cal/EPA Cancer Potency Factor <sup>4</sup>	-	-	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CTR <sup>5</sup> Humans	-	-	-	-	-	-	-	-	0	-	-	-	0	-	-	-	0	-	-	-	-	-	-	-	-	-
CTR <sup>5</sup> Aquatic Life	-	-	0	0	0	-	0	0	0	0	-	-	-	-	-	-	0	0	0	-	-	-	0	0	0	0
NTR <sup>6</sup>	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-
NAWQC <sup>7</sup> Humans	-	-	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NAWQC <sup>7</sup> Aquatic Life	3	-	-	-	-	-	-	-	-	-	0	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-
USEPA IRIS Reference Dose <sup>8</sup>	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	0	-	0	-

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## Appendix 3c-2. Continued.

### Lake Oroville At Dam Btm (A5R93251286)

	Aluminum		Arsenic		Cadmium		Chromium		Copper		Iron		Mercury	Methyl Mercury	Manganese		Nickel		Lead		Selenium		Silver		Zinc	
	T	D	T	D	T	D	T	D	T	D	T	D	T	T	T	D	T	D	T	D	T	D	T	D	T	D
Maximum detected	251	71.9	0.764	0.706	0.064	0.005	1.69	0.783	1.62	1.98	329	57.6	0.00272	0.000069	18.5	44	2.11	1.23	0.64	0.031	0.277	0.07	0.141	0.075	0.93	0.38
Minimum detected	8.61	1.7	0.395	0.398	0.001	0.002	0.11	0.05	0.54	0.44	18.34	2.47	<0.00015	<0.000009	1.21	0.08	0.18	0.16	<0.002	<0.002	<0.05	<0.052	<0.006	<0.001	<0.035	<0.013
Number of samples	19	24	19	24	19	24	19	24	19	24	19	24	20	24	19	24	19	24	19	24	19	24	12	12	19	24
Number of samples exceeding criteria or objectives																										
Public Health Goal <sup>1</sup>	0	-	-	-	0	-	-	-	0	-	-	0	-	-	0	-	0	-	0	-	-	-	-	-	-	-
Primary MCL <sup>2</sup>	0	-	0	-	-	-	0	-	0	-	-	0	-	-	-	-	0	-	0	-	0	-	-	-	-	-
Secondary MCL <sup>2</sup>	0	-	-	-	-	-	-	-	0	-	1	-	-	-	0	-	-	-	-	-	-	-	0	-	0	-
Agricultural Goal <sup>3</sup>	0	-	0	-	0	-	0	-	0	-	0	-	-	-	0	-	0	-	0	-	0	-	-	-	0	-
Cal/EPA Cancer Potency Factor <sup>4</sup>	-	-	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CTR <sup>5</sup> Humans	-	-	-	-	-	-	-	-	0	-	-	0	-	-	-	-	0	-	-	-	-	-	-	-	-	-
CTR <sup>5</sup> Aquatic Life	-	-	0	-	0	0	-	0	0	0	-	-	-	-	-	-	0	0	0	-	-	-	0	0	0	0
NTR <sup>6</sup>	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-	-
NAWQC <sup>7</sup> Humans	-	-	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NAWQC <sup>7</sup> Aquatic Life	4 <sup>9</sup>	-	-	-	-	-	-	-	-	-	0	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-
USEPA IRIS Reference Dose <sup>8</sup>	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	0	-	-	0	-	0	-

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### Appendix 3c-3. Summary of metal numerical limits for the Lower Feather River (µg/L).

#### Thermalito Diversion Pool US of Power Plant (A5R93191294)

	Aluminum		Arsenic		Cadmium		Chromium		Copper		Iron		Mercury	Methyl Mercury	Manganese		Nickel		Lead		Selenium		Silver		Zinc	
	T	D	T	D	T	D	T	D	T	D	T	D	T	T	T	D	T	D	T	D	T	D	T	D	T	D
Maximum detected	170.2	70.7	0.906	0.894	<0.039	<0.039	0.893	0.772	1.41	1.07	288	45	0.00104	0.000037	20.2	2.12	1.47	1.13	0.064	0.015	0.25	0.156	<0.165	0.028	0.7	0.34
Minimum detected	9.24	1.8	0.36	0.324	<0.002	<0.001	<0.056	<0.039	0.47	0.43	<0.002	<0.004	0.00024	0.000005	0.6	0.28	0.54	0.33	<0.002	<0.001	<0.07	<0.056	<0.006	<0.003	0.03	<0.013
Number of samples	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	12	12	27	27
Number of samples exceeding criteria or objectives																										
Public Health Goal <sup>1</sup>	0	-	-	-	0	-	-	-	0	-	-	-	0	-	0	-	0	-	0	-	-	-	-	-	-	-
Primary MCL <sup>2</sup>	0	-	0	-	-	-	0	-	0	-	-	-	0	-	-	-	0	-	0	-	0	-	-	-	-	-
Secondary MCL <sup>2</sup>	0	-	0	-	-	-	-	-	0	-	0	-	-	-	0	-	-	-	-	-	-	-	0	-	0	-
Agricultural Goal <sup>3</sup>	0	-	0	-	0	-	0	-	0	-	0	-	-	-	0	-	0	-	0	-	0	-	-	-	0	-
Cal/EPA Cancer Potency Factor <sup>4</sup>		-	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CTR <sup>5</sup> Humans		-	-	-	-	-	-	-	0	-	-	-	0	-	-	-	0	-	-	-	-	-	-	-	-	-
CTR <sup>5</sup> Aquatic Life		-	0	0	0	-	0	0	0	0	-	-	-	-	-	-	0	0	0	-	-	0	0	0	0	0
NTR <sup>6</sup>		-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-	-
NAWQC <sup>7</sup> Humans		-	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NAWQC <sup>7</sup> Aquatic Life	4 <sup>8</sup>	-	-	-	-	-	-	-	-	-	0	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-
USEPA IRIS Reference Dose <sup>8</sup>		-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	0	-	0	-	0	-	-

#### Thermalito Diversion Pool DS of Power Plant (A5R93191297)

	Aluminum		Arsenic		Cadmium		Chromium		Copper		Iron		Mercury	Methyl Mercury	Manganese		Nickel		Lead		Selenium		Silver		Zinc	
	T	D	T	D	T	D	T	D	T	D	T	D	T	T	T	D	T	D	T	D	T	D	T	D	T	D
Maximum detected	250	44.6	0.935	0.62	0.005	<0.039	1.81	0.749	2.6	0.72	883	97.6	0.00125	0.000096	34.2	9.05	1.91	1.12	0.354	0.012	0.24	0.11	<0.303	0.521	8.57	2.98
Minimum detected	12.4	4.99	0.478	0.382	0.005	<0.001	0.093	<0.039	0.44	0.44	9.44	9	0.00039	<0.000025	0.76	0.131	0.88	0.749	<0.004	<0.002	0.046	<0.10	<0.018	<0.005	0.08	<0.013
Number of samples	13	13	13	13	13	13	13	13	13	13	13	13	14	14	13	13	13	13	13	13	13	13	11	11	13	13
Number of samples exceeding criteria or objectives																										
Public Health Goal <sup>1</sup>	0	-	-	-	0	-	-	-	0	-	-	-	0	-	0	-	0	-	0	-	-	-	-	-	-	-
Primary MCL <sup>2</sup>	0	-	0	-	-	-	0	-	0	-	-	-	0	-	-	-	0	-	0	-	0	-	-	-	-	-
Secondary MCL <sup>2</sup>	1	-	0	-	-	-	-	-	0	-	2	-	-	-	0	-	-	-	-	-	-	-	0	-	0	-
Agricultural Goal <sup>3</sup>	0	-	0	-	0	-	0	-	0	-	0	-	-	-	0	-	0	-	0	-	0	-	-	-	0	-
Cal/EPA Cancer Potency Factor <sup>4</sup>		-	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CTR <sup>5</sup> Humans		-	-	-	-	-	-	-	0	-	-	-	0	-	-	-	0	-	-	-	-	-	-	-	-	-
CTR <sup>5</sup> Aquatic Life		-	0	0	0	-	0	0	0	0	-	-	-	-	-	-	0	0	0	-	-	0	0	0	0	0
NTR <sup>6</sup>		-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-	-
NAWQC <sup>7</sup> Humans		-	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NAWQC <sup>7</sup> Aquatic Life	1 <sup>8</sup>	-	-	-	-	-	-	-	-	-	0	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-
USEPA IRIS Reference Dose <sup>8</sup>		-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	0	-	0	-	0	-	-

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## Appendix 3c-3. Continued.

### Glen C US from Glen Pond (A5-3050)

	Aluminum		Arsenic		Cadmium		Chromium		Copper		Iron		Mercury	Methyl Mercury	Manganese		Nickel		Lead		Selenium		Silver		Zinc	
	T	D	T	D	T	D	T	D	T	D	T	D	T	T	T	D	T	D	T	D	T	D	T	D	T	D
Maximum detected	450	402	1.19	1.10	0.161	0.096	3.31	2.0	12.1	9.63	1920	508	0.015	0.000394	95.4	22.6	3.35	2.16	0.515	0.158	0.39	0.347	0.047	0.015	5.12	1.77
Minimum detected	1.11	1.8	0.361	0.302	0.003	<0.001	0.15	<0.02	1.03	0.79	134.0	66.2	0.00096	0.000056	3.07	0.254	0.09	0.05	<0.015	<0.003	<0.09	<0.07	<0.006	<0.004	0.21	0.15
Number of samples	27	27	27	27	27	27	27	27	27	27	27	27	26	26	27	27	27	27	27	27	27	27	13	13	27	27
Number of samples exceeding criteria or																										
Public Health Goal <sup>1</sup>	0	-	-	-	1	-	-	-	0	-	-	-	0	-	0	-	0	-	0	-	-	-	-	-	-	-
Primary MCL <sup>2</sup>	0	-	0	-	0	-	0	-	0	-	-	-	0	-	-	-	0	-	0	-	-	-	-	-	-	-
Secondary MCL <sup>2</sup>	4	-	0	-	0	-	-	-	0	-	16	-	-	-	5	-	-	-	-	-	-	-	0	-	0	-
Agricultural Goal <sup>3</sup>	0	-	0	-	0	-	0	-	0	-	0	-	-	-	0	-	0	-	0	-	-	-	-	-	0	-
Cal/EPA Cancer Potency Factor <sup>4</sup>	-	-	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CTR <sup>5</sup> Humans	-	-	-	-	-	-	-	-	0	-	-	-	0	-	-	-	0	-	-	-	-	-	-	-	-	-
CTR <sup>5</sup> Aquatic Life	-	-	0	0	0	-	0	2	10	10	-	-	-	-	-	-	0	0	0	-	-	-	0	0	0	0
NTR <sup>6</sup>	-	-	-	-	-	-	0	-	-	-	2	-	-	-	-	-	-	-	-	0	-	-	-	-	-	-
NAWQC <sup>7</sup> Humans	-	-	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NAWQC <sup>7</sup> Aquatic Life	9	-	-	-	-	-	-	-	-	-	0	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-
USEPA IRIS Reference Dose <sup>8</sup>	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	-	0	-	-	0	-

### Glen Pond (A5L93221307)

	Aluminum		Arsenic		Cadmium		Chromium		Copper		Iron		Mercury	Methyl Mercury	Manganese		Nickel		Lead		Selenium		Silver		Zinc	
	T	D	T	D	T	D	T	D	T	D	T	D	T	T	T	D	T	D	T	D	T	D	T	D	T	D
Maximum detected	1560	171	3.57	3.42	0.029	0.005	5.05	1.7	9.5	7.14	945	286	0.0149	0.00194	70.5	22.4	7.22	1.95	0.945	0.068	0.3	0.306	<0.203	0.036	11.1	1.58
Minimum detected	20.70	2.3	0.238	0.126	<0.003	<0.001	0.12	<0.02	1.03	0.79	38.0	2.2	0.00077	0.000061	6.75	0.105	0.42	0.06	0.008	<0.002	<0.07	<0.056	<0.006	<0.005	0.16	<0.013
Number of samples	27	27	27	27	27	27	27	27	27	27	27	27	26	26	27	27	27	27	27	27	27	27	13	13	27	27
Number of samples exceeding criteria or																										
Public Health Goal <sup>1</sup>	1	-	-	-	0	-	-	-	0	-	-	-	0	-	0	-	0	-	0	-	-	-	-	-	-	-
Primary MCL <sup>2</sup>	1	-	0	-	0	-	0	-	0	-	-	-	0	-	-	-	0	-	0	-	-	-	-	-	-	-
Secondary MCL <sup>2</sup>	9	-	0	-	-	-	-	-	0	-	14	-	-	-	6	-	-	-	-	-	-	-	0	-	0	-
Agricultural Goal <sup>3</sup>	0	-	0	-	0	-	0	-	0	-	0	-	-	-	0	-	0	-	0	-	-	-	-	-	0	-
Cal/EPA Cancer Potency Factor <sup>4</sup>	-	-	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CTR <sup>5</sup> Humans	-	-	-	-	-	-	-	-	0	-	-	-	0	-	-	-	0	-	-	-	-	-	-	-	-	-
CTR <sup>5</sup> Aquatic Life	-	-	0	0	0	-	0	4	10	10	-	-	-	-	-	-	0	0	0	-	-	-	0	0	0	0
NTR <sup>6</sup>	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-	-
NAWQC <sup>7</sup> Humans	-	-	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NAWQC <sup>7</sup> Aquatic Life	16	-	-	-	-	-	-	-	-	-	0	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-
USEPA IRIS Reference Dose <sup>8</sup>	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	-	0	-	-	0	-

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## Appendix 3c-3. Continued.

### Morris Ravine at Mouth (A5-1850)

	Aluminum		Arsenic		Cadmium		Chromium		Copper		Iron		Mercury	Methyl Mercury	Manganese		Nickel		Lead		Selenium		Silver		Zinc	
	T	D	T	D	T	D	T	D	T	D	T	D	T	T	T	D	T	D	T	D	T	D	T	D	T	D
Maximum detected	3217	1485	1.96	1.63	0.017	<0.032	8.65	4.06	6.33	4.13	2289	1179	0.0138	0.000567	255	13	5.81	2.91	1.01	0.650	0.41	0.240	0.035	0.030	5.89	3.7
Minimum detected	13.3	1.9	0.7	0.7	<0.004	<0.001	0.52	0.26	0.40	0.30	9.2	<1.02	0.00091	0.00003	2.2	0.26	0.99	0.9	<0.007	<0.002	<0.092	<0.056	0.030	0.005	0.16	0.11
Number of samples	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	
Number of samples exceeding criteria or																										
Public Health Goal <sup>1</sup>	3	-	-	-	0	-	-	-	0	-	-	-	0	-	0	-	0	-	0	-	-	-	-	-	-	
Primary MCL <sup>2</sup>	3	-	0	-	0	-	0	-	0	-	-	-	0	-	-	-	0	-	0	-	-	-	-	-	-	
Secondary MCL <sup>2</sup>	3	-	0	-	-	-	-	-	0	-	4	-	-	-	3	-	-	-	-	-	-	-	0	-	0	
Agricultural Goal <sup>3</sup>	0	-	0	-	0	-	0	-	0	-	0	-	-	-	-	-	0	-	0	-	-	-	-	-	0	
Cal/EPA Cancer Potency Factor <sup>4</sup>	-	-	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
CTR <sup>5</sup> Humans	-	-	-	-	-	-	-	-	0	-	-	-	0	-	-	-	0	-	-	-	-	-	-	-	-	
CTR <sup>5</sup> Aquatic Life	-	-	0	0	0	-	0	0	0	0	-	-	-	-	-	-	-	0	0	0	-	-	0	0	0	
NTR <sup>6</sup>	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-	
NAWQC <sup>7</sup> Humans	-	-	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
NAWQC <sup>7</sup> Aquatic Life	5 <sup>9</sup>	-	-	-	-	-	-	-	-	-	0	-	0	-	-	-	-	-	-	-	-	-	-	-	-	
USEPA IRIS Reference Dose <sup>8</sup>	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	0	-	0	-	0	-	

### Thermalito Diversion Pool US of Dam Surface (A5R93191326)

	Aluminum		Arsenic		Cadmium		Chromium		Copper		Iron		Mercury	Methyl Mercury	Manganese		Nickel		Lead		Selenium		Silver		Zinc	
	T	D	T	D	T	D	T	D	T	D	T	D	T	T	T	D	T	D	T	D	T	D	T	D	T	D
Maximum detected	249	68.4	0.834	0.72	0.002	0.002	1.65	0.746	1.84	1.22	374	66.2	0.00302	0.00003	22.3	43.8	1.51	1.11	0.31	0.004	0.17	0.11	<0.203	0.085	1.59	0.31
Minimum detected	6.87	1.8	0.364	0.281	<0.002	<0.001	<0.056	<0.03	0.5	0.46	<3.1	<2.45	0.0002	0.000005	1.04	<0.006	0.5	0.35	<0.002	<0.001	<0.033	<0.056	<0.006	<0.004	<0.02	<0.07
Number of samples	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	15	15	26	26
Number of samples exceeding criteria or objectives																										
Public Health Goal <sup>1</sup>	0	-	-	-	0	-	-	-	0	-	-	-	0	-	0	-	0	-	0	-	-	-	-	-	-	-
Primary MCL <sup>2</sup>	0	-	0	-	0	-	0	-	0	-	-	-	0	-	-	-	0	-	0	-	0	-	-	-	-	-
Secondary MCL <sup>2</sup>	1	-	0	-	-	-	-	-	0	-	1	-	-	-	0	-	-	-	-	-	-	-	0	-	0	-
Agricultural Goal <sup>3</sup>	0	-	0	-	0	-	0	-	0	-	0	-	-	-	0	-	0	-	0	-	0	-	-	-	0	-
Cal/EPA Cancer Potency Factor <sup>4</sup>	-	-	26	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CTR <sup>5</sup> Humans	-	-	-	-	-	-	-	-	0	-	-	-	0	-	-	-	0	-	-	-	-	-	-	-	-	-
CTR <sup>5</sup> Aquatic Life	-	-	0	0	0	-	0	0	0	0	-	-	-	-	-	-	0	0	0	-	-	0	0	0	0	0
NTR <sup>6</sup>	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-
NAWQC <sup>7</sup> Humans	-	-	26	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NAWQC <sup>7</sup> Aquatic Life	3 <sup>9</sup>	-	-	-	-	-	-	-	-	-	0	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-
USEPA IRIS Reference Dose <sup>8</sup>	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	0	-	0	-

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## Appendix 3c-3. Continued.

### Thermalito Diversion Pool US of Dam BOTTOM (A5R93191326)

	Aluminum		Arsenic		Cadmium		Chromium		Copper		Iron		Mercury	Methyl Mercury	Manganese		Nickel		Lead		Selenium		Silver		Zinc	
	T	D	T	D	T	D	T	D	T	D	T	D	T	T	T	D	T	D	T	D	T	D	T	D	T	D
Maximum detected	150	64.6	0.925	0.75	0.085	0.131	0.74	0.51	2.83	1.14	242	47.1	0.00393	0.000034	23	3.05	1.35	1.12	0.109	0.032	0.34	0.64	0.205	0.053	0.52	0.29
Minimum detected	9.05	2.6	0.335	0.341	<0.003	<0.001	0.097	0.05	0.47	0.41	4.7	<1.02	<0.00015	<0.000005	0.94	0.42	0.52	0.08	<0.002	<0.002	<0.09	<0.056	<0.006	<0.004	0.03	<0.033
Number of samples	21	18	21	18	21	18	21	18	21	18	21	18	19	22	21	18	21	18	20	18	21	18	11	10	21	18
Number of samples exceeding criteria or objectives																										
Public Health Goal <sup>1</sup>	0	-	-	-	0	-	-	-	0	-	-	-	0	-	0	-	0	-	0	-	-	-	-	-	-	-
Primary MCL <sup>2</sup>	0	-	0	-	0	-	0	-	0	-	-	-	0	-	-	-	0	-	0	-	0	-	-	-	-	-
Secondary MCL <sup>2</sup>	0	-	0	-	-	-	-	-	0	-	0	-	-	-	0	-	-	-	-	-	-	-	0	-	0	-
Agricultural Goal <sup>3</sup>	0	-	0	-	0	-	0	-	0	-	0	-	-	-	0	-	0	-	0	-	0	-	-	-	0	-
Cal/EPA Cancer Potency Factor <sup>4</sup>	-	-	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CTR <sup>5</sup> Humans	-	-	-	-	-	-	-	-	0	-	0	-	0	-	-	-	0	-	-	-	-	-	-	-	-	-
CTR <sup>5</sup> Aquatic Life	-	-	0	0	0	-	0	0	0	0	-	-	-	-	-	-	0	0	0	-	-	0	0	0	0	0
NTR <sup>6</sup>	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-
NAWQC <sup>7</sup> Humans	-	-	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NAWQC <sup>7</sup> Aquatic Life	3 <sup>8</sup>	-	-	-	-	-	-	-	-	-	0	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-
USEPA IRIS Reference Dose <sup>8</sup>	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	0	-	0	-

### Feather R A Oroville (A5-1800.00)

	Aluminum		Arsenic		Cadmium		Chromium		Copper		Iron		Mercury	Methyl Mercury	Manganese		Nickel		Lead		Selenium		Silver		Zinc	
	T	D	T	D	T	D	T	D	T	D	T	D	T	T	T	D	T	D	T	D	T	D	T	D	T	D
Maximum detected	624	447	0.985	0.646	0.009	0.016	2.4	1.65	2.82	1.54	807	390	0.00731	0.000073	43.4	13	1.87	1.37	0.3	0.077	0.38	0.14	<0.273	0.031	2.66	2.41
Minimum detected	11.5	<1.5	0.382	0.31	<0.004	<0.002	<0.07	<0.02	0.6	0.35	8.1	<3.25	0.00023	0.00001	2.07	<0.06	0.5	0.18	<0.012	<0.001	<0.033	<0.052	<0.006	<0.001	0.16	0.15
Number of samples	29	29	29	29	29	29	29	29	29	29	29	29	29	28	29	29	29	29	29	29	29	29	14	14	29	29
Number of samples exceeding criteria or objectives																										
Public Health Goal <sup>1</sup>	1	-	-	-	0	-	-	-	0	-	-	-	0	-	0	-	0	-	0	-	-	-	-	-	-	-
Primary MCL <sup>2</sup>	0	-	0	-	0	-	0	-	0	-	-	-	0	-	-	-	0	-	0	-	0	-	-	-	-	-
Secondary MCL <sup>2</sup>	2	-	0	-	-	-	-	-	0	-	1	-	-	-	0	-	-	-	-	-	-	-	0	-	0	-
Agricultural Goal <sup>3</sup>	0	-	0	-	0	-	0	-	0	-	0	-	-	-	0	-	0	-	0	-	0	-	-	-	0	-
Cal/EPA Cancer Potency Factor <sup>4</sup>	-	-	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CTR <sup>5</sup> Humans	-	-	-	-	-	-	-	-	0	-	-	-	0	-	-	-	0	-	-	-	-	-	-	-	-	-
CTR <sup>5</sup> Aquatic Life	-	-	0	0	0	-	0	0	0	0	-	-	-	-	-	-	0	0	0	-	-	0	0	0	0	0
NTR <sup>6</sup>	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-
NAWQC <sup>7</sup> Humans	-	-	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NAWQC <sup>7</sup> Aquatic Life	8 <sup>8</sup>	-	-	-	-	-	-	-	-	-	0	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-
USEPA IRIS Reference Dose <sup>8</sup>	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	0	-	0	-

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## Appendix 3c-3. Continued.

### Feather R US Hatchery (A5-1789.50)

	Aluminum		Arsenic		Cadmium		Chromium		Copper		Iron		Mercury	Methyl Mercury	Manganese		Nickel		Lead		Selenium		Silver		Zinc	
	T	D	T	D	T	D	T	D	T	D	T	D	T	T	T	D	T	D	T	D	T	D	T	D	T	D
Maximum detected	542	452	0.811	0.65	0.008	0.003	2.26	1.63	2.62	1.57	684	376	0.05900	0.000037	30.6	4.24	1.77	1.44	0.264	0.077	0.24	0.12	0.167	0.03	1.83	0.76
Minimum detected	8.34	1.8	0.378	0.215	<0.004	<0.002	<0.06	<0.02	0.45	0.26	7.7	<1.64	0.00028	<0.000025	1.55	0.12	0.44	0.24	<0.002	<0.001	<0.07	<0.07	<0.006	<0.001	<0.035	<0.023
Number of samples	30	30	30	30	30	30	30	30	30	30	30	30	30	29	30	30	30	30	30	30	30	30	14	14	30	30
Number of samples exceeding criteria or objectives																										
Public Health Goal <sup>1</sup>	0	-	-	-	0	-	-	-	0	-	-	-	0	-	0	-	0	-	0	-	-	-	-	-	-	-
Primary MCL <sup>2</sup>	0	-	0	-	0	-	0	-	0	-	-	-	0	-	-	-	0	-	0	-	0	-	-	-	-	-
Secondary MCL <sup>2</sup>	1	-	0	-	-	-	-	-	0	-	2	-	-	-	0	-	-	-	-	-	-	-	0	-	0	-
Agricultural Goal <sup>3</sup>	0	-	0	-	0	-	0	-	0	-	0	-	-	-	0	-	0	-	0	-	0	-	-	-	0	-
Cal/EPA Cancer Potency Factor <sup>4</sup>	-	-	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CTR <sup>5</sup> Humans	-	-	-	-	-	-	-	-	0	-	-	-	1	-	-	-	0	-	-	-	-	-	-	-	-	-
CTR <sup>5</sup> Aquatic Life	-	-	-	0	0	0	-	0	0	0	-	-	-	-	-	-	0	0	0	-	-	-	0	0	0	0
NTR <sup>6</sup>	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-	-
NAWQC <sup>7</sup> Humans	-	-	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NAWQC <sup>7</sup> Aquatic Life	6	-	-	-	-	-	-	-	-	-	0	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-
USEPA IRIS Reference Dose <sup>8</sup>	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	0	-	0	-

### Feather R Hatchery Settling Pond (A5R93101333)

	Aluminum		Arsenic		Cadmium		Chromium		Copper		Iron		Mercury	Methyl Mercury	Manganese		Nickel		Lead		Selenium		Silver		Zinc	
	T	D	T	D	T	D	T	D	T	D	T	D	T	T	T	D	T	D	T	D	T	D	T	D	T	D
Maximum detected	666	584	0.839	0.763	0.191	0.003	2.53	1.93	6.47	2.28	5205	519	0.01120	0.000258	37	6.61	2.17	1.38	0.445	0.101	0.21	0.12	0.272	0.088	3.37	1.3
Minimum detected	7.98	2.5	0.359	0.38	<0.004	<0.004	0.087	<0.02	0.73	0.61	5.7	<1.64	0.00023	0.000025	0.56	0.08	0.43	0.27	0.002	<0.003	<0.04	<0.089	<0.006	<0.006	0.15	0.1
Number of samples	27	27	27	27	27	27	27	27	27	27	27	27	27	25	27	27	27	27	27	27	27	27	14	14	27	27
Number of samples exceeding criteria or objectives																										
Public Health Goal <sup>1</sup>	1	-	-	-	1	-	-	-	0	-	-	-	0	-	0	-	0	-	0	-	-	-	-	-	-	-
Primary MCL <sup>2</sup>	0	-	0	-	0	-	0	-	0	-	-	-	0	-	-	-	0	-	0	-	0	-	-	-	-	-
Secondary MCL <sup>2</sup>	2	-	0	-	-	-	-	-	0	-	4	-	-	-	0	-	-	-	-	-	-	-	0	-	0	-
Agricultural Goal <sup>3</sup>	0	-	0	-	0	-	0	-	0	-	1	-	-	-	0	-	0	-	0	-	0	-	-	-	0	-
Cal/EPA Cancer Potency Factor <sup>4</sup>	-	-	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CTR <sup>5</sup> Humans	-	-	-	-	-	-	-	-	0	-	-	-	0	-	-	-	0	-	-	-	-	-	-	-	-	-
CTR <sup>5</sup> Aquatic Life	-	-	-	0	0	0	-	0	3 <sup>8</sup> 1 <sup>9</sup>	0	-	-	-	-	-	-	0	0	0	-	-	-	0	0	0	0
NTR <sup>6</sup>	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-	-
NAWQC <sup>7</sup> Humans	-	-	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NAWQC <sup>7</sup> Aquatic Life	5 <sup>8</sup> 1 <sup>10</sup>	-	-	-	-	-	-	-	-	-	2	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-
USEPA IRIS Reference Dose <sup>8</sup>	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	0	-	0	-

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## Appendix 3c-3. Continued.

### Feather R DS Hatchery (A5-1780.50)

	Aluminum		Arsenic		Cadmium		Chromium		Copper		Iron		Mercury	Methyl Mercury	Manganese		Nickel		Lead		Selenium		Silver		Zinc	
	T	D	T	D	T	D	T	D	T	D	T	D	T	T	T	D	T	D	T	D	T	D	T	D	T	D
Maximum detected	298	287	0.697	0.683	0.027	0.003	2.3	1.35	4.32	2.47	470	255	0.00894	0.000458	18.2	4.94	1.93	1.35	0.225	0.05	0.32	0.22	0.176	0.043	2.41	1.18
Minimum detected	12.1	2.1	0.448	0.29	<0.004	<0.004	0.07	<0.02	1.3	1.02	14.2	<2.45	0.00113	0.000051	0.91	0.06	0.59	0.4	0.007	<0.003	<0.04	<0.089	<0.006	<0.006	0.305	0.17
Number of samples	29	29	29	29	29	29	29	29	29	29	29	29	29	27	29	29	29	29	29	29	29	29	14	14	29	29
Number of samples exceeding criteria or objectives																										
Public Health Goal <sup>1</sup>	0	-	-	-	0	-	-	-	0	-	-	-	0	-	0	-	0	-	0	-	-	-	-	-	-	-
Primary MCL <sup>2</sup>	0	-	0	-	0	-	0	-	0	-	-	-	0	-	-	-	0	-	0	-	0	-	-	-	-	-
Secondary MCL <sup>2</sup>	2	-	0	-	-	-	-	-	0	-	2	-	-	-	0	-	-	-	-	-	-	-	0	-	0	-
Agricultural Goal <sup>3</sup>	0	-	0	-	0	-	0	-	0	-	0	-	-	-	0	-	0	-	0	-	0	-	-	-	0	-
Cal/EPA Cancer Potency Factor <sup>4</sup>	-	-	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CTR <sup>5</sup> Humans	-	-	-	-	-	-	-	-	0	-	-	-	0	-	-	-	0	-	-	-	-	-	-	-	-	-
CTR <sup>5</sup> Aquatic Life	-	-	0	0	0	0	0	0	1 <sup>10</sup>	0	-	-	-	-	-	-	0	0	0	0	-	-	0	0	0	0
NTR <sup>6</sup>	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-	-
NAWQC <sup>7</sup> Humans	-	-	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NAWQC <sup>7</sup> Aquatic Life	3 <sup>9</sup>	-	-	-	-	-	-	-	-	-	0	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-
USEPA IRIS Reference Dose <sup>8</sup>	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	0	-	0	-	-	0	-

### Feather R DS HWY 162 (A5-1740.50)

	Aluminum		Arsenic		Cadmium		Chromium		Copper		Iron		Mercury	Methyl Mercury	Manganese		Nickel		Lead		Selenium		Silver		Zinc	
	T	D	T	D	T	D	T	D	T	D	T	D	T	T	T	D	T	D	T	D	T	D	T	D	T	D
Maximum detected	183	130	0.789	0.731	0.123	0.004	1.62	0.87	2.7	0.98	358	148	0.00308	0.00034	28.5	15.3	1.49	1.11	0.505	0.03	0.19	0.3	0.04	0.047	0.99	0.53
Minimum detected	12	2.1	0.333	0.263	<0.004	<0.004	0.07	<0.02	0.59	0.4	24.8	<3.98	0.00028	0.000025	2.36	0.11	0.48	0.3	0.006	<0.003	<0.04	<0.089	<0.006	<0.006	0.049	0.06
Number of samples	30	29	30	29	30	29	30	29	30	29	30	29	30	28	30	29	30	29	30	29	30	29	15	14	30	29
Number of samples exceeding criteria or objectives																										
Public Health Goal <sup>1</sup>	0	-	-	-	1	-	-	-	0	-	-	-	0	-	0	-	0	-	0	-	-	-	-	-	-	-
Primary MCL <sup>2</sup>	0	-	0	-	0	-	0	-	0	-	-	-	0	-	-	-	0	-	0	-	0	-	-	-	-	-
Secondary MCL <sup>2</sup>	0	-	0	-	-	-	-	-	0	-	2	-	-	-	0	-	-	-	-	-	-	-	0	-	0	-
Agricultural Goal <sup>3</sup>	0	-	0	-	0	-	0	-	0	-	0	-	-	-	0	-	0	-	0	-	0	-	-	-	0	-
Cal/EPA Cancer Potency Factor <sup>4</sup>	-	-	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CTR <sup>5</sup> Humans	-	-	-	-	-	-	-	-	0	-	-	-	0	-	-	-	0	-	-	-	-	-	-	-	-	-
CTR <sup>5</sup> Aquatic Life	-	-	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0	0	-	-	0	0	0	0
NTR <sup>6</sup>	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-	-
NAWQC <sup>7</sup> Humans	-	-	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NAWQC <sup>7</sup> Aquatic Life	4 <sup>9</sup>	-	-	-	-	-	-	-	-	-	0	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-
USEPA IRIS Reference Dose <sup>8</sup>	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	0	-	0	-	-	0	-

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## Appendix 3c-3. Continued.

### Oroville Fishing Pond (A5L92951347)

	Aluminum		Arsenic		Cadmium		Chromium		Copper		Iron		Mercury	Methyl Mercury	Manganese		Nickel		Lead		Selenium		Silver		Zinc	
	T	D	T	D	T	D	T	D	T	D	T	D	T	T	T	D	T	D	T	D	T	D	T	D	T	D
Maximum concentration	104	5.45	4.42	4.16	0.009	<0.003	4.41	0.03	0.97	0.44	526	275	0.0022	0.00013	173	81.3	1.51	1.49	0.131	0.028	0.59	0.68	0.063	0.008	1.51	1.39
Minimum concentration	<1.5	<0.1	0.72	0.65	<0.004	<0.003	<0.02	<0.07	0.03	0.06	22	<3.5	0.0003	<0.00002	9.18	0.25	<0.04	<0.04	<0.01	<0.01	<0.30	<0.30	<0.106	<0.001	0.14	0.1
Number of samples	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	12	12	24	24
Number of samples exceeding criteria or objectives																										
Public Health Goal <sup>1</sup>	0	-	-	-	0	-	-	-	0	-	-	-	0	-	0	-	0	-	0	-	-	-	-	-	-	-
Primary MCL <sup>2</sup>	0	-	0	-	0	-	0	-	0	-	-	-	0	-	-	-	0	-	0	-	0	-	-	-	-	-
Secondary MCL <sup>2</sup>	0	-	-	-	-	-	-	-	-	-	6	-	-	-	15	-	-	-	-	-	-	-	0	-	0	-
Agricultural Goal <sup>3</sup>	0	-	0	-	0	-	0	-	0	-	0	-	-	-	0	-	0	-	0	-	0	-	-	-	0	-
Cal/EPA Cancer Potency Factor <sup>4</sup>	-	-	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CTR <sup>5</sup> Humans	-	-	-	-	-	-	-	-	0	-	-	-	0	-	-	-	0	-	-	-	-	-	-	-	-	-
CTR <sup>5</sup> Aquatic Life	-	-	-	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0	0	-	-	0	0	0	0
NTR <sup>6</sup>	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-
NAWQC <sup>7</sup> Humans	-	-	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NAWQC <sup>7</sup> Aquatic Life	1 <sup>8</sup>	-	-	-	-	-	-	-	-	-	0	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-
USEPA IRIS Reference Dose <sup>9</sup>	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	0	-	0	-

### Feather R A Robinson Riffle (A5-1712.50)

	Aluminum		Arsenic		Cadmium		Chromium		Copper		Iron		Mercury	Methyl Mercury	Manganese		Nickel		Lead		Selenium		Silver		Zinc	
	T	D	T	D	T	D	T	D	T	D	T	D	T	T	T	D	T	D	T	D	T	D	T	D	T	D
Maximum detected	555	224	1.52	1.4	0.109	0.034	2.2	1.88	2.79	2.61	597	244	0.0145	0.000225	18.4	8.13	2.55	2.52	0.49	0.338	0.258	0.1	0.071	0.052	2.8	2.34
Minimum detected	9.53	1.5	0.346	0.29	<0.004	<0.004	0.11	<0.02	0.58	0.44	16.9	4.6	0.0003	0.000027	1.49	0.1	0.4	0.27	<0.011	<0.001	<0.04	<0.089	<0.006	<0.001	0.052	0.05
Number of samples	29	29	29	29	29	29	29	29	29	29	29	29	29	28	29	29	29	29	29	29	29	29	14	14	29	29
Number of samples exceeding criteria or objectives																										
Public Health Goal <sup>1</sup>	0	-	-	-	1	-	-	-	0	-	-	-	0	-	0	-	0	-	0	-	-	-	-	-	-	-
Primary MCL <sup>2</sup>	0	-	0	-	0	-	0	-	0	-	-	-	0	-	-	-	0	-	0	-	0	-	-	-	-	-
Secondary MCL <sup>2</sup>	3	-	0	-	-	-	-	-	0	-	2	-	-	-	0	-	-	-	-	-	-	-	0	-	0	-
Agricultural Goal <sup>3</sup>	0	-	0	-	0	-	0	-	0	-	0	-	-	-	0	-	0	-	0	-	0	-	-	-	0	-
Cal/EPA Cancer Potency Factor <sup>4</sup>	-	-	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CTR <sup>5</sup> Humans	-	-	-	-	-	-	-	-	0	-	-	-	0	-	-	-	0	-	-	-	-	-	-	-	-	-
CTR <sup>5</sup> Aquatic Life	-	-	-	0	0	0	-	0	0	0	-	-	-	-	-	-	0	0	0	0	-	-	0	0	0	0
NTR <sup>6</sup>	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-
NAWQC <sup>7</sup> Humans	-	-	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NAWQC <sup>7</sup> Aquatic Life	6 <sup>8</sup>	-	-	-	-	-	-	-	-	-	0	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-
USEPA IRIS Reference Dose <sup>9</sup>	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	0	-	0	-

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## Appendix 3c-3. Continued.

### Robinson Riffle Pond (A5L92821359)

	Aluminum		Arsenic		Cadmium		Chromium		Copper		Iron		Mercury	Methyl Mercury	Manganese		Nickel		Lead		Selenium		Silver		Zinc	
	T	D	T	D	T	D	T	D	T	D	T	D	T	T	T	D	T	D	T	D	T	D	T	D	T	D
Maximum concentration	149	24	2.62	1.92	0.02	0.41	3.66	0.96	3.79	3.38	5290	968	0.0114	0.00057	2260	920	7.54	2.95	0.465	0.182	0.49	0.41	<0.203	<0.011	2.62	1.24
Minimum concentration	3	<1.5	0.28	0.21	<0.004	<0.004	<0.06	<0.07	0.10	<0.04	111	<2.08	0.0004	<0.00002	27.9	0.14	0.22	0.16	<0.01	<0.01	0.18	<0.11	<0.062	<0.001	0.15	<0.1
Number of samples	24	24	24	24	24	24	24	24	24	24	24	24	23	23	24	24	24	24	24	24	24	24	12	12	24	24
Number of samples exceeding criteria or objectives																										
Public Health Goal <sup>1</sup>	0	-	-	-	0	-	-	-	0	-	-	-	0	-	8	-	0	-	0	-	-	-	-	-	-	-
Primary MCL <sup>2</sup>	0	-	0	-	0	-	0	-	0	-	-	-	0	-	-	-	0	-	0	-	-	-	-	-	-	-
Secondary MCL <sup>2</sup>	0	-	0	-	-	-	-	-	0	-	17	-	-	-	21	-	-	-	-	-	-	-	0	-	0	-
Agricultural Goal <sup>3</sup>	0	-	0	-	0	-	0	-	0	-	1	-	-	-	13	-	0	-	0	-	0	-	-	-	0	-
Cal/EPA Cancer Potency Factor <sup>4</sup>	-	-	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CTR <sup>5</sup> Humans	-	-	-	-	-	-	-	-	0	-	-	-	0	-	-	-	0	-	-	-	-	-	-	-	-	-
CTR <sup>5</sup> Aquatic Life	-	-	0	0	0	-	0	0	0	0	-	-	-	-	-	-	0	0	0	0	-	-	0	0	0	0
NTR <sup>6</sup>	-	-	-	-	-	-	0	-	-	-	0	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-
NAWQC <sup>7</sup> Humans	-	-	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NAWQC <sup>7</sup> Aquatic Life	-	-	-	-	-	-	-	-	-	-	9	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-
USEPA IRIS Reference Dose <sup>8</sup>	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	0	-	0	-

### Upper Pacific Heights Pond (A5L92771367)

	Aluminum		Arsenic		Cadmium		Chromium		Copper		Iron		Mercury	Methyl Mercury	Manganese		Nickel		Lead		Selenium		Silver		Zinc	
	T	D	T	D	T	D	T	D	T	D	T	D	T	T	T	D	T	D	T	D	T	D	T	D	T	D
Maximum detected	95	28	0.90	0.866	0.008	<0.13	1.90	0.47	1.27	0.98	182	50	0.0044	0.00019	19.9	7.38	1.04	0.87	0.10	0.093	0.27	0.170	<0.203	0.01	0.515	0.8
Minimum detected	5	<1.5	0.29	0.259	<0.002	<0.002	<0.07	<0.06	0.33	0.32	<2.93	<2.08	0.0003	<0.000025	1.08	0.05	0.050	<0.04	<0.01	<0.01	<0.04	<0.04	<0.006	<0.001	<0.035	<0.013
Number of samples	25	24	25	24	25	24	25	24	25	24	25	24	24	24	25	24	25	24	25	24	25	24	13	12	25	24
Number of samples exceeding criteria or objectives																										
Public Health Goal <sup>1</sup>	0	-	-	-	0	-	-	-	0	-	-	-	0	-	0	-	0	-	0	-	-	-	-	-	-	-
Primary MCL <sup>2</sup>	0	-	0	-	0	-	0	-	0	-	-	-	0	-	-	-	0	-	0	-	0	-	-	-	-	-
Secondary MCL <sup>2</sup>	0	-	0	-	-	-	-	-	0	-	0	-	-	-	0	-	-	-	-	-	-	-	0	-	0	-
Agricultural Goal <sup>3</sup>	0	-	0	-	0	-	0	-	0	-	0	-	-	-	0	-	0	-	0	-	0	-	-	-	0	-
Cal/EPA Cancer Potency Factor <sup>4</sup>	-	-	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CTR <sup>5</sup> Humans	-	-	-	-	-	-	-	-	0	-	-	-	0	-	-	-	0	-	-	-	-	-	-	-	-	-
CTR <sup>5</sup> Aquatic Life	-	-	0	0	0	-	0	0	0	0	-	-	-	-	-	-	0	0	0	0	-	-	0	0	0	0
NTR <sup>6</sup>	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-
NAWQC <sup>7</sup> Humans	-	-	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NAWQC <sup>7</sup> Aquatic Life	-	-	-	-	-	-	-	-	-	-	0	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-
USEPA IRIS Reference Dose <sup>8</sup>	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	0	-	0	-

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## Appendix 3c-3. Continued.

### Feather R US from Afterbay Outlet (A5-1695.50)

	Aluminum		Arsenic		Cadmium		Chromium		Copper		Iron		Mercury	Methyl Mercury	Manganese		Nickel		Lead		Selenium		Silver		Zinc	
	T	D	T	D	T	D	T	D	T	D	T	D	T	T	T	D	T	D	T	D	T	D	T	D	T	D
Maximum detected	447	372	0.731	0.671	0.633	0.003	1.64	1.57	67.5	1.82	445	377	0.00905	0.000207	27.9	16.2	2.35	2.15	0.506	0.254	0.282	0.14	<0.273	0.02	2.08	1.26
Minimum detected	7.14	1.5	0.305	0.35	<0.004	<0.002	<0.06	<0.02	0.53	0.49	23.8	5.6	0.00032	<0.000013	3.82	0.104	0.35	0.26	<0.002	<0.001	<0.07	<0.07	<0.006	<0.001	<0.035	<0.023
Number of samples	30	30	30	30	30	30	30	30	30	30	30	30	30	29	30	30	30	30	30	30	30	30	14	14	30	30
Number of samples exceeding criteria or objectives																										
Public Health Goal <sup>1</sup>	0	-	-	-	1	-	-	-	0	-	-	-	0	-	0	-	0	-	0	-	-	-	-	-	-	-
Primary MCL <sup>2</sup>	0	-	0	-	0	-	0	-	0	-	-	-	0	-	-	-	0	-	0	-	0	-	-	-	-	-
Secondary MCL <sup>2</sup>	1	-	0	-	-	-	-	-	0	-	2	-	-	-	0	-	-	-	-	-	-	-	0	-	0	-
Agricultural Goal <sup>3</sup>	0	-	0	-	0	-	0	-	0	-	0	-	-	-	0	-	0	-	0	-	0	-	-	-	0	-
Cal/EPA Cancer Potency Factor <sup>4</sup>	-	-	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CTR <sup>5</sup> Humans	-	-	-	-	-	-	-	-	0	-	-	-	0	-	-	-	0	-	-	-	-	-	-	-	-	-
CTR <sup>5</sup> Aquatic Life	-	-	0	0	0	0	0	0	1	0	-	-	-	-	-	-	0	0	0	0	-	-	0	0	0	0
NTR <sup>6</sup>	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-	-
NAWQC <sup>7</sup> Humans	-	-	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NAWQC <sup>7</sup> Aquatic Life	4	-	-	-	-	-	-	-	-	-	0	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-
USEPA IRIS Reference Dose <sup>8</sup>	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	0	-	0	-

### North Forebay C (A5-5185)

	Aluminum		Arsenic		Cadmium		Chromium		Copper		Iron		Mercury	Methyl Mercury	Manganese		Nickel		Lead		Selenium		Silver		Zinc	
	T	D	T	D	T	D	T	D	T	D	T	D	T	T	T	D	T	D	T	D	T	D	T	D	T	D
Maximum detected	1262	590	0.92	0.593	0.016	0.05	4.79	4.5	16.0	2.9	3443	1105	0.00798	0.000347	219	50.7	2.76	2.52	1.54	0.429	0.27	0.40	0.160	0.05	7.3	3.3
Minimum detected	7.3	1.2	0.14	0.118	0.004	<0.001	0.05	<0.012	30.51	0.44	64.3	<1.06	0.00025	0.000037	0.73	0.28	0.20	0.14	<0.007	<0.002	<0.116	<0.052	<0.006	<0.005	0.55	0.09
Number of samples	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	14	14	21	21
Number of samples exceeding criteria or objectives																										
Public Health Goal <sup>1</sup>	3	-	-	-	0	-	-	-	0	-	-	-	0	-	0	-	0	-	0	-	-	-	-	-	-	-
Primary MCL <sup>2</sup>	2	-	0	-	0	-	0	-	0	-	-	-	0	-	-	-	0	-	0	-	0	-	-	-	-	-
Secondary MCL <sup>2</sup>	5	-	0	-	-	-	-	-	0	-	14	-	-	-	4	-	-	-	-	-	-	-	0	-	0	-
Agricultural Goal <sup>3</sup>	0	-	0	-	0	-	0	-	0	-	0	-	-	-	1	-	0	-	0	-	0	-	-	-	0	-
Cal/EPA Cancer Potency Factor <sup>4</sup>	-	-	21	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CTR <sup>5</sup> Humans	-	-	-	-	-	-	-	-	0	-	-	-	0	-	-	-	0	-	-	-	-	-	-	-	-	-
CTR <sup>5</sup> Aquatic Life	-	-	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0	0	-	-	0	0	0	0
NTR <sup>6</sup>	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-	-
NAWQC <sup>7</sup> Humans	-	-	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NAWQC <sup>7</sup> Aquatic Life	6	-	-	-	-	-	-	-	-	-	0	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-
USEPA IRIS Reference Dose <sup>8</sup>	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	0	-	0	-	-	0	-

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## Appendix 3c-3. Continued.

### Thermalito N Forebay Surface (A5R93161366)

	Aluminum		Arsenic		Cadmium		Chromium		Copper		Iron		Mercury	Methyl Mercury	Manganese		Nickel		Lead		Selenium		Silver		Zinc	
	T	D	T	D	T	D	T	D	T	D	T	D	T	T	T	D	T	D	T	D	T	D	T	D	T	D
Maximum detected	174	69	0.815	0.689	0.028	0.036	0.74	0.67	2.64	1.09	260	39	0.00191	0.000055	20	3.69	2.50	1.19	0.09	0.06	0.24	0.08	0.052	16.8	1.18	0.42
Minimum detected	10.8	2.1	0.349	0.045	0.002	<0.001	0.09	<0.039	0.51	0.43	8	1.8	0.00034	0.000005	1.96	0.21	0.50	0.34	<0.002	<0.001	0.05	<0.056	<0.006	<0.001	0.03	<0.013
Number of samples	26	26	26	26	26	26	26	26	26	26	26	26	25	26	26	26	26	26	26	26	26	26	12	12	26	26
Number of samples exceeding criteria or																										
Public Health Goal <sup>1</sup>	0	-	-	-	0	-	-	-	0	-	-	-	0	-	0	-	0	-	0	-	-	-	-	-	-	-
Primary MCL <sup>2</sup>	0	-	0	-	0	-	0	-	0	-	-	-	0	-	-	-	0	-	0	-	0	-	-	-	-	-
Secondary MCL <sup>2</sup>	0	-	0	-	-	-	-	-	0	-	0	-	-	-	0	-	-	-	-	-	-	-	0	-	0	-
Agricultural Goal <sup>3</sup>	0	-	0	-	0	-	0	-	0	-	0	-	-	-	0	-	0	-	0	-	0	-	-	-	0	-
Cal/EPA Cancer Potency Factor <sup>4</sup>	-	-	26	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CTR <sup>5</sup> Humans	-	-	-	-	-	-	-	-	0	-	-	-	0	-	-	-	0	-	-	-	-	-	-	-	-	-
CTR <sup>5</sup> Aquatic Life	-	-	0	0	0	-	0	0	0	0	-	-	-	-	-	-	0	0	0	-	-	0	0	0	0	0
NTR <sup>6</sup>	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-	-
NAWQC <sup>7</sup> Humans	-	-	26	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NAWQC <sup>7</sup> Aquatic Life	3 <sup>9</sup>	-	-	-	-	-	-	-	-	-	0	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-
USEPA IRIS Reference Dose <sup>8</sup>	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	0	-	0	-

### Thermalito N Forebay Bottom (A5R93161366)

	Aluminum		Arsenic		Cadmium		Chromium		Copper		Iron		Mercury	Methyl Mercury	Manganese		Nickel		Lead		Selenium		Silver		Zinc	
	T	D	T	D	T	D	T	D	T	D	T	D	T	T	T	D	T	D	T	D	T	D	T	D	T	D
Maximum detected	167	74	0.791	0.707	3.93	0.245	0.66	0.70	2.05	1.31	301	276	0.00191	0.00003	23.1	9.2	3.6	1.9	0.73	0.191	0.28	<0.30	0.088	0.045	1.3	1.1
Minimum detected	11	1.6	0.354	0.321	<0.003	<0.001	0.05	<0.039	0.52	0.45	3.50	2.69	0.00026	0.000006	1.63	0.36	0.52	0.33	<0.002	<0.002	<0.033	<0.052	<0.006	0.001	<0.035	<0.031
Number of samples	20	21	20	21	20	21	19	21	20	21	20	21	20	21	20	21	20	21	20	21	20	21	11	12	20	21
Number of samples exceeding criteria or																										
Public Health Goal <sup>1</sup>	0	-	-	-	1	-	-	-	0	-	-	-	0	-	0	-	0	-	0	-	-	-	-	-	-	-
Primary MCL <sup>2</sup>	0	-	0	-	0	-	0	-	0	-	-	-	0	-	-	-	0	-	0	-	0	-	-	-	-	-
Secondary MCL <sup>2</sup>	0	-	0	-	-	-	-	-	0	-	1	-	-	-	0	-	-	-	-	-	-	-	0	-	0	-
Agricultural Goal <sup>3</sup>	0	-	0	-	0	-	0	-	0	-	0	-	-	-	0	-	0	-	0	-	0	-	-	-	0	-
Cal/EPA Cancer Potency Factor <sup>4</sup>	-	-	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CTR <sup>5</sup> Humans	-	-	-	-	-	-	-	-	0	-	-	-	0	-	-	-	0	-	-	-	-	-	-	-	-	-
CTR <sup>5</sup> Aquatic Life	-	-	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0	-	-	0	0	0	0	0
NTR <sup>6</sup>	-	-	-	-	10	10	0	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-	-
NAWQC <sup>7</sup> Humans	-	-	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NAWQC <sup>7</sup> Aquatic Life	3 <sup>9</sup>	-	-	-	-	-	-	-	-	-	0	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-
USEPA IRIS Reference Dose <sup>8</sup>	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	0	-	0	-

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## Appendix 3c-3. Continued.

### Thermalito S Forebay Surface (A5R93111370)

	Aluminum		Arsenic		Cadmium		Chromium		Copper		Iron		Mercury	Methyl Mercury	Manganese		Nickel		Lead		Selenium		Silver		Zinc	
	T	D	T	D	T	D	T	D	T	D	T	D	T	T	T	D	T	D	T	D	T	D	T	D	T	D
Maximum detected	147	62	0.763	0.642	0.04	0.04	0.72	0.64	1.84	1.08	232	38	0.00165	0.000009	19.6	4.63	1.54	3.09	0.082	0.033	0.289	0.140	0.056	0.049	0.6	0.5
Minimum detected	10.2	1.6	0.346	0.288	<0.002	<0.001	<0.056	<0.04	0.49	0.44	7.60	<1.33	0.0003	0.000008	1.58	0.30	0.48	0.34	<0.002	<0.001	<0.07	<0.056	<0.006	0.003	0.08	<0.013
Number of samples	26	26	26	26	26	26	26	26	26	26	26	26	25	25	26	26	26	26	26	26	26	26	12	12	26	26
Number of samples exceeding criteria or																										
Public Health Goal <sup>1</sup>	0	-	-	-	0	-	-	-	0	-	-	-	0	-	0	-	0	-	0	-	-	-	-	-	-	-
Primary MCL <sup>2</sup>	0	-	0	-	0	-	0	-	0	-	-	-	0	-	-	-	0	-	0	-	0	-	-	-	-	-
Secondary MCL <sup>2</sup>	0	-	0	-	-	-	-	-	0	-	0	-	-	-	0	-	-	-	-	-	-	-	0	-	0	-
Agricultural Goal <sup>3</sup>	0	-	0	-	0	-	0	-	0	-	0	-	-	-	0	-	0	-	0	-	0	-	-	-	0	-
Cal/EPA Cancer Potency Factor <sup>4</sup>	-	-	26	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CTR <sup>5</sup> Humans	-	-	-	-	-	-	-	-	0	-	-	-	0	-	-	-	0	-	-	-	-	-	-	-	-	-
CTR <sup>5</sup> Aquatic Life	-	-	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0	-	-	0	0	0	0	0
NTR <sup>6</sup>	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-	-
NAWQC <sup>7</sup> Humans	-	-	26	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NAWQC <sup>7</sup> Aquatic Life	2 <sup>9</sup>	-	-	-	-	-	-	-	-	-	0	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-
USEPA IRIS Reference Dose <sup>8</sup>	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	0	-	0	-

### Thermalito S Forebay Bottom (A5R93111370)

	Aluminum		Arsenic		Cadmium		Chromium		Copper		Iron		Mercury	Methyl Mercury	Manganese		Nickel		Lead		Selenium		Silver		Zinc	
	T	D	T	D	T	D	T	D	T	D	T	D	T	T	T	D	T	D	T	D	T	D	T	D	T	D
Maximum detected	172	68	0.772	1	0.946	0.160	0.71	0.71	2.04	1.36	307	44	0.00168	0.000029	21.5	3.9	1.7	1.11	0.170	0.026	0.32	0.36	0.057	0.040	1.69	1.54
Minimum detected	14.5	2.2	0.337	0.292	<0.002	<0.001	<0.07	<0.04	0.51	0.46	8.50	<3.25	0.00024	0.000003	1.83	0.35	0.50	0.34	0.005	<0.001	<0.033	<0.056	<0.006	<0.001	0.11	<0.013
Number of samples	25	23	25	23	25	23	25	23	25	23	25	23	24	22	25	23	25	23	25	23	25	23	12	11	25	23
Number of samples exceeding criteria or																										
Public Health Goal <sup>1</sup>	0	-	-	-	1	-	-	-	0	-	-	-	0	-	0	-	0	-	0	-	-	-	-	-	-	-
Primary MCL <sup>2</sup>	0	-	0	-	0	-	0	-	0	-	-	-	0	-	-	-	0	-	0	-	0	-	-	-	-	-
Secondary MCL <sup>2</sup>	1	-	0	-	-	-	-	-	0	-	1	-	-	-	0	-	-	-	-	-	-	-	0	-	0	-
Agricultural Goal <sup>3</sup>	0	-	0	-	0	-	0	-	0	-	0	-	-	-	0	-	0	-	0	-	0	-	-	-	0	-
Cal/EPA Cancer Potency Factor <sup>4</sup>	-	-	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CTR <sup>5</sup> Humans	-	-	-	-	-	-	-	-	0	-	-	-	0	-	-	-	0	-	-	-	-	-	-	-	-	-
CTR <sup>5</sup> Aquatic Life	-	-	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0	-	-	0	0	0	0	0
NTR <sup>6</sup>	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-	-
NAWQC <sup>7</sup> Humans	-	-	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NAWQC <sup>7</sup> Aquatic Life	6 <sup>9</sup>	-	-	-	-	-	-	-	-	-	0	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-
USEPA IRIS Reference Dose <sup>8</sup>	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	0	-	0	-

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# Appendix 3c-3. Continued.

## Thermalito N Afterbay Surface (A5R93011411)

	Aluminum		Arsenic		Cadmium		Chromium		Copper		Iron		Mercury	Methyl Mercury	Manganese		Nickel		Lead		Selenium		Silver		Zinc	
	T	D	T	D	T	D	T	D	T	D	T	D	T	T	T	D	T	D	T	D	T	D	T	D	T	D
Maximum detected	157	97.1	0.791	0.616	0.002	0.044	0.82	0.80	1.31	1.18	232	73.1	0.00141	0.000031	203	191	1.31	1.1	0.53	0.175	0.17	0.15	0.053	0.03	0.78	0.76
Minimum detected	13	1.6	0.343	0.042	<0.002	<0.001	<0.07	<0.039	0.44	0.39	18.2	<3.25	<0.00015	0.000014	1.84	0.16	0.48	0.33	<0.002	0.001	<0.033	<0.052	<0.014	<0.011	<0.035	<0.013
Number of samples	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	12	12	26	26
Number of samples exceeding criteria or																										
Public Health Goal <sup>1</sup>	0	-	-	-	0	-	-	-	0	-	-	-	0	-	0	-	0	-	0	-	-	-	-	-	-	-
Primary MCL <sup>2</sup>	0	-	0	-	0	-	0	-	0	-	-	-	0	-	-	-	0	-	0	-	0	-	-	-	-	-
Secondary MCL <sup>2</sup>	0	-	0	-	-	-	-	-	0	-	0	-	-	-	-	-	-	-	-	-	-	-	0	-	0	-
Agricultural Goal <sup>3</sup>	0	-	0	-	0	-	0	-	0	-	0	-	-	-	0	-	0	-	0	-	0	-	-	-	0	-
Cal/EPA Cancer Potency Factor <sup>4</sup>	-	-	26	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CTR <sup>5</sup> Humans	-	-	-	-	-	-	-	-	0	-	-	-	0	-	-	-	0	-	-	-	-	-	-	-	-	-
CTR <sup>5</sup> Aquatic Life	-	-	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0	0	-	-	0	0	0	0
NTR <sup>6</sup>	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-	-
NAWQC <sup>7</sup> Humans	-	-	26	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NAWQC <sup>7</sup> Aquatic Life	5	-	-	-	-	-	-	-	-	-	0	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-
USEPA IRIS Reference Dose <sup>8</sup>	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	0	-	-	0	-	0	-

## Thermalito N Afterbay Bottom (A5R93011411)

	Aluminum		Arsenic		Cadmium		Chromium		Copper		Iron		Mercury	Methyl Mercury	Manganese		Nickel		Lead		Selenium		Silver		Zinc	
	T	D	T	D	T	D	T	D	T	D	T	D	T	T	T	D	T	D	T	D	T	D	T	D	T	D
Maximum detected	249	67.1	0.773	0.654	0.026	0.039	0.98	0.73	1.71	1.08	605	43.9	0.00268	0.000051	213	3.61	1.28	1.15	0.200	0.038	0.246	0.11	0.047	0.031	1.1	0.8
Minimum detected	12.5	1.6	0.336	0.042	0.002	<0.001	<0.056	0.05	0.48	0.43	12.7	<1.33	0.00033	<0.000009	1.97	0.42	0.58	0.37	0.004	<0.002	0.07	<0.052	0.05	<0.005	<0.035	<0.013
Number of samples	24	26	24	26	24	26	24	26	22	25	26	26	25	25	26	26	26	26	26	26	26	26	12	12	26	26
Number of samples exceeding criteria or																										
Public Health Goal <sup>1</sup>	0	-	-	-	0	-	-	-	0	-	-	-	0	-	0	-	0	-	0	-	-	-	-	-	-	-
Primary MCL <sup>2</sup>	0	-	0	-	0	-	0	-	0	-	-	-	0	-	-	-	0	-	0	-	0	-	-	-	-	-
Secondary MCL <sup>2</sup>	1	-	0	-	-	-	-	-	0	-	2	-	-	-	0	-	-	-	-	-	-	-	0	-	0	-
Agricultural Goal <sup>3</sup>	0	-	0	-	0	-	0	-	0	-	0	-	-	-	0	-	0	-	0	-	0	-	-	-	0	-
Cal/EPA Cancer Potency Factor <sup>4</sup>	-	-	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CTR <sup>5</sup> Humans	-	-	-	-	-	-	-	-	0	-	-	-	0	-	-	-	0	-	-	-	-	-	-	-	-	-
CTR <sup>5</sup> Aquatic Life	-	-	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0	0	-	-	0	0	0	0
NTR <sup>6</sup>	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-	-
NAWQC <sup>7</sup> Humans	-	-	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NAWQC <sup>7</sup> Aquatic Life	5	-	-	-	-	-	-	-	-	-	0	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-
USEPA IRIS Reference Dose <sup>8</sup>	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	0	-	-	0	-	0	-

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## Appendix 3c-3. Continued.

### Thermalito S Afterbay Surface (A5R92921412)

	Aluminum		Arsenic		Cadmium		Chromium		Copper		Iron		Mercury	Methyl Mercury	Manganese		Nickel		Lead		Selenium		Silver		Zinc	
	T	D	T	D	T	D	T	D	T	D	T	D	T	T	T	D	T	D	T	D	T	D	T	D	T	D
Maximum detected	135	78	0.882	0.620	0.003	0.036	1.54	5	1.87	0.96	203	55	0.00174	0.000133	53.8	3.5	2.1	1.1	1.54	0.037	0.19	0.21	0.127	0.104	0.53	1.0
Minimum detected	15.90	2.00	0.315	0.325	<0.003	<0.001	<0.056	<0.039	0.47	0.44	21.9	<3.25	0.00018	0.000012	2.08	0.11	0.47	0.34	0.002	<0.002	0.04	<0.052	<0.006	<0.005	<0.035	<0.013
Number of samples	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	12	12	26	26
Number of samples exceeding criteria or																										
Public Health Goal <sup>1</sup>	0	-	-	-	0	-	-	-	0	-	-	-	0	-	0	-	0	-	0	-	-	-	-	-	-	-
Primary MCL <sup>2</sup>	0	-	0	-	0	-	0	-	0	-	-	-	0	-	-	-	0	-	-	-	-	-	-	-	-	-
Secondary MCL <sup>2</sup>	0	-	0	-	-	-	-	-	0	-	0	-	-	-	1	-	-	-	-	-	-	-	0	-	0	-
Agricultural Goal <sup>3</sup>	0	-	0	-	0	-	0	-	0	-	0	-	-	-	0	-	0	-	0	-	-	-	-	-	0	-
Cal/EPA Cancer Potency Factor <sup>4</sup>	-	-	26	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CTR <sup>5</sup> Humans	-	-	-	-	-	-	-	-	0	-	-	-	0	-	-	-	0	-	-	-	-	-	-	-	-	-
CTR <sup>5</sup> Aquatic Life	-	-	0	0	0	-	0	0	0	-	-	-	-	-	-	-	0	1	0	-	-	-	0	0	0	0
NTR <sup>6</sup>	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-	-
NAWQC <sup>7</sup> Humans	-	-	26	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NAWQC <sup>7</sup> Aquatic Life	6	-	-	-	-	-	-	-	-	-	0	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-
USEPA IRIS Reference Dose <sup>8</sup>	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	0	-	0	-

### Thermalito S Afterbay Bottom (A5R92921412)

	Aluminum		Arsenic		Cadmium		Chromium		Copper		Iron		Mercury	Methyl Mercury	Manganese		Nickel		Lead		Selenium		Silver		Zinc	
	T	D	T	D	T	D	T	D	T	D	T	D	T	T	T	D	T	D	T	D	T	D	T	D	T	D
Maximum detected	479	65	0.653	0.600	0.004	0.04	1.43	0.70	2.81	1.27	219	217	0.0366	0.00141	20.7	5.7	2.1	1.2	0.28	0.027	0.203	0.190	<0.242	0.039	1.62	0.83
Minimum detected	10.6	2	0.34	0.295	<0.003	<0.001	0.10	0.08	0.54	0.52	<3.1	<1.33	0.00024	0.000005	1.31	0.31	0.49	0.35	0.002	<0.002	0.05	<0.056	<0.006	<0.001	<0.071	<0.013
Number of samples	22	22	22	22	21	21	22	22	22	22	22	22	21	23	22	22	22	22	22	22	22	22	12	12	22	22
Number of samples exceeding criteria or																										
Public Health Goal <sup>1</sup>	0	-	-	-	0	-	-	-	0	-	-	-	0	-	0	-	0	-	0	-	-	-	-	-	-	-
Primary MCL <sup>2</sup>	0	-	0	-	0	-	0	-	0	-	-	-	0	-	-	-	0	-	0	-	0	-	-	-	-	-
Secondary MCL <sup>2</sup>	1	-	0	-	-	-	-	-	0	-	0	-	-	-	0	-	-	-	-	-	-	-	0	-	0	-
Agricultural Goal <sup>3</sup>	0	-	0	-	0	-	0	-	0	-	0	-	-	-	0	-	0	-	0	-	-	-	-	-	0	-
Cal/EPA Cancer Potency Factor <sup>4</sup>	-	-	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CTR <sup>5</sup> Humans	-	-	-	-	-	-	-	-	0	-	-	-	0	-	-	-	0	-	-	-	-	-	-	-	-	-
CTR <sup>5</sup> Aquatic Life	-	-	0	0	0	-	0	0	0	-	-	-	-	-	-	-	0	0	0	-	-	-	0	0	0	0
NTR <sup>6</sup>	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-	-
NAWQC <sup>7</sup> Humans	-	-	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NAWQC <sup>7</sup> Aquatic Life	4	-	-	-	-	-	-	-	-	-	0	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-
USEPA IRIS Reference Dose <sup>8</sup>	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	0	-	0	-

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## Appendix 3c-3. Continued.

### Afterbay Outlet Canal to Feather R (A5C92751383)

	Aluminum		Arsenic		Cadmium		Chromium		Copper		Iron		Mercury	Methyl Mercury	Manganese		Nickel		Lead		Selenium		Silver		Zinc	
	T	D	T	D	T	D	T	D	T	D	T	D	T	T	T	D	T	D	T	D	T	D	T	D	T	D
Maximum detected	568	69.3	0.659	0.62	0.019	0.002	1.99	0.6	2.2	1.23	718	55.3	0.00244	0.000096	20.7	1.48	2.37	1.18	0.3	0.037	0.388	0.19	0.022	0.017	2.87	0.54
Minimum detected	33.7	3.7	0.278	0.265	0.002	0.001	0.238	<0.07	0.64	0.45	135.8	3.7	0.00021	0.000013	1.26	<0.055	0.43	0.28	<0.011	<0.001	0.045	<0.07	<0.008	<0.001	0.14	0.05
Number of samples	31	30	31	30	31	30	31	30	31	30	31	30	30	29	31	30	31	30	31	30	31	30	14	14	31	30
Number of samples exceeding criteria or objectives																										
Public Health Goal <sup>1</sup>	0	-	-	-	0	-	-	-	0	-	-	-	0	-	0	-	0	-	0	-	-	-	-	-	-	-
Primary MCL <sup>2</sup>	0	-	0	-	0	-	0	-	0	-	-	-	0	-	-	-	0	-	0	-	0	-	-	-	-	-
Secondary MCL <sup>2</sup>	5	-	0	-	-	-	-	-	0	-	5	-	-	-	0	-	-	-	-	-	-	-	0	-	0	-
Agricultural Goal <sup>3</sup>	0	-	0	-	0	-	0	-	0	-	0	-	-	-	0	-	0	-	0	-	0	-	-	-	0	-
Cal/EPA Cancer Potency Factor <sup>4</sup>	-	-	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CTR <sup>5</sup> Humans	-	-	-	-	-	-	-	-	0	-	-	-	0	-	-	-	0	-	-	-	-	-	-	-	-	-
CTR <sup>5</sup> Aquatic Life	-	-	0	-	0	0	-	0	0	0	-	-	-	-	-	-	0	0	0	-	-	0	0	0	0	0
NTR <sup>6</sup>	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-
NAWQC <sup>7</sup> Humans	-	-	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NAWQC <sup>7</sup> Aquatic Life	19 <sup>9</sup>	-	-	-	-	-	-	-	-	-	0	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-
USEPA IRIS Reference Dose <sup>8</sup>	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	0	-	0	-

### Feather R DS from Afterbay Outlet (A5-1687.70)

	Aluminum		Arsenic		Cadmium		Chromium		Copper		Iron		Mercury	Methyl Mercury	Manganese		Nickel		Lead		Selenium		Silver		Zinc	
	T	D	T	D	T	D	T	D	T	D	T	D	T	T	T	D	T	D	T	D	T	D	T	D	T	D
Maximum detected	618	84.5	0.698	0.67	0.074	0.008	1.43	0.73	5.02	1.05	873	72.7	0.00239	0.000077	19.9	12.9	2.61	1.22	0.448	0.05	0.23	0.13	<0.273	0.019	2.97	0.61
Minimum detected	22.9	3	0.383	0.312	<0.004	<0.002	<0.06	<0.02	0.64	0.5	30.4	<3.25	0.00038	<0.000013	2.34	<0.055	0.44	0.27	<0.002	<0.001	<0.07	<0.07	<0.008	<0.001	<0.035	<0.023
Number of samples	30	30	30	30	30	30	30	30	30	30	30	30	30	29	30	30	30	30	30	30	30	30	14	14	30	30
Number of samples exceeding criteria or objectives																										
Public Health Goal <sup>1</sup>	1	-	-	-	1	-	-	-	0	-	-	-	0	-	0	-	0	-	0	-	-	-	-	-	-	-
Primary MCL <sup>2</sup>	0	-	0	-	0	-	0	-	0	-	-	-	0	-	-	-	0	-	0	-	0	-	-	-	-	-
Secondary MCL <sup>2</sup>	3	-	0	-	-	-	-	-	0	-	2	-	-	-	0	-	-	-	-	-	-	-	0	-	0	-
Agricultural Goal <sup>3</sup>	0	-	0	-	0	-	0	-	0	-	0	-	-	-	0	-	0	-	0	-	0	-	-	-	0	-
Cal/EPA Cancer Potency Factor <sup>4</sup>	-	-	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CTR <sup>5</sup> Humans	-	-	-	-	-	-	-	-	0	-	-	-	0	-	-	-	0	-	-	-	-	-	-	-	-	-
CTR <sup>5</sup> Aquatic Life	-	-	0	-	0	0	-	0	0	0	-	-	-	-	-	-	0	0	0	-	-	0	0	0	0	0
NTR <sup>6</sup>	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-
NAWQC <sup>7</sup> Humans	-	-	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NAWQC <sup>7</sup> Aquatic Life	11 <sup>9</sup>	-	-	-	-	-	-	-	-	-	0	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-
USEPA IRIS Reference Dose <sup>8</sup>	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	0	-	0	-

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## Appendix 3c-3. Continued.

### Feather R DS from SCOR Outlet (A5-1687.20)

	Aluminum		Arsenic		Cadmium		Chromium		Copper		Iron		Mercury	Methyl Mercury	Manganese		Nickel		Lead		Selenium		Silver		Zinc	
	T	D	T	D	T	D	T	D	T	D	T	D	T	T	T	D	T	D	T	D	T	D	T	D	T	D
Maximum detected	222.4	68.9	0.679	0.6	0.069	0.007	1.43	0.623	1.58	1.24	308	62.9	0.00239	0.000077	16.9	10.5	1.49	1.28	0.79	0.085	0.307	0.08	0.024	0.056	1.25	1.09
Minimum detected	17	3	0.317	0.218	<0.004	<0.004	0.09	<0.02	0.73	0.53	18.2	<3.25	0.00034	<0.000025	2.01	0.09	0.45	0.29	<0.018	<0.003	<0.04	<0.052	<0.006	<0.001	0.31	0.06
Number of samples	30	29	30	29	30	29	30	29	30	29	30	29	29	28	30	29	30	29	30	29	30	29	15	14	30	29
Number of samples exceeding criteria or objectives																										
Public Health Goal <sup>1</sup>	0	-	-	-	0	-	-	-	0	-	-	-	0	-	0	-	0	-	0	-	-	-	-	-	-	-
Primary MCL <sup>2</sup>	0	-	0	-	0	-	0	-	0	-	-	-	0	-	-	-	0	-	0	-	0	-	-	-	-	-
Secondary MCL <sup>2</sup>	2	-	0	-	-	-	-	-	0	-	1	-	-	-	0	-	-	-	-	-	-	-	0	-	0	-
Agricultural Goal <sup>3</sup>	0	-	0	-	0	-	0	-	0	-	0	-	-	-	0	-	0	-	0	-	0	-	-	-	0	-
Cal/EPA Cancer Potency Factor <sup>4</sup>		-	30	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CTR <sup>5</sup> Humans		-		-		-		-	0	-		-	0	-		-	0	-		-		-		-		-
CTR <sup>5</sup> Aquatic Life		-	0	0	0	0	0	0	0	0		-	-	-	-	-	0	0	0	-	-	0	0	0	0	0
NTR <sup>6</sup>		-		-		-	0	-	-	-		-	-	-	-	-	-	-	-	0	-	-	-	-	-	-
NAWQC <sup>7</sup> Humans		-	30	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NAWQC <sup>7</sup> Aquatic Life	12 <sup>8</sup>	-		-	-	-	-	-	-	-	0	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-
USEPA IRIS Reference Dose <sup>8</sup>		-		-	-	-	0	-	-	-		-	-	0	-	-	-	-	-	0	-	0	-	0	-	-

### Lower Pacific Heights Pond (A5L92551372)

	Aluminum		Arsenic		Cadmium		Chromium		Copper		Iron		Mercury	Methyl Mercury	Manganese		Nickel		Lead		Selenium		Silver		Zinc	
	T	D	T	D	T	D	T	D	T	D	T	D	T	T	T	D	T	D	T	D	T	D	T	D	T	D
Maximum detected	242	43.4	4.97	4.82	0.055	0.005	4.17	0.87	2.43	1.54	413	126	0.00477	0.000183	120	35.7	3.1	1.8	0.322	0.191	0.399	0.190	0.129	0.031	0.86	0.61
Minimum detected	3	<1.5	0.098	0.074	<0.004	<0.004	<0.07	<0.06	0.33	0.25	6.6	<2.08	0.00042	0.000015	5.8	<0.06	0.37	0.20	<0.001	<0.001	<0.04	<0.04	<0.006	<0.001	<0.066	<0.013
Number of samples	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	12	12	24	24
Number of samples exceeding criteria or objectives																										
Public Health Goal <sup>1</sup>	0	-	-	-	0	-	-	-	0	-	-	-	0	-	0	-	0	-	0	-	-	-	-	-	-	-
Primary MCL <sup>2</sup>	0	-	0	-	0	-	0	-	0	-	-	-	0	-	-	-	0	-	0	-	0	-	-	-	-	-
Secondary MCL <sup>2</sup>	1	-	0	-	-	-	-	-	0	-	1	-	-	-	4	-	-	-	-	-	-	-	0	-	0	-
Agricultural Goal <sup>3</sup>	0	-	0	-	0	-	0	-	0	-	0	-	-	-	0	-	0	-	0	-	0	-	-	-	0	-
Cal/EPA Cancer Potency Factor <sup>4</sup>		-	24	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CTR <sup>5</sup> Humans		-		-		-		-	0	-		-	0	-		-	0	-		-		-		-		-
CTR <sup>5</sup> Aquatic Life		-	0	0	0	0	0	0	0	0		-	-	-	-	-	0	0	0	-	-	0	0	0	0	0
NTR <sup>6</sup>		-		-		-	0	-	-	-		-	-	-	-	-	-	-	-	0	-	-	-	-	-	-
NAWQC <sup>7</sup> Humans		-	24	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NAWQC <sup>7</sup> Aquatic Life	3 <sup>8</sup>	-		-	-	-	-	-	-	-	0	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-
USEPA IRIS Reference Dose <sup>8</sup>		-		-	-	-	0	-	-	-		-	-	0	-	-	-	-	-	-	0	-	0	-	0	-

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# Appendix 3c-3. Continued.

## Mile Long Pond Surface (A59L92541377)

	Aluminum		Arsenic		Cadmium		Chromium		Copper		Iron		Mercury	Methyl Mercury	Manganese		Nickel		Lead		Selenium		Silver		Zinc	
	T	D	T	D	T	D	T	D	T	D	T	D	T	T	T	D	T	D	T	D	T	D	T	D	T	D
Maximum detected	48	6.1	0.776	0.757	<0.039	<0.039	1.46	0.310	1.07	0.640	329	156	0.00144	0.000089	216	70	0.74	1.41	0.162	0.118	0.372	<0.30	0.083	0.008	0.48	0.89
Minimum detected	<1.5	<1.5	0.061	0.065	<0.002	<0.002	<0.039	<0.039	0.04	<0.19	9.8	<2.08	0.00021	<0.000025	7.2	<0.06	<0.04	<0.04	<0.002	<0.001	<0.06	<0.04	<0.006	<0.001	<0.011	<0.013
Number of samples	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	12	12	24	24
Number of samples exceeding criteria or																										
Public Health Goal <sup>1</sup>	0	-	-	-	0	-	-	-	0	-	-	-	0	-	0	-	0	-	0	-	-	-	-	-	-	-
Primary MCL <sup>2</sup>	0	-	0	-	0	-	0	-	0	-	-	-	0	-	-	-	0	-	0	-	0	-	-	-	-	-
Secondary MCL <sup>2</sup>	0	-	0	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	-
Agricultural Goal <sup>3</sup>	0	-	0	-	0	-	0	-	0	-	0	-	-	-	-	-	0	-	0	-	0	-	-	-	0	-
Cal/EPA Cancer Potency Factor <sup>4</sup>	-	-	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CTR <sup>5</sup> Humans	-	-	-	-	-	-	-	-	0	-	-	-	0	-	-	-	0	-	-	-	-	-	-	-	-	-
CTR <sup>5</sup> Aquatic Life	-	-	-	0	0	0	-	0	0	0	-	-	-	-	-	-	0	0	0	-	-	-	0	0	0	0
NTR <sup>6</sup>	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-
NAWQC <sup>7</sup> Humans	-	-	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NAWQC <sup>7</sup> Aquatic Life	0	-	-	-	-	-	-	-	-	-	0	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-
USEPA IRIS Reference Dose <sup>8</sup>	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	0	-	0	-

## Mile Long Pond Bottom (A59L92541377)

	Aluminum		Arsenic		Cadmium		Chromium		Copper		Iron		Mercury	Methyl Mercury	Manganese		Nickel		Lead		Selenium		Silver		Zinc	
	T	D	T	D	T	D	T	D	T	D	T	D	T	T	T	D	T	D	T	D	T	D	T	D	T	D
Maximum detected	5.0	1.7	0.569	0.391	<0.008	<0.008	0.10	0.10	173	3.4	337	81.3	0.00117	0.000187	882	36.9	0.41	0.33	0.027	0.004	0.080	0.080			0.69	0.48
Minimum detected	<1.5	0.4	0.328	0.330	<0.002	<0.004	<0.06	<0.06	1.27	0.33	79	11.3	0.00046	0.000068	14.7	4.92	0.13	0.08	<0.002	0.004	<0.20	<0.20			0.10	0.12
Number of samples	4	3	4	3	4	3	4	3	4	3	4	3	4	3	4	3	4	3	4	3	4	3	0	0	4	3
Number of samples exceeding criteria or																										
Public Health Goal <sup>1</sup>	0	-	-	-	0	-	-	-	1	-	-	-	0	-	-	-	0	-	0	-	-	-	-	-	-	-
Primary MCL <sup>2</sup>	0	-	0	-	0	-	0	-	0	-	-	-	0	-	-	-	0	-	0	-	0	-	-	-	-	-
Secondary MCL <sup>2</sup>	0	-	0	-	-	-	-	-	0	-	2	-	-	-	2	-	-	-	-	-	-	-	-	-	0	-
Agricultural Goal <sup>3</sup>	0	-	0	-	0	-	0	-	0	-	0	-	-	-	2	-	0	-	0	-	0	-	-	-	0	-
Cal/EPA Cancer Potency Factor <sup>4</sup>	-	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CTR <sup>5</sup> Humans	-	-	-	-	-	-	-	-	0	-	-	-	0	-	-	-	0	-	-	-	-	-	-	-	-	-
CTR <sup>5</sup> Aquatic Life	-	-	-	0	0	0	-	0	10	0	-	-	-	-	-	-	0	0	0	-	-	-	-	-	0	0
NTR <sup>6</sup>	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-	-
NAWQC <sup>7</sup> Humans	-	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NAWQC <sup>7</sup> Aquatic Life	0	-	-	-	-	-	-	-	-	-	0	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-
USEPA IRIS Reference Dose <sup>8</sup>	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	0	-

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## Appendix 3c-3. Continued.

### Feather R NR Mile Long Pond (A5-1662.50)

	Aluminum		Arsenic		Cadmium		Chromium		Copper		Iron		Mercury	Methyl Mercury	Manganese		Nickel		Lead		Selenium		Silver		Zinc	
	T	D	T	D	T	D	T	D	T	D	T	D	T	T	T	D	T	D	T	D	T	D	T	D	T	D
Maximum detected	175	77.4	0.763	0.65	0.061	0.003	1.32	0.73	1.42	1.14	263	67.7	0.00225	0.000114	20.5	11.6	1.57	1.22	0.313	0.066	0.21	0.07	<0.273	0.04	0.87	0.57
Minimum detected	16.7	0.02	0.395	0.364	<0.004	<0.004	0.11	<0.02	0.65	0.51	20.7	<3.25	0.00029	0.000017	1.73	0.084	0.42	0.25	0.015	<0.003	<0.033	<0.089	<0.006	<0.006	<0.10	<0.023
Number of samples	29	29	29	29	29	29	29	29	29	29	29	29	29	28	29	29	29	29	29	29	29	29	14	14	29	29
Number of samples exceeding criteria or objectives																										
Public Health Goal <sup>1</sup>	0	-	-	-	0	-	-	-	0	-	-	-	0	-	0	-	0	-	0	-	-	-	-	-	-	-
Primary MCL <sup>2</sup>	0	-	0	-	0	-	0	-	0	-	-	-	0	-	-	-	0	-	0	-	0	-	-	-	-	-
Secondary MCL <sup>2</sup>	0	-	0	-	-	-	-	-	0	-	0	-	-	-	0	-	-	-	-	-	-	-	0	-	0	-
Agricultural Goal <sup>3</sup>	0	-	0	-	0	-	0	-	0	-	0	-	-	-	0	-	0	-	0	-	0	-	-	-	0	-
Cal/EPA Cancer Potency Factor <sup>4</sup>	-	-	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CTR <sup>5</sup> Humans	-	-	-	-	-	-	-	-	0	-	-	-	0	-	-	-	0	-	-	-	-	-	-	-	-	-
CTR <sup>5</sup> Aquatic Life	-	-	0	0	0	-	0	0	0	0	-	-	-	-	-	-	0	0	0	0	-	-	0	0	0	0
NTR <sup>6</sup>	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-
NAWQC <sup>7</sup> Humans	-	-	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NAWQC <sup>7</sup> Aquatic Life	6	-	-	-	-	-	-	-	-	-	0	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-
USEPA IRIS Reference Dose <sup>8</sup>	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	0	-	0	-

### Feather R DS from Project Boundary (A5-1645.50)

	Aluminum		Arsenic		Cadmium		Chromium		Copper		Iron		Mercury	Methyl Mercury	Manganese		Nickel		Lead		Selenium		Silver		Zinc	
	T	D	T	D	T	D	T	D	T	D	T	D	T	T	T	D	T	D	T	D	T	D	T	D	T	D
Maximum detected	1130	89.9	0.757	0.646	0.052	0.003	2.92	0.67	3.25	2.02	1510	75.9	0.0113	0.000186	30.9	12.4	5.47	1.22	0.771	0.2	0.25	0.12	<0.273	0.03	3.65	1.38
Minimum detected	18.2	4.1	0.416	0.397	<0.004	<0.002	<0.06	<0.02	0.61	0.54	20	<3.25	0.00027	<0.000013	2.51	0.111	0.61	0.25	0.019	<0.003	<0.07	<0.07	<0.006	<0.001	<0.035	<0.023
Number of samples	30	30	30	30	30	30	30	30	30	30	30	30	30	29	30	30	30	30	30	30	30	30	14	14	30	30
Number of samples exceeding criteria or objectives																										
Public Health Goal <sup>1</sup>	1	-	-	-	0	-	-	-	0	-	-	-	0	-	0	-	0	-	0	-	-	-	-	-	-	-
Primary MCL <sup>2</sup>	1	-	0	-	0	-	0	-	0	-	-	-	0	-	-	-	0	-	0	-	0	-	-	-	-	-
Secondary MCL <sup>2</sup>	6	-	0	-	-	-	-	-	0	-	5	-	-	-	0	-	-	-	-	-	-	-	0	-	0	-
Agricultural Goal <sup>3</sup>	0	-	0	-	0	-	0	-	0	-	0	-	-	-	0	-	0	-	0	-	0	-	-	-	0	-
Cal/EPA Cancer Potency Factor <sup>4</sup>	-	-	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CTR <sup>5</sup> Humans	-	-	-	-	-	-	-	-	0	-	-	-	0	-	-	-	0	-	-	-	-	-	-	-	-	-
CTR <sup>5</sup> Aquatic Life	-	-	0	0	0	-	0	0	0	0	-	-	-	-	-	-	0	0	0	0	-	-	0	0	0	0
NTR <sup>6</sup>	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-
NAWQC <sup>7</sup> Humans	-	-	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NAWQC <sup>7</sup> Aquatic Life	14	10	-	-	-	-	-	-	-	-	1	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-
USEPA IRIS Reference Dose <sup>8</sup>	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	0	-	0	-

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## Appendix 3c-3. Continued.

### Feather R at Singh AB Riviera Rd. (A5-1556.50)

	Aluminum		Arsenic		Cadmium		Chromium		Copper		Iron		Mercury	Methyl Mercury	Manganese		Nickel		Lead		Selenium		Silver		Zinc	
	T	D	T	D	T	D	T	D	T	D	T	D	T	T	T	D	T	D	T	D	T	D	T	D	T	D
Maximum detected	454	57.6	127	0.817	0.047	0.005	1.25	0.681	2.38	1.08	642	77.1	0.00233	0.000519	42	19	13.9	1.29	0.371	0.045	0.22	0.17	<0.273	0.045	1.94	1.3
Minimum detected	21.6	2.9	10.44	0.34	<0.004	<0.004	<0.06	<0.02	0.57	0.47	31.9	<1.64	0.00041	<0.000013	3.6	0.11	0.46	0.25	<0.002	<0.001	<0.07	<0.07	<0.006	<0.001	<0.026	<0.023
Number of samples	31	29	31	29	31	29	31	29	31	29	31	29	29	28	31	29	31	29	31	29	31	29	15	14	31	29
Number of samples exceeding criteria or																										
Public Health Goal <sup>1</sup>	0	-	-	-	0	-	-	-	0	-	-	-	0	-	0	-	1	-	0	-	-	-	-	-	-	-
Primary MCL <sup>2</sup>	0	-	0	-	0	-	0	-	0	-	-	-	0	-	-	-	0	-	0	-	0	-	-	-	-	-
Secondary MCL <sup>2</sup>	4	-	0	-	-	-	-	-	0	-	5	-	-	-	0	-	-	-	-	-	-	-	0	-	0	-
Agricultural Goal <sup>3</sup>	0	-	0	-	0	-	0	-	0	-	0	-	-	-	0	-	0	-	0	-	0	-	-	-	0	-
Cal/EPA Cancer Potency Factor <sup>4</sup>	-	-	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CTR <sup>5</sup> Humans	-	-	-	-	-	-	-	-	0	-	-	-	0	-	-	-	0	-	-	-	-	-	-	-	-	-
CTR <sup>5</sup> Aquatic Life	-	-	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0	-	-	-	0	0	0	0
NTR <sup>6</sup>	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-	-	-
NAWQC <sup>7</sup> Humans	-	-	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NAWQC <sup>7</sup> Aquatic Life	14	-	-	-	-	-	-	-	-	-	0	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-
USEPA IRIS Reference Dose <sup>8</sup>	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	0	-	0	-

### Honcut C at Pacific Ranch NR-Palermo (A5-7010.50)

	Aluminum		Arsenic		Cadmium		Chromium		Copper		Iron		Mercury	Methyl Mercury	Manganese		Nickel		Lead		Selenium		Silver		Zinc	
	T	D	T	D	T	D	T	D	T	D	T	D	T	T	T	D	T	D	T	D	T	D	T	D	T	D
Maximum detected	1338	1129	3.53	1.86	0.091	0.003	3.56	2.66	7.4	4.51	4170	1138	0.01220	0.000399	1150	670	3.6	2.31	0.734	0.344	0.49	0.64	0.063	0.026	5.11	2.33
Minimum detected	4.16	1.9	0.176	0.142	<0.004	<0.004	0.08	<0.02	0.75	0.61	1.5	<3.31	0.00037	0.000051	5.41	0.2	0.15	0.06	<0.005	<0.003	<0.04	<0.089	<0.006	<0.001	0.21	0.06
Number of samples	29	29	29	29	29	29	29	29	29	29	29	29	29	28	29	29	29	29	29	29	29	29	14	14	29	29
Number of samples exceeding criteria or																										
Public Health Goal <sup>1</sup>	3	-	-	-	0	-	-	-	0	-	-	-	0	-	1	-	0	-	0	-	-	-	-	-	-	-
Primary MCL <sup>2</sup>	2	-	0	-	0	-	0	-	0	-	-	-	0	-	-	-	0	-	0	-	0	-	-	-	-	-
Secondary MCL <sup>2</sup>	12	-	0	-	-	-	-	-	0	-	22	-	-	-	8	-	-	-	-	-	-	-	0	-	0	-
Agricultural Goal <sup>3</sup>	0	-	0	-	0	-	0	-	0	-	0	-	-	-	1	-	0	-	0	-	0	-	-	-	0	-
Cal/EPA Cancer Potency Factor <sup>4</sup>	-	-	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CTR <sup>5</sup> Humans	-	-	-	-	-	-	-	-	0	-	-	-	0	-	-	-	0	-	-	-	-	-	-	-	-	-
CTR <sup>5</sup> Aquatic Life	-	-	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0	-	-	-	0	0	0	0
NTR <sup>6</sup>	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-	-	-
NAWQC <sup>7</sup> Humans	-	-	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NAWQC <sup>7</sup> Aquatic Life	15	310	-	-	-	-	-	-	-	-	59	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-
USEPA IRIS Reference Dose <sup>8</sup>	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	0	-	0	-

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# Appendix 3c-3. Continued.

## Feather R A Archer Ave. (A5-1516.50)

	Aluminum		Arsenic		Cadmium		Chromium		Copper		Iron		Mercury	Methyl Mercury	Manganese		Nickel		Lead		Selenium		Silver		Zinc	
	T	D	T	D	T	D	T	D	T	D	T	D	T	T	T	D	T	D	T	D	T	D	T	D	T	D
Maximum detected	937	783	0.987	0.902	0.018	0.003	2.57	1.75	4.89	2.93	1318	642	0.01200	0.000161	40.9	19.3	3.34	2	0.666	0.182	0.3	0.12	0.072	0.042	3.53	1.2
Minimum detected	20.7	2.9	0.443	0.305	<0.004	<0.004	0.24	<0.02	0.62	0.54	38	<3.31	0.00039	0.000025	4.05	0.177	0.57	0.29	<0.018	<0.003	<0.04	<0.089	<0.006	<0.006	0.157	0.06
Number of samples	30	29	30	29	30	29	30	29	30	29	30	29	29	28	30	29	30	29	30	29	30	29	14	14	30	29
Number of samples exceeding criteria or																										
Public Health Goal <sup>1</sup>	1	-	-	-	0	-	-	-	0	-	-	-	0	-	0	-	0	-	0	-	-	-	-	-	-	-
Primary MCL <sup>2</sup>	0	-	0	-	0	-	0	-	0	-	-	-	0	-	-	-	0	-	0	-	0	-	-	-	-	-
Secondary MCL <sup>2</sup>	7	-	0	-	-	-	-	-	0	-	8	-	-	-	0	-	-	-	-	-	-	-	0	-	0	-
Agricultural Goal <sup>3</sup>	0	-	0	-	0	-	0	-	0	-	0	-	-	-	0	-	0	-	0	-	0	-	-	-	0	-
Cal/EPA Cancer Potency Factor <sup>4</sup>		-	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CTR <sup>5</sup> Humans		-	-	-	-	-	-	-	0	-	-	-	0	-	-	-	0	-	-	-	-	-	-	-	-	-
CTR <sup>5</sup> Aquatic Life		-	-	0	0	0	-	0	1	0	-	-	-	-	-	-	0	0	0	-	-	-	0	0	0	0
NTR <sup>6</sup>		-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-	-	-
NAWQC <sup>7</sup> Humans		-	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NAWQC <sup>7</sup> Aquatic Life	15	10	-	-	-	-	-	-	-	-	19	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-
USEPA IRIS Reference Dose <sup>8</sup>		-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	-	-	0	-	0	-	0	-

## Feather R US from Yuba R (A5-1425.50)

	Aluminum		Arsenic		Cadmium		Chromium		Copper		Iron		Mercury	Methyl Mercury	Manganese		Nickel		Lead		Selenium		Silver		Zinc	
	T	D	T	D	T	D	T	D	T	D	T	D	T	T	T	D	T	D	T	D	T	D	T	D	T	D
Maximum detected	2120	1213	1.49	0.924	0.109	0.005	5.27	2.31	8.2	3.99	2815	1017	0.01940	0.00016	94	47.6	7.93	2.59	1.72	0.324	0.26	0.16	0.046	0.11	7.25	1.81
Minimum detected	32	4	0.425	0.398	<0.004	<0.002	<0.06	<0.02	0.56	0.46	61.2	<1.64	0.00079	<0.000013	6.46	0.163	0.61	0.17	<0.002	<0.001	<0.07	<0.07	<0.006	<0.001	<0.035	<0.023
Number of samples	30	30	30	30	30	30	30	30	30	30	30	30	30	29	30	30	30	30	30	30	30	30	14	14	30	30
Number of samples exceeding criteria or																										
Public Health Goal <sup>1</sup>	3	-	-	-	1	-	-	-	0	-	-	-	0	-	0	-	0	-	0	-	-	-	-	-	-	-
Primary MCL <sup>2</sup>	2	-	0	-	0	-	0	-	0	-	-	-	0	-	-	-	0	-	0	-	0	-	-	-	-	-
Secondary MCL <sup>2</sup>	14	-	0	-	-	-	-	-	0	-	17	-	-	-	7	-	-	-	-	-	-	-	0	-	0	-
Agricultural Goal <sup>3</sup>	0	-	0	-	0	-	0	-	0	-	0	-	-	-	0	-	0	-	0	-	0	-	-	-	0	-
Cal/EPA Cancer Potency Factor <sup>4</sup>		-	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CTR <sup>5</sup> Humans		-	-	-	-	-	-	-	0	-	-	-	0	-	-	-	0	-	-	-	-	-	-	-	-	-
CTR <sup>5</sup> Aquatic Life		-	-	0	0	0	-	0	9	10	19	-	-	-	-	-	0	2	0	-	-	-	0	0	0	0
NTR <sup>6</sup>		-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-	-
NAWQC <sup>7</sup> Humans		-	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NAWQC <sup>7</sup> Aquatic Life	26	3	10	-	-	-	-	-	-	-	3	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-
USEPA IRIS Reference Dose <sup>8</sup>		-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	-	0	-	0	-	-	0	-

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## Appendix 3c-3. Continued.

### Yuba R at Mouth (A6-1010.50)

	Aluminum		Arsenic		Cadmium		Chromium		Copper		Iron		Mercury	Methyl Mercury	Manganese		Nickel		Lead		Selenium		Silver		Zinc	
	T	D	T	D	T	D	T	D	T	D	T	D	T	T	T	D	T	D	T	D	T	D	T	D	T	D
Maximum detected	769	365	1.07	0.932	0.014	0.003	1.30	1.08	2.26	1.25	989	258	0.00919	0.000305	46.8	26.7	2.07	1.60	0.370	0.094	0.29	0.15	<0.273	0.034	2.13	0.91
Minimum detected	18.4	1.90	0.424	0.371	<0.004	<0.002	<0.06	<0.02	0.40	0.26	16.0	<1.64	0.00036	<0.000013	3.17	0.21	0.41	0.15	<0.002	<0.001	<0.07	<0.07	<0.006	<0.001	<0.035	<0.023
Number of samples	31	30	31	30	31	30	31	30	31	30	31	30	30	29	31	30	31	30	31	30	31	30	14	14	31	30
Number of samples exceeding criteria or																										
Public Health Goal <sup>1</sup>	1	-	0	-	0	-	-	-	0	-	-	-	0	-	0	-	0	-	0	-	-	-	-	-	-	-
Primary MCL <sup>2</sup>	0	-	0	-	0	-	0	-	0	-	-	-	0	-	-	-	0	-	0	-	0	-	-	-	-	-
Secondary MCL <sup>2</sup>	5	-	0	-	-	-	-	-	0	-	4	-	-	-	0	-	-	-	-	-	-	-	0	-	0	-
Agricultural Goal <sup>3</sup>	0	-	0	-	0	-	0	-	0	-	0	-	-	-	0	-	0	-	0	-	0	-	-	-	0	-
Cal/EPA Cancer Potency Factor <sup>4</sup>	1	-	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CTR <sup>5</sup> Humans	-	-	-	-	-	-	-	-	0	-	-	-	0	-	-	-	0	-	-	-	-	-	-	-	-	-
CTR <sup>5</sup> Aquatic Life	-	-	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0	0	-	-	0	0	0	0
NTR <sup>6</sup>	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-
NAWQC <sup>7</sup> Humans	-	-	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NAWQC <sup>7</sup> Aquatic Life	18	110	-	-	-	-	-	-	-	-	0	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-
USEPA IRIS Reference Dose <sup>8</sup>	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	0	-	0	-

### Feather R at Shanghai Bend (A5-1389.50)

	Aluminum		Arsenic		Cadmium		Chromium		Copper		Iron		Mercury	Methyl Mercury	Manganese		Nickel		Lead		Selenium		Silver		Zinc	
	T	D	T	D	T	D	T	D	T	D	T	D	T	T	T	D	T	D	T	D	T	D	T	D	T	D
Maximum detected	2250	1287	1.63	0.942	0.027	0.003	6.11	2.5	9.23	4.44	3261	1094	0.01840	0.000216	133	66.9	8.43	2.74	2.06	1.320	0.24	0.15	0.072	0.048	8.46	1.95
Minimum detected	31.6	5.3	0.393	0.352	<0.004	<0.002	<0.06	<0.02	0.72	0.59	3.52	<1.64	0.00087	0.000031	3	0.17	0.77	0.15	<0.002	<0.001	<0.07	<0.07	<0.006	<0.001	<0.035	<0.023
Number of samples	30	30	30	30	30	30	30	30	30	30	30	30	30	29	30	30	30	30	30	30	30	30	14	14	30	30
Number of samples exceeding criteria or																										
Public Health Goal <sup>1</sup>	3	-	-	-	0	-	-	-	0	-	-	-	0	-	0	-	0	-	1	-	-	-	-	-	-	-
Primary MCL <sup>2</sup>	3	-	0	-	0	-	0	-	0	-	-	-	0	-	-	-	0	-	0	-	0	-	-	-	-	-
Secondary MCL <sup>2</sup>	14	-	0	-	-	-	-	-	0	-	18	-	-	-	6	-	-	-	-	-	-	-	0	-	0	-
Agricultural Goal <sup>3</sup>	0	-	0	-	0	-	0	-	0	-	0	-	-	-	0	-	0	-	0	-	0	-	-	-	0	-
Cal/EPA Cancer Potency Factor <sup>4</sup>	-	-	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CTR <sup>5</sup> Humans	-	-	-	-	-	-	-	-	0	-	-	-	0	-	-	-	0	-	-	-	-	-	-	-	-	-
CTR <sup>5</sup> Aquatic Life	-	-	0	0	0	0	0	0	3	210	19	-	-	-	-	-	0	3	3	19	-	-	0	0	0	0
NTR <sup>6</sup>	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-
NAWQC <sup>7</sup> Humans	-	-	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NAWQC <sup>7</sup> Aquatic Life	27	310	-	-	-	-	-	-	-	-	3	4	0	-	-	-	-	-	-	-	-	-	-	-	-	-
USEPA IRIS Reference Dose <sup>8</sup>	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	0	-	0	-

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## Appendix 3c-3. Continued.

### Bear R near Mouth (A6-5010.50)

	Aluminum		Arsenic		Cadmium		Chromium		Copper		Iron		Mercury	Methyl Mercury	Manganese		Nickel		Lead		Selenium		Silver		Zinc	
	T	D	T	D	T	D	T	D	T	D	T	D	T	T	T	D	T	D	T	D	T	D	T	D	T	D
Maximum detected	1504	1203	1.57	1.320	0.034	0.009	3.46	2.22	8.36	5.82	2880	1768	0.04070	0.000934	390	284	5.40	3.73	1.57	1.01	0.33	0.370	0.55	0.035	8.11	4.23
Minimum detected	53	5.5	0.39	0.282	<0.004	<0.004	0.23	<0.02	1.52	1.12	224	35.6	0.00205	0.000056	13.2	0.33	0.51	0.38	0.070	<0.011	<0.04	<0.04	<0.006	<0.001	0.38	0.19
Number of samples	29	29	29	29	29	29	29	29	29	29	29	29	29	28	29	29	29	29	29	29	29	29	14	14	29	29
Number of samples exceeding criteria or																										
Public Health Goal <sup>1</sup>	9	-	-	-	0	-	-	-	0	-	-	-	0	-	0	-	0	-	0	-	-	-	-	-	-	-
Primary MCL <sup>2</sup>	3	-	0	-	0	-	0	-	0	-	-	-	0	-	-	0	-	0	-	0	-	-	-	-	-	-
Secondary MCL <sup>2</sup>	30	-	0	-	-	-	-	-	0	-	25	-	-	-	14	-	-	-	-	-	-	-	0	-	0	-
Agricultural Goal <sup>3</sup>	0	-	0	-	0	-	0	-	0	-	0	-	-	-	21	-	0	-	0	-	0	-	-	-	0	-
Cal/EPA Cancer Potency Factor <sup>4</sup>	-	-	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CTR <sup>5</sup> Humans	-	-	-	-	-	-	-	-	0	-	-	-	0	-	-	-	0	-	-	-	-	-	-	-	-	-
CTR <sup>5</sup> Aquatic Life	-	-	0	0	0	-	0	-	15	29	-	-	-	-	-	-	0	-	1	1	-	-	0	0	0	0
NTR <sup>6</sup>	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-
NAWQC <sup>7</sup> Humans	-	-	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NAWQC <sup>7</sup> Aquatic Life	28	4	-	-	-	-	-	-	-	-	8	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-
USEPA IRIS Reference Dose <sup>8</sup>	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	0	-	0	-

### Feather R near Verona (A5-1010.50)

	Aluminum		Arsenic		Cadmium		Chromium		Copper		Iron		Mercury	Methyl Mercury	Manganese		Nickel		Lead		Selenium		Silver		Zinc	
	T	D	T	D	T	D	T	D	T	D	T	D	T	T	T	D	T	D	T	D	T	D	T	D	T	D
Maximum detected	1500	1213	1.71	0.958	0.046	0.007	3.34	2.27	8.21	4.05	2152	1000	0.04680	0.000219	145	16.3	4.78	2.58	1.610	0.332	0.21	0.20	0.039	0.055	9.7	2.1
Minimum detected	51	5.6	0.491	0.386	<0.004	<0.004	0.10	<0.02	0.87	0.59	197.3	3.88	0.00171	0.000050	8.29	0.21	0.76	0.08	<0.002	<0.001	<0.07	<0.07	<0.006	<0.001	<0.035	<0.023
Number of samples	30	30	30	30	30	30	30	30	30	30	30	30	30	29	30	30	30	30	30	30	30	30	14	14	30	30
Number of samples exceeding criteria or																										
Public Health Goal <sup>1</sup>	4	-	-	-	0	-	-	-	0	-	-	-	0	-	0	-	0	-	0	-	-	-	-	-	-	-
Primary MCL <sup>2</sup>	3	-	0	-	0	-	0	-	0	-	-	-	0	-	-	0	-	0	-	0	-	-	-	-	-	-
Secondary MCL <sup>2</sup>	18	-	0	-	-	-	-	-	0	-	20	-	-	-	3	-	-	-	-	-	-	-	0	-	0	-
Agricultural Goal <sup>3</sup>	0	-	0	-	0	-	0	-	0	-	0	-	-	-	0	-	0	-	0	-	0	-	-	-	0	-
Cal/EPA Cancer Potency Factor <sup>4</sup>	-	-	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CTR <sup>5</sup> Humans	-	-	-	-	-	-	-	-	0	-	-	-	0	-	-	-	0	-	-	-	-	-	-	-	-	-
CTR <sup>5</sup> Aquatic Life	-	-	0	0	0	-	0	-	4	3	-	-	-	-	-	-	0	-	4	0	-	-	0	0	0	0
NTR <sup>6</sup>	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-
NAWQC <sup>7</sup> Humans	-	-	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NAWQC <sup>7</sup> Aquatic Life	28	3	-	-	-	-	-	-	-	-	5	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-
USEPA IRIS Reference Dose <sup>8</sup>	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	0	-	0	-

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## Appendix 3c-3. Continued.

### Sacramento R US from Feather R (A0-2157:50)

	Aluminum		Arsenic		Cadmium		Chromium		Copper		Iron		Mercury	Methyl Mercury	Manganese		Nickel		Lead		Selenium		Silver		Zinc	
	T	D	T	D	T	D	T	D	T	D	T	D	T	T	T	D	T	D	T	D	T	D	T	D	T	D
Maximum detected	5523	2769	2.62	2.540	0.129	0.033	14.1	5.48	16.9	6.12	8088	2015	0.02700	0.000193	21.1	21.6	23.6	5.87	3.2	0.652	0.45	0.350	0.062	0.035	31.4	6.31
Minimum detected	230	5.3	1.14	1.010	<0.004	<0.004	0.79	<0.02	1.78	0.86	284	<3.31	0.00134	0.000048	13.6	0.19	1.21	0.15	0.102	<0.003	<0.04	<0.089	<0.006	<0.006	1.64	0.24
Number of samples	29	28	29	28	29	28	29	28	29	28	29	28	28	27	29	28	29	28	29	28	29	28	14	14	29	28
Number of samples exceeding criteria or																										
Public Health Goal <sup>1</sup>	17	-	-	-	2	-	-	-	0	-	-	-	0	-	0	-	2	-	-	-	-	-	-	-	-	-
Primary MCL <sup>2</sup>	6	-	0	-	0	-	0	-	0	-	-	-	0	-	-	-	0	-	-	0	-	-	-	-	-	-
Secondary MCL <sup>2</sup>	29	-	0	-	-	-	-	-	0	-	-	-	-	-	9	-	-	-	-	-	-	0	-	-	0	-
Agricultural Goal <sup>3</sup>	1	-	0	-	0	-	0	-	0	-	1	-	-	-	1	-	0	-	-	0	-	-	-	-	0	-
Cal/EPA Cancer Potency Factor <sup>4</sup>	-	-	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CTR <sup>5</sup> Humans	-	-	-	-	-	-	-	-	0	-	-	-	0	-	-	-	0	-	-	-	-	-	-	-	-	-
CTR <sup>5</sup> Aquatic Life	-	-	0	-	0	0	-	0	5 <sup>9</sup> 3 <sup>10</sup>	1 <sup>9</sup>	-	-	-	-	-	-	0	-	2 <sup>9</sup>	0	-	-	0	0	0	0
NTR <sup>6</sup>	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-	-
NAWQC <sup>7</sup> Humans	-	-	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NAWQC <sup>7</sup> Aquatic Life	29 <sup>9</sup> 11 <sup>10</sup>	-	-	-	-	-	-	-	-	-	14	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-
USEPA IRIS Reference Dose <sup>8</sup>	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	0	-	-	0	-	0	-

#### Footnotes:

1. California Environmental Protection Agency (Cal/EPA), Office of Environmental Health Hazard Assessment, *Public Health Goals for Chemicals in Drinking Water*
2. California Department of Health Services, California Code of Regulations, Title 22, Division 4, Chapter 15, Domestic Water Quality and Monitoring
3. Food and Agriculture Organization of the United Nations, 1985. *Water Quality for Agriculture*.
4. Cal/EPA, Office of Environmental Health Hazard Assessment, Cal/EPA Toxicity Criteria Database
5. California State Water Resources Control Board, Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California (2 March 2003)
6. U.S. Environmental Protection Agency, Federal Register, Volume 64, No. 216 (Tuesday, 9 November 1999) [National Toxics Rule revisions]
7. U.S. Environmental Protection Agency, Quality Criteria for Water, 1986 (May 1986) [The Gold Book] plus updates (various dates)
8. U.S. Environmental Protection Agency, Integrated Risk Information System [IRIS] database
9. Chronic (4 day average)
10. Acute (1 hr average)

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#### **Appendix 4. Organic contaminants and detection levels**

<b>Standard Test</b>	<b>Analyte</b>	<b>Detection Level</b>	<b>Unit</b>
<b><i>Chlorinated Organic Pesticide</i></b>			
EPA 508	Alachlor	0.05	µg/L
EPA 508	Aldrin	0.01	µg/L
EPA 508	Atrazine	0.02	µg/L
EPA 508	BHC-alpha	0.01	µg/L
EPA 508	BHC-beta	0.01	µg/L
EPA 508	BHC-delta	0.01	µg/L
EPA 508	BHC-gamma (Lindane)	0.01	µg/L
EPA 508	Captan	0.02	µg/L
EPA 508	Chlordane	0.05	µg/L
EPA 508	Chlorothalonil	0.01	µg/L
EPA 508	Chlorpropham	0.02	µg/L
EPA 508	Chlorpyrifos	0.01	µg/L
EPA 508	Cyanazine	0.3	µg/L
EPA 508	Dacthal (DCPA)	0.01	µg/L
EPA 508	Dichloran	0.01	µg/L
EPA 508	Dicofol	0.05	µg/L
EPA 508	Dieldrin	0.01	µg/L
EPA 508	Diuron	0.25	µg/L
EPA 508	Endosulfan sulfate	0.02	µg/L
EPA 508	Endosulfan-I	0.01	µg/L
EPA 508	Endosulfan-II	0.01	µg/L
EPA 508	Endrin	0.01	µg/L
EPA 508	Endrin aldehyde	0.01	µg/L
EPA 508	Heptachlor	0.01	µg/L
EPA 508	Heptachlor epoxide	0.01	µg/L
EPA 508	Methoxychlor	0.05	µg/L
EPA 508	Metolachlor	0.2	µg/L
EPA 508	Oxyfluorfen	0.2	µg/L
EPA 508	p,p'-DDD	0.01	µg/L
EPA 508	p,p'-DDE	0.01	µg/L
EPA 508	p,p'-DDT	0.05	µg/L
EPA 508	PCB-1016	0.1	µg/L
EPA 508	PCB-1221	0.1	µg/L
EPA 508	PCB-1232	0.1	µg/L
EPA 508	PCB-1242	0.1	µg/L
EPA 508	PCB-1248	0.1	µg/L

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Standard Test	Analyte	Detection Level	Unit
EPA 508	PCB-1254	0.1	µg/L
EPA 508	PCB-1260	0.1	µg/L
EPA 508	Pentachloronitrobenzene (PCNB)	0.01	µg/L
EPA 508	Ronnel	0.3	µg/L
EPA 508	Simazine	0.02	µg/L
EPA 508	Thiobencarb	0.02	µg/L
EPA 508	Toxaphene	0.4	µg/L
EPA 508	Trifluralin	0.05	µg/L
<b>Organic Phosphorus Pesticides</b>			
EPA 508	Azinphos methyl (Guthion)	0.05	µg/L
EPA 508	Benfluralin	0.01	µg/L
EPA 508	Bromacil	1	µg/L
EPA 508	Carbophenothion (Trithion)	0.02	µg/L
EPA 508	Chlorpyrifos	0.01	µg/L
EPA 508	Cyanazine	0.3	µg/L
EPA 508	Demeton (Demeton O + Demeton S)	0.02	µg/L
EPA 508	Diazinon	0.01	µg/L
EPA 508	Dimethoate	0.01	µg/L
EPA 508	Disulfoton	0.01	µg/L
EPA 508	Ethion	0.01	µg/L
EPA 508	Malathion	0.01	µg/L
EPA 508	Methidathion	0.02	µg/L
EPA 508	Mevinphos	0.01	µg/L
EPA 508	Naled	0.02	µg/L
EPA 508	Napropamide	5	µg/L
EPA 508	Norflurazon	5	µg/L
EPA 508	Parathion (Ethyl)	0.01	µg/L
EPA 508	Parathion, Methyl	0.01	µg/L
EPA 508	Pendimethalin	5	µg/L
EPA 508	Phorate	0.01	µg/L
EPA 508	Phosalone	0.02	µg/L
EPA 508	Phosmet	0.02	µg/L
EPA 508	Profenofos	0.01	µg/L
EPA 508	Prometryn	0.05	µg/L
EPA 508	Propetamphos	0.1	µg/L
EPA 508	Ronnel	0.01	µg/L
EPA 508	s,s,s-Tributyl Phosphorotrithioate	0.01	µg/L
EPA 508	Trifluralin	0.01	µg/L

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Standard Test	Analyte	Detection Level	Unit
<b>Volatile Organics (Purgeable)</b>			
EPA 502.2	1,1,1,2-Tetrachloroethane	0.5	µg/L
EPA 502.2	1,1,1-Trichloroethane	0.5	µg/L
EPA 502.2	1,1,2,2-Tetrachloroethane	0.5	µg/L
EPA 502.2	1,1,2-Trichloroethane	0.5	µg/L
EPA 502.2	1,1-Dichloroethane	0.5	µg/L
EPA 502.2	1,1-Dichloroethene	0.5	µg/L
EPA 502.2	1,1-Dichloropropene	0.5	µg/L
EPA 502.2	1,2,3-Trichlorobenzene	0.5	µg/L
EPA 502.2	1,2,3-Trichloropropane	0.5	µg/L
EPA 502.2	1,2,4-Trichlorobenzene	0.5	µg/L
EPA 502.2	1,2,4-Trimethylbenzene	0.5	µg/L
EPA 502.2	1,2-Dibromo-3-chloropropane (DBCP)	0.5	µg/L
EPA 502.2	1,2-Dibromoethane	0.5	µg/L
EPA 502.2	1,2-Dichlorobenzene	0.5	µg/L
EPA 502.2	1,2-Dichloroethane	0.5	µg/L
EPA 502.2	1,2-Dichloropropane	0.5	µg/L
EPA 502.2	1,3,5-Trimethylbenzene	0.5	µg/L
EPA 502.2	1,3-Dichlorobenzene	0.5	µg/L
EPA 502.2	1,3-Dichloropropane	0.5	µg/L
EPA 502.2	1,4-Dichlorobenzene	0.5	µg/L
EPA 502.2	2,2-Dichloropropane	0.5	µg/L
EPA 502.2	2-Chlorotoluene	0.5	µg/L
EPA 502.2	4-Chlorotoluene	0.5	µg/L
EPA 502.2	4-Isopropyltoluene	0.5	µg/L
EPA 502.2	Benzene	0.5	µg/L
EPA 502.2	Bromobenzene	0.5	µg/L
EPA 502.2	Bromochloromethane	0.5	µg/L
EPA 502.2	Bromodichloromethane	0.5	µg/L
EPA 502.2	Bromoform	0.5	µg/L
EPA 502.2	Bromomethane	0.5	µg/L
EPA 502.2	Carbon tetrachloride	0.5	µg/L
EPA 502.2	Chlorobenzene	0.5	µg/L
EPA 502.2	Chloroethane	0.5	µg/L
EPA 502.2	Chloroform	0.5	µg/L
EPA 502.2	Chloromethane	0.5	µg/L
EPA 502.2	cis-1,2-Dichloroethene	0.5	µg/L
EPA 502.2	cis-1,3-Dichloropropene	0.5	µg/L

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Standard Test	Analyte	Detection Level	Unit
EPA 502.2	Dibromochloromethane	0.5	µg/L
EPA 502.2	Chloromethane	0.5	µg/L
EPA 502.2	cis-1,2-Dichloroethene	0.5	µg/L
EPA 502.2	cis-1,3-Dichloropropene	0.5	µg/L
EPA 502.2	Dibromochloromethane	0.5	µg/L
EPA 502.2	Dibromomethane	0.5	µg/L
EPA 502.2	Dichlorodifluoromethane	0.5	µg/L
EPA 502.2	Ethyl benzene	0.5	µg/L
EPA 502.2	Fluorobenzene	0.5	µg/L
EPA 502.2	Hexachlorobutadiene	0.5	µg/L
EPA 502.2	Isopropylbenzene	0.5	µg/L
EPA 502.2	m + p Xylene	0.5	µg/L
EPA 8260	Methyl tert-butyl ether (MTBE)	0.5	µg/L
EPA 502.2	Methylene chloride	0.5	µg/L
EPA 502.2	n-Butylbenzene	0.5	µg/L
EPA 502.2	n-Propylbenzene	0.5	µg/L
EPA 502.2	Naphthalene	0.5	µg/L
EPA 502.2	o-Xylene	0.5	µg/L
EPA 502.2	sec-Butylbenzene	0.5	µg/L
EPA 502.2	Styrene	0.5	µg/L
EPA 502.2	tert-Butylbenzene	0.5	µg/L
EPA 502.2	Tetrachloroethene	0.5	µg/L
EPA 502.2	Toluene	0.5	µg/L
EPA 502.2	trans-1,2-Dichloroethene	0.5	µg/L
EPA 502.2	trans-1,3-Dichloropropene	0.5	µg/L
EPA 502.2	Trichloroethene	0.5	µg/L
EPA 502.2	Trichlorofluoromethane	0.5	µg/L
EPA 502.2	Vinyl chloride	0.5	µg/L
<b>Chlorinated Phenoxy Acid Herbicides</b>			
EPA 515.1	2,4,5-T	0.1	µg/L
EPA 515.1	2,4,5-TP (Silvex)	0.1	µg/L
EPA 515.1	2,4-D	0.1	µg/L
EPA 515.1	2,4-DB	0.1	µg/L
EPA 515.1	2,4-Dichlorophenylacetic acid (DCAA)	0.1	µg/L
EPA 515.1	Dacthal (DCPA)	0.1	µg/L
EPA 515.1	Dicamba	0.1	µg/L
EPA 515.1	Dichlorprop	0.1	µg/L
EPA 515.1	Dinoseb (DNPB)	0.1	µg/L

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Standard Test	Analyte	Detection Level	Unit
EPA 515.1	MCPA	0.1	µg/L
EPA 515.1	MCPP	0.1	µg/L
EPA 515.1	Pentachlorophenol (PCP)	0.1	µg/L
EPA 515.1	Picloram	0.1	µg/L
EPA 515.1	Triclopyr	0.1	µg/L
EPA 547	Aminomethylphosphonic Acid (AMPA)	100	µg/L
EPA 547	Glyphosate	100	µg/L
<b>Carbamate Pesticides</b>			
EPA 531.1	3-Hydroxycarbofuran	2	µg/L
EPA 531.1	Aldicarb	2	µg/L
EPA 531.1	Aldicarb sulfone	2	µg/L
EPA 531.1	Aldicarb sulfoxide	2	µg/L
EPA 531.1	Carbaryl	2	µg/L
EPA 531.1	Carbofuran	2	µg/L
EPA 531.1	Formetanate hydrochloride	100	µg/L
EPA 531.1	Methiocarb	4	µg/L
EPA 531.1	Methomyl	2	µg/L
EPA 531.1	Oxamyl	2	µg/L

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**Appendix 5a. Bacteria detected at SPW1 water quality monitoring stations.**

Bacteria Criteria	Total Coliform (#/100 mL)	Fecal Coliform (#/100 mL)
DHS <sup>a</sup>	10,000	400
CVRWQCB <sup>b</sup>		200 <sup>c</sup> 400 <sup>d</sup>

Station Name	Sample Date	Sample Time	Total Coliform		Fecal Coliform	
			Sample Size (mL)	Count #/100 mL	Sample Size (mL)	Count #/100 mL
West Branch nr Paradise	9/24/02	0630	50	0	100	1
West Branch nr Paradise	9/24/02	0630	25	0		
West Branch nr Paradise	10/18/02	0745	100	8	50	0
West Branch nr Paradise	11/12/02	1245	100	0	100	30
West Branch nr Paradise	12/10/02	1200	100	80	100	10
West Branch nr Paradise	12/16/02	1345	100	62	100	9
West Branch nr Paradise	1/8/03	1000	100	114	100	4
West Branch nr Paradise	3/12/03	1230	100	54	100	0
West Branch nr Paradise	4/15/03	1145	50	40	100	0
West Branch nr Paradise	4/15/03	1145	25	48		
West Branch nr Paradise	5/13/03	1045	100	16	100	0
West Branch nr Paradise	6/11/03	1000	100	45	100	3
West Branch nr Paradise	7/15/03	1200	100	125	100	4
West Branch nr Paradise	8/19/03	1015	50	270	100	0
West Branch nr Paradise	8/19/03	1015	25	588		
West Branch nr Paradise	9/16/03	1140	50	150	100	0
West Branch nr Paradise	9/16/03	1140	25	192		
West Branch nr Paradise	10/16/03	1315	50	60	100	0
West Branch nr Paradise	10/16/03	1315	25	88		
West Branch nr Paradise	11/12/03	1515	100	75	100	0
West Branch nr Paradise	12/9/03	1230	100	19	100	10
West Branch nr Paradise	1/14/04	1200	100	161	100	2
West Branch nr Paradise	2/3/04	1130	50	348	50	6
West Branch nr Paradise	2/18/04	1100	50	230	50	20
West Branch nr Paradise	3/15/04	1245	25	72	100	0
West Branch US LK Oroville	4/23/02	1530	50	168	100	0
West Branch US LK Oroville	4/23/02	1530	25	252		
West Branch US LK Oroville	5/21/02	1515	50	52	100	0
West Branch US LK Oroville	5/21/02	1515	25	80		
West Branch US LK Oroville	6/25/02	1000	50	0	100	3

\* sampling site moved to West Branch nr Paradise due to inaccessibility during lower lake levels

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**Appendix 5a. Continued.**

Station Name	Sample Date	Sample Time	Total Coliform		Fecal Coliform	
			Sample Size (mL)	Count #/100 mL	Sample Size (mL)	Count #/100 mL
Concow C A Jordan Hill Rd	5/15/02	0850	25	448		
Concow C A Jordan Hill Rd	6/17/02	0630	50	6	100	19
Concow C A Jordan Hill Rd	6/17/02	0630	25	48		
Concow C A Jordan Hill Rd	7/15/02	0645	50	0	100	7
Concow C A Jordan Hill Rd	7/15/02	0645	25	0		
Concow C A Jordan Hill Rd	9/24/02	0800	100	4	100	4
Concow C A Jordan Hill Rd	9/24/02	0800	50	8		
Concow C A Jordan Hill Rd	10/18/02	0900	50	20	50	24
Concow C A Jordan Hill Rd	10/18/02	0900	25	36		
Concow C A Jordan Hill Rd	11/12/02	1115	100	1	100	4
Concow C A Jordan Hill Rd	12/10/02	1040	100	59	100	4
Concow C A Jordan Hill Rd	12/16/02	1230	100	63	100	0
Concow C A Jordan Hill Rd	1/8/03	0845	100	78	100	4
Concow C A Jordan Hill Rd	2/18/03	1230	100	18	100	3
Concow C A Jordan Hill Rd	3/12/03	1100	100	46	100	0
Concow C A Jordan Hill Rd	4/15/03	1015	100	27	100	0
Concow C A Jordan Hill Rd	5/13/03	0930	100	24	100	13
Concow C A Jordan Hill Rd	6/11/03	0845	100	3	100	0
Concow C A Jordan Hill Rd	7/15/03	1035	100	135	100	7
Concow C A Jordan Hill Rd	8/19/03	0900	50	178	100	1
Concow C A Jordan Hill Rd	8/19/03	0900	25	236		
Concow C A Jordan Hill Rd	9/16/03	1015	50	84	100	3
Concow C A Jordan Hill Rd	9/16/03	1015	25	204		
Concow C A Jordan Hill Rd	10/16/03	1135	50	78	100	2
Concow C A Jordan Hill Rd	10/16/03	1135	25	92		
Concow C A Jordan Hill Rd	11/12/03	1400	100	34	100	1
Concow C A Jordan Hill Rd	12/9/03	1110	100	24	100	2
Concow C A Jordan Hill Rd	1/14/04	1020	100	109	100	8
Concow C A Jordan Hill Rd	2/3/04	0945	50	294	50	14
Concow C A Jordan Hill Rd	2/18/04	0940	50	426	50	18
Concow C A Jordan Hill Rd	3/15/04	1120	25	284	100	0
NF Feather R US Poe PH	7/15/02	0745	50	0	100	1
NF Feather R US Poe PH	7/15/02	0745	25	0		
NF Feather R US Poe PH	9/24/02	0900	50	6	100	2
NF Feather R US Poe PH	9/24/02	0900	25	8		
NF Feather R US Poe PH	10/18/02	0945	50	10	50	2
NF Feather R US Poe PH	10/18/02	0945	25	16		
NF Feather R US Poe PH	11/12/02	0930	100	0	100	0
NF Feather R US Poe PH	12/10/02	0900	100	60	100	6

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**Appendix 5a. Continued.**

Station Name	Sample Date	Sample Time	Total Coliform		Fecal Coliform	
			Sample Size (mL)	Count #/100 mL	Sample Size (mL)	Count #/100 mL
NF Feather R US Poe PH	12/16/02	1015	100	62	100	0
NF Feather R US Poe PH	1/8/03	0745	100	14	100	1
NF Feather R US Poe PH	2/18/03	1045	100	10	100	0
NF Feather R US Poe PH	3/12/03	0900	100	126	100	-
NF Feather R US Poe PH	4/15/03	0815	50	50	100	2
NF Feather R US Poe PH	4/15/03	0815	25	84		
NF Feather R US Poe PH	5/13/03	0745	100	24	100	0
NF Feather R US Poe PH	6/11/03	0720	100	3	100	2
NF Feather R US Poe PH	7/15/03	-	100	234	100	1
NF Feather R US Poe PH	8/19/03	0715	50	2016	100	2
NF Feather R US Poe PH	8/19/03	0715	25	2288		
NF Feather R US Poe PH	9/16/03	0840	50	76	100	0
NF Feather R US Poe PH	9/16/03	0840	25	116		
NF Feather R US Poe PH	10/16/03	0930	50	60	100	0
NF Feather R US Poe PH	10/16/03	0930	25	196		
NF Feather R US Poe PH	11/12/03	1230	100	78	100	1
NF Feather R US Poe PH	12/9/03	0915	100	30	100	13
NF Feather R US Poe PH	1/14/04	0840	100	225	100	1
NF Feather R US Poe PH	2/3/04	0740	50	312	50	4
NF Feather R US Poe PH	2/18/04	0800	50	118	50	0
NF Feather R US Poe PH	3/15/04	0950	25	376	100	0
Poe Powerhouse Outflow	7/15/02	0800	50	16	100	3
Poe Powerhouse Outflow	7/15/02	0800	25	52		
Poe Powerhouse Outflow	9/24/02	0930	50	0	100	0
Poe Powerhouse Outflow	9/24/02	0930	25	0		
Poe Powerhouse Outflow	10/18/02	1010	100	2	50	2
Poe Powerhouse Outflow	11/12/02	1000	100	0	100	0
Poe Powerhouse Outflow	12/10/02	0945	100	40	100	1
Poe Powerhouse Outflow	12/16/02	1115	100	61	100	36
Poe Powerhouse Outflow	1/8/03	0810	100	22	100	4
Poe Powerhouse Outflow	2/18/03	1110	100	14	100	3
Poe Powerhouse Outflow	4/15/03	0815	100	72	100	37
Poe Powerhouse Outflow	5/13/03	0815	100	23	100	2
Poe Powerhouse Outflow	6/11/03	0750	100	17	100	0
Poe Powerhouse Outflow	7/15/03	0920	100	TNTC	100	2
Poe Powerhouse Outflow	8/19/03	0800	50	470	100	2
Poe Powerhouse Outflow	8/19/03	0800	25	420		
Poe Powerhouse Outflow	9/16/03	0915	50	122	100	0
Poe Powerhouse Outflow	9/16/03	0915	25	156		
Poe Powerhouse Outflow	10/16/03	1015	50	130	100	1

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**Appendix 5a. Continued.**

Station Name	Sample Date	Sample Time	Total Coliform		Fecal Coliform	
			Sample Size (mL)	Count #/100 mL	Sample Size (mL)	Count #/100 mL
Poe Powerhouse Outflow	10/16/03	1015	25	132		
Poe Powerhouse Outflow	11/12/03	1300	100	75	100	2
Poe Powerhouse Outflow	12/9/03	1000	100	71	100	41
Poe Powerhouse Outflow	1/14/04	0915	100	131	100	1
Poe Powerhouse Outflow	2/3/04	0835	50	234	50	4
Poe Powerhouse Outflow	2/18/04	0830	50	120	50	0
Poe Powerhouse Outflow	3/15/04	1030	25	284	100	0
NF Feather R DS Poe PH	3/28/02	1730	50	114	100	1
NF Feather R DS Poe PH	3/28/02	1730	25	88		
NF Feather R DS Poe PH	5/15/02	0930	50	160	100	0
NF Feather R DS Poe PH	6/17/02	0730	50	160	100	6
NF Feather R DS Poe PH	6/17/02	0730	25	228		
Feather R MF NR Merrimac	3/28/02	1530	50	128	100	0
Feather R MF NR Merrimac	3/28/02	1530	25	232		
Feather R MF NR Merrimac	4/23/02	1145	50	54	100	0
Feather R MF NR Merrimac	4/23/02	1145	25	116		
Feather R MF NR Merrimac	5/15/02	1300	50	52	100	0
Feather R MF NR Merrimac	5/15/02	1300	25	112		
Feather R MF NR Merrimac	6/17/02	0945	50	140	100	1
Feather R MF NR Merrimac	6/17/02	0945	25	228		
Feather R MF NR Merrimac	7/15/02	1330	50	0	100	0
Feather R MF NR Merrimac	7/15/02	1330	25	4		
Feather R MF NR Merrimac	9/24/02	1530	50	8	100	0
Feather R MF NR Merrimac	9/24/02	1530	25	8		
Feather R MF NR Merrimac	10/17/02	0800	100	9	50	0
Feather R MF NR Merrimac	11/12/02	1010	100	0	100	40
Feather R MF NR Merrimac	12/10/02	1230	100	119	100	0
Feather R MF NR Merrimac	1/9/03	1015	100	50	100	1
Feather R MF NR Merrimac	2/18/03	1000	100	31	100	0
Feather R MF NR Merrimac	3/12/03	1245	100	97	100	2
Feather R MF NR Merrimac	4/15/03	1200	50	40	100	0
Feather R MF NR Merrimac	4/15/03	1200	25	84		
Feather R MF NR Merrimac	5/13/03	0740	100	29	100	0
Feather R MF NR Merrimac	6/11/03	1200	100	29	100	0
Feather R MF NR Merrimac	7/15/03	0945	100	TNTC	100	0
Feather R MF NR Merrimac	8/19/03	1115	50	292	100	0
Feather R MF NR Merrimac	8/19/03	1115	25	468		
Feather R MF NR Merrimac	9/16/03	0745	50	184	100	0
Feather R MF NR Merrimac	9/16/03	0745	25	184		
Feather R MF NR Merrimac	10/16/03	1300	50	340	100	0

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**Appendix 5a. Continued.**

Station Name	Sample Date	Sample Time	Total Coliform		Fecal Coliform	
			Sample Size (mL)	Count #/100 mL	Sample Size (mL)	Count #/100 mL
Feather R MF NR Merrimac	10/16/03	1300	25	580		
Feather R MF NR Merrimac	11/12/03	0945	100	48	100	0
Feather R MF NR Merrimac	12/9/03	1220	100	57	100	5
Feather R MF NR Merrimac	1/14/04	0900	100	155	100	1
Feather R MF NR Merrimac	2/3/04	0820	50	120	50	0
Feather R MF NR Merrimac	2/18/04	1050	50	140	50	6
Feather R MF NR Merrimac	3/15/04	1420	25	164	50	0
Fall R US Feather Falls	3/28/02	1145	50	310	100	2
Fall R US Feather Falls	3/28/02	1145	25	208		
Fall R US Feather Falls	4/22/02	1310	50	100	100	0
Fall R US Feather Falls	4/22/02	1310	25	88		
Fall R US Feather Falls	5/16/02	0910	50	242	100	4
Fall R US Feather Falls	5/16/02	0910	25	292		
Fall R US Feather Falls	6/18/02	0915	50	64	100	1
Fall R US Feather Falls	7/15/02	1045	50	0	100	15
Fall R US Feather Falls	7/15/02	1045	25	0		
Fall R US Feather Falls	9/24/02	1030	50	14	100	13
Fall R US Feather Falls	9/24/02	1030	25	56		
Fall R US Feather Falls	10/17/02	1300	100	38	50	0
Fall R US Feather Falls	11/13/02	1030	100	20	100	9
Fall R US Feather Falls	12/9/02	0930	100	107	100	0
Fall R US Feather Falls	12/16/02	0945	100	91	100	92
Fall R US Feather Falls	1/8/03	1100	100	142	100	6
Fall R US Feather Falls	2/18/03	1035	100	26	100	8
Fall R US Feather Falls	3/12/03	1045	100	83	100	-
Fall R US Feather Falls	4/15/03	1100	50	36	100	4
Fall R US Feather Falls	4/15/03	1100	25	52		
Fall R US Feather Falls	5/13/03	1000	100	13	100	0
Fall R US Feather Falls	6/11/03	1000	100	31	100	0
Fall R US Feather Falls	7/14/03	0830	100	TNTC	100	-
Fall R US Feather Falls	8/18/03	1030	100	86	100	4
Fall R US Feather Falls	9/15/03	0950	100	1252	100	3
Fall R US Feather Falls	10/15/03	1020	100	260	100	0
Fall R US Feather Falls	11/13/03	1115	100	9	100	3
Fall R US Feather Falls	12/9/03	1050	100	76	100	7
Fall R US Feather Falls	1/14/04	1230	100	81	100	4
Fall R US Feather Falls	2/3/04	1130	50	196	50	14
Fall R US Feather Falls	2/18/04	1050	50	900	50	866
Fall R US Feather Falls	3/15/04	1145	25	96	25	0

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**Appendix 5a. Continued.**

Station Name	Sample Date	Sample Time	Total Coliform		Fecal Coliform	
			Sample Size (mL)	Count #/100 mL	Sample Size (mL)	Count #/100 mL
SF Feather R US Ponderosa Res	3/28/02	0815	50	TNTC	100	1
SF Feather R US Ponderosa Res	3/28/02	0815	25	84		
SF Feather R US Ponderosa Res	4/23/02	0830	50	76	100	0
SF Feather R US Ponderosa Res	4/23/02	0830	25	136		
SF Feather R US Ponderosa Res	5/16/02	1315	50	162	100	0
SF Feather R US Ponderosa Res	5/16/02	1315	25	168		
SF Feather R US Ponderosa Res	6/17/02	1200	50	44	100	0
SF Feather R US Ponderosa Res	6/17/02	1200	25	32		
SF Feather R US Ponderosa Res	7/15/02	1015	50	14	100	4
SF Feather R US Ponderosa Res	7/15/02	1015	25	32		
SF Feather R US Ponderosa Res	9/24/02	1215	50	10	100	2
SF Feather R US Ponderosa Res	9/24/02	1215	25	12		
SF Feather R US Ponderosa Res	10/17/02	1115	100	5	50	0
SF Feather R US Ponderosa Res	11/12/02	1310	100	0	100	0
SF Feather R US Ponderosa Res	12/10/02	1000	100	67	100	8
SF Feather R US Ponderosa Res	12/16/02	1130	100	23	100	0
SF Feather R US Ponderosa Res	1/9/03	1500	100	88	100	6
SF Feather R US Ponderosa Res	2/18/03	1430	100	50	100	1
SF Feather R US Ponderosa Res	3/12/03	0930	100	152	100	0
SF Feather R US Ponderosa Res	4/15/03	0915	50	98	100	4
SF Feather R US Ponderosa Res	4/15/03	0915	25	132		
SF Feather R US Ponderosa Res	5/13/03	1130	50	64	100	0
SF Feather R US Ponderosa Res	5/13/03	1130	25	64		
SF Feather R US Ponderosa Res	6/11/03	0930	50	48	100	1
SF Feather R US Ponderosa Res	6/11/03	0930	25	54		
SF Feather R US Ponderosa Res	7/15/03	1235	100	262	100	1
SF Feather R US Ponderosa Res	8/19/03	0830	50	422	100	3
SF Feather R US Ponderosa Res	8/19/03	0830	25	392		
SF Feather R US Ponderosa Res	9/16/03	1015	50	112	100	0
SF Feather R US Ponderosa Res	9/16/03	1015	25	160		
SF Feather R US Ponderosa Res	10/16/03	0945	50	140	100	6
SF Feather R US Ponderosa Res	10/16/03	0945	25	176		
SF Feather R US Ponderosa Res	11/12/03	1100	100	87	100	1
SF Feather R US Ponderosa Res	12/9/03	0850	100	57	100	15
SF Feather R US Ponderosa Res	1/15/04	1130	100	143	50	2
SF Feather R US Ponderosa Res	2/3/04	1245	50	578	50	22
SF Feather R US Ponderosa Res	2/18/04	1330	50	300	50	30
SF Feather R US Ponderosa Res	3/15/04	1010	25	180	100	0

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**Appendix 5a. Continued.**

Station Name	Sample Date	Sample Time	Total Coliform		Fecal Coliform	
			Sample Size (mL)	Count #/100 mL	Sample Size (mL)	Count #/100 mL
Sucker Run NR Forbestown	3/28/02	0900	50	162	100	9
Sucker Run NR Forbestown	3/28/02	0900	25	226		
Sucker Run NR Forbestown	4/23/02	0945	50	418	100	13
Sucker Run NR Forbestown	4/23/02	0945	25	560		
Sucker Run NR Forbestown	5/16/02	1215	50	104	100	6
Sucker Run NR Forbestown	5/16/02	1215	25	168		
Sucker Run NR Forbestown	6/17/02	1300	50	182	100	0
Sucker Run NR Forbestown	6/17/02	1300	25	316		
Sucker Run NR Forbestown	7/15/02	1120	50	0	100	9
Sucker Run NR Forbestown	7/15/02	1120	25	0		
Sucker Run NR Forbestown	9/24/02	-	50	10	100	3
Sucker Run NR Forbestown	9/24/02	-	25	8		
Sucker Run NR Forbestown	10/17/02	1000	50	26	50	6
Sucker Run NR Forbestown	10/17/02	1000	25	24		
Sucker Run NR Forbestown	11/12/02	1430	100	0	100	0
Sucker Run NR Forbestown	12/9/02	1200	100	339	100	2
Sucker Run NR Forbestown	12/16/02	1330	100	72	100	0
Sucker Run NR Forbestown	1/9/03	1220	100	122	100	29
Sucker Run NR Forbestown	2/18/03	1215	100	67	100	5
Sucker Run NR Forbestown	3/12/03	1330	100	TNTC	100	-
Sucker Run NR Forbestown	4/15/03	0730	50	128	100	7
Sucker Run NR Forbestown	4/15/03	0730	25	180		
Sucker Run NR Forbestown	5/13/03	0945	50	58	100	1
Sucker Run NR Forbestown	5/13/03	0945	25	120		
Sucker Run NR Forbestown	6/11/03	0800	50	98	100	2
Sucker Run NR Forbestown	6/11/03	0800	25	124		
Sucker Run NR Forbestown	7/14/03	1130	100	TNTC	100	0
Sucker Run NR Forbestown	8/18/03	1310	100	121	100	3
Sucker Run NR Forbestown	9/15/03	1225	100	401	100	5
Sucker Run NR Forbestown	10/15/03	1315	100	TNTC	100	11
Sucker Run NR Forbestown	11/12/03	1215	100	78	100	10
Sucker Run NR Forbestown	12/9/03	1000	50	126	100	28
Sucker Run NR Forbestown	12/9/03	1000	25	196		
Sucker Run NR Forbestown	1/14/04	1110	25	212	100	12
Sucker Run NR Forbestown	1/14/04	1110	50	240		
Sucker Run NR Forbestown	2/3/04	1040	50	596	50	32
Sucker Run NR Forbestown	2/18/04	1440	50	394	50	42
Sucker Run NR Forbestown	2/18/04	1440	25	200		
Sucker Run NR Forbestown	3/15/04	1145	25	460	100	3

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**Appendix 5a. Continued.**

Station Name	Sample Date	Sample Time	Total Coliform		Fecal Coliform	
			Sample Size (mL)	Count #/100 mL	Sample Size (mL)	Count #/100 mL
SF Feather R DS Ponderosa Res	1/9/03	1320	100	52	100	1
SF Feather R DS Ponderosa Res	2/18/03	1245	100	13	100	0
SF Feather R DS Ponderosa Res	3/12/03	1030	100	33	100	-
SF Feather R DS Ponderosa Res	4/15/03	0815	100	62	100	8
SF Feather R DS Ponderosa Res	5/13/03	1030	100	7	100	0
SF Feather R DS Ponderosa Res	6/11/03	0830	100	5	100	0
SF Feather R DS Ponderosa Res	7/15/03	1145	100	TNTC	100	2
SF Feather R DS Ponderosa Res	8/19/03	0740	50	360	100	3
SF Feather R DS Ponderosa Res	8/19/03	0740	25	940		
SF Feather R DS Ponderosa Res	9/16/03	1130	50	184	100	2
SF Feather R DS Ponderosa Res	9/16/03	1130	25	188		
SF Feather R DS Ponderosa Res	10/16/03	1100	50	26	100	0
SF Feather R DS Ponderosa Res	10/16/03	1100	25	32		
SF Feather R DS Ponderosa Res	11/12/03	1130	100	95	100	3
SF Feather R DS Ponderosa Res	12/9/03	1025	100	12	100	2
SF Feather R DS Ponderosa Res	1/14/04	1200	100	26	100	0
SF Feather R DS Ponderosa Res	2/3/04	1115	50	68	50	4
SF Feather R DS Ponderosa Res	2/18/04	1530	50	398	50	0
SF Feather R DS Ponderosa Res	3/15/04	1220	25	8	100	0
SF Feather R DS Ponderosa Res	3/15/04	1220			25	0
Miner's Ranch Canal	9/24/02	1315	50	2	100	0
Miner's Ranch Canal	9/24/02	1315	25	20		
Miner's Ranch Canal	10/17/02	1020	100	2	50	2
Miner's Ranch Canal	11/12/02	1510	100	0	100	0
Miner's Ranch Canal	12/9/02	1240	100	21	100	0
Miner's Ranch Canal	12/16/02	1400	100	111	100	0
Miner's Ranch Canal	1/9/03	1350	100	40	100	4
LK Oroville N F	4/23/02	1000	50	20	100	0
LK Oroville N F	4/23/02	1000	25	16		
LK Oroville N F	5/21/02	0930	50	158	100	0
LK Oroville N F	5/21/02	0930	25	56		
LK Oroville N F	6/25/02	1200	50	0	100	0
LK Oroville N F	7/22/02	1230	50	-	100	1
LK Oroville N F	8/13/02	1300	50	68	100	0
LK Oroville N F	8/13/02	1300	25	52		
LK Oroville N F	10/28/02	1115	100	0	100	0
LK Oroville N F	11/20/02	1200	100	-	100	-
LK Oroville N F	2/24/03	1245	100	8	100	0

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Appendix 5a. Continued.

Station Name	Sample Date	Sample Time	Total Coliform		Fecal Coliform	
			Sample Size (mL)	Count #/100 mL	Sample Size (mL)	Count #/100 mL
LK Oroville N F	3/20/03	1050	100	160	100	0
LK Oroville N F	4/30/03	1400	100	3	100	0
LK Oroville N F	6/2/03	1130	100	89	100	0
LK Oroville N F	6/24/03	1030	100	42	100	1
LK Oroville N F	7/22/03	1100	100	3	100	-
LK Oroville N F	8/26/03	0915	100	20	100	0
LK Oroville N F	10/21/03	0940	100	25	100	0
LK Oroville N F	11/18/03	1110	100	24	100	0
LK Oroville N F	12/16/03	1015	100	14	100	3
LK Oroville N F	1/21/04	0900	100	22	100	0
LK Oroville N F	3/22/04	1000	25	2252	100	0
LK Oroville N F	4/22/04	1130	100	162	100	0
Lk Oroville M F	4/29/02	1200	50	4	100	0
Lk Oroville M F	5/23/02	1300	50	24	100	0
Lk Oroville M F	5/23/02	1300	25	48		
Lk Oroville M F	6/19/02	0800	50	6	100	0
Lk Oroville M F	7/16/02	-	50	12	100	0
Lk Oroville M F	8/14/02	0900	50	0	100	0
Lk Oroville M F	10/23/02	1200	100	2	100	0
Lk Oroville M F	11/20/02	1015	100	-	100	-
Lk Oroville M F	12/17/02	0845	100	46	100	0
Lk Oroville M F	1/15/03	1100	100	13	100	1
Lk Oroville M F	2/20/03	1145	100	5	100	0
Lk Oroville M F	3/24/03	1110	100	96	100	2
Lk Oroville M F	4/22/03	1200	100	1	100	0
Lk Oroville M F	5/29/03	1245	100	30	100	0
Lk Oroville M F	6/24/03	0815	100	64	100	0
Lk Oroville M F	7/23/03	0845	100	-	100	-
Lk Oroville M F	8/26/03	1145	100	78	100	0
Lk Oroville M F	10/22/03	1145	100	6	100	0
Lk Oroville M F	11/19/03	1155	100	0	100	0
Lk Oroville M F	12/16/04	1230	100	0	100	0
Lk Oroville M F	1/21/04	1100	100	8	100	1
Lk Oroville M F	2/26/04		100	20	100	0
Lk Oroville M F	3/23/04	1300	25	212	100	1
LK Oroville S F	4/25/02	0830	50	94	100	0
LK Oroville S F	5/24/02	0900	50	34	100	0
LK Oroville S F	6/20/02	0840	50	12	100	0
LK Oroville S F	7/16/02	0830	100	0	100	0

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**Appendix 5a. Continued.**

Station Name	Sample Date	Sample Time	Total Coliform		Fecal Coliform	
			Sample Size (mL)	Count #/100 mL	Sample Size (mL)	Count #/100 mL
LK Oroville S F	7/16/02	0830	50	14	100	0
LK Oroville S F	8/19/02	1330	50	0	100	0
LK Oroville S F	10/23/02	1340	100	0	100	0
LK Oroville S F	11/20/02	0840	100	-	100	-
LK Oroville S F	12/17/02	1030	100	99	100	0
LK Oroville S F	1/15/03	0900	100	95	100	4
LK Oroville S F	2/20/03	1400	100	11	100	0
LK Oroville S F	3/24/03	1300	100	17	100	1
LK Oroville S F	4/22/03	1030	100	10	100	0
LK Oroville S F	5/29/03	1100	100	30	100	0
LK Oroville S F	6/23/03	1245	100	47	100	1
LK Oroville S F	7/23/03	0730	100	-	100	-
LK Oroville S F	8/26/03	1400	100	6	100	0
LK Oroville S F	10/22/03	0930	100	0	100	0
LK Oroville S F	11/19/03	1415	50	4	50	0
LK Oroville S F	12/16/03		100	5	100	0
LK Oroville S F	1/20/04	1345	100	45	100	0
LK Oroville S F	2/23/04	1235	100	27	100	0
LK Oroville S F	3/23/04	1100	25	180	100	0
Lk Oroville Main Body	4/30/02	1000	50	2	100	0
Lk Oroville Main Body	5/23/02	1245	50	0	100	0
Lk Oroville Main Body	5/23/02	1245	25	8		
Lk Oroville Main Body	6/26/02	-	50	0	100	0
Lk Oroville Main Body	7/17/02	0745	100	0	100	0
Lk Oroville Main Body	8/14/02	1200	50	0	100	0
Lk Oroville Main Body	9/23/02	1200	100	0	100	0
Lk Oroville Main Body	10/23/02	0920	100	1	100	0
Lk Oroville Main Body	11/20/02	1400	100	-	100	0
Lk Oroville Main Body	1/15/03	1615	100	33	100	0
Lk Oroville Main Body	2/19/03	1340	100	16	100	0
Lk Oroville Main Body	3/25/03	1000	100	66	100	0
Lk Oroville Main Body	4/30/03	1005	100	2	100	0
Lk Oroville Main Body	6/2/03	0845	100	66	100	0
Lk Oroville Main Body	6/23/03	1030	100	19	100	0
Lk Oroville Main Body	7/21/03	0830	100	2	100	0
Lk Oroville Main Body	8/25/03	1005	100	57	100	0
Lk Oroville Main Body	9/22/03	0940	100	247	100	0
Lk Oroville Main Body	10/21/03	1210	100	23	100	0
Lk Oroville Main Body	11/18/03	1340	100	6	100	0

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**Appendix 5a. Continued.**

Station Name	Sample Date	Sample Time	Total Coliform		Fecal Coliform	
			Sample Size (mL)	Count #/100 mL	Sample Size (mL)	Count #/100 mL
Lk Oroville Main Body	12/15/03	1130	100	0	100	0
Lk Oroville Main Body	1/20/04	1200	100	72	100	0
Lk Oroville Main Body	2/23/04	1100	100	15	100	0
Lk Oroville Main Body	3/22/04	1215	25	60	100	0
Lake Oroville A Dam	5/2/02	1200	50	8	100	0
Lake Oroville A Dam	5/2/02	1200	25	0		
Lake Oroville A Dam	5/29/02	0945	100	4	50	0
Lake Oroville A Dam	6/26/02	1245	50	0	100	0
Lake Oroville A Dam	7/17/02	1130	100	0	100	0
Lake Oroville A Dam	8/15/02	1100	50	0	100	0
Lake Oroville A Dam	9/18/02	0845	100	0	100	0
Lake Oroville A Dam	10/21/02	1130	100	1	100	0
Lake Oroville A Dam	11/20/02	1120	100	-	100	0
Lake Oroville A Dam	2/19/03	1030	100	16	100	-
Lake Oroville A Dam	3/25/03	1130	100	19	100	0
Lake Oroville A Dam	4/21/03	1130	100	14	100	0
Lake Oroville A Dam	5/21/03	1030	100	59	100	0
Lake Oroville A Dam	6/23/03	0815	100	55	100	0
Lake Oroville A Dam	7/21/03	1030	100	0	100	0
Lake Oroville A Dam	8/25/03	1215	100	4	100	0
Lake Oroville A Dam	9/22/03	1220	100	1	100	0
Lake Oroville A Dam	10/20/03	1050	100	5	100	0
Lake Oroville A Dam	11/17/03	1150	100	4	100	0
Lake Oroville A Dam	12/15/03	1330	100	1	100	0
Lake Oroville A Dam	1/20/04	0915	100	140	100	0
Lake Oroville A Dam	2/23/04	0845	100	198	100	1
Lake Oroville A Dam	3/22/04	1420	25	16	75	0
Thermalito DIV Pool US Kelly Ridge PH	4/3/02	0845	50	58	100	1
Thermalito DIV Pool US Kelly Ridge PH	4/3/02	0845	25	40		
Thermalito DIV Pool US Kelly Ridge PH	4/22/02	1345	50	54	100	0
Thermalito DIV Pool US Kelly Ridge PH	4/22/02	1345	25	52		
Thermalito DIV Pool US Kelly Ridge PH	5/22/02	-	25	0		
Thermalito DIV Pool US Kelly Ridge PH	6/18/02	-	50	30	100	0
Thermalito DIV Pool US Kelly Ridge PH	7/23/02	0740	100	16	100	1
Thermalito DIV Pool US Kelly Ridge PH	8/20/02	1630	100	-	100	0
Thermalito DIV Pool US Kelly Ridge PH	9/24/02	1235	50	0	100	0
Thermalito DIV Pool US Kelly Ridge PH	11/18/02	1345	100	3	100	1
Thermalito DIV Pool US Kelly Ridge PH	12/16/02	0930	50	54	50	0

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Appendix 5a. Continued.

Station Name	Sample Date	Sample Time	Total Coliform		Fecal Coliform	
			Sample Size (mL)	Count #/100 mL	Sample Size (mL)	Count #/100 mL
Thermalito DIV Pool US Kelly Ridge PH	1/13/03	1215	100	42	100	0
Thermalito DIV Pool US Kelly Ridge PH	2/25/03	1700	100	18	100	-
Thermalito DIV Pool US Kelly Ridge PH	3/18/03	1115	100	43	100	1
Thermalito DIV Pool US Kelly Ridge PH	4/14/03	1445	100	24	100	1
Thermalito DIV Pool US Kelly Ridge PH	5/22/03	-	50	4	100	0
Thermalito DIV Pool US Kelly Ridge PH	5/28/03	0845	100	215	100	1
Thermalito DIV Pool US Kelly Ridge PH	6/24/03	1340	100	47	100	-
Thermalito DIV Pool US Kelly Ridge PH	7/22/03	0840	100	34	100	0
Thermalito DIV Pool US Kelly Ridge PH	8/26/03	1130	50	362	100	0
Thermalito DIV Pool US Kelly Ridge PH	8/26/03	1130	25	586		
Thermalito DIV Pool US Kelly Ridge PH	9/23/03	1400	100	118	100	0
Thermalito DIV Pool US Kelly Ridge PH	10/20/03	1045	50	46	100	0
Thermalito DIV Pool US Kelly Ridge PH	11/17/03	1215	100	12	100	1
Thermalito DIV Pool US Kelly Ridge PH	12/15/03	1045	100	5	100	0
Thermalito DIV Pool US Kelly Ridge PH	1/21/04	1145	100	14	100	1
Thermalito DIV Pool US Kelly Ridge PH	2/23/04	1500	100	50	100	0
Thermalito DIV Pool US Kelly Ridge PH	3/22/04	1445	25	28	100	0
Thermalito DIV Pool DS Kelly Ridge PH	3/18/03	1145	100	42	100	0
Thermalito DIV Pool DS Kelly Ridge PH	4/14/03	1530	100	30	100	1
Thermalito DIV Pool DS Kelly Ridge PH	5/28/03	1015	100	83	100	1
Thermalito DIV Pool DS Kelly Ridge PH	6/24/03	1400	100	4	100	0
Thermalito DIV Pool DS Kelly Ridge PH	7/22/03	0800	100	53	100	2
Thermalito DIV Pool DS Kelly Ridge PH	8/26/03	1200	50	334	100	0
Thermalito DIV Pool DS Kelly Ridge PH	8/26/03	1200	25	1312		
Thermalito DIV Pool DS Kelly Ridge PH	9/23/03	1430	100	12	100	0
Thermalito DIV Pool DS Kelly Ridge PH	10/20/03	1100	100	41	100	0
Thermalito DIV Pool DS Kelly Ridge PH	11/17/03	1245	100	10	100	0
Thermalito DIV Pool DS Kelly Ridge PH	12/15/03	1110	100	27	100	0
Thermalito DIV Pool DS Kelly Ridge PH	1/21/04	1105	100	8	100	0
Thermalito DIV Pool DS Kelly Ridge PH	2/3/04	1530	100	TNTC	100	0
Thermalito DIV Pool DS Kelly Ridge PH	3/22/04	1515	25	340	100	0
Glen PD	3/28/02	1200	50	40	100	2
Glen PD	3/28/02	1200	25	108		
Glen PD	5/22/02	1500	50	0	100	0
Glen PD	5/22/02	1500	25	0		
Glen PD	6/18/02	0830	50	8	100	5
Glen PD	7/22/02	1230	50	6	100	0

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Appendix 5a. Continued.

Station Name	Sample Date	Sample Time	Total Coliform		Fecal Coliform	
			Sample Size (mL)	Count #/100 mL	Sample Size (mL)	Count #/100 mL
Glen PD	3/28/02	1200	50	40	100	2
Glen PD	3/28/02	1200	25	108		
Glen PD	5/22/02	1500	50	0	100	0
Glen PD	5/22/02	1500	25	0		
Glen PD	6/18/02	0830	50	8	100	5
Glen PD	7/22/02	1230	50	6	100	0
Glen PD	7/22/02	1230	25	28		
Glen PD	8/20/02	1230	50	0	100	74
Glen PD	10/28/02	1530	100	35	100	26
Glen PD	11/22/02	0900	100	-	100	-
Glen PD	12/16/02	1330	100	-	100	TNTC
Glen PD	1/13/03	1030	50	TNTC	50	564
Glen PD	3/18/03	1430	100	TNTC	100	45
Glen PD	5/28/03	1345	100	10	100	18
Glen PD	6/24/03	1400	100	1	100	2
Glen PD	7/22/03	0730	100	61	100	0
Glen PD	8/26/03	1245	50	1520	100	0
Glen PD	8/26/03	1245	25	2264		
Glen PD	10/22/03	1130	100	88	100	9
Glen PD	11/17/03	1530	100	131	100	14
Glen PD	12/15/03	1200	100	64	100	TNTC
Glen PD	1/19/03	0945	100	TNTC	100	13
Glen PD	2/16/04	0900	100	TNTC	100	397
Glen PD	2/24/04	1530	50	TNTC	50	70
Glen PD	3/24/04	1430	100	TNTC	100	1
Glen C US Glen PD	3/28/02	1230	50	88	100	56
Glen C US Glen PD	3/28/02	1230	25	136		
Glen C US Glen PD	3/28/02	1230	25	112		
Glen C US Glen PD	4/22/02	1045	50	130	100	45
Glen C US Glen PD	4/22/02	1045	25	144		
Glen C US Glen PD	5/22/02	1600	50	80	100	41
Glen C US Glen PD	5/22/02	1600	25	44		
Glen C US Glen PD	6/18/02	0910	50	12	100	0
Glen C US Glen PD	7/15/02	1700	50	0	50	26
Glen C US Glen PD	7/15/02	1700	25	0		
Glen C US Glen PD	8/13/02	0715	50	0	100	251
Glen C US Glen PD	8/13/02	0715	25	40		
Glen C US Glen PD	9/16/02	1430	100	28	100	1
Glen C US Glen PD	10/28/02	1455	100	28	100	3
Glen C US Glen PD	11/22/02	0815	100	-	100	-

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Appendix 5a. Continued.

Station Name	Sample Date	Sample Time	Total Coliform		Fecal Coliform	
			Sample Size (mL)	Count #/100 mL	Sample Size (mL)	Count #/100 mL
Glen C US Glen PD	12/16/02	1300	100	-	100	TNTC
Glen C US Glen PD	1/13/03	1130	50	TNTC	50	320
Glen C US Glen PD	2/25/03	1700	100	TNTC	100	7
Glen C US Glen PD	3/18/03	1515	100	TNTC	100	25
Glen C US Glen PD	5/28/03	1300	100	58	100	94
Glen C US Glen PD	6/24/03	1500	100	13	100	0
Glen C US Glen PD	7/22/03	0630	100	274	100	0
Glen C US Glen PD	8/26/03	1330	50	46	100	1
Glen C US Glen PD	8/26/03	1330	25	484		
Glen C US Glen PD	10/22/03	1230	100	142	100	135
Glen C US Glen PD	11/19/03	0815	100	97	100	52
Glen C US Glen PD	12/15/03	1245	100	180	100	52
Glen C US Glen PD	1/19/03	1015	100	TNTC	100	135
Glen C US Glen PD	2/16/04	0830	100	TNTC	100	9
Glen C US Glen PD	2/24/04	1400	50	TNTC	50	58
Glen C US Glen PD	3/24/04	1515	100	TNTC	100	18
Morris Ravine	8/5/03	1050	50	300	50	444
Morris Ravine	8/26/03	1430	50	76	100	574
Morris Ravine	10/20/03	1330	100	92	100	6
Morris Ravine	11/17/03	1630	50	274	50	10
Morris Ravine	12/15/03	1000	100	337	100	17
Morris Ravine	1/19/04	0830	100	TNTC	100	16
Morris Ravine	2/16/04	1000	50	874	50	1190
Morris Ravine	2/23/04	1615	50	28	50	20
Morris Ravine	3/24/04	1345	100	TNCT	100	134
Thermalito DIV Pool US DIV Dam	4/3/02	1130	50	14	100	0
Thermalito DIV Pool US DIV Dam	4/3/02	1130	25	4		
Thermalito DIV Pool US DIV Dam	4/22/02	0800	50	54	100	0
Thermalito DIV Pool US DIV Dam	4/22/02	0800	25	36		
Thermalito DIV Pool US DIV Dam	5/22/02	-	50	20	100	1
Thermalito DIV Pool US DIV Dam	5/22/02	-	25	76		
Thermalito DIV Pool US DIV Dam	6/18/02	1030	50	48	100	0
Thermalito DIV Pool US DIV Dam	7/22/02	1300	50	24	100	0
Thermalito DIV Pool US DIV Dam	7/22/02	1300	25	24		
Thermalito DIV Pool US DIV Dam	8/20/02	1015	50	0	100	0
Thermalito DIV Pool US DIV Dam	9/24/02	1050	50	0	100	0
Thermalito DIV Pool US DIV Dam	11/18/02	1155	100	43	100	0
Thermalito DIV Pool US DIV Dam	12/16/02	1030	100	132	100	105

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**Appendix 5a. Continued.**

Station Name	Sample Date	Sample Time	Total Coliform		Fecal Coliform	
			Sample Size (mL)	Count #/100 mL	Sample Size (mL)	Count #/100 mL
Thermalito DIV Pool US DIV Dam	1/13/03	1500	100	162	100	51
Thermalito DIV Pool US DIV Dam	2/27/03	1010	100	12	100	1
Thermalito DIV Pool US DIV Dam	3/18/03	1220	100	TNTC	100	31
Thermalito DIV Pool US DIV Dam	4/14/03	1230	100	68	100	24
Thermalito DIV Pool US DIV Dam	5/28/03	0845	100	89	100	2
Thermalito DIV Pool US DIV Dam	6/24/03	1200	100	27	100	-
Thermalito DIV Pool US DIV Dam	7/28/03	1130	100	0	100	0
Thermalito DIV Pool US DIV Dam	8/5/03	1130	100	32	100	1
Thermalito DIV Pool US DIV Dam	8/26/03	0900	50	450	100	0
Thermalito DIV Pool US DIV Dam	8/26/03	0900	25	254		
Thermalito DIV Pool US DIV Dam	10/20/03	1130	100	91	50	2
Thermalito DIV Pool US DIV Dam	11/17/03	1315	100	13	100	0
Thermalito DIV Pool US DIV Dam	12/16/03	1330	100	18	100	1
Thermalito DIV Pool US DIV Dam	1/21/04	0945	100	16	100	1
Thermalito DIV Pool US DIV Dam	2/23/04	1500	100	84	100	0
Thermalito DIV Pool US DIV Dam	3/22/04	1300	25	20	100	0
Feather R A Oroville	3/26/02	0815	50	72	100	0
Feather R A Oroville	3/26/02	0815	25	88		
Feather R A Oroville	4/24/02	0700	50	34	100	0
Feather R A Oroville	4/24/02	0700	25	60		
Feather R A Oroville	5/21/02	0645	50	58	100	0
Feather R A Oroville	5/21/02	0645	25	68		
Feather R A Oroville	6/25/02	0645	50	2	100	0
Feather R A Oroville	7/24/02	0715	50	0	100	174
Feather R A Oroville	8/21/02	0830	50	10	100	0
Feather R A Oroville	9/25/02	0810	100	4	100	0
Feather R A Oroville	10/22/02	1010	100	33	100	1
Feather R A Oroville	11/14/02	0830	100	13	100	1
Feather R A Oroville	12/11/02	0845	100	96	100	2
Feather R A Oroville	12/17/02	0900	50	506	100	103
Feather R A Oroville	1/14/03	0835	50	136	50	26
Feather R A Oroville	2/20/03	0845	100	64	100	1
Feather R A Oroville	3/19/03	0830	100	295	100	36
Feather R A Oroville	5/15/03	0745	50	44	100	100
Feather R A Oroville	5/15/03	0745	25	96		
Feather R A Oroville	6/17/03	0645	100	279	100	2
Feather R A Oroville	7/8/03	0730	50	16	100	2
Feather R A Oroville	7/8/03	0730	25	24		
Feather R A Oroville	8/11/03	0700	100	658	100	0

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**Appendix 5a. Continued.**

Station Name	Sample Date	Sample Time	Total Coliform		Fecal Coliform	
			Sample Size (mL)	Count #/100 mL	Sample Size (mL)	Count #/100 mL
Feather R A Oroville	9/17/03	0715	100	111	100	1
Feather R A Oroville	10/27/03	0830	100	81	100	0
Feather R A Oroville	11/17/03	0900	100	44	100	0
Feather R A Oroville	12/15/03	0810	100	187	100	23
Feather R A Oroville	1/13/04	0730	100	TNTC	100	2
Feather R A Oroville	2/10/04	0740	100	88	100	3
Feather R A Oroville	3/10/04	0800	50	130	100	1
Feather R A Oroville	4/6/04	0700	50	220	100	6
Feather R US from Hatchery	3/26/02	-	25	124		
Feather R US from Hatchery	4/24/02	0910	50	42	100	0
Feather R US from Hatchery	4/24/02	0910	25	68		
Feather R US from Hatchery	5/21/02	0740	50	54	100	1
Feather R US from Hatchery	5/21/02	0740	25	136		
Feather R US from Hatchery	6/25/02	0745	50	80	100	2
Feather R US from Hatchery	7/24/02	0840	50	54	100	1
Feather R US from Hatchery	8/21/02	0910	50	0	100	0
Feather R US from Hatchery	9/25/02	0845	100	5	100	0
Feather R US from Hatchery	10/22/02	0700	100	19	100	1
Feather R US from Hatchery	11/14/02	1000	100	1	100	4
Feather R US from Hatchery	12/11/02	0940	100	81	100	1
Feather R US from Hatchery	12/17/02	0945	50	202	100	28
Feather R US from Hatchery	1/14/03	0940	50	154	50	0
Feather R US from Hatchery	2/20/03	1015	100	34	100	4
Feather R US from Hatchery	3/19/03	0930	100	445	100	46
Feather R US from Hatchery	5/15/03	0830	50	14	100	0
Feather R US from Hatchery	5/15/03	0830	25	4		
Feather R US from Hatchery	6/17/03	0725	100	221	100	6
Feather R US from Hatchery	7/8/03	0830	50	24	100	0
Feather R US from Hatchery	7/8/03	0830	25	28		
Feather R US from Hatchery	8/11/03	0745	100	22	100	0
Feather R US from Hatchery	9/17/03	0800	100	368	100	-
Feather R US from Hatchery	10/27/03	0930	100	99	100	18
Feather R US from Hatchery	11/17/03	1015	100	38	100	0
Feather R US from Hatchery	12/15/03	0900	100	123	100	24
Feather R US from Hatchery	1/13/04	0830	100	172	100	1
Feather R US from Hatchery	2/3/04	0740	50	456	50	2
Feather R US from Hatchery	2/10/04	0820	100	61	100	7
Feather R US from Hatchery	2/19/04	0830	10	990	50	0

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**Appendix 5a. Continued.**

Station Name	Sample Date	Sample Time	Total Coliform		Fecal Coliform	
			Sample Size (mL)	Count #/100 mL	Sample Size (mL)	Count #/100 mL
Feather R US from Hatchery	3/10/04	0900	50	200	100	3
Feather R US from Hatchery	4/6/04	0740	50	226	100	15
Feather R Hatchery Settling Pond	5/21/02	0825	50	62	100	0
Feather R Hatchery Settling Pond	6/25/02	1505	50	0	100	0
Feather R Hatchery Settling Pond	7/24/02	0950	50	0	100	0
Feather R Hatchery Settling Pond	8/21/02	0950	50	0	100	0
Feather R Hatchery Settling Pond	9/25/02	0925	100	2	100	0
Feather R Hatchery Settling Pond	10/22/02	0800	100	31	100	3
Feather R Hatchery Settling Pond	11/14/02	1100	100	7	100	6
Feather R Hatchery Settling Pond	12/11/02	1030	100	89	100	0
Feather R Hatchery Settling Pond	12/17/02	1030	50	194	100	55
Feather R Hatchery Settling Pond	1/14/03	1020	50	122	50	0
Feather R Hatchery Settling Pond	2/20/03	1115	100	46	100	4
Feather R Hatchery Settling Pond	3/19/03	1015	100	259	100	18
Feather R Hatchery Settling Pond	5/15/03	0930	50	10	100	1
Feather R Hatchery Settling Pond	5/15/03	0930	25	28		
Feather R Hatchery Settling Pond	6/17/03	0800	100	243	100	3
Feather R Hatchery Settling Pond	7/8/03	0915	50	134	100	1
Feather R Hatchery Settling Pond	7/8/03	0915	25	156		
Feather R Hatchery Settling Pond	8/11/03	0900	100	138	100	0
Feather R Hatchery Settling Pond	9/17/03	0900	100	72	100	5
Feather R Hatchery Settling Pond	10/27/03		100	53	100	15
Feather R Hatchery Settling Pond	11/17/03	1100	100	50	100	0
Feather R Hatchery Settling Pond	12/15/03	1000	100	229	100	15
Feather R Hatchery Settling Pond	1/13/04	0910	100	TNTC	100	1
Feather R Hatchery Settling Pond	2/3/04	0810	25	804	50	18
Feather R Hatchery Settling Pond	2/19/04	0850	10	2240	50	0
Feather R Hatchery Settling Pond	3/10/04	0930	50	TNTC	100	0
Feather R Hatchery Settling Pond	4/6/04	0830	50	718	100	0
Feather R DS from Hatchery	3/26/02	1015	50	52	100	2
Feather R DS from Hatchery	3/26/02	1015	25	104		
Feather R DS from Hatchery	7/24/02	1035	50	34	100	95
Feather R DS from Hatchery	8/21/02	1030	50	6	100	58
Feather R DS from Hatchery	9/25/02	1030	100	1	100	0

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Appendix 5a. Continued.

Station Name	Sample Date	Sample Time	Total Coliform		Fecal Coliform	
			Sample Size (mL)	Count #/100 mL	Sample Size (mL)	Count #/100 mL
Feather R DS from Hatchery	10/22/02	0900	100	6	100	107
Feather R DS from Hatchery	11/14/02	1145	100	4	100	100
Feather R DS from Hatchery	12/11/02	1120	100	156	100	7
Feather R DS from Hatchery	12/17/02	1115	50	268	50	24
Feather R DS from Hatchery	1/14/03	1055	50	128	50	4
Feather R DS from Hatchery	2/20/03	1200	100	186	100	16
Feather R DS from Hatchery	3/19/03	1115	100	201	100	8
Feather R DS from Hatchery	5/15/03	1215	50	70	100	57
Feather R DS from Hatchery	5/15/03	1215	25	120		
Feather R DS from Hatchery	6/17/03	1000	100	107	100	12
Feather R DS from Hatchery	7/8/03	-	50	94	100	54
Feather R DS from Hatchery	7/8/03	-	25	172		
Feather R DS from Hatchery	8/11/03	1130	100	79	100	0
Feather R DS from Hatchery	9/17/03	1115	100	157	100	-
Feather R DS from Hatchery	10/27/03	1215	100	283	100	203
Feather R DS from Hatchery	11/17/03	1300	100	139	100	126
Feather R DS from Hatchery	12/15/03	1210	100	97	100	18
Feather R DS from Hatchery	1/13/04	1100	100	TNTC	100	6
Feather R DS from Hatchery	2/3/04	1015	25	179	50	18
Feather R DS from Hatchery	2/10/04	1200	100	157	100	0
Feather R DS from Hatchery	2/19/04	1100	10	TNTC	50	72
Feather R DS from Hatchery	3/10/04	1200	50	TNTC	100	2
Feather R DS from Hatchery	4/6/04	1100	50	TNTC	100	3
Feather R DS from Hwy 162	3/26/02	1200	50	8	100	0
Feather R DS from Hwy 162	3/26/02	1200	25	12		
Feather R DS from Hwy 162	4/24/02	1130	50	28	100	1
Feather R DS from Hwy 162	4/24/02	1130	25	4		
Feather R DS from Hwy 162	5/21/02	1135	50	138	100	8
Feather R DS from Hwy 162	5/21/02	1135	25	264		
Feather R DS from Hwy 162	6/25/02	1130	50	6	100	3
Feather R DS from Hwy 162	8/21/02	0730	50	0	100	0
Feather R DS from Hwy 162	9/25/02	-	100	0	100	62
Feather R DS from Hwy 162	10/22/02	0700	100	24	100	27
Feather R DS from Hwy 162	11/14/02	1200	100	13	100	40
Feather R DS from Hwy 162	12/11/02	1045	100	100	100	3
Feather R DS from Hwy 162	12/17/02	0900	50	448	100	0
Feather R DS from Hwy 162	1/14/03	-	50	124	50	100
Feather R DS from Hwy 162	2/20/03	0710	100	54	100	11
Feather R DS from Hwy 162	3/19/03	0630	100	TNTC	100	28

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Appendix 5a. Continued.

Station Name	Sample Date	Sample Time	Total Coliform		Fecal Coliform	
			Sample Size (mL)	Count #/100 mL	Sample Size (mL)	Count #/100 mL
Feather R DS from Hwy 162	5/15/03	0730	50	72	100	123
Feather R DS from Hwy 162	5/15/03	0730	25	204		
Feather R DS from Hwy 162	6/17/03	0710	100	119	100	21
Feather R DS from Hwy 162	7/8/03	0715	50	36	100	6
Feather R DS from Hwy 162	7/8/03	0715	25	44		
Feather R DS from Hwy 162	8/11/03	0800	100	49	100	0
Feather R DS from Hwy 162	9/17/03	0830	100	148	100	15
Feather R DS from Hwy 162	10/27/03	0930	100	98	100	16
Feather R DS from Hwy 162	11/17/03	0940	100	85	100	0
Feather R DS from Hwy 162	12/15/03	0920	100	87	100	27
Feather R DS from Hwy 162	1/13/04	0900	100	TNTC	100	2
Feather R DS from Hwy 162	2/3/04	0800	25	660	50	26
Feather R DS from Hwy 162	2/10/04	0810	100	32	100	2
Feather R DS from Hwy 162	2/19/04	0920	10	890	50	60
Feather R DS from Hwy 162	3/10/04	0815	50	TNTC	100	7
Feather R DS from Hwy 162	4/6/04	0700	50	TNTC	100	1
Feather R A Robinson Riffle	3/26/02	1115	50	46	100	0
Feather R A Robinson Riffle	3/26/02	1115	25	44		
Feather R A Robinson Riffle	4/24/02	1230	50	-	100	0
Feather R A Robinson Riffle	4/24/02	1230	25	32		
Feather R A Robinson Riffle	5/21/02	1220	50	164	100	6
Feather R A Robinson Riffle	5/21/02	1220	25	160		
Feather R A Robinson Riffle	6/25/02	1230	50	8	100	3
Feather R A Robinson Riffle	7/24/02	1200	50	10	100	0
Feather R A Robinson Riffle	9/25/02	-	100	0	100	18
Feather R A Robinson Riffle	10/22/02	0830	100	15	100	5
Feather R A Robinson Riffle	11/14/02	1245	100	0	100	28
Feather R A Robinson Riffle	12/11/02	1130	100	73	100	2
Feather R A Robinson Riffle	12/17/02	0945	50	TNTC	100	0
Feather R A Robinson Riffle	1/14/03	0910	50	150	50	0
Feather R A Robinson Riffle	2/20/03	0800	100	134	100	38
Feather R A Robinson Riffle	3/19/03	0730	100	TNTC	100	22
Feather R A Robinson Riffle	5/15/03	0815	50	152	100	111
Feather R A Robinson Riffle	5/15/03	0815	25	184		
Feather R A Robinson Riffle	6/17/03	0820	100	221	100	6
Feather R A Robinson Riffle	7/8/03	0840	50	18	100	0
Feather R A Robinson Riffle	7/8/03	0840	25	12		
Feather R A Robinson Riffle	8/11/03	0845	100	290	100	0
Feather R A Robinson Riffle	9/17/03	0915	100	75	100	8

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Appendix 5a. Continued.

Station Name	Sample Date	Sample Time	Total Coliform		Fecal Coliform	
			Sample Size (mL)	Count #/100 mL	Sample Size (mL)	Count #/100 mL
Feather R A Robinson Riffle	10/27/03	1055	100	90	100	10
Feather R A Robinson Riffle	11/17/03	1030	100	36	100	0
Feather R A Robinson Riffle	12/15/03	1010	100	83	100	0
Feather R A Robinson Riffle	1/13/04	1010	100	162	100	7
Feather R A Robinson Riffle	2/3/04	0840	25	153	50	0
Feather R A Robinson Riffle	2/10/04	0810	100	32	100	2
Feather R A Robinson Riffle	2/19/04	1315	10	1460	50	2
Feather R A Robinson Riffle	3/10/04	0930	50	TNTC	100	4
Feather R A Robinson Riffle	4/6/04	0800	50	TNTC	100	1
Feather R US from Afterbay Outlet	3/26/02	1250	50	6	100	0
Feather R US from Afterbay Outlet	3/26/02	1250	25	40		
Feather R US from Afterbay Outlet	4/24/02	1525	50	22	100	0
Feather R US from Afterbay Outlet	4/24/02	1525	25	36		
Feather R US from Afterbay Outlet	5/21/02	1520	50	74	100	1
Feather R US from Afterbay Outlet	5/21/02	1520	25	248		
Feather R US from Afterbay Outlet	6/25/02	1600	50	0	100	1
Feather R US from Afterbay Outlet	7/24/02	1315	50	12	100	1
Feather R US from Afterbay Outlet	8/21/02	1150	50	0	100	0
Feather R US from Afterbay Outlet	12/11/02	1315	100	83	100	2
Feather R US from Afterbay Outlet	12/17/02	1245	50	TNTC	100	0
Feather R US from Afterbay Outlet	1/14/03	1300	50	180	50	0
Feather R US from Afterbay Outlet	2/20/03	1415	100	43	100	6
Feather R US from Afterbay Outlet	3/19/03	1315	100	172	100	-
Feather R US from Afterbay Outlet	5/15/03	1330	50	22	100	0
Feather R US from Afterbay Outlet	5/15/03	1330	25	40		
Feather R US from Afterbay Outlet	6/17/03	1100	100	133	100	0
Feather R US from Afterbay Outlet	7/8/03	0855	100	17	100	0
Feather R US from Afterbay Outlet	8/11/03	1245	100	35	100	2
Feather R US from Afterbay Outlet	9/17/03	1300	100	52	100	2
Feather R US from Afterbay Outlet	10/27/03	1400	100	92	100	1
Feather R US from Afterbay Outlet	11/17/03	1440	100	26	100	5
Feather R US from Afterbay Outlet	12/15/03	1350	100	85	100	3
Feather R US from Afterbay Outlet	1/13/04	1200	100	TNTC	100	2
Feather R US from Afterbay Outlet	2/3/04	1200	25	248	50	66
Feather R US from Afterbay Outlet	2/10/04	1400	100	34	100	0
Feather R US from Afterbay Outlet	2/19/04	1150	10	1810	50	0
Feather R US from Afterbay Outlet	3/10/04	1300	50	TNTC	100	2
Feather R US from Afterbay Outlet	4/6/04	1200	50	TNTC	100	3

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**Appendix 5a. Continued.**

Station Name	Sample Date	Sample Time	Total Coliform		Fecal Coliform	
			Sample Size (mL)	Count #/100 mL	Sample Size (mL)	Count #/100 mL
Feather R DS from Afterbay Outlet	3/26/02	1325	50	6	100	0
Feather R DS from Afterbay Outlet	3/26/02	1325	25	16		
Feather R DS from Afterbay Outlet	4/24/02	1655	50	16	100	0
Feather R DS from Afterbay Outlet	4/24/02	1655	25	40		
Feather R DS from Afterbay Outlet	5/21/02	1640	50	138	100	0
Feather R DS from Afterbay Outlet	5/21/02	1640	25	164		
Feather R DS from Afterbay Outlet	6/25/02	1715	50	0	100	0
Feather R DS from Afterbay Outlet	7/24/02	1445	50	16	100	2
Feather R DS from Afterbay Outlet	8/21/02	1145	50	2	100	2
Feather R DS from Afterbay Outlet	9/25/02	1300	100	0	100	0
Feather R DS from Afterbay Outlet	10/22/02	1320	100	86	100	6
Feather R DS from Afterbay Outlet	11/14/02	1520	100	2	100	4
Feather R DS from Afterbay Outlet	12/17/02	1345	50	TNTC	100	0
Feather R DS from Afterbay Outlet	1/14/03	1400	50	136	50	0
Feather R DS from Afterbay Outlet	2/20/03	1510	100	112	100	32
Feather R DS from Afterbay Outlet	3/19/03	1420	100	112	100	-
Feather R DS from Afterbay Outlet	5/15/03	1430	50	12	100	4
Feather R DS from Afterbay Outlet	5/15/03	1430	25	0		
Feather R DS from Afterbay Outlet	6/17/03	1200	100	60	100	0
Feather R DS from Afterbay Outlet	7/8/03	0945	100	19	100	20
Feather R DS from Afterbay Outlet	8/11/03	1415	100	45	100	0
Feather R DS from Afterbay Outlet	9/17/03	1400	100	88	100	3
Feather R DS from Afterbay Outlet	10/27/03	1500	100	42	100	4
Feather R DS from Afterbay Outlet	11/17/03	1530	100	26	100	5
Feather R DS from Afterbay Outlet	12/15/03	1530	100	100	100	4
Feather R DS from Afterbay Outlet	1/13/04	1300	100	283	100	3
Feather R DS from Afterbay Outlet	2/3/04	1230	25	194	50	4
Feather R DS from Afterbay Outlet	2/10/04	1310	100	79	100	1
Feather R DS from Afterbay Outlet	2/19/04	1230	10	600	50	0
Feather R DS from Afterbay Outlet	3/10/04	1350	50	TNTC	100	4
Feather R DS from Afterbay Outlet	4/6/04	1245	50	474	100	2
Feather R DS from SCOR Outlet	3/26/02	1350	50	30	100	0
Feather R DS from SCOR Outlet	3/26/02	1350	25	44		
Feather R DS from SCOR Outlet	4/24/02	1455	50	-	100	0
Feather R DS from SCOR Outlet	4/24/02	1455	25	64		
Feather R DS from SCOR Outlet	5/21/02	1345	50	24	100	0
Feather R DS from SCOR Outlet	3/26/02	1350	50	30	100	0

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Appendix 5a. Continued.

Station Name	Sample Date	Sample Time	Total Coliform		Fecal Coliform	
			Sample Size (mL)	Count #/100 mL	Sample Size (mL)	Count #/100 mL
Feather R DS from SCOR Outlet	3/26/02	1350	50	30	100	0
Feather R DS from SCOR Outlet	3/26/02	1350	25	44		
Feather R DS from SCOR Outlet	4/24/02	1455	50	-	100	0
Feather R DS from SCOR Outlet	4/24/02	1455	25	64		
Feather R DS from SCOR Outlet	5/21/02	1345	50	24	100	0
Feather R DS from SCOR Outlet	5/21/02	1345	25	36		
Feather R DS from SCOR Outlet	6/25/02	1345	50	6	100	4
Feather R DS from SCOR Outlet	6/25/02	1345	25	5		
Feather R DS from SCOR Outlet	7/24/02	1330	50	34	100	0
Feather R DS from SCOR Outlet	8/21/02	1030	50	0	100	3
Feather R DS from SCOR Outlet	9/25/02	-	100	0	100	0
Feather R DS from SCOR Outlet	10/22/02	0940	100	17	100	2
Feather R DS from SCOR Outlet	11/14/02	1345	100	1	100	5
Feather R DS from SCOR Outlet	2/20/03	0915	100	227	100	207
Feather R DS from SCOR Outlet	3/19/03	0845	100	96	100	4
Feather R DS from SCOR Outlet	5/15/03	0930	50	50	100	2
Feather R DS from SCOR Outlet	5/15/03	0930	25	240		
Feather R DS from SCOR Outlet	6/17/03	0925	100	66	100	9
Feather R DS from SCOR Outlet	7/8/03	0930	100	27	100	6
Feather R DS from SCOR Outlet	8/11/03	0945	100	31	100	0
Feather R DS from SCOR Outlet	9/17/03	1030	100	86	100	5
Feather R DS from SCOR Outlet	10/27/03	1220	100	67	100	2
Feather R DS from SCOR Outlet	11/17/03	1115	100	25	100	0
Feather R DS from SCOR Outlet	12/15/03	1100	100	170	100	10
Feather R DS from SCOR Outlet	1/13/04	1110	100	TNTC	100	1
Feather R DS from SCOR Outlet	2/3/04	0920	25	1044	50	2
Feather R DS from SCOR Outlet	2/10/04	0955	100	26	100	0
Feather R DS from SCOR Outlet	2/19/04	1415	10	190	50	20
Feather R DS from SCOR Outlet	3/10/04	1050	50	TNTC	100	1
Feather R DS from SCOR Outlet	4/6/04	0900	50	TNTC	100	2
Feather R NR Mile Long Pond	3/26/02	1445	50	20	100	0
Feather R NR Mile Long Pond	3/26/02	1445	25	12		
Feather R NR Mile Long Pond	4/24/02	1750	50	10	100	1
Feather R NR Mile Long Pond	4/24/02	1750	25	4		
Feather R NR Mile Long Pond	5/21/02	1750	50	38	100	0
Feather R NR Mile Long Pond	5/21/02	1750	25	20		
Feather R NR Mile Long Pond	6/25/02	1810	50	0	100	0
Feather R NR Mile Long Pond	7/24/02	1540	50	36	100	1
Feather R NR Mile Long Pond	8/21/02	1400	50	0	100	0

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Appendix 5a. Continued.

Station Name	Sample Date	Sample Time	Total Coliform		Fecal Coliform	
			Sample Size (mL)	Count #/100 mL	Sample Size (mL)	Count #/100 mL
Feather R NR Mile Long Pond	9/25/02	-	100	0	100	0
Feather R NR Mile Long Pond	10/22/02	1430	100	5	100	3
Feather R NR Mile Long Pond	11/14/02	1615	100	5	100	2
Feather R NR Mile Long Pond	12/11/02	1515	100	100	100	3
Feather R NR Mile Long Pond	12/11/02	1430	50	356	100	4
Feather R NR Mile Long Pond	1/14/03	1440	50	48	50	4
Feather R NR Mile Long Pond	2/20/03	1615	100	103	100	39
Feather R NR Mile Long Pond	5/15/03	1345	50	40	100	4
Feather R NR Mile Long Pond	5/15/03	1345	25	60		
Feather R NR Mile Long Pond	6/17/03	1400	100	27	100	0
Feather R NR Mile Long Pond	7/8/03	1020	100	17	100	0
Feather R NR Mile Long Pond	8/11/03	1340	100	36	100	0
Feather R NR Mile Long Pond	9/17/03	1440	100	21	100	4
Feather R NR Mile Long Pond	10/27/03	1615	100	43	100	2
Feather R NR Mile Long Pond	11/17/03	1610	100	28	100	6
Feather R NR Mile Long Pond	12/15/03	1500	100	90	100	4
Feather R NR Mile Long Pond	1/13/04	1415	100	TNTC	100	1
Feather R NR Mile Long Pond	2/3/04	1230	25	109	50	2
Feather R NR Mile Long Pond	2/10/04	1450	100	7	100	0
Feather R NR Mile Long Pond	2/19/04	1545	10	210	50	18
Feather R NR Mile Long Pond	3/10/04	1440	50	486	100	0
Feather R NR Mile Long Pond	4/6/04	1215	50	566	100	17
Feather R DS from Project Boundary	3/26/02	1550	50	20	100	0
Feather R DS from Project Boundary	3/26/02	1550	25	84		
Feather R DS from Project Boundary	4/24/02	1850	50	60	100	-
Feather R DS from Project Boundary	4/24/02	1850	25	-		
Feather R DS from Project Boundary	5/21/02	1850	50	20	100	1
Feather R DS from Project Boundary	5/21/02	1850	25	40		
Feather R DS from Project Boundary	6/25/02	0620	50	0	100	4
Feather R DS from Project Boundary	7/24/02	1640	50	24	100	1
Feather R DS from Project Boundary	8/21/02	1150	50	0	100	1
Feather R DS from Project Boundary	9/25/02	-	100	0	100	0
Feather R DS from Project Boundary	10/22/02	1110	100	10	100	0
Feather R DS from Project Boundary	11/14/02	1045	100	2	100	5
Feather R DS from Project Boundary	12/11/02	1320	100	113	100	4
Feather R DS from Project Boundary	12/17/02	1130	50	228	100	1
Feather R DS from Project Boundary	1/14/03	1135	50	94	50	0
Feather R DS from Project Boundary	2/20/03	1000	100	160	100	95
Feather R DS from Project Boundary	3/19/03	1000	100	319	100	6

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Appendix 5a. Continued.

Station Name	Sample Date	Sample Time	Total Coliform		Fecal Coliform	
			Sample Size (mL)	Count #/100 mL	Sample Size (mL)	Count #/100 mL
Feather R DS from Project Boundary	5/15/03	1020	25	32		
Feather R DS from Project Boundary	6/17/03	1045	100	82	100	1
Feather R DS from Project Boundary	7/8/03	1030	100	19	100	3
Feather R DS from Project Boundary	8/11/03	1100	100	139	100	0
Feather R DS from Project Boundary	9/17/03	1150	100	247	100	1
Feather R DS from Project Boundary	10/27/03	1320	100	172	100	4
Feather R DS from Project Boundary	11/17/03	1215	100	91	100	0
Feather R DS from Project Boundary	12/15/03	1215	100	77	100	4
Feather R DS from Project Boundary	1/13/04	1200	100	TNTC	100	2
Feather R DS from Project Boundary	2/3/04	1010	50	1344	50	62
Feather R DS from Project Boundary	2/10/04	1045	100	67	100	1
Feather R DS from Project Boundary	2/19/04	1745	10	350	50	18
Feather R DS from Project Boundary	3/10/04	1155	50	TNTC	100	0
Feather R DS from Project Boundary	4/6/04	0950	50	TNTC	100	3
Oroville Fish Pond	5/30/02	1245	50	0	100	0
Oroville Fish Pond	5/30/02	1245	25	0		
Oroville Fish Pond	6/27/02	1100	50	36	100	0
Oroville Fish Pond	6/27/02	1100	25	48		
Oroville Fish Pond	7/24/02	1320	50	42	50	2
Oroville Fish Pond	8/22/02	1400	50	0	100	0
Oroville Fish Pond	9/18/02	1315	100	0	100	0
Oroville Fish Pond	10/23/02	1055	100	0	100	1
Oroville Fish Pond	11/14/02	1230	100	3	100	0
Oroville Fish Pond	12/19/02	0800	100	9	100	0
Oroville Fish Pond	1/21/03	1600	100	19	100	9
Oroville Fish Pond	2/10/03	1315	100	3	100	0
Oroville Fish Pond	3/26/03	0845	100	TNTC	100	2
Oroville Fish Pond	4/24/03	1220	50	34	100	15
Oroville Fish Pond	4/24/03	1220	25	48		
Oroville Fish Pond	6/3/03	1530	100	4	100	0
Oroville Fish Pond	6/25/03	1200	100	35	100	0
Oroville Fish Pond	7/24/03	1315	100	1	100	2
Oroville Fish Pond	8/21/03	1040	100	19	100	0
Oroville Fish Pond	9/22/03	1215	100	152	100	1
Oroville Fish Pond	11/18/03	1415	100	TNTC	100	3
Oroville Fish Pond	12/16/03	1350	100	6	100	0
Oroville Fish Pond	1/13/04	1100	100	7	100	0
Oroville Fish Pond	2/10/04	1530	100	3	100	0
Oroville Fish Pond	4/7/04	1100	25	300	100	0

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**Appendix 5a. Continued.**

Station Name	Sample Date	Sample Time	Total Coliform		Fecal Coliform	
			Sample Size (mL)	Count #/100 mL	Sample Size (mL)	Count #/100 mL
Robinson Riffle Pond	5/30/02	1345	50	2	100	0
Robinson Riffle Pond	5/30/02	1345	25	4		
Robinson Riffle Pond	6/27/02	-	50	52	100	0
Robinson Riffle Pond	6/27/02	-	25	104		
Robinson Riffle Pond	7/24/02	0900	50	0	50	2
Robinson Riffle Pond	7/24/02	0900	25	24		
Robinson Riffle Pond	8/22/02	0845	50	-	100	0
Robinson Riffle Pond	9/18/02	0830	100	0	100	0
Robinson Riffle Pond	10/23/02	-	100	0	100	4
Robinson Riffle Pond	11/14/02	1345	100	0	100	7
Robinson Riffle Pond	12/19/02	0945	100	35	100	2
Robinson Riffle Pond	1/21/03	1300	100	58	100	0
Robinson Riffle Pond	2/10/03	1440	100	15	100	1
Robinson Riffle Pond	3/26/03	1615	100	128	100	1
Robinson Riffle Pond	4/24/03	1345	50	22	100	11
Robinson Riffle Pond	4/24/03	1345	25	48		
Robinson Riffle Pond	6/3/03	1715	100	79	100	61
Robinson Riffle Pond	6/25/03	1340	25	0	25	336
Robinson Riffle Pond	7/24/03	1515	50	4	50	4
Robinson Riffle Pond	8/21/03	1200	50	22	50	2
Robinson Riffle Pond	9/22/03	-	50	124	50	30
Robinson Riffle Pond	11/18/03	1545	100	1	100	0
Robinson Riffle Pond	12/16/03	1510	100	68	100	3
Robinson Riffle Pond	1/13/04	1245	100	TNTC	100	14
Robinson Riffle Pond	2/10/04	0930	100	55	100	1
Robinson Riffle Pond	3/10/04	1430	100	TNTC	100	0
Robinson Riffle Pond	4/7/04	1220	25	300	100	11
Mile Long Pond	5/30/02	1430	50	6	100	1
Mile Long Pond	5/30/02	1430	25	20		
Mile Long Pond	6/28/02	-	50	50	100	0
Mile Long Pond	6/28/02	-	25	16		
Mile Long Pond	7/24/02	0700	50	0	100	0
Mile Long Pond	8/22/02	0720	50	2	100	0
Mile Long Pond	9/18/02	0700	100	0	100	0
Mile Long Pond	10/23/02	-	100	0	100	0
Mile Long Pond	11/14/02	1500	100	1	100	0
Mile Long Pond	12/19/02	1200	100	4	100	1
Mile Long Pond	1/21/03	1125	100	2	100	0
Mile Long Pond	2/10/03	1540	100	9	100	0

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Appendix 5a. Continued.

Station Name	Sample Date	Sample Time	Total Coliform		Fecal Coliform	
			Sample Size (mL)	Count #/100 mL	Sample Size (mL)	Count #/100 mL
Mile Long Pond	3/26/03	1730	100	253	100	0
Mile Long Pond	4/24/03	1445	50	48	100	14
Mile Long Pond	4/24/03	1445	25	108		
Mile Long Pond	6/3/03	1900	100	9	100	0
Mile Long Pond	6/25/03	1530	100	227	100	0
Mile Long Pond	7/24/03	1600	100	3	100	5
Mile Long Pond	8/21/03	1300	100	18	100	1
Mile Long Pond	9/22/03	0945	100	96	100	0
Mile Long Pond	11/18/03	1630	100	54	100	0
Mile Long Pond	12/16/03	1600	100	0	100	1
Mile Long Pond	1/13/04	1410	100	5	100	0
Mile Long Pond	2/10/04	0800	100	50	100	0
Mile Long Pond	3/10/04	1600	100	TNTC	100	0
Mile Long Pond	4/7/04	1330	25	24	100	0
Upper Pacific Heights Pond	5/30/02	1110	50	16	100	0
Upper Pacific Heights Pond	5/30/02	1110	25	20		
Upper Pacific Heights Pond	6/28/02	-	50	0	100	0
Upper Pacific Heights Pond	6/28/02	-	25	0		
Upper Pacific Heights Pond	7/24/02	1230	50	0	100	TNTC
Upper Pacific Heights Pond	8/22/02	1000	50	12	100	1
Upper Pacific Heights Pond	9/18/02	1000	100	0	100	0
Upper Pacific Heights Pond	10/23/02	0845	-	-	100	1
Upper Pacific Heights Pond	11/14/02	1100	100	0	100	1
Upper Pacific Heights Pond	12/19/02	1440	100	17	100	0
Upper Pacific Heights Pond	1/21/03	0950	100	22	100	0
Upper Pacific Heights Pond	2/10/03	1145	100	6	100	0
Upper Pacific Heights Pond	3/26/03	1045	100	75	100	0
Upper Pacific Heights Pond	4/24/03	1140	50	76	100	2
Upper Pacific Heights Pond	4/24/03	1140	25	84		
Upper Pacific Heights Pond	6/3/03	1330	100	20	100	0
Upper Pacific Heights Pond	6/25/03	-	100	573	100	0
Upper Pacific Heights Pond	7/24/03	1050	100	2	100	0
Upper Pacific Heights Pond	8/21/03	0900	100	86	100	0
Upper Pacific Heights Pond	9/22/03	-	100	158	100	0
Upper Pacific Heights Pond	11/18/03	1230	100	18	100	0
Upper Pacific Heights Pond	12/16/03	1215	100	3	100	0
Upper Pacific Heights Pond	1/13/04	0940	100	142	100	0
Upper Pacific Heights Pond	2/10/04	1345	100	31	100	0

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**Appendix 5a. Continued.**

Station Name	Sample Date	Sample Time	Total Coliform		Fecal Coliform	
			Sample Size (mL)	Count #/100 mL	Sample Size (mL)	Count #/100 mL
Upper Pacific Heights Pond	3/10/04	1040	100	TNTC	100	2
Upper Pacific Heights Pond	4/7/04	0915	25	232	100	0
Lower Pacific Heights Pond	5/30/02	1210	50	34	100	0
Lower Pacific Heights Pond	5/30/02	1210	25	32		
Lower Pacific Heights Pond	6/28/02	-	50	6	100	0
Lower Pacific Heights Pond	6/28/02	-	25	8		
Lower Pacific Heights Pond	7/24/02	1145	50	0	100	0
Lower Pacific Heights Pond	8/22/02	1215	50	0	100	0
Lower Pacific Heights Pond	9/18/02	1215	100	0	100	0
Lower Pacific Heights Pond	10/23/02	0640	100	0	100	0
Lower Pacific Heights Pond	11/14/02	0815	100	9	100	0
Lower Pacific Heights Pond	12/19/02	1400	100	39	100	3
Lower Pacific Heights Pond	1/21/03	0840	100	20	100	3
Lower Pacific Heights Pond	2/10/03	1020	100	7	100	2
Lower Pacific Heights Pond	3/26/03	1230	100	211	100	0
Lower Pacific Heights Pond	4/24/03	0830	50	134	100	2
Lower Pacific Heights Pond	4/24/03	0830	25	168		
Lower Pacific Heights Pond	6/3/03	1145	100	9	100	0
Lower Pacific Heights Pond	6/25/03	0845	100	-	100	1
Lower Pacific Heights Pond	7/24/03	0940	100	0	100	2
Lower Pacific Heights Pond	8/21/03	0715	100	3	100	1
Lower Pacific Heights Pond	9/22/03	-	100	99	100	0
Lower Pacific Heights Pond	11/18/03	1100	100	256	100	0
Lower Pacific Heights Pond	12/16/03	1100	100	5	100	1
Lower Pacific Heights Pond	1/13/04	0820	100	117	100	1
Lower Pacific Heights Pond	2/10/04	1220	100	21	100	0
Lower Pacific Heights Pond	3/10/04	0920	100	TNTC	100	0
Lower Pacific Heights Pond	4/7/04	0800	25	276	100	0
Thermolito Afterbay A Feather River Outlet	3/28/02	1015	50	82	100	1
Thermolito Afterbay A Feather River Outlet	3/28/02	1015	25	124		
Thermolito Afterbay A Feather River Outlet	4/24/02	1130	50	12	100	0
Thermolito Afterbay A Feather River Outlet	4/24/02	1130	25	44		
Thermolito Afterbay A Feather River Outlet	6/25/02	0600	50	0	100	12

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**Appendix 5a. Continued.**

Station Name	Sample Date	Sample Time	Total Coliform		Fecal Coliform	
			Sample Size (mL)	Count #/100 mL	Sample Size (mL)	Count #/100 mL
Thermolito Afterbay A Feather River Outlet	7/15/02	0900	50	0	50	2
Thermolito Afterbay A Feather River Outlet	8/21/02	0900	50	54	100	0
Thermolito Afterbay A Feather River Outlet	10/22/02	1400	100	30	100	5
Thermolito Afterbay A Feather River Outlet	12/17/02	1345	100	0	100	6
Thermolito Afterbay A Feather River Outlet	1/14/03	1615	100	33	100	32
Thermolito Afterbay A Feather River Outlet	2/20/03	1015	100	TNTC	100	182
Thermolito Afterbay A Feather River Outlet	3/19/03	1445	100	TNTC	100	35
Thermolito Afterbay A Feather River Outlet	5/15/03	1430	50	8	100	4
Thermolito Afterbay A Feather River Outlet	5/15/03	1430	25	12		
Thermolito Afterbay A Feather River Outlet	6/17/03	1330	100	66	100	0
Thermolito Afterbay A Feather River Outlet	7/8/03	0900	100	7	100	0
Thermolito Afterbay A Feather River Outlet	8/11/03	1100	100	29	100	0
Thermolito Afterbay A Feather River Outlet	9/17/03	0700	100	77	100	4
Thermolito Afterbay A Feather River Outlet	10/27/03	0800	100	40	100	8
Thermolito Afterbay A Feather River Outlet	11/17/03	1700	100	64	100	8
Thermolito Afterbay A Feather River Outlet	12/15/03	0745	100	60	100	16
Thermolito Afterbay A Feather River Outlet	1/13/04	0750	100	165	100	9
Thermolito Afterbay A Feather River Outlet	2/3/04	1310	50	390	50	0
Thermolito Afterbay A Feather River Outlet	2/10/04	1320	50	110	50	0
Thermolito Afterbay A Feather River Outlet	2/19/04	1515	10	20	50	4
Thermolito Afterbay A Feather River Outlet	3/10/04	0720	50	390	100	4

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Appendix 5a. Continued.

Station Name	Sample Date	Sample Time	Total Coliform		Fecal Coliform	
			Sample Size (mL)	Count #/100 mL	Sample Size (mL)	Count #/100 mL
Thermolito Afterbay A Feather River Outlet	4/6/04	1245	50	180	100	1
South Afterbay	4/2/02	1415	50	12	100	0
South Afterbay	4/2/02	1415	25	8		
South Afterbay	4/24/02		50		100	0
South Afterbay	4/24/02		25	13		
South Afterbay	5/23/02	0830	50	42	100	0
South Afterbay	5/23/02	0830	25	28		
South Afterbay	6/17/02	0815	50	90	100	0
South Afterbay	8/19/02	0915	50	0	100	0
South Afterbay	9/17/02	1415	100	0	100	1
South Afterbay	10/22/02	1245	100	5	100	1
South Afterbay	11/19/02	1025	100	19	100	2
South Afterbay	12/12/02	0900	100	103	100	3
South Afterbay	1/14/03	1330	100	111	100	13
South Afterbay	2/26/03	1000	100	0	100	2
South Afterbay	3/19/03	1230	100	134	100	21
South Afterbay	4/15/03	0800	100	272	100	0
South Afterbay	5/20/03	0900	100	10	100	0
South Afterbay	6/24/03	0825	100	153	100	0
South Afterbay	7/21/03	0935	50	8	100	0
South Afterbay	8/25/03	0930	100	28	100	2
South Afterbay	9/22/03	0930	100	14	100	0
South Afterbay	10/21/03	0900	100	150	100	0
South Afterbay	11/18/03	0845	100	22	100	5
South Afterbay	12/16/03	0830	100	70	100	14
South Afterbay	1/20/04	1020	100	77	100	1
South Afterbay	1/20/04	1020	100	86		
South Afterbay	2/23/04	0845	100	120	100	17
South Afterbay	3/22/04	0845	25	128	100	0
South Afterbay	4/22/04	1000	100	115	100	0
North Afterbay	4/2/02	1635	50	2	100	0
North Afterbay	4/2/02	1635	25	8		
North Afterbay	4/24/02	0800	50	17	100	0
North Afterbay	4/24/02	0800	25	24		
North Afterbay	5/23/02	0930	50	54	100	1
North Afterbay	5/23/02	0930	25	92		
North Afterbay	6/17/02	0900	50	8	100	0

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**Appendix 5a. Continued.**

Station Name	Sample Date	Sample Time	Total Coliform		Fecal Coliform	
			Sample Size (mL)	Count #/100 mL	Sample Size (mL)	Count #/100 mL
North Afterbay	8/19/02	0830	50	6	100	0
North Afterbay	9/17/02	1200	100	1	100	0
North Afterbay	10/22/02	1130	100	2	100	0
North Afterbay	11/19/02	1125	100	40	100	2
North Afterbay	12/12/02	1015	100	36	100	0
North Afterbay	1/14/03	1415	100	59	100	61
North Afterbay	2/26/03	1140	100	49	100	13
North Afterbay	3/19/03	1330	100	108	100	9
North Afterbay	3/19/03	1330	100	108	100	9
North Afterbay	4/15/03	0900	100	257	100	0
North Afterbay	5/20/03	0800	100	7	100	0
North Afterbay	6/24/03	0940	100	88	100	0
North Afterbay	7/21/03	1115	100	2	100	1
North Afterbay	8/25/03	1045	100	382	100	2
North Afterbay	9/22/03	1030	100	4	100	0
North Afterbay	10/21/03	1000	100	137	100	0
North Afterbay	11/18/03	0930	100	34	100	3
North Afterbay	12/16/03	0930	100	32	100	16
North Afterbay	1/20/04	1200	100	65	100	0
North Afterbay	1/20/04	1200	100	65		
North Afterbay	3/22/04	0945	25	280	100	1
North Afterbay	4/22/04	0900	100	63	100	0
South Forebay	4/2/02	1415	50	2	100	0
South Forebay	4/2/02	1415	25	0		
South Forebay	4/29/02	0730	50	58	100	0
South Forebay	5/22/02	0900	50	28	100	1
South Forebay	5/22/02	0900	25	52		
South Forebay	6/17/02	1135	50	146	100	5
South Forebay	8/19/02	1200	50	0	100	0
South Forebay	9/17/02	1000	100	3	100	0
South Forebay	9/24/02	-	50	0	100	0
South Forebay	10/22/02	0840	100	14	100	10
South Forebay	11/19/02	1400	100	15	100	1
South Forebay	12/12/02	1215	100	100	100	2
South Forebay	1/14/03	1045	100	79	100	86
South Forebay	2/26/03	1430	100	11	100	2
South Forebay	3/19/03	1050	100	77	100	6
South Forebay	5/20/03	1215	100	0	100	0
South Forebay	6/23/03	1245	100	29	100	0

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**Appendix 5a. Continued.**

Station Name	Sample Date	Sample Time	Total Coliform		Fecal Coliform	
			Sample Size (mL)	Count #/100 mL	Sample Size (mL)	Count #/100 mL
South Forebay	7/21/03	1230	100	19	100	0
South Forebay	8/25/03	1200	100	363	100	0
South Forebay	9/22/03	1200	100	0	100	0
South Forebay	10/21/03	1300	100	64	100	0
South Forebay	11/18/03	1230	100	36	100	3
South Forebay	12/16/03	1045	100	61	100	0
South Forebay	1/20/04	1400	25	36	25	0
South Forebay	1/20/04	1400	50	46		
South Forebay	2/23/04	1100	100	250	100	3
South Forebay	3/22/04	1045	25	36	100	0
South Forebay	4/22/04	1025	100	63	100	0
North Forebay C	12/12/02	1530	100	174	100	10
North Forebay C	1/13/03	1615	100	TNTC	100	TNTC
North Forebay C	3/19/03	1600	100	189	100	93
North Forebay C	4/14/03	1630	100	-	100	45
North Forebay C	5/20/03	1430	100	19	100	180
North Forebay C	6/23/03		100	-	100	175
North Forebay C	7/21/03	0820	100	76	100	332
North Forebay C	8/25/03	1630	100	97	100	15
North Forebay C	9/22/03	1600	100	117	100	28
North Forebay C	10/20/03	1515	100	91	100	132
North Forebay C	11/19/03	1600	100	-	100	0
North Forebay C	12/15/03	0930	100	114	100	134
North Forebay C	1/21/04	1425	100	75	100	9
North Forebay C	2/16/04	0730	100	TNTC	100	TNTC
North Forebay C	2/23/04	1645	50	TNTC	50	38
North Forebay C	3/22/04	1600	25	TNTC	100	504
North Forebay C	4/19/04	1400	100	TNTC	100	265
North Forebay	4/2/02	1635	50	6	100	0
North Forebay	4/2/02	1635	25	4		
North Forebay	4/29/02	0845	50	70	100	1
North Forebay	5/22/02	1030	50	52	100	1
North Forebay	5/22/02	1030	25	72		
North Forebay	6/17/02	1145	50	124	100	1
North Forebay	8/19/02	1100	50	24	100	1
North Forebay	9/17/02	0800	100	3	100	41
North Forebay	10/21/02	-	100	0	100	146
North Forebay	10/22/02	0950	100	4	100	1
North Forebay	4/2/02	1635	50	6	100	0

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Appendix 5a. Continued.

Station Name	Sample Date	Sample Time	Total Coliform		Fecal Coliform	
			Sample Size (mL)	Count #/100 mL	Sample Size (mL)	Count #/100 mL
North Forebay	11/19/02	1300	100	12	100	1
North Forebay	12/12/02	1320	100	76	100	0
North Forebay	1/14/03	0915	100	96	100	48
North Forebay	2/26/03	1330	100	11	100	0
North Forebay	3/19/03	1000	100	133	100	9
North Forebay	4/15/03	1030	100	54	100	1
North Forebay	5/20/03	1115	100	1	100	0
North Forebay	6/23/03	1115	100	99	100	0
North Forebay	7/21/03	1400	100	24	100	0
North Forebay	8/25/03	1315	100	613	100	3
North Forebay	9/22/03	1245	100	54	100	1
North Forebay	10/21/03	1200	100	111	100	3
North Forebay	11/18/03	1115	100	19	100	0
North Forebay	12/16/03	1200	100	21	100	3
North Forebay	1/20/04	1510	100	60	100	0
North Forebay	1/20/04	1510	100	52		
North Forebay	2/23/04	1145	100	120	100	1
North Forebay	3/22/04	1130	25	32	100	0
North Forebay	4/19/04	1115	100	42	100	2
Feather R A Singh AB Riviera Rd.	3/26/02	1640	50	42	100	2
Feather R A Singh AB Riviera Rd.	3/26/02	1640	25	12		
Feather R A Singh AB Riviera Rd.	4/24/02	0830	50	28	100	2
Feather R A Singh AB Riviera Rd.	4/24/02	0830	25	52		
Feather R A Singh AB Riviera Rd.	5/21/02	0745	50	130	100	1
Feather R A Singh AB Riviera Rd.	5/21/02	0745	25	104		
Feather R A Singh AB Riviera Rd.	6/25/02	0830	50	0	100	7
Feather R A Singh AB Riviera Rd.	7/24/02	0705	50	6	100	7
Feather R A Singh AB Riviera Rd.	8/21/02	1410	50	0	100	1
Feather R A Singh AB Riviera Rd.	9/25/02		100	0	100	0
Feather R A Singh AB Riviera Rd.	10/22/02	1320	100	16	100	3
Feather R A Singh AB Riviera Rd.	11/14/02	0830	100	3	100	11
Feather R A Singh AB Riviera Rd.	12/11/02	0840	100	130	100	3
Feather R A Singh AB Riviera Rd.	12/17/02	1315	50	258	100	3
Feather R A Singh AB Riviera Rd.	1/14/03	1330	50	62	50	0
Feather R A Singh AB Riviera Rd.	2/20/03	1200	100	143	100	50
Feather R A Singh AB Riviera Rd.	3/19/03	1215	100	220	100	8
Feather R A Singh AB Riviera Rd.	5/15/03	1245	50	50	100	21
Feather R A Singh AB Riviera Rd.	5/15/03	1245	25	84		

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Appendix 5a. Continued.

Station Name	Sample Date	Sample Time	Total Coliform		Fecal Coliform	
			Sample Size (mL)	Count #/100 mL	Sample Size (mL)	Count #/100 mL
Feather R A Singh AB Riviera Rd.	6/17/03	1300	100	29	100	2
Feather R A Singh AB Riviera Rd.	8/11/03	1245	100	136	100	1
Feather R A Singh AB Riviera Rd.	9/17/03	1340	100	394	100	4
Feather R A Singh AB Riviera Rd.	10/27/03	1515	100	182	100	1
Feather R A Singh AB Riviera Rd.	11/17/03	1400	100	98	100	6
Feather R A Singh AB Riviera Rd.	12/15/03	1400	100	107	100	8
Feather R A Singh AB Riviera Rd.	1/13/04	1415	100	TNTC	100	3
Feather R A Singh AB Riviera Rd.	2/3/04	1140	25	436	50	12
Feather R A Singh AB Riviera Rd.	2/10/04	1235	100	31	100	0
Feather R A Singh AB Riviera Rd.	3/10/04	1345	50	TNTC	100	3
Feather R A Singh AB Riviera Rd.	4/6/04	1125	50	TNTC	100	0
Honcut C A Pacific Ranch NR Palermo	3/27/02	0740	50	148	50	64
Honcut C A Pacific Ranch NR Palermo	4/24/02	0630	50	0	50	10
Honcut C A Pacific Ranch NR Palermo	4/24/02	0630	25	12		
Honcut C A Pacific Ranch NR Palermo	5/21/02	0630	50	130	100	130
Honcut C A Pacific Ranch NR Palermo	5/21/02	0630	25	188		
Honcut C A Pacific Ranch NR Palermo	6/25/02	0715	50	0	100	27
Honcut C A Pacific Ranch NR Palermo	7/24/02	1845	50	4	100	11
Honcut C A Pacific Ranch NR Palermo	8/21/02	1300	50	0	100	44
Honcut C A Pacific Ranch NR Palermo	9/25/02	-	100	0	100	0
Honcut C A Pacific Ranch NR Palermo	10/22/02	1215	100	12	100	15
Honcut C A Pacific Ranch NR Palermo	11/14/02	1000	100	0	100	36
Honcut C A Pacific Ranch NR Palermo	12/11/02	0945	100	101	100	5
Honcut C A Pacific Ranch NR Palermo	12/17/02	1215	50	192	100	229
Honcut C A Pacific Ranch NR Palermo	1/14/03	1230	50	24	50	246

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**Appendix 5a. Continued.**

Station Name	Sample Date	Sample Time	Total Coliform		Fecal Coliform	
			Sample Size (mL)	Count #/100 mL	Sample Size (mL)	Count #/100 mL
Honcut C A Pacific Ranch NR Palermo	2/20/03	1100	100	35	100	130
Honcut C A Pacific Ranch NR Palermo	3/19/03	1100	100	181	100	135
Honcut C A Pacific Ranch NR Palermo	5/15/03	1140	50	56	100	227
Honcut C A Pacific Ranch NR Palermo	5/15/03	1140	25	204		
Honcut C A Pacific Ranch NR Palermo	8/11/03	1200	100	21	100	6
Honcut C A Pacific Ranch NR Palermo	9/17/03	1250	100	21	100	12
Honcut C A Pacific Ranch NR Palermo	10/27/03	1410	100	229	100	3
Honcut C A Pacific Ranch NR Palermo	11/17/03	1300	100	21	100	22
Honcut C A Pacific Ranch NR Palermo	12/15/03	1300	100	TNTC	100	374
Honcut C A Pacific Ranch NR Palermo	1/13/04	1250	50	712	50	30
Honcut C A Pacific Ranch NR Palermo	1/13/04	1250	25	1100		
Honcut C A Pacific Ranch NR Palermo	2/3/04	1050	25	743	50	1280
Honcut C A Pacific Ranch NR Palermo	2/10/04	1125	100	58	100	12
Honcut C A Pacific Ranch NR Palermo	2/19/04	1700	5	2140	50	408
Honcut C A Pacific Ranch NR Palermo	3/10/04	1250	50	TNTC	50	60
Honcut C A Pacific Ranch NR Palermo	4/6/04	1045	50	TNTC	100	2
Feather R A Archer Ave	3/27/02	0915	50	58	100	3
Feather R A Archer Ave	3/27/02	0915	25	40		
Feather R A Archer Ave	4/24/02	0910	50	0	100	4
Feather R A Archer Ave	4/24/02	0910	25	16		
Feather R A Archer Ave	5/21/02	0840	50	66	100	2
Feather R A Archer Ave	5/21/02	0840	25	120		

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Appendix 5a. Continued.

Station Name	Sample Date	Sample Time	Total Coliform		Fecal Coliform	
			Sample Size (mL)	Count #/100 mL	Sample Size (mL)	Count #/100 mL
Feather R A Archer Ave	6/25/02	0930	50	0	100	5
Feather R A Archer Ave	7/24/02	0750	50	0	100	1
Feather R A Archer Ave	8/21/02	0730	50	0	100	0
Feather R A Archer Ave	10/22/02	0720	100	11	100	2
Feather R A Archer Ave	11/14/02	0820	100	7	100	8
Feather R A Archer Ave	12/11/02	0900	100	73	100	2
Feather R A Archer Ave	12/17/02	0815	50	518	100	297
Feather R A Archer Ave	1/14/03	0815	50	82	50	0
Feather R A Archer Ave	2/20/03	0730	100	71	100	58
Feather R A Archer Ave	3/19/03	0810	100	145	100	22
Feather R A Archer Ave	5/15/03	0740	50	24	100	13
Feather R A Archer Ave	5/15/03	0740	25	44		
Feather R A Archer Ave	6/17/03	1230	100	48	100	2
Feather R A Archer Ave	7/8/03	1210	100	5	100	5
Feather R A Archer Ave	8/11/03	1345	100	200	100	0
Feather R A Archer Ave	9/17/03	1530	100	140	100	0
Feather R A Archer Ave	10/27/03	1450	100	45	100	2
Feather R A Archer Ave	11/17/03	1100	100	8	100	0
Feather R A Archer Ave	12/15/03	1430	100	105	100	0
Feather R A Archer Ave	1/13/04	1400	100	311	100	5
Feather R A Archer Ave	2/3/04	1335	25	410	50	44
Feather R A Archer Ave	2/10/04	1345	100	44	100	4
Feather R A Archer Ave	2/19/04	0815	5	1250	50	0
Feather R A Archer Ave	3/10/04	1650	50	TNTC	100	2
Feather R A Archer Ave	4/6/04	1315	50	TNTC	100	9
Feather R US from Yuba R	3/27/02	1030	50	36	100	5
Feather R US from Yuba R	3/27/02	1030	25	48		
Feather R US from Yuba R	4/24/02	1030	50	36	100	0
Feather R US from Yuba R	4/24/02	1030	25	52		
Feather R US from Yuba R	5/21/02	1040	50	44	100	2
Feather R US from Yuba R	5/21/02	1040	25	92		
Feather R US from Yuba R	6/25/02	1100	25	16	100	17
Feather R US from Yuba R	6/25/02	100	10	70		
Feather R US from Yuba R	7/24/02	0915	50	38	100	8
Feather R US from Yuba R	7/24/02	0915	25	8		
Feather R US from Yuba R	8/21/02	0905	50	2	100	0
Feather R US from Yuba R	10/22/02	0840	100	0	100	3
Feather R US from Yuba R	11/14/02	0945	100	3	100	12
Feather R US from Yuba R	12/11/02	1015	100	125	100	7

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Appendix 5a. Continued.

Station Name	Sample Date	Sample Time	Total Coliform		Fecal Coliform	
			Sample Size (mL)	Count #/100 mL	Sample Size (mL)	Count #/100 mL
Feather R US from Yuba R	12/17/02	0930	50	10	100	TNTC
Feather R US from Yuba R	1/14/03	0940	50	116	50	126
Feather R US from Yuba R	2/20/03	0920	100	76	100	40
Feather R US from Yuba R	3/19/03	0950	100	137	100	5
Feather R US from Yuba R	5/15/03	0910	50	36	100	9
Feather R US from Yuba R	5/15/03	0910	25	60		
Feather R US from Yuba R	6/17/03	1125	100	63	100	0
Feather R US from Yuba R	7/8/03	1200	100	25	100	8
Feather R US from Yuba R	8/11/03	1200	100	86	100	26
Feather R US from Yuba R	9/17/03	0845	100	28	100	11
Feather R US from Yuba R	10/27/03	1330	100	55	100	9
Feather R US from Yuba R	11/17/03		100	41	100	1
Feather R US from Yuba R	12/15/03	1300	100	93	100	0
Feather R US from Yuba R	1/13/04	1240	50	TNTC	50	4
Feather R US from Yuba R	1/13/04	1240	25	268		
Feather R US from Yuba R	2/3/04	1215	25	414	50	200
Feather R US from Yuba R	2/10/04	1215	100	34	100	2
Feather R US from Yuba R	2/19/04	0900	5	1860	50	0
Feather R US from Yuba R	3/10/04	1500	50	878	100	2
Feather R US from Yuba R	4/6/04	1130	50	TNTC	100	15
Yuba R A Mouth	3/27/02	1120	50	56	100	12
Yuba R A Mouth	3/27/02	1120	25	64		
Yuba R A Mouth	4/24/02	1115	50	76	100	4
Yuba R A Mouth	4/24/02	1115	25	164		
Yuba R A Mouth	5/21/02	1040	50	200	100	0
Yuba R A Mouth	5/21/02	1040	25	140		
Yuba R A Mouth	6/25/02		50	8	100	26
Yuba R A Mouth	7/24/02	0840	50	2	100	0
Yuba R A Mouth	8/21/02	0820	50	0	100	4
Yuba R A Mouth	10/22/02	0810	100	20	100	26
Yuba R A Mouth	11/14/02	0915	100	30	100	20
Yuba R A Mouth	12/11/02	0945	100	105	10	14
Yuba R A Mouth	12/17/02	0900	50	470	100	TNTC
Yuba R A Mouth	1/14/03	0910	50	64	50	70
Yuba R A Mouth	2/20/03	0840	100	103	100	21
Yuba R A Mouth	3/19/03	0910	100	TNTC	100	43
Yuba R A Mouth	5/15/03	0835	50	34	100	-
Yuba R A Mouth	5/15/03	0835	25	104		
Yuba R A Mouth	6/17/03	1055	100	77	100	10

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**Appendix 5a. Continued.**

Station Name	Sample Date	Sample Time	Total Coliform		Fecal Coliform	
			Sample Size (mL)	Count #/100 mL	Sample Size (mL)	Count #/100 mL
Yuba R A Mouth	7/8/03	-	100	18	100	11
Yuba R A Mouth	8/11/03	1215	100	2	100	0
Yuba R A Mouth	9/17/03	0815	100	40	100	10
Yuba R A Mouth	10/27/03	1250	100	61	100	3
Yuba R A Mouth	11/17/03	1200	100	70	100	62
Yuba R A Mouth	12/15/03	1220	100	159	100	16
Yuba R A Mouth	1/13/04	1310	100	165	100	3
Yuba R A Mouth	2/3/04	1140	25	315	50	158
Yuba R A Mouth	2/10/04	1150	100	52	100	1
Yuba R A Mouth	2/19/04	1015	10	830	50	0
Yuba R A Mouth	3/10/04	1610	50	TNTC	100	10
Yuba R A Mouth	4/6/04	1100	50	TNTC	100	0
Feather R A Shanghai Bend	3/27/02	1300	50	34	100	2
Feather R A Shanghai Bend	3/27/02	1300	25	24		
Feather R A Shanghai Bend	4/24/02	1210	50	10	100	0
Feather R A Shanghai Bend	4/24/02	1210	25	56		
Feather R A Shanghai Bend	5/21/02	1130	50	14	100	0
Feather R A Shanghai Bend	5/21/02	1130	25	128		
Feather R A Shanghai Bend	6/25/02	-	25	40	100	2
Feather R A Shanghai Bend	6/25/02	-	10	80		
Feather R A Shanghai Bend	7/24/02	0955	50	0	100	0
Feather R A Shanghai Bend	7/24/02	0955	25	12		
Feather R A Shanghai Bend	8/21/02	0945	50	0	100	0
Feather R A Shanghai Bend	10/22/02	0930	100	4	100	9
Feather R A Shanghai Bend	11/14/02	1040	100	0	100	19
Feather R A Shanghai Bend	12/11/02	1100	100	18	100	1
Feather R A Shanghai Bend	12/17/02	1010	50	12	100	167
Feather R A Shanghai Bend	1/14/03	1015	50	60	50	116
Feather R A Shanghai Bend	2/20/03	1015	100	23	100	48
Feather R A Shanghai Bend	3/19/03	1030	100	235	100	12
Feather R A Shanghai Bend	5/15/03	0950	50	28	100	15
Feather R A Shanghai Bend	5/15/03	0950	25	52		
Feather R A Shanghai Bend	6/17/03	1200	100	81	100	1
Feather R A Shanghai Bend	7/8/03	1300	100	11	100	2
Feather R A Shanghai Bend	8/11/03	1300	100	157	100	0
Feather R A Shanghai Bend	9/17/03	0940	100	14	100	9
Feather R A Shanghai Bend	10/27/03	1400	100	46	100	2
Feather R A Shanghai Bend	11/17/03	1300	100	98	100	4
Feather R A Shanghai Bend	12/15/03	1335	100	54	100	0

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Appendix 5a. Continued.

Station Name	Sample Date	Sample Time	Total Coliform		Fecal Coliform	
			Sample Size (mL)	Count #/100 mL	Sample Size (mL)	Count #/100 mL
Feather R A Shanghai Bend	1/13/04	1200	50	298	50	2
Feather R A Shanghai Bend	1/13/04	1200	25	420		
Feather R A Shanghai Bend	2/3/04	1250	25	2080	50	6
Feather R A Shanghai Bend	2/10/04	1245	100	60	100	0
Feather R A Shanghai Bend	2/19/04	0930	5	1240	50	0
Feather R A Shanghai Bend	3/10/04	1410	50	TNTC	100	7
Feather R A Shanghai Bend	4/6/04	1300	50	TNTC	100	20
Bear R NR Mouth	3/27/02	1430	50	70	100	10
Bear R NR Mouth	3/27/02	1430	25	56		
Bear R NR Mouth	4/24/02	1430	50	6	100	0
Bear R NR Mouth	4/24/02	1430	25	16		
Bear R NR Mouth	5/21/02	1240	50	0	100	4
Bear R NR Mouth	5/21/02	1240	25	0		
Bear R NR Mouth	6/25/02	-	25	0	100	118
Bear R NR Mouth	6/25/02	-	10	170		
Bear R NR Mouth	7/24/02	1100	25	0	100	0
Bear R NR Mouth	7/24/02	1100	10	0		
Bear R NR Mouth	8/21/02	1115	50	0	100	4
Bear R NR Mouth	10/22/02	1045	100	0	100	84
Bear R NR Mouth	11/14/02	1140	50	18	100	70
Bear R NR Mouth	11/14/02	1140	25	24		
Bear R NR Mouth	12/11/02	1200	100	103	100	72
Bear R NR Mouth	12/17/02	1110	50	0	100	44
Bear R NR Mouth	1/14/03	1110	50	44	50	0
Bear R NR Mouth	2/20/03	1140	100	53	100	0
Bear R NR Mouth	3/19/03	1135	100	231	100	28
Bear R NR Mouth	5/15/03	1115	50	66	100	17
Bear R NR Mouth	5/15/03	1115	25	56		
Bear R NR Mouth	6/17/03	1020	100	155	100	144
Bear R NR Mouth	7/8/03	1115	50	78	50	56
Bear R NR Mouth	7/8/03	1115	25	124	25	84
Bear R NR Mouth	8/11/03	1100	100	115	100	24
Bear R NR Mouth	9/17/03	1100	100	64	100	161
Bear R NR Mouth	10/27/03	1145	100	38	100	31
Bear R NR Mouth	11/17/03	1400	100	44	100	30
Bear R NR Mouth	12/15/03	1130	100	62	100	3
Bear R NR Mouth	1/13/04	1045	50	80	50	32
Bear R NR Mouth	2/3/04	1100	25	TNTC	50	168
Bear R NR Mouth	2/10/04	1050	100	68	100	19

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**Appendix 5a. Continued.**

Station Name	Sample Date	Sample Time	Total Coliform		Fecal Coliform	
			Sample Size (mL)	Count #/100 mL	Sample Size (mL)	Count #/100 mL
Bear R NR Mouth	2/19/04	1100	5	TNTC	50	TNTC
Bear R NR Mouth	3/10/04	1240	50	TNTC	50	8
Bear R NR Mouth	4/6/04	1000	50	TNTC	100	2
Feather R NR Verona	3/27/02	1515	50	56	100	8
Feather R NR Verona	3/27/02	1515	25	120		
Feather R NR Verona	4/24/02	1520	50	36	100	0
Feather R NR Verona	4/24/02	1520	25	36		
Feather R NR Verona	5/21/02	1330	50	40	100	1
Feather R NR Verona	5/21/02	1330	25	120		
Feather R NR Verona	6/25/02	1400	25	8	100	6
Feather R NR Verona	6/25/02	1400	10	350		
Feather R NR Verona	7/24/02	1320	25	36	100	3
Feather R NR Verona	7/24/02	1320	10	30		
Feather R NR Verona	8/21/02	1215	50	12	100	6
Feather R NR Verona	10/22/02	1135	100	2	100	3
Feather R NR Verona	11/14/02	1230	100	2	100	6
Feather R NR Verona	12/11/02	1300	100	108	100	2
Feather R NR Verona	12/17/02	1210	50	4	100	TNTC
Feather R NR Verona	1/14/03	1215	50	150	50	100
Feather R NR Verona	2/20/03	1230	100	44	100	11
Feather R NR Verona	3/19/03	1230	100	TNTC	100	50
Feather R NR Verona	5/15/03	1215	50	4	100	18
Feather R NR Verona	5/15/03	1215	25	64		
Feather R NR Verona	6/17/03	0930	100	54	100	0
Feather R NR Verona	7/8/03	1015	100	23	100	3
Feather R NR Verona	8/11/03	1000	100	35	100	11
Feather R NR Verona	9/17/03	1200	100	109	100	6
Feather R NR Verona	10/27/03	1100	100	97	100	5
Feather R NR Verona	11/17/03	1500	100	43	100	7
Feather R NR Verona	12/15/03	1030	100	79	100	56
Feather R NR Verona	1/13/04	0950	50	394	50	6
Feather R NR Verona	1/13/04	0950	25	700		
Feather R NR Verona	2/3/04	1005	25	768	50	36
Feather R NR Verona	2/10/04	0950	100	34	100	0
Feather R NR Verona	2/19/04	1200	5	TNTC	50	TNTC

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**Appendix 5a. Continued.**

Station Name	Sample Date	Sample Time	Total Coliform		Fecal Coliform	
			Sample Size (mL)	Count #/100 mL	Sample Size (mL)	Count #/100 mL
Feather R NR Verona	3/10/04	0915	50	TNTC	50	8
Feather R NR Verona	4/6/04	0850	50	TNTC	100	0
Sacramento R US from Feather R	3/27/02	1630	50	32	100	3
Sacramento R US from Feather R	3/27/02	1630	25	56		
Sacramento R US from Feather R	4/24/02	1730	50	2	100	0
Sacramento R US from Feather R	4/24/02	1730	25	12		
Sacramento R US from Feather R	5/21/02	1445	50	4	100	0
Sacramento R US from Feather R	5/21/02	1445	25	20		
Sacramento R US from Feather R	6/25/02	-	50	2	100	5
Sacramento R US from Feather R	7/24/02	1215	50	0	100	12
Sacramento R US from Feather R	8/21/02	1330	50	0	100	0
Sacramento R US from Feather R	10/22/02	1345	100	0	100	6
Sacramento R US from Feather R	11/14/02	1430	100	0	100	29
Sacramento R US from Feather R	12/11/02	1415	100	36	100	4
Sacramento R US from Feather R	1/14/03	1330	50	80	50	0
Sacramento R US from Feather R	2/20/03	1345	100	65	100	277
Sacramento R US from Feather R	3/19/03	1330	100	-	100	TNTC
Sacramento R US from Feather R	5/15/03	1330	50	20	100	17
Sacramento R US from Feather R	5/15/03	1330	25	60		
Sacramento R US from Feather R	6/17/03	0815	100	8	100	6
Sacramento R US from Feather R	7/8/03	0845	100	13	100	0
Sacramento R US from Feather R	8/11/03	0830	100	20	100	0
Sacramento R US from Feather R	9/17/03	1315	100	6	100	4
Sacramento R US from Feather R	10/27/03	0930	100	42	100	14
Sacramento R US from Feather R	11/17/03	1620	100	38	100	0
Sacramento R US from Feather R	12/15/03	0920	100		100	14
Sacramento R US from Feather R	1/13/04	0830	50	140	50	28
Sacramento R US from Feather R	2/3/04	0850	25	113	50	8
Sacramento R US from Feather R	2/10/04	0830	100	18	100	13
Sacramento R US from Feather R	2/19/04	1310	5	TNTC	50	0
Sacramento R US from Feather R	3/10/04	1045	50	634	50	16
Sacramento R US from Feather R	4/6/04	725	50	TNTC	100	0

a. California Department of Health Services. Draft Guidance for Fresh Water Beaches. July 24, 2001.

b. Central Valley Regional Water Quality Control Board. Water Quality Control Plan (Basin Plan), Fourth Edition, 1998.

c. geometric mean of 200 bacteria per 100 mL of water from not less than five samples collected over a 30-day period

d. no more than ten percent of the total samples taken during any 30-day period shall have fecal bacteria in excess of 400 organisms per 100 mL.

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**Appendix 5b. Recreation area bacteria monitoring results for 2002.**

Bacteria Criteria				Total Coliform #/100 mL		Fecal Coliform #/100 mL	Geometric Mean Fecal Coliform (5 samples/30 days)
DHS <sup>1</sup>	Single sample maximum			10,000		400	
CVRWQCB <sup>2</sup>	Geometric Mean of 5 samples/30 days						200
	No more than 10% of samples in 30 days					400	
	Sample Date	Sample Time	Sample Volume	Total Coliform #/100 mL	Sample Volume	Fecal Coliform #/100 mL	Geometric Mean Fecal Coliform (5 samples/30 days)
Afterbay Outlet	8/25/02	1645	50	28	100	0	2
Afterbay Outlet	8/25/02	1645	25	28			
Afterbay Outlet	8/28/02	1655	50	16	100	1	
Afterbay Outlet	8/28/02	1655	25	8			
Afterbay Outlet	9/2/02	1715	50	6	100	4	
Afterbay Outlet	9/2/02	1715	25	88			
Afterbay Outlet	9/8/02	1405	50	16	100	5	
Afterbay Outlet	9/8/02	1405	25	24			
Afterbay Outlet	9/15/02	1345	50	38	100	1	
Afterbay Outlet	9/15/02	1345	25	40			
Bedrock Park (Upstream)	8/25/02	1730	50	82	100	0	
Bedrock Park (Upstream)	8/25/02	1730	25	96			
Bedrock Park (Upstream)	8/28/02	1845	50	64	100	21	
Bedrock Park (Upstream)	8/28/02	1845	25	368			
Bedrock Park (Upstream)	9/2/02	1810	50	166	100	8	

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Appendix 5b. Continued.

	Sample Date	Sample Time	Sample Volume	Total Coliform #/100 mL	Sample Volume	Fecal Coliform #/100 mL	Geometric Mean Fecal Coliform (5 samples/30 days)
Bedrock Park (Upstream)	9/2/02	1810	25	136			
Bedrock Park (Upstream)	9/8/02	1420	50	48	100	0	
Bedrock Park (Upstream)	9/8/02	1420	25	92			
Bedrock Park (Upstream)	9/15/02	1400	50	40	100	4	4
Bedrock Park (Upstream)	9/15/02	1400	25	44			
Bedrock Park (Downstream)	8/25/02	1730	50	66	100	0	
Bedrock Park (Downstream)	8/25/02	1730	25	152			
Bedrock Park (Downstream)	8/28/02	1850	50	94	100	20	
Bedrock Park (Downstream)	8/28/02	1850	25	432			
Bedrock Park (Downstream)	9/2/02	1815	50	16	100	332	
Bedrock Park (Downstream)	9/2/02	1815	25	24			
Bedrock Park (Downstream)	9/8/02	1425	50	78	100	0	
Bedrock Park (Downstream)	9/8/02	1425	25	72			
Bedrock Park (Downstream)	9/15/02	1410	50	162	100	5	8
Bedrock Park (Downstream)	9/15/02	1410	25	172			
Bidwell Marina Houseboats @ E-36	8/25/02	1500	50	0	100	0	
Bidwell Marina Houseboats @ E-36	8/25/02	1500	25	0			
Bidwell Marina Houseboats @ E-36	8/28/02	1450	50	62	100	0	
Bidwell Marina Houseboats @ E-36	8/28/02	1450	25	124			
Bidwell Marina Houseboats @ E-36	9/2/02	1515	50	28	100	3	
Bidwell Marina Houseboats @ E-36	9/2/02	1515	25	124			
Bidwell Marina Houseboats @ E-36	9/8/02	1655	50	8	100	0	
Bidwell Marina Houseboats @ E-36	9/8/02	1655	25	4			
Bidwell Marina Houseboats @ E-36	9/15/02	1635	50	26	100	0	1
Bidwell Marina Houseboats @ E-36	9/15/02	1635	25	48			
Bidwell Marina Houseboats @ L-4	8/25/02	1515	50	6	100	1	
Bidwell Marina Houseboats @ L-4	8/25/02	1515	25	0			
Bidwell Marina Houseboats @ L-4	8/28/02	1505	50	70	100	0	
Bidwell Marina Houseboats @ L-4	8/28/02	1505	25	68			
Bidwell Marina Houseboats @ L-4	9/2/02	1530	50	72	100	2	

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**Appendix 5b. Continued.**

	Sample Date	Sample Time	Sample Volume	Total Coliform #/100 mL	Sample Volume	Fecal Coliform #/100 mL	Geometric Mean Fecal Coliform (5 samples/30 days)
Bidwell Marina Houseboats @ L-4	9/2/02	1530	25	0			
Bidwell Marina Houseboats @ L-4	9/8/02	1635	50	2	100	1	
Bidwell Marina Houseboats @ L-4	9/8/02	1635	25	4			
Bidwell Marina Houseboats @ L-4	9/15/02	1610	50	54	100	1	1
Bidwell Marina Houseboats @ L-4	9/15/02	1610	25	60			
Foreman Creek Boat Access	8/25/02	1215	50	6	100	0	
Foreman Creek Boat Access	8/25/02	1215	25	0			
Foreman Creek Boat Access	8/28/02	1400	50	44	100	0	
Foreman Creek Boat Access	8/28/02	1400	25	336			
Foreman Creek Boat Access	9/2/02	1430	50	2	100	0	
Foreman Creek Boat Access	9/2/02	1430	25	12			
Foreman Creek Boat Access	9/8/02	1600	50	8	100	4	
Foreman Creek Boat Access	9/8/02	1600	25	16			
Foreman Creek Boat Access	9/15/02	1530	50	10	100	0	1
Foreman Creek Boat Access	9/15/02	1530	25	8			
Mile Long Pond	8/25/02	1630	50	TNTC	100	71	
Mile Long Pond	8/25/02	1630	25	TNTC			
Mile Long Pond	8/28/02	1640	50	26	100	2	
Mile Long Pond	8/28/02	1640	25	200			
Mile Long Pond	9/2/02	1700	50	38	100	7	
Mile Long Pond	9/2/02	1700	25	56			
Mile Long Pond	9/8/02	1355	50	74	100	10	
Mile Long Pond	9/8/02	1355	25	156			
Mile Long Pond	9/15/02	1315	50	54	100	7	9
Mile Long Pond	9/15/02	1315	25	92			
Monument Hill Recreation Area	8/25/02	1700	50	68	100	6	
Monument Hill Recreation Area	8/25/02	1700	25	296			
Monument Hill Recreation Area	8/28/02	1710	50	136	100	42	
Monument Hill Recreation Area	8/28/02	1710	25	304			
Monument Hill Recreation Area	9/2/02	1730	50	0	100	TNTC	

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Appendix 5b. Continued.

	Sample Date	Sample Time	Sample Volume	Total Coliform #/100 mL	Sample Volume	Fecal Coliform #/100 mL	Geometric Mean Fecal Coliform (5 samples/30 days)
Monument Hill Recreation Area	9/2/02	1730	25	0			
Monument Hill Recreation Area	9/8/02	1335	50	26	100	5	
Monument Hill Recreation Area	9/8/02	1335	25	44			
Monument Hill Recreation Area	9/15/02	1250	50	0	100	0	6
Monument Hill Recreation Area	9/15/02	1250	25	4			
North Forebay Recreation Area @ Beach	8/25/02	1800	50	86	50	8	
North Forebay Recreation Area @ Beach	8/25/02	1800	25	124	25	16	
North Forebay Recreation Area @ Beach	8/28/02	1915	50	TNTC	50	208	
North Forebay Recreation Area @ Beach	8/28/02	1915	25	688	25	228	
North Forebay Recreation Area @ Beach	9/2/02	1840	50	8	50	158	
North Forebay Recreation Area @ Beach	9/2/02	1840	25	48	25	196	
North Forebay Recreation Area @ Beach	9/8/02	1240	50	0	50	288	
North Forebay Recreation Area @ Beach	9/8/02	1240	25	32	25	416	
North Forebay Recreation Area @ Beach	9/15/02	1220	50	4	50	6	
North Forebay Recreation Area @ Beach	9/15/02	1220	25	12	25	8	
North Forebay Recreation Area @ Beach	9/19/02	1615	100	12	100	18	64
North Forebay Recreation Area @ Beach	9/19/02	1615					
North Forebay Recreation Area @ Footbridge	8/25/02	1800	50	12	50	4	
North Forebay Recreation Area @ Footbridge	8/25/02	1800	25	4	25	0	
North Forebay Recreation Area @ Footbridge	8/28/02	1910	50	0	50	38	
North Forebay Recreation Area @ Footbridge	8/28/02	1910	25	4	25	44	
North Forebay Recreation Area @ Footbridge	9/2/02	1845	50	0	50	148	
North Forebay Recreation Area @ Footbridge	9/2/02	1845	25	0	25	140	
North Forebay Recreation Area @ Footbridge	9/8/02	1235	50	0	50	22	
North Forebay Recreation Area @ Footbridge	9/8/02	1235	25	4	25	44	
North Forebay Recreation Area @ Footbridge	9/15/02	1215	50	0	50	10	
North Forebay Recreation Area @ Footbridge	9/15/02	1215	25	0	25	4	
North Forebay Recreation Area @ Footbridge	9/19/02	1615	100	2	100	0	14
North Forebay Recreation Area @ Footbridge	9/19/02	1615					
North Forebay Recreation Area @ Mouth	8/25/02	1800	50	130	50	20	

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**Appendix 5b. Continued.**

	Sample Date	Sample Time	Sample Volume	Total Coliform #/100 mL	Sample Volume	Fecal Coliform #/100 mL	Geometric Mean Fecal Coliform (5 samples/30 days)
North Forebay Recreation Area @ Mouth	8/25/02	1800	25	156	25	16	9
North Forebay Recreation Area @ Mouth	8/28/02	1905	50	32	50	2	
North Forebay Recreation Area @ Mouth	8/28/02	1905	25	140	25	0	
North Forebay Recreation Area @ Mouth	9/2/02	1835	50	4	50	40	
North Forebay Recreation Area @ Mouth	9/2/02	1835	25	44	25	28	
North Forebay Recreation Area @ Mouth	9/8/02	1245	50	32	50	16	
North Forebay Recreation Area @ Mouth	9/8/02	1245	25	48	25	4	
North Forebay Recreation Area @ Mouth	9/15/02	1205	50	0	50	18	
North Forebay Recreation Area @ Mouth	9/15/02	1205	25	12	25	32	
North Forebay Recreation Area @ Mouth	9/19/02	1615	100	18	100	2	
North Forebay Recreation Area @ Mouth	9/19/02	1615					
Potter Ravine Floating Campsite	8/25/02	1400	50	0	100	0	2
Potter Ravine Floating Campsite	8/25/02	1400	25	0			
Potter Ravine Floating Campsite	8/28/02	1345	50	2	100	1	
Potter Ravine Floating Campsite	8/28/02	1345	25	0			
Potter Ravine Floating Campsite	9/2/02	1415	50	0	100	10	
Potter Ravine Floating Campsite	9/2/02	1415	25	16			
Potter Ravine Floating Campsite	9/8/02	1550	50	2	100	0	
Potter Ravine Floating Campsite	9/8/02	1550	25	0			
Potter Ravine Floating Campsite	9/15/02	1520	50	34	100	1	
Potter Ravine Floating Campsite	9/15/02	1520	25	36			
South Forebay Boat Launch	8/25/02	1715	50	78	100	1	31
South Forebay Boat Launch	8/25/02	1715	25	148			
South Forebay Boat Launch	8/28/02	1730	50	192	100	78	
South Forebay Boat Launch	8/28/02	1730	25	328			
South Forebay Boat Launch	9/2/02	1750	50	0	100	96	
South Forebay Boat Launch	9/2/02	1750	25	88			
South Forebay Boat Launch	9/8/02	1315	50	64	100	61	
South Forebay Boat Launch	9/8/02	1315	25	172			
South Forebay Boat Launch	9/15/02	1235	50	334	100	59	
South Forebay Boat Launch							

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**Appendix 5b. Continued.**

	Sample Date	Sample Time	Sample Volume	Total Coliform #/100 mL	Sample Volume	Fecal Coliform #/100 mL	Geometric Mean Fecal Coliform (5 samples/30 days)
South Forebay Boat Launch	9/15/02	1235	25	256			
South Forebay Recreation Area	8/25/02	1715	50	324	100	111	
South Forebay Recreation Area	8/25/02	1715	25	392			
South Forebay Recreation Area	8/28/02	1735	50	TNTC	100	103	
South Forebay Recreation Area	8/28/02	1735	25	468			
South Forebay Recreation Area	9/2/02	1755	50	2	100	213	
South Forebay Recreation Area	9/2/02	1755	25	4			
South Forebay Recreation Area	9/8/02	1320	50	28	100	1	
South Forebay Recreation Area	9/8/02	1320	25	64			
South Forebay Recreation Area	9/15/02	1240	50	40	100	13	32
South Forebay Recreation Area	9/15/02	1240	25	0			
Stringtown Cove	8/25/02	1430	50	0	100	0	
Stringtown Cove	8/25/02	1430	25	4			
Stringtown Cove	8/28/02	1410	50	132	100	0	
Stringtown Cove	8/28/02	1410	25	164			
Stringtown Cove	9/2/02	1445	50	4	100	0	
Stringtown Cove	9/2/02	1445	25	8			
Stringtown Cove	9/8/02	1615	50	0	100	0	
Stringtown Cove	9/8/02	1615	25	0			
Stringtown Cove	9/15/02	1545	50	0	100	0	0
Stringtown Cove	9/15/02	1545	25	0			
Stringtown Main Body	8/25/02	1435	50	6	100	1	
Stringtown Main Body	8/25/02	1435	25	8			
Stringtown Main Body	8/28/02	1415	50	26	100	0	
Stringtown Main Body	8/28/02	1415	25	44			
Stringtown Main Body	9/2/02	1450	50	0	100	0	
Stringtown Main Body	9/2/02	1450	25	32			
Stringtown Main Body	9/8/02	1620	50	2	100	1	
Stringtown Main Body	9/8/02	1620	25	4			

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**Appendix 5b. Continued.**

	Sample Date	Sample Time	Sample Volume	Total Coliform #/100 mL	Sample Volume	Fecal Coliform #/100 mL	Geometric Mean Fecal Coliform (5 samples/30 days)
Stringtown Main Body	9/15/02	1550	50	0	100	0	1
Stringtown Main Body	9/15/02	1550	25	4			

1. California Department of Health Services. Draft Guidance for Fresh Water Beaches. July 24, 2001.
2. Central Valley Regional Water Quality Control Board. Water Quality Control Plan (Basin Plan), Fourth Edition, 1998.

**Appendix 5c. Recreation area bacteria monitoring results for 2003.**

Bacteria Criteria			Total Coliform #/100 mL	Fecal Coliform #/100 mL	Geometric Mean Fecal Coliform (5 samples/30 days)	Enterococcus #/100 mL	Geometric Mean Enterococcus (5 samples/30 days)	Fecal Streptococcus #/100 mL
DHS <sup>1</sup>	Single sample maximum		10,000	400		61		
CVRWQCB <sup>2</sup>	Geometric Mean of 5 samples/30 days				200			
	No more than 10% of samples in 30 days			400				
USEPA <sup>3</sup>	Single sample maximum					61		
	Geometric Mean of 5 samples/30 days						33	
Station Name	Sample Date	Sample Time	Total Coliform #/100 mL	Fecal Coliform #/100 mL	Geometric Mean Fecal Coliform (5 samples/30 days)	Enterococcus #/100 mL	Geometric Mean Enterococcus (5 samples/30 days)	Fecal Streptococcus #/100 mL
Bedrock Park US	6/10/03	0905	300	300		170		170
Bedrock Park US	6/23/03	0845	70	50		30		50
Bedrock Park US	6/26/03	0945	90	11		2		8
Bedrock Park US	6/30/03	1020	130	8		14		22
Bedrock Park US	7/3/03	1030	90	4	22	4	14	11
Bedrock Park US	7/7/03	1005	240	9	11	4	7	14
Bedrock Park US	7/10/03	1035	70	6	7	2	4	7
Bedrock Park US	7/14/03	1045	23	23	8	4	4	8
Bedrock Park US	7/17/03	1045	80	23	10	30	5	50
Bedrock Park US	8/6/03	0850	>1600	170	22	50	9	280

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**Appendix 5c. Continued.**

Station Name	Sample Date	Sample Time	Total Coliform #/100 mL	Fecal Coliform #/100 mL	Geometric Mean Fecal Coliform (5 samples/30 days)	Enterococcus #/100 mL	Geometric Mean Enterococcus (5 samples/30 days)	Fecal Streptococcus #/100 mL
Bedrock Park DS	6/10/03	0905	300	170		300		500
Bedrock Park DS	6/23/03	0855	350	14		17		27
Bedrock Park DS	6/26/03	0955	500	23		30		170
Bedrock Park DS	6/30/03	1025	110	13		4		30
Bedrock Park DS	7/3/03	1140	220	30	29	11	23	22
Bedrock Park DS	7/7/03	1010	189	8	16	12	12	16
Bedrock Park DS	7/10/03	1045	80	17	16	4	9	26
Bedrock Park DS	7/14/03	1100	240	17	16	11	7	140
Bedrock Park DS	7/17/03	1055	240	80	22	23	11	80
Bedrock Park DS	8/6/03	0855	900	300	35	4	9	11
Foreman Creek Boat Access	6/10/03	0810	>1600	>1600		500		900
Foreman Creek Boat Access	6/23/03	0700	220	80		-		-
Foreman Creek Boat Access	6/26/03	0845	22	2		2		7
Foreman Creek Boat Access	6/30/03	0845	50	8		7		7
Foreman Creek Boat Access	7/3/03	0850	170	4	24	280		280
Foreman Creek Boat Access	7/7/03	0755	50	8	8	6	26	6
Foreman Creek Boat Access	7/10/03	0830	220	140	9	<2	7	2
Foreman Creek Boat Access	7/14/03	0900	>1600	13	14	20	12	23
Foreman Creek Boat Access	7/17/03	0850	17	7	13	2	9	4
Foreman Creek Boat Access	8/6/03	0815	21	<2	10	-		<2
Loafer Creek Swim Area	6/10/03	0830	>1600	1600		>1600		>1600
Loafer Creek Swim Area	6/23/03	0830	>1600	500		59		123
Loafer Creek Swim Area	6/26/03	0805	240	50		300		500
Loafer Creek Swim Area	6/30/03	0900	300	130		23		23
Loafer Creek Swim Area	7/3/03	0910	300	50	192	<2	58	33
Loafer Creek Swim Area	7/7/03	0815	220	11	71	27	26	110
Loafer Creek Swim Area	7/10/03	0855	30	8	31	2	13	2
Loafer Creek Swim Area	7/14/03	0920	70	8	21	17	7	33
Loafer Creek Swim Area	7/17/03	0905	130	30	16	7	6	80
Loafer Creek Swim Area	8/6/03	0745	14	2	8	6	8	6

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Appendix 5c. Continued.

Station Name	Sample Date	Sample Time	Total Coliform #/100 mL	Fecal Coliform #/100 mL	Geometric Mean Fecal Coliform (5 samples/30 days)	Enterococcus #/100 mL	Geometric Mean Enterococcus (5 samples/30 days)	Fecal Streptococcus #/100 mL
Monument Hill Swim Area	6/10/03	1005	80	30		50		50
Monument Hill Swim Area	6/23/03	0930	60	4		110		170
Monument Hill Swim Area	6/26/03	0910	130	50		280		900
Monument Hill Swim Area	6/30/03	0950	80	8		27		27
Monument Hill Swim Area	7/3/03	1005	500	30	17	23	63	30
Monument Hill Swim Area	7/7/03	920	900	23	16	30	56	130
Monument Hill Swim Area	7/10/03	1000	900	500	42	130	58	130
Monument Hill Swim Area	7/14/03	1020	220	7	29	4	25	7
Monument Hill Swim Area	7/17/03	1010	900	170	53	30	25	70
Monument Hill Swim Area	8/6/03	1000	>1600	110	68	17	24	22
North Forebay Swim Area (Beach)	6/10/03	0935	220	23		22		50
North Forebay Swim Area (Beach)	6/23/03	0920	>1600	>1600		1600		1600
North Forebay Swim Area (Beach)	6/26/03	1010	1600	1600		>1600		>1600
North Forebay Swim Area (Beach)	6/30/03	1040	900	500		140		140
North Forebay Swim Area (Beach)	7/3/03	1105	>1600	>1600	543	1600	417	1600
North Forebay Swim Area (Beach)	7/7/03	1040	170	130	767	50	491	70
North Forebay Swim Area (Beach)	7/10/03	1115	300	50	384	1600	491	1600
North Forebay Swim Area (Beach)	7/14/03	1125	>1600	500	384	220	330	500
North Forebay Swim Area (Beach)	7/17/03	1125	1600	900	342	80	295	130
North Forebay Swim Area (Beach)	8/6/03	0915	50000	5000	430	>1600	295	>1600
North Forebay Swim Area (Cove)	6/10/03	0930	500	500		500		500
North Forebay Swim Area (Cove)	6/23/03	0915	1300	140		300		300
North Forebay Swim Area (Cove)	6/26/03	1005	1600	300		80		80
North Forebay Swim Area (Cove)	6/30/03	1035	1600	240		70		140
North Forebay Swim Area (Cove)	7/3/03	1100	500	130	231	1600	266	>1600
North Forebay Swim Area (Cove)	7/7/03	1035	1600	300	208	80	185	110
North Forebay Swim Area (Cove)	7/10/03	1110	80	22	144	2	68	4
North Forebay Swim Area (Cove)	7/14/03	1120	>1600	900	179	70	66	70
North Forebay Swim Area (Cove)	7/17/03	1115	>1600	300	187	220	83	280
North Forebay Swim Area (Cove)	8/6/03	0905	>160000	22000	523	>1600	83	>1600

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Appendix 5c. Continued.

Station Name	Sample Date	Sample Time	Total Coliform #/100 mL	Fecal Coliform #/100 mL	Geometric Mean Fecal Coliform (5 samples/30 days)	Enterococcus #/100 mL	Geometric Mean Enterococcus (5 samples/30 days)	Fecal Streptococcus #/100 mL
North Forebay Swim Area (Mouth)	6/10/03	0925	300	70		900		900
North Forebay Swim Area (Mouth)	6/23/03	0900	500	50		13		13
North Forebay Swim Area (Mouth)	6/26/03	1015	140	30		23		23
North Forebay Swim Area (Mouth)	6/30/03	1050	600	30		14		14
North Forebay Swim Area (Mouth)	7/3/03	1050	280	220	59	110	53	110
North Forebay Swim Area (Mouth)	7/7/03	1025	>1600	80	60	29	27	29
North Forebay Swim Area (Mouth)	7/10/03	1055	220	14	47	21	29	21
North Forebay Swim Area (Mouth)	7/14/03	1110	900	50	52	11	25	11
North Forebay Swim Area (Mouth)	7/17/03	1105	>1600	500	91	110	38	220
North Forebay Swim Area (Mouth)	8/6/03	0920	>1600	>1600	135	1600	65	>1600
South Forebay Boat Ramp	6/10/03	0945	22	22		23		23
South Forebay Boat Ramp	6/23/03	0950	130	8		900		900
South Forebay Boat Ramp	6/26/03	0920	17	4		4		4
South Forebay Boat Ramp	6/30/03	1000	300	130		220		220
South Forebay Boat Ramp	7/3/03	1015	170	50	21	7	42	7
South Forebay Boat Ramp	7/7/03	940	900	130	31	80	54	80
South Forebay Boat Ramp	7/10/03	1015	280	11	33	50	30	50
South Forebay Boat Ramp	7/14/03	1030	900	500	86	300	71	300
South Forebay Boat Ramp	7/17/03	1020	>1600	>1600	142	500	84	500
South Forebay Boat Ramp	8/6/03	0945	>1600	>1600	283	300	178	300
South Forebay Swim Area	6/10/03	0950	30	17		2		30
South Forebay Swim Area	6/23/03	0945	17	13		7		7
South Forebay Swim Area	6/26/03	0925	110	26		30		30
South Forebay Swim Area	6/30/03	1005	500	30		11		11
South Forebay Swim Area	7/3/03	1020	300	30	22	>1600	24	>1600
South Forebay Swim Area	7/7/03	945	140	7	18	2	24	6
South Forebay Swim Area	7/10/03	1020	40	8	17	17	28	17
South Forebay Swim Area	7/14/03	1035	>1600	1600	38	1600	63	1600
South Forebay Swim Area	7/17/03	1030	300	50	42	30	76	50
South Forebay Swim Area	8/6/03	0950	>1600	>1600	94	>1600	76	>1600

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**Appendix 5c. Continued.**

Station Name	Sample Date	Sample Time	Total Coliform #/100 mL	Fecal Coliform #/100 mL	Geometric Mean Fecal Coliform (5 samples/30 days)	Enterococcus #/100 mL	Geometric Mean Enterococcus (5 samples/30 days)	Fecal Streptococcus #/100 mL
Stringtown Boat Ramp	6/10/03	0735	300	130		900		1600
Stringtown Boat Ramp	6/23/03	0800	70	4		900		900
Stringtown Boat Ramp	6/26/03	0830	50	2		29		44
Stringtown Boat Ramp	6/30/03	0915	2	2		2		2
Stringtown Boat Ramp	7/3/03	0930	1600	1600	20	>1600	150	>1600
Stringtown Boat Ramp	7/7/03	0835	30	<2	8	2	44	4
Stringtown Boat Ramp	7/10/03	0915	11	<2	6	<2	11	2
Stringtown Boat Ramp	7/14/03	0945	37	4	7	4	8	6
Stringtown Boat Ramp	7/17/03	0930	22	<2	6	2	8	29
Stringtown Boat Ramp	8/6/03	0720	17	<2	1	<2	2	2

1. California Department of Health Services. Draft Guidance for Fresh Water Beaches. July 24, 2001.
2. Central Valley Regional Water Quality Control Board. Water Quality Control Plan (Basin Plan), Fourth Edition, 1998.
3. USEPA. Ambient Water Quality Criteria for Bacteria - 1986. EPA 440/5-84-002.

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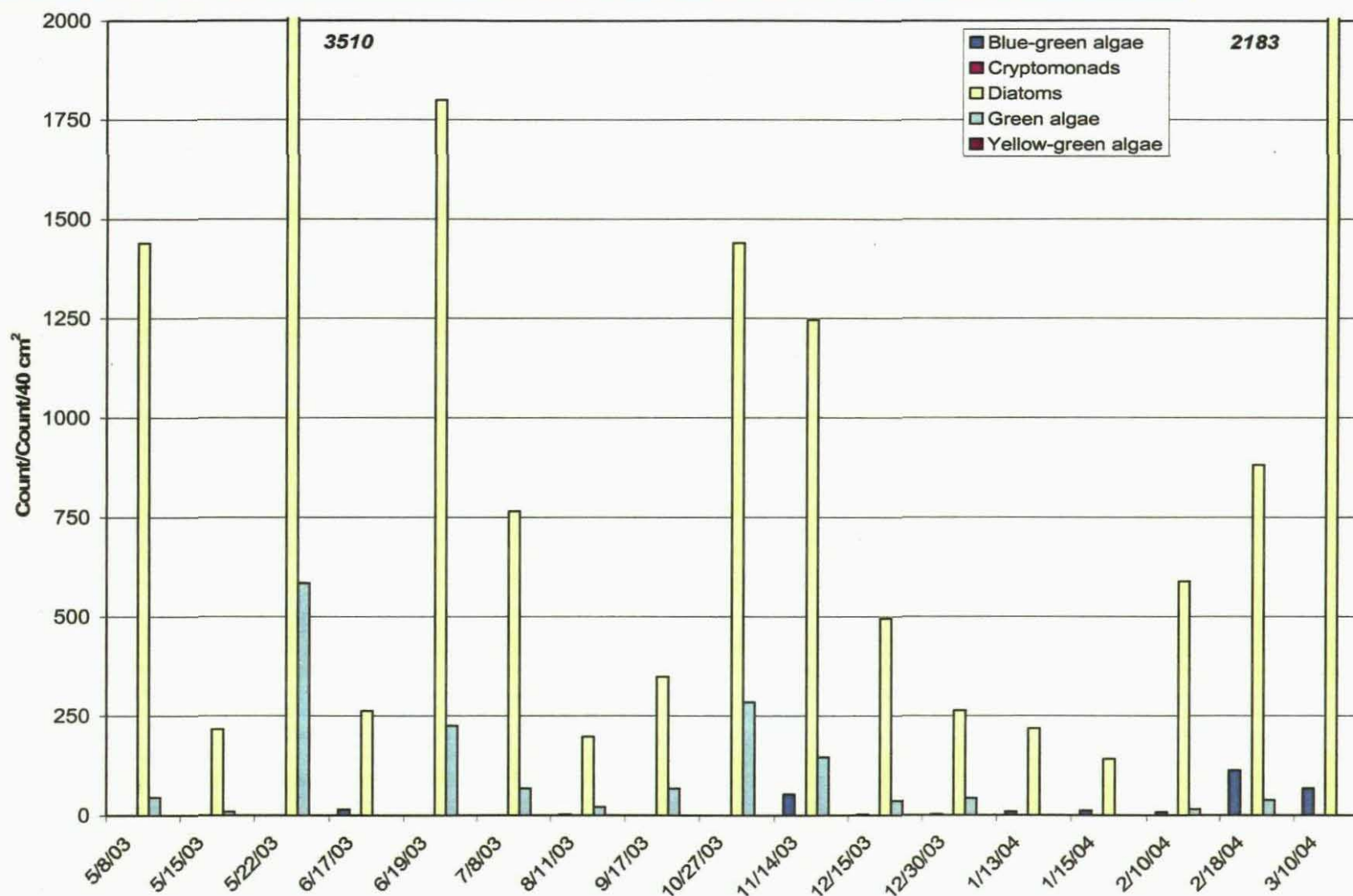
# Appendix 6. List of algae species found in periphyton samples

Family	Genus	Species
Bacillariophyceae (Diatoms)	<i>Achnanthes</i>	sp.
	<i>Amphora</i>	<i>ovalis</i>
	<i>Aulacoseira</i>	<i>granulata</i>
	<i>Caloneis</i>	sp.
	<i>Cocconeis</i>	sp.
	<i>Coscinodiscus</i>	sp.
	<i>Cyclotella</i>	sp.
	<i>Cymbella</i>	sp.
	<i>Diatoma</i>	sp.
	<i>Epithemia</i>	sp.
	<i>Eunotia</i>	sp.
	<i>Fragilaria</i>	<i>crotonensis</i>
	<i>Fragilaria</i>	sp.
	<i>Gomphonema</i>	sp.
	<i>Gyrosigma</i>	sp.
	<i>Melosira</i>	sp.
	<i>Navicula</i>	sp.
	<i>Nitzschia</i>	sp.
	<i>Pennate</i>	<i>diatom</i>
	<i>Rhoicosphenia</i>	<i>curvata</i>
	<i>Stauroneis</i>	sp.
	<i>Synedra</i>	<i>actinastroides</i>
	<i>Synedra</i>	<i>capitata</i>
	<i>Synedra</i>	sp.
Chlorophyceae (Green algae)	<i>Ankistrodesmus</i>	<i>falcatus</i>
	<i>Bulbochaete</i>	sp.
	<i>Calothrix</i>	sp.
	<i>Chaetophora</i>	sp.
	<i>Cladophora</i>	sp.
	<i>Closterium</i>	sp.
	<i>Coleochaete</i>	sp.
	<i>Cosmarium</i>	sp.
	<i>Desmidium</i>	sp.
	<i>Dictyosphaerium</i>	<i>pulchellum</i>
	<i>Elakatothrix</i>	sp.
	<i>Eremosphaera</i>	<i>viridis</i>
	<i>Mougeotia</i>	sp.
	<i>Oedogonium</i>	sp.
	<i>Pediastrum</i>	<i>duplex</i>

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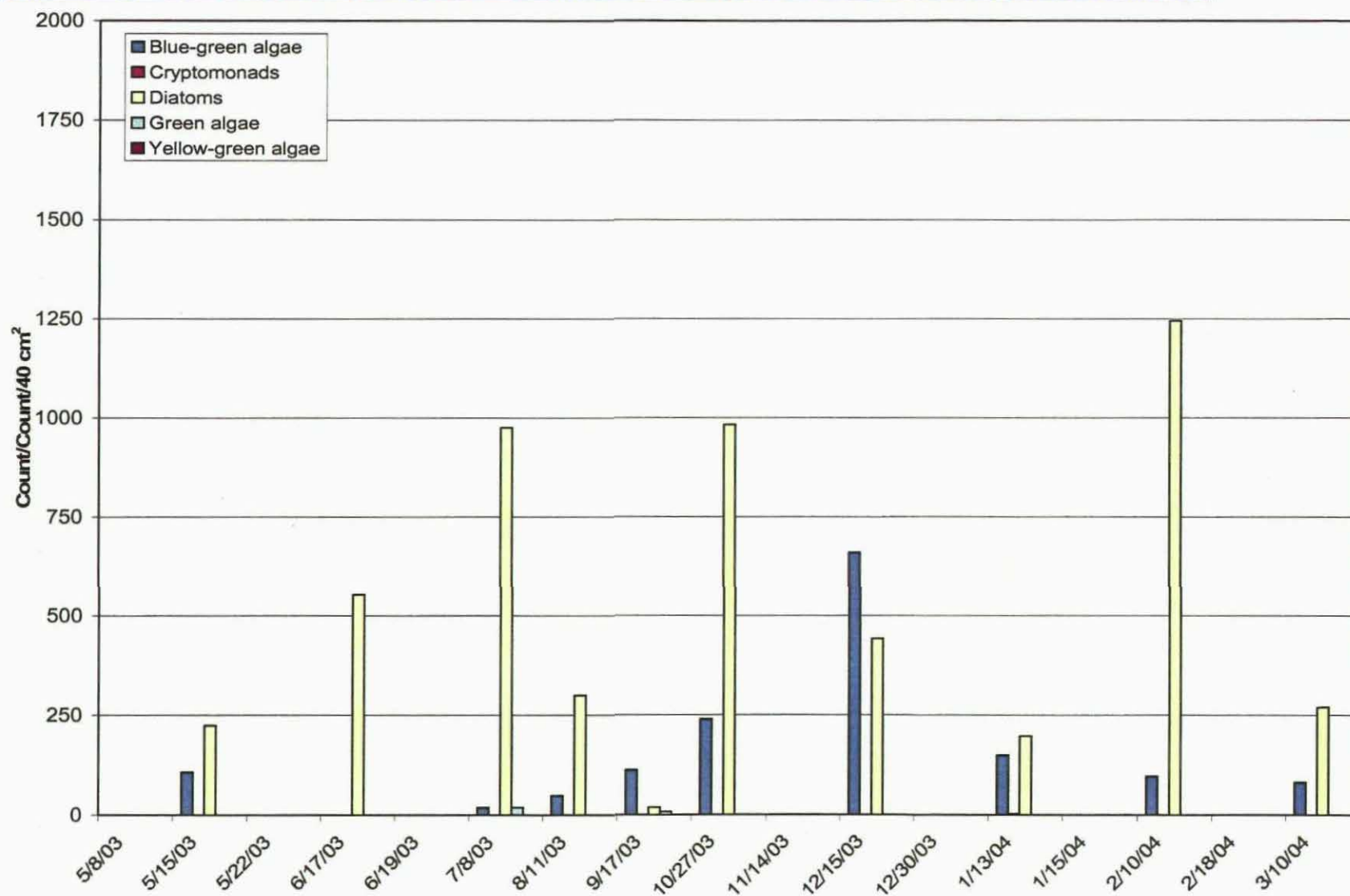


**Appendix 7.1. Periphyton densities by sampling date - Feather River upstream from the hatchery.**



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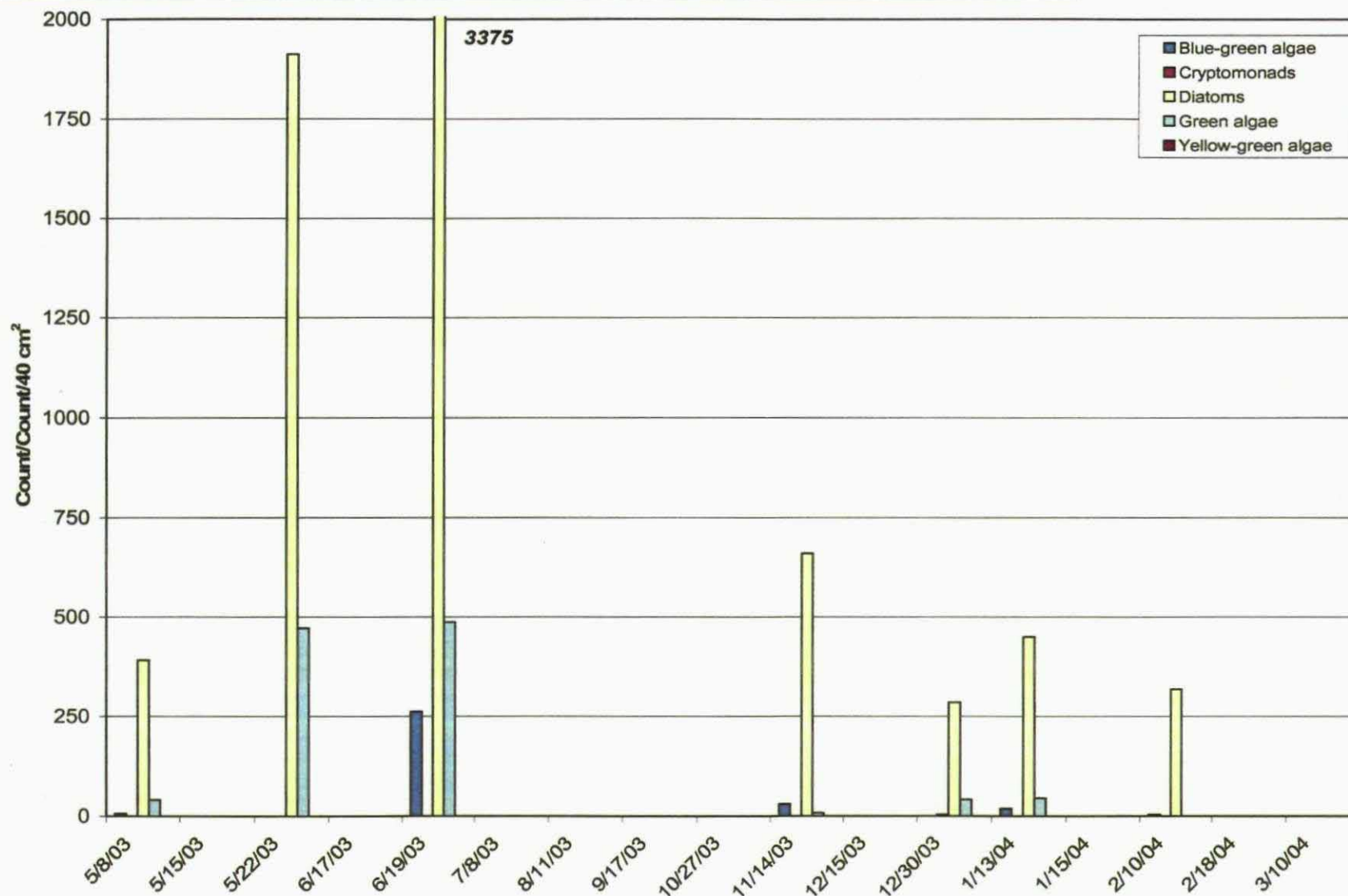
## Appendix 7.2. Periphyton densities by sampling date - Feather River downstream from the hatchery.



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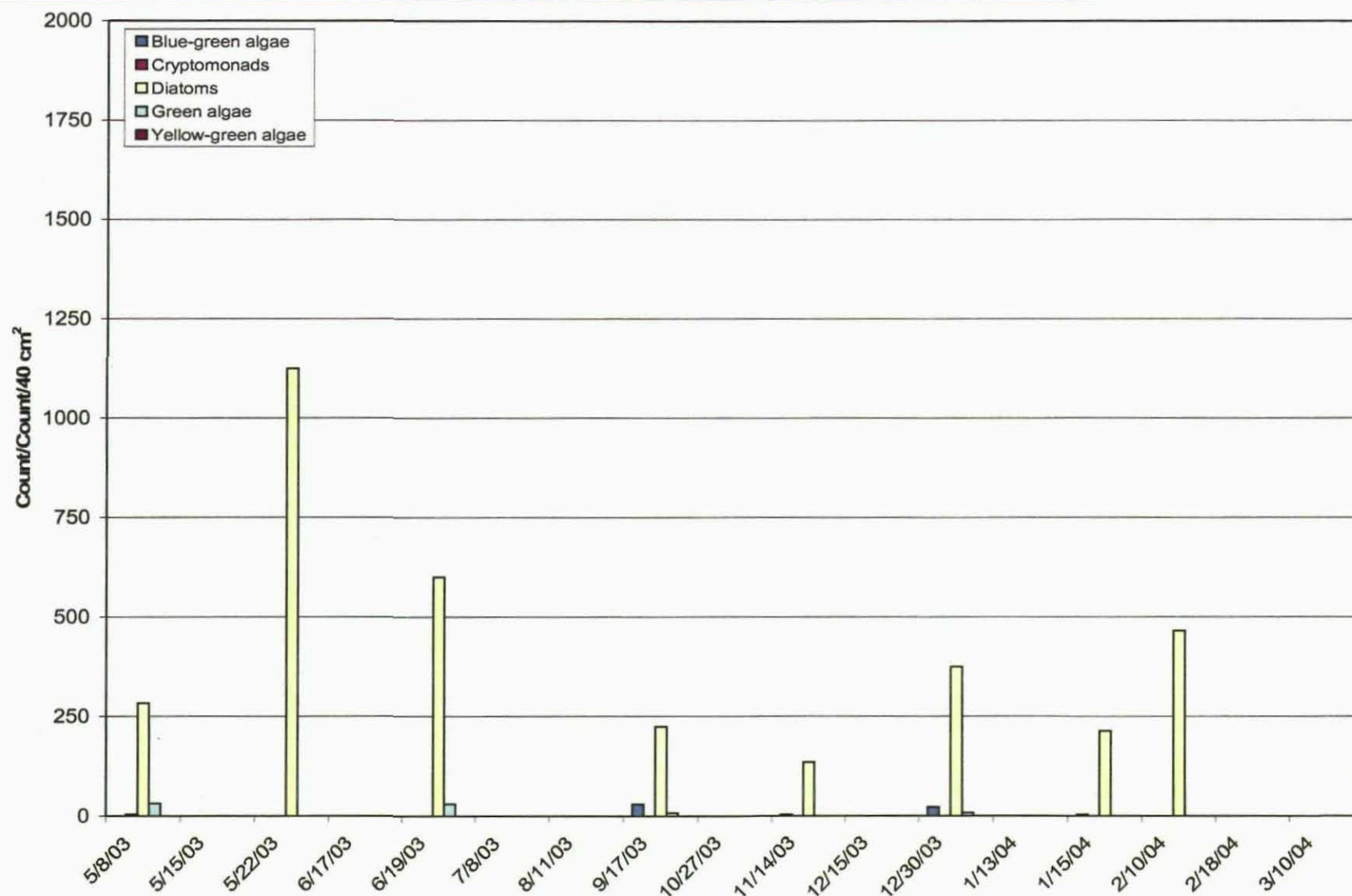


### Appendix 7.3. Periphyton densities by sampling date - Feather River at Auditorium Riffle.



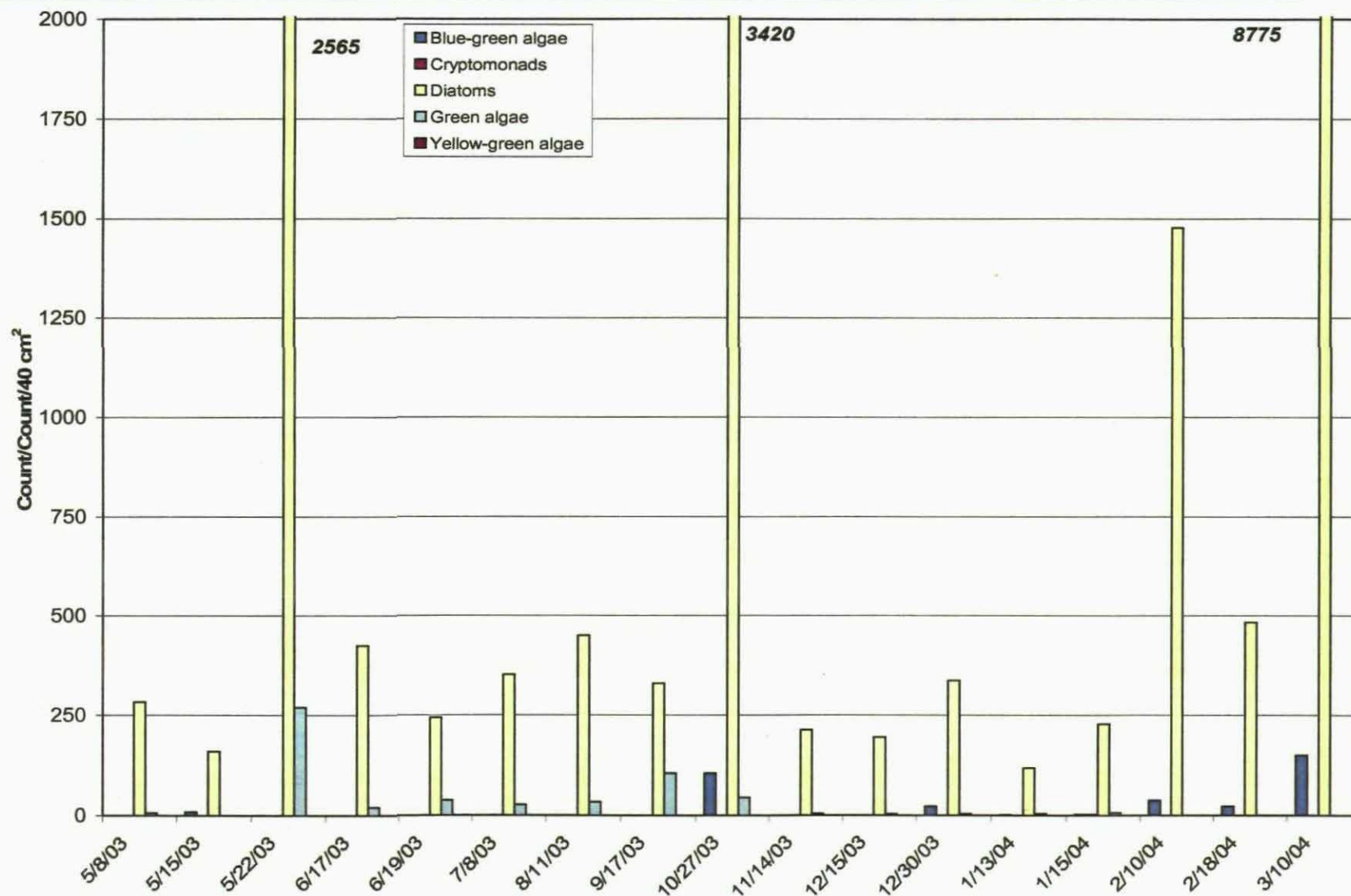
Preliminary Information – Subject to Revision – For Collaborative Process Purposes Only

**Appendix 7.4. Periphyton densities by sampling date - Feather River at spawning channel.**



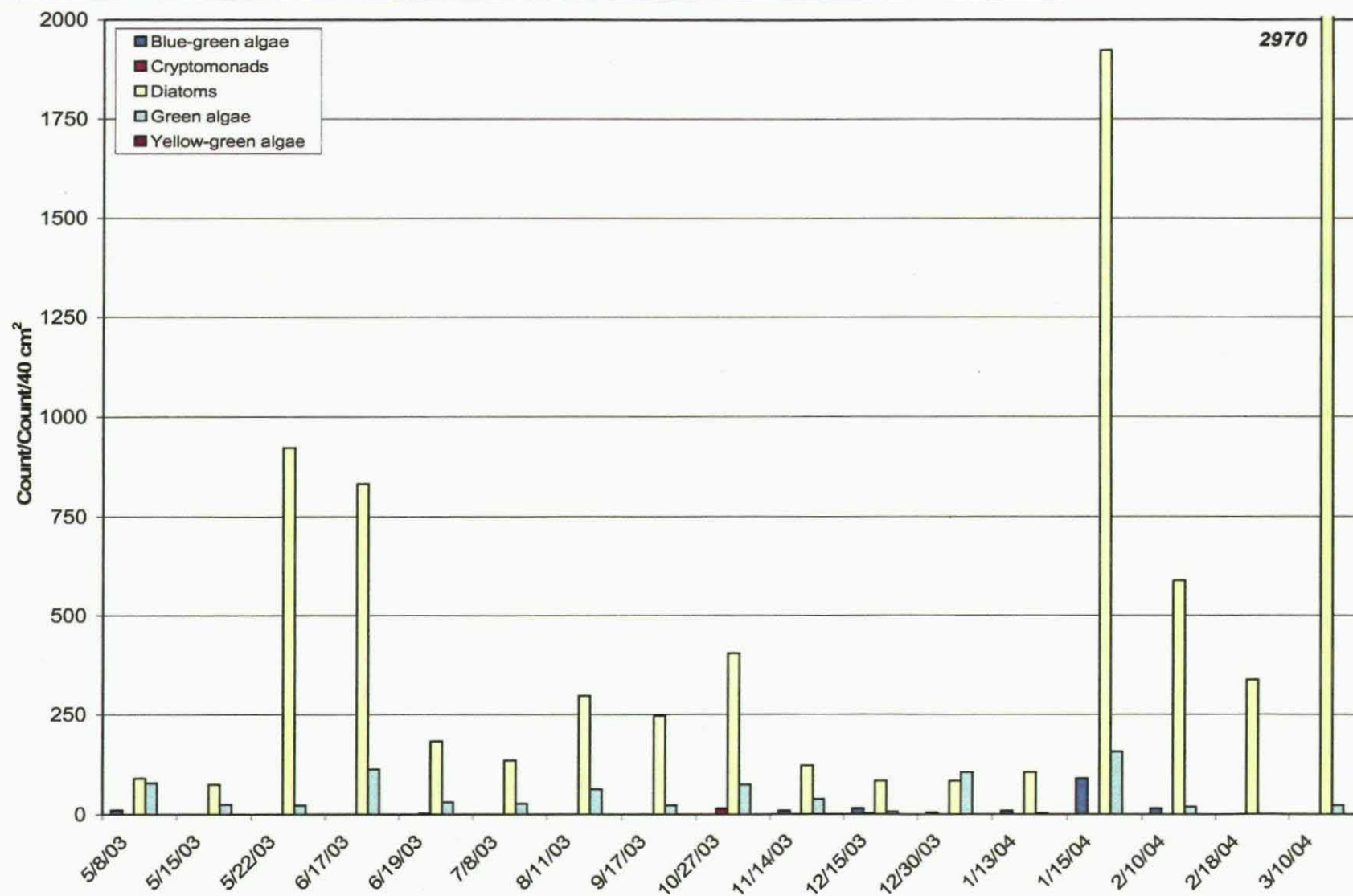
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**Appendix 7.5. Periphyton densities by sampling date - Feather River downstream from Highway 162 bridge.**



Preliminary Information – Subject to Revision – For Collaborative Process Purposes Only

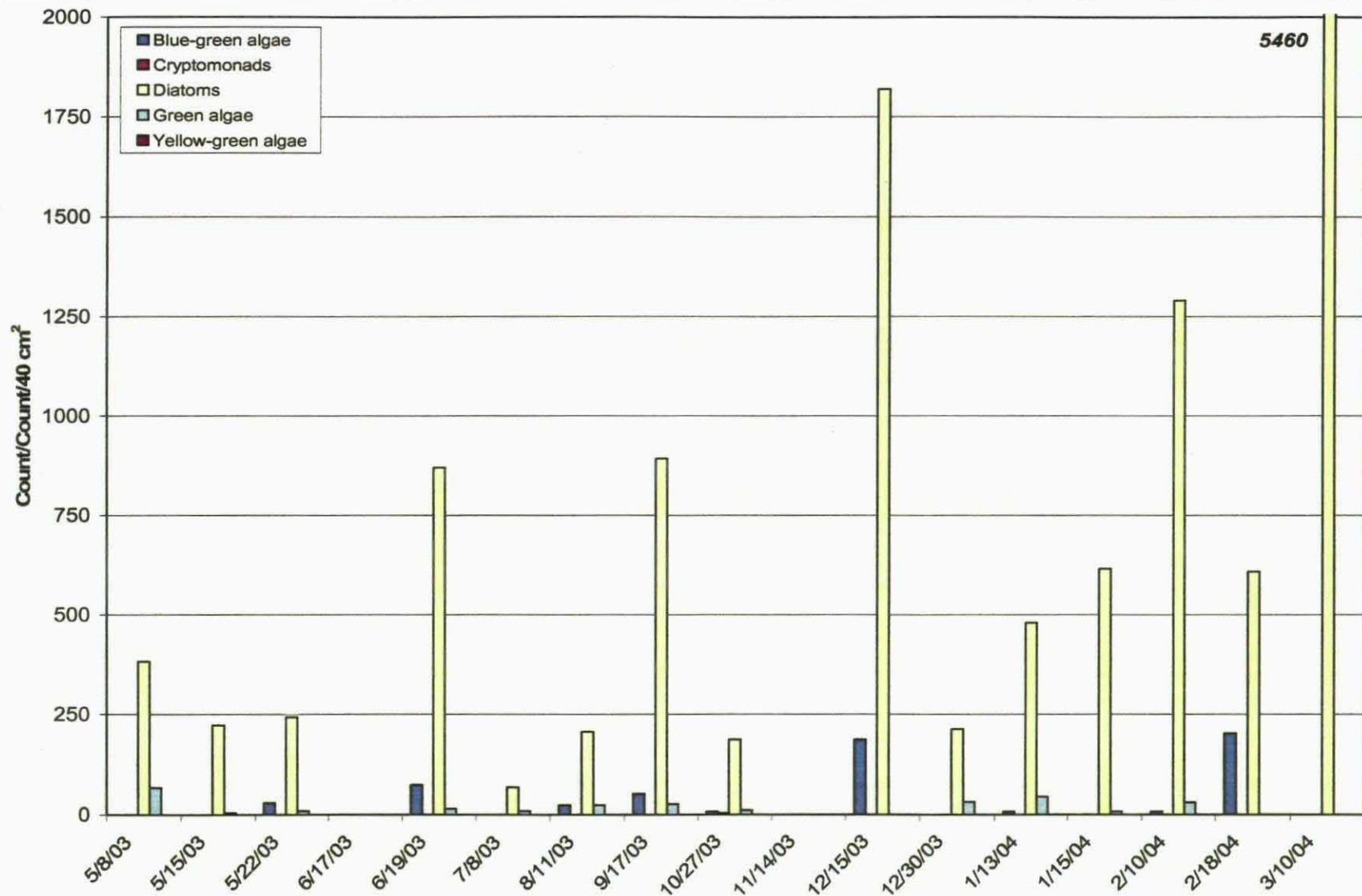
**Appendix 7.6. Periphyton densities by sampling date - Feather River at Robinson Riffle.**



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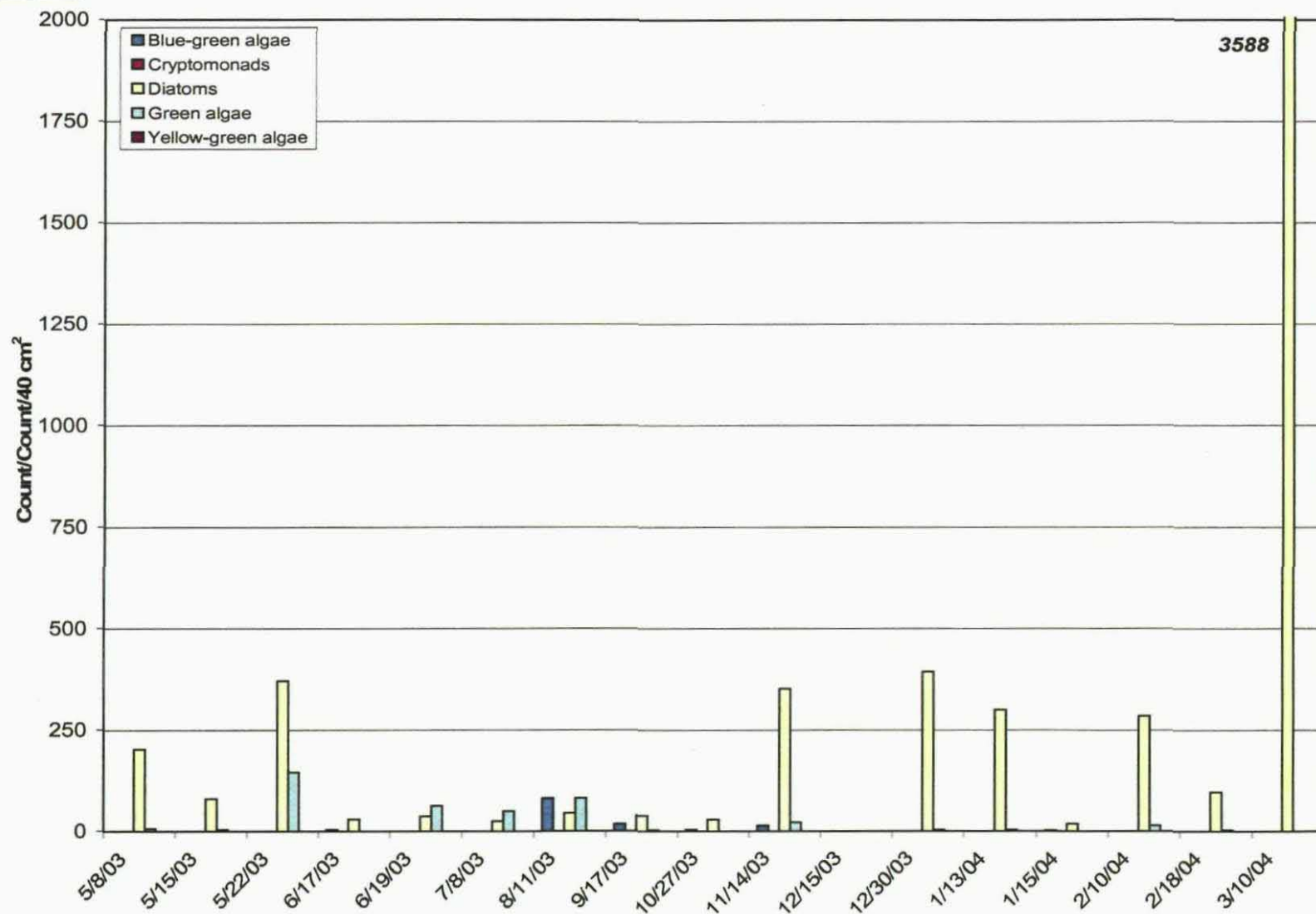


**Appendix 7.7. Periphyton densities by sampling date - Feather River upstream from Thermalito Afterbay Outlet.**



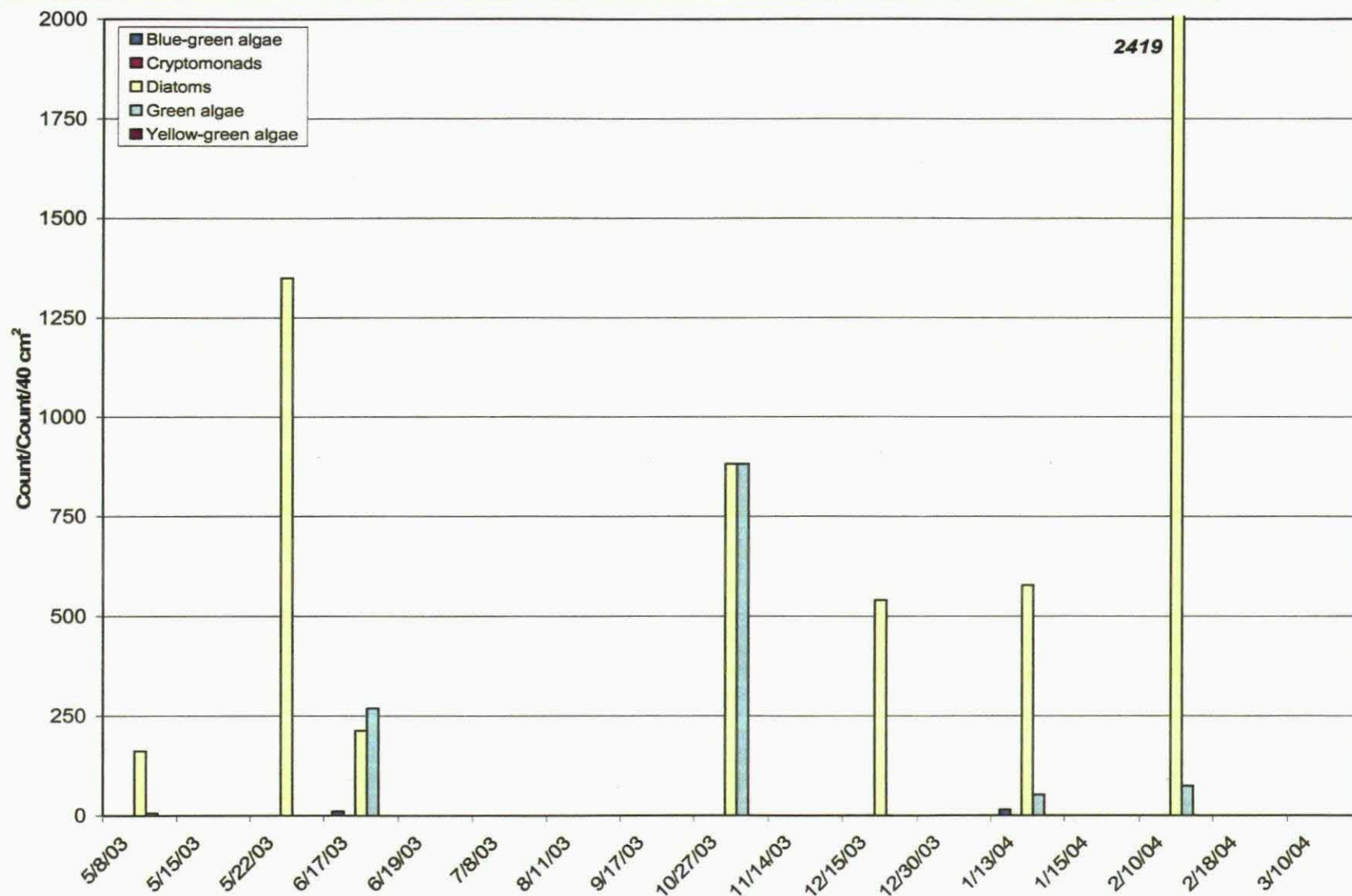
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**Appendix 7.8. Periphyton densities by sampling date - Feather River downstream from Thermalito Afterbay Outlet.**



Preliminary Information – Subject to Revision – For Collaborative Process Purposes Only

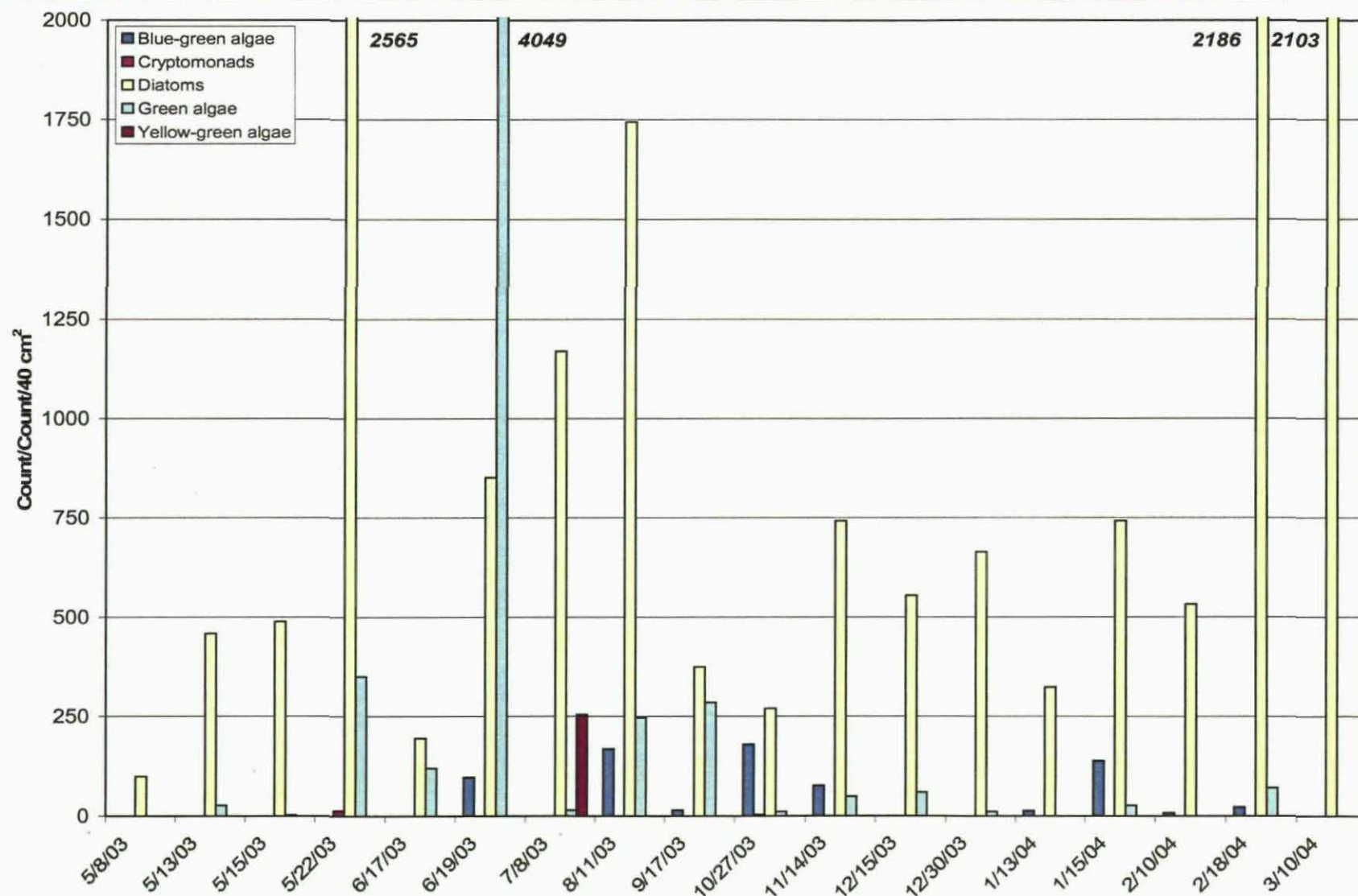
**Appendix 7.9. Periphyton densities by sampling date - Feather River upstream from the SCOR outfall.**



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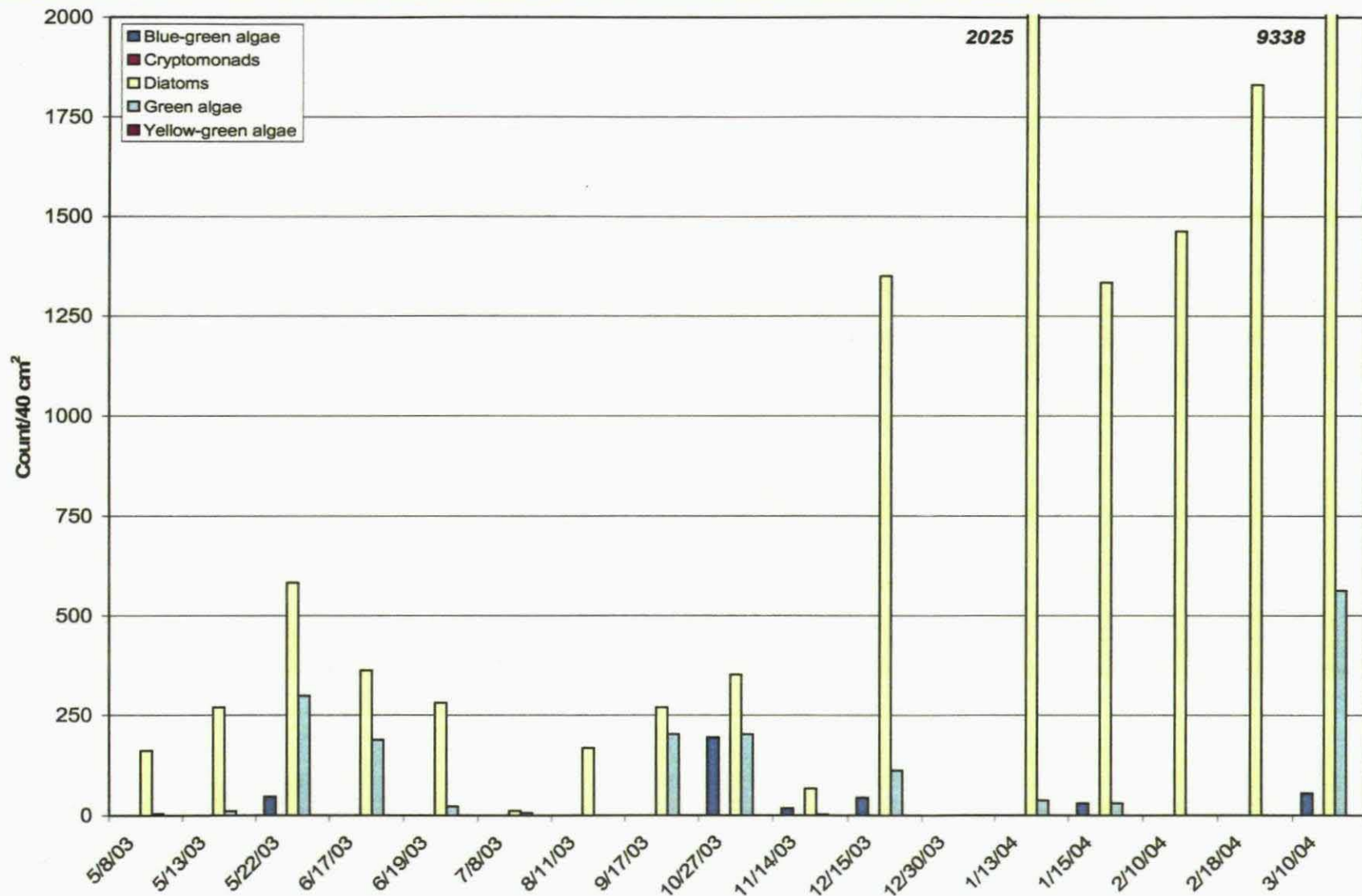


**Appendix 7.10. Periphyton densities by sampling date - Feather River downstream from the SCOR outfall.**



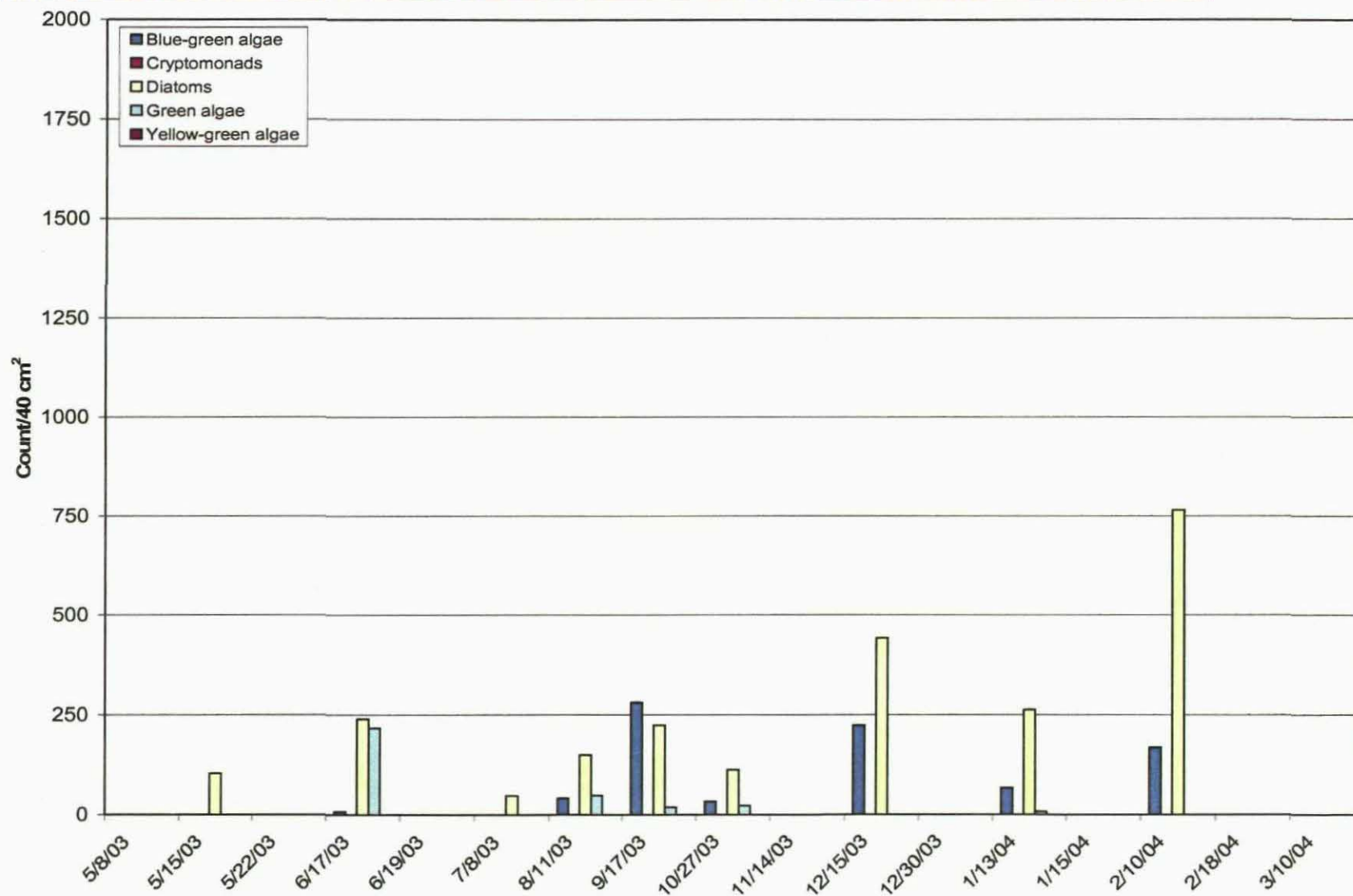
Preliminary Information – Subject to Revision – For Collaborative Process Purposes Only

# **Appendix 7.11. Periphyton densities by sampling date - Feather River near Mile Long Pond.**



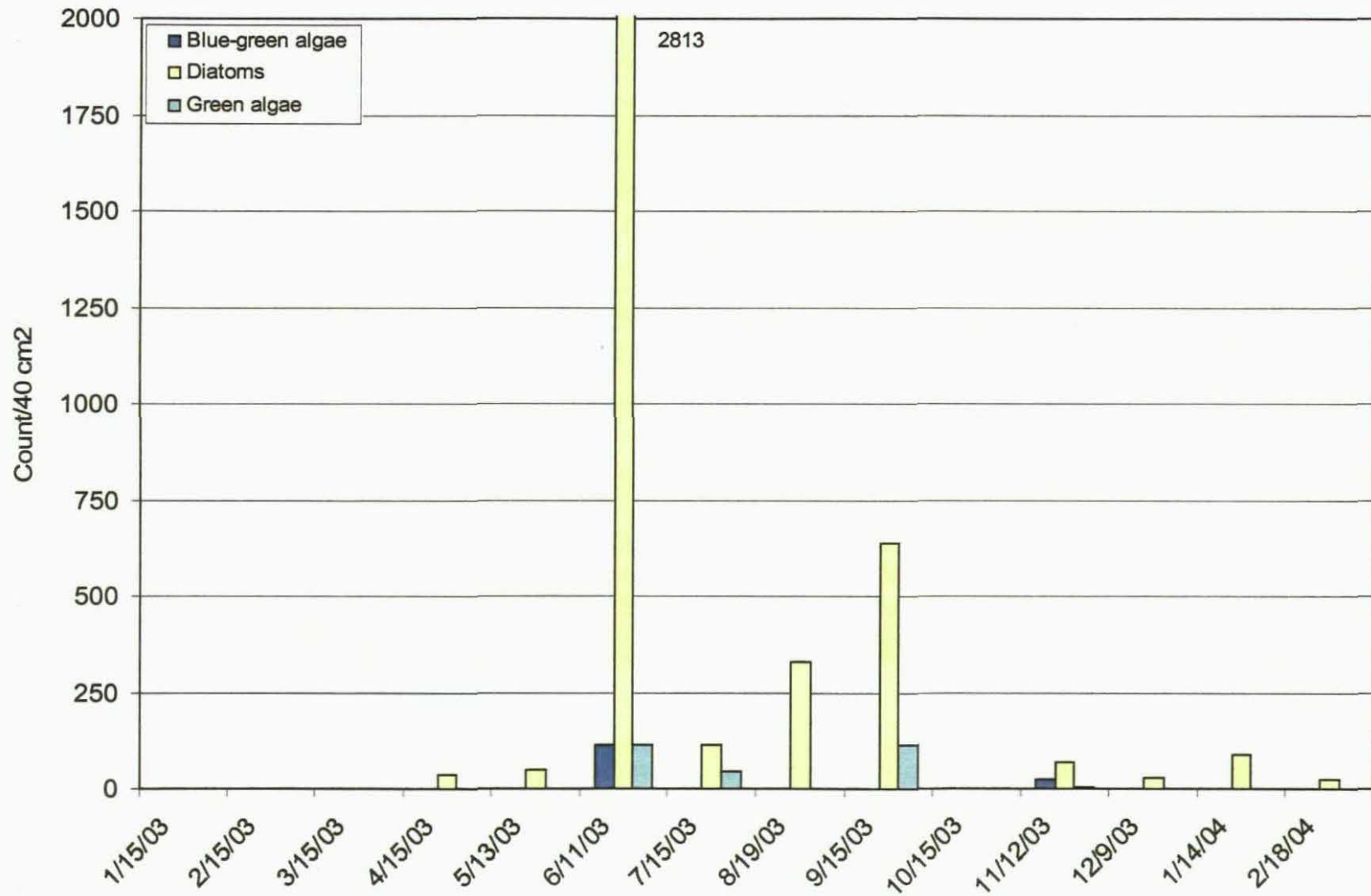
Preliminary Information – Subject to Revision – For Collaborative Process Purposes Only

**Appendix 7.12. Periphyton densities by sampling date - Feather River upstream from Honcut Creek.**



Preliminary Information – Subject to Revision – For Collaborative Process Purposes Only

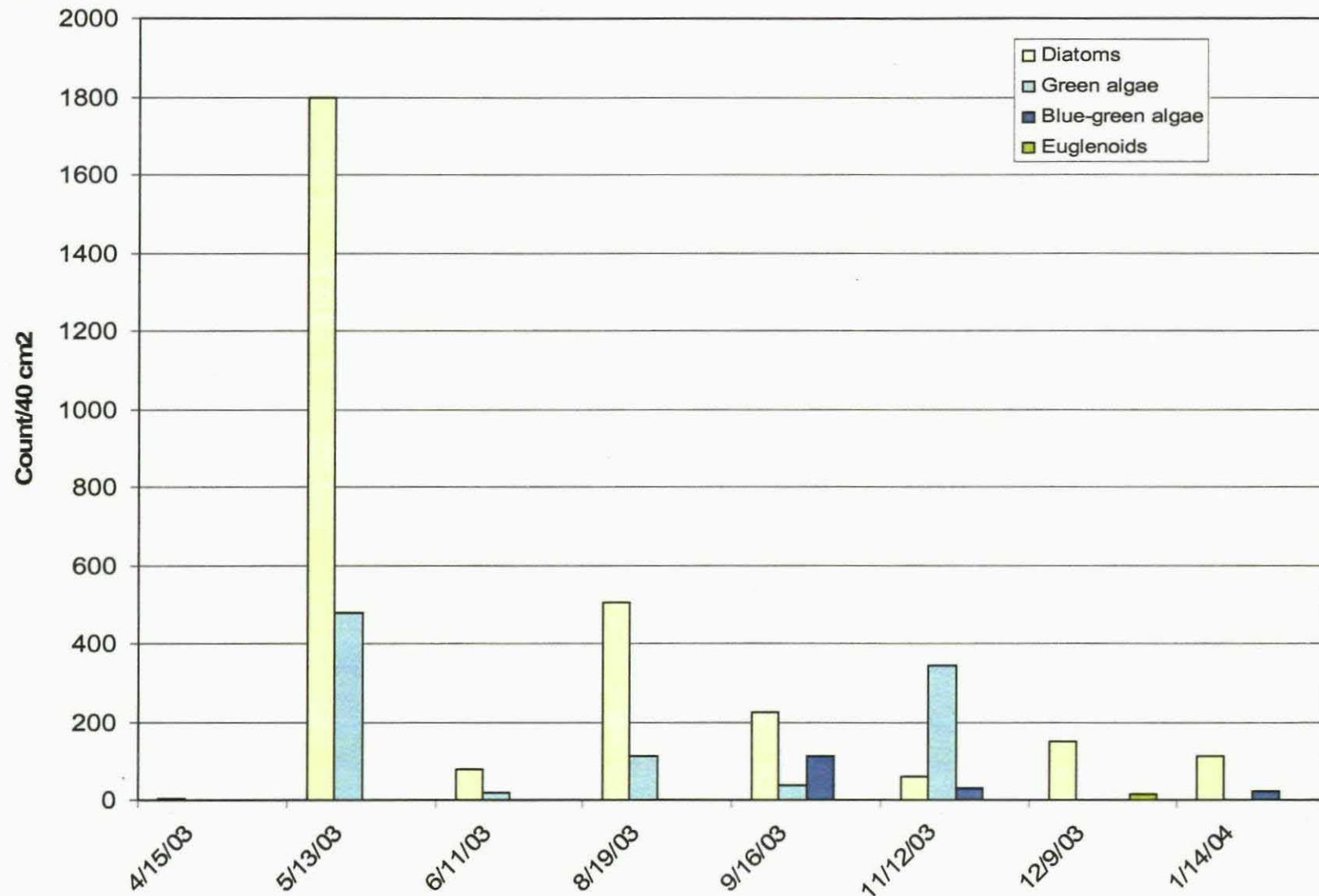
**Appendix 7.13. Periphyton densities by sampling date – Feather River Middle Fork near Merrimac (upper Feather River)**



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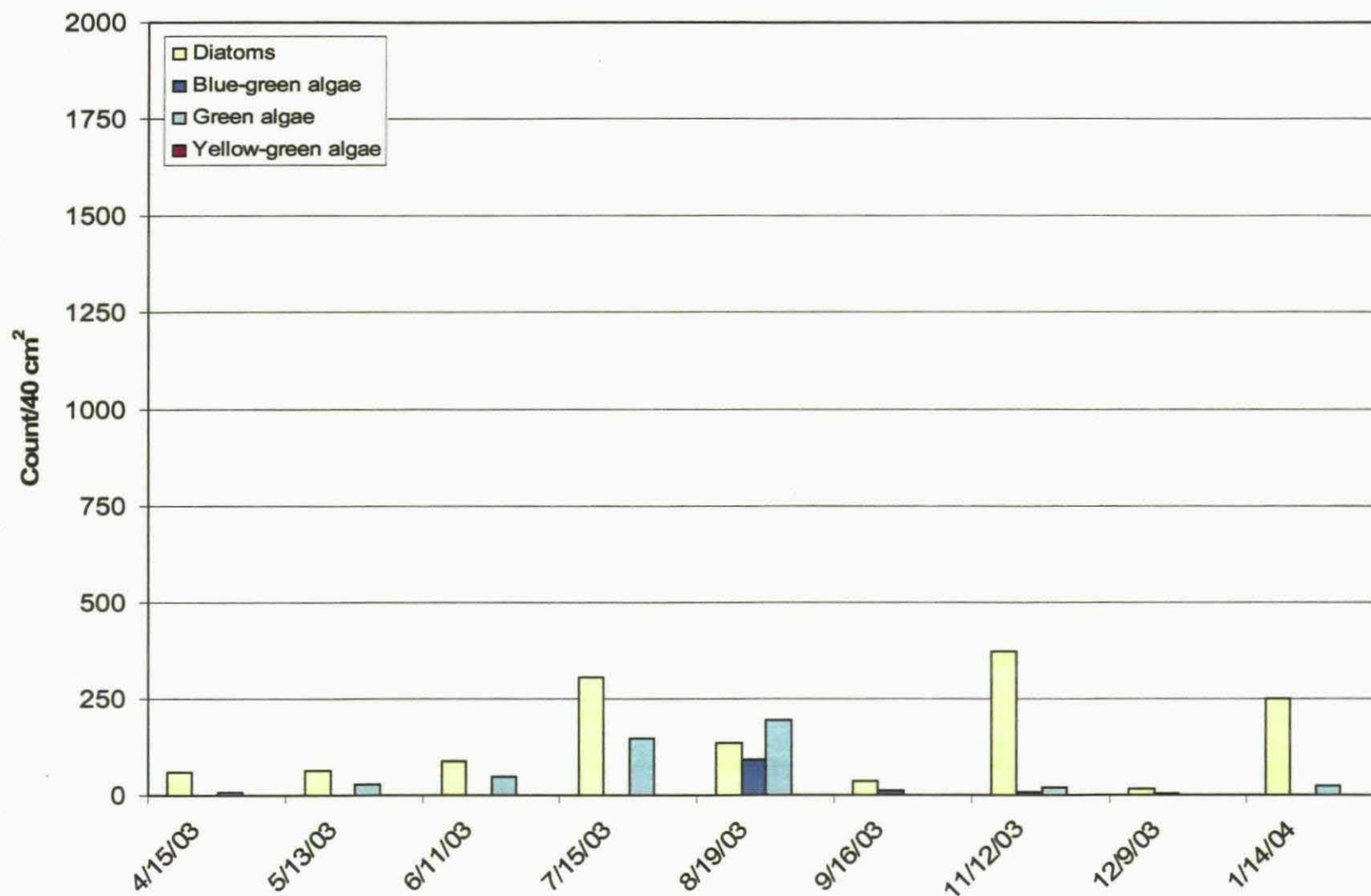


**Appendix 7.14. Periphyton densities by date – Feather River North Fork above Poe Powerhouse (upper Feather River)**



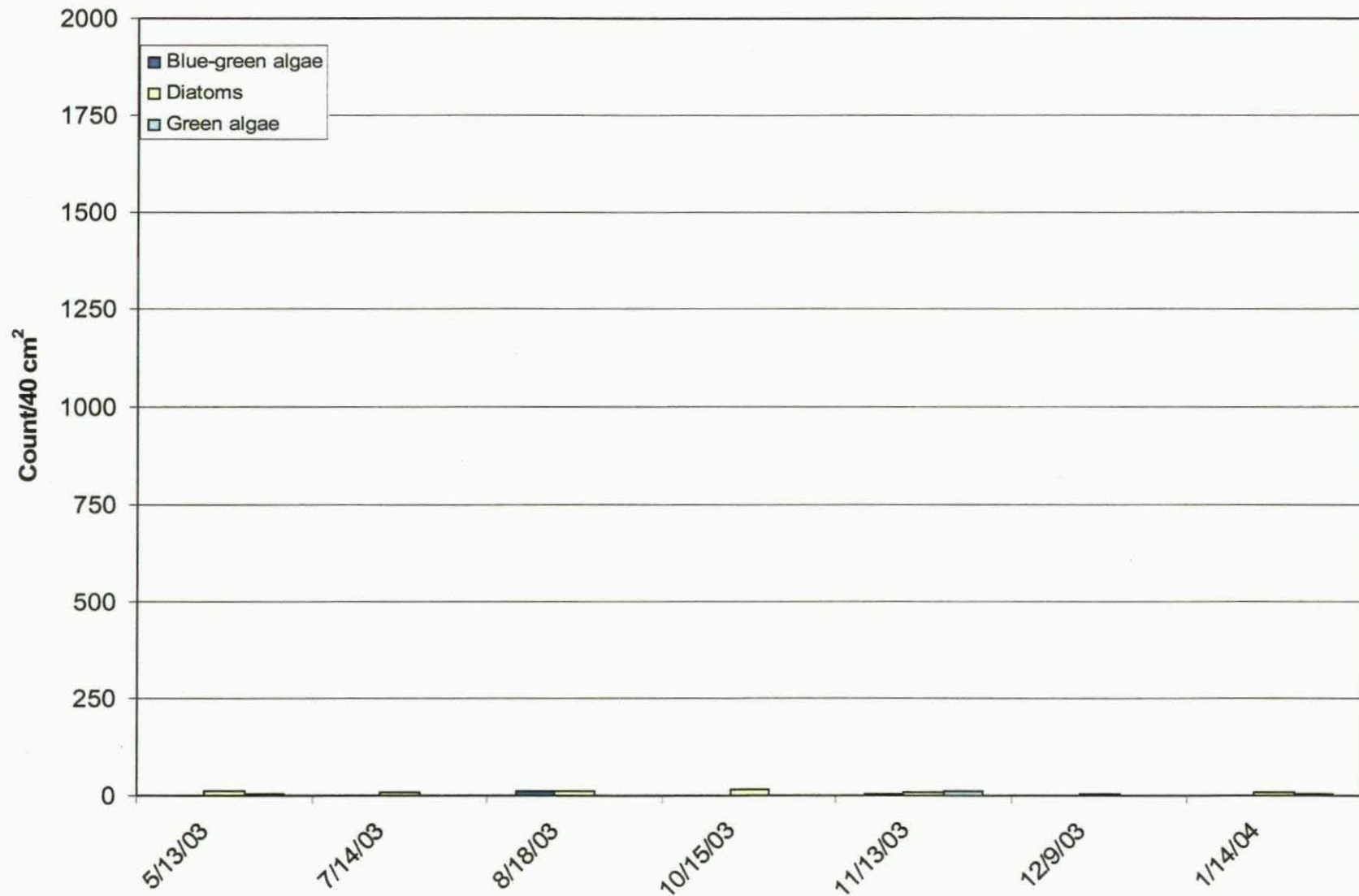
Preliminary Information – Subject to Revision – For Collaborative Process Purposes Only

**Appendix 7.15. Periphyton densities by date – Concow Creek at Jordan Hill Road (tributary to Lake Oroville West Branch)**



Preliminary Information – Subject to Revision – For Collaborative Process Purposes Only

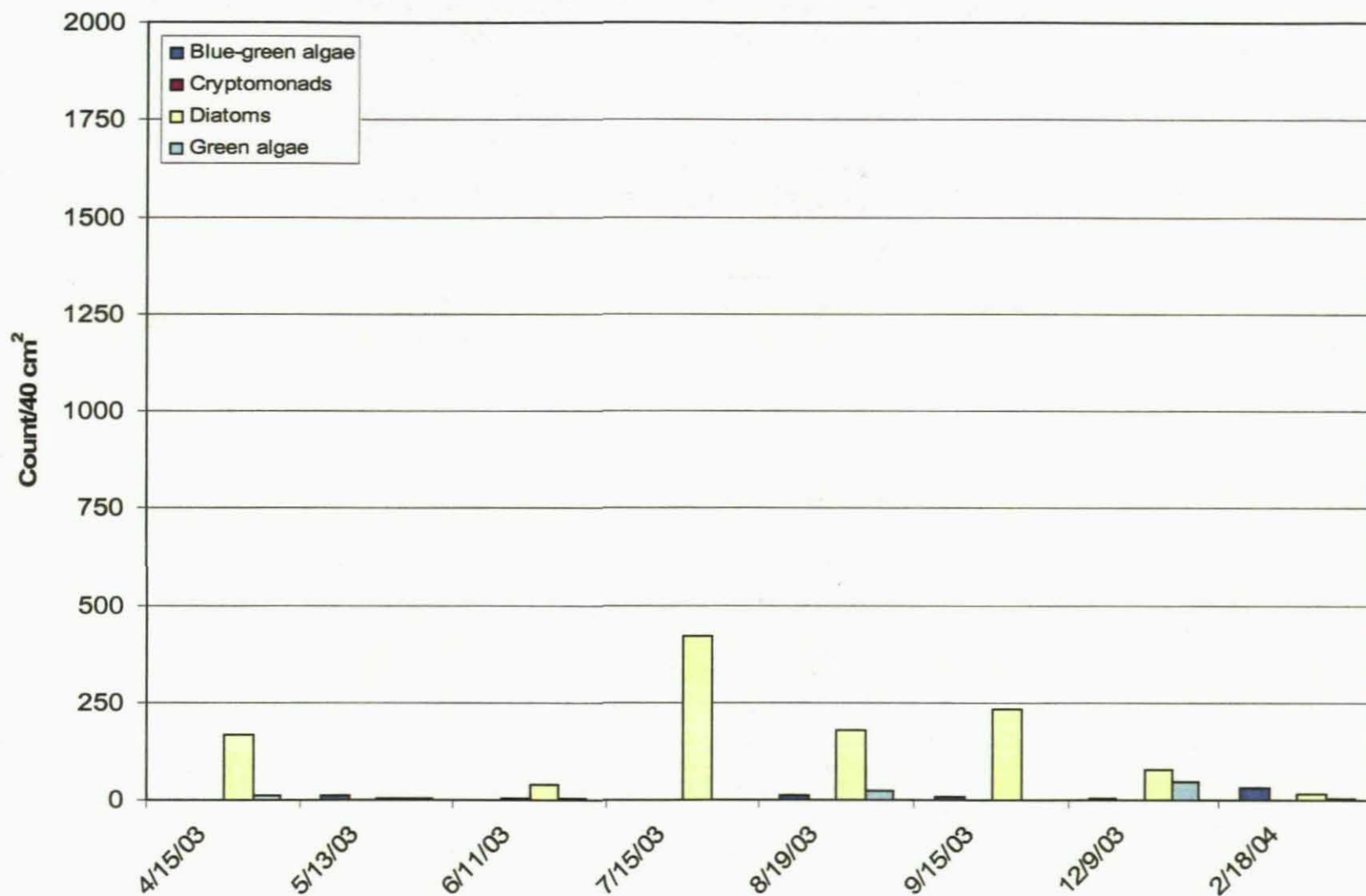
**Appendix 7.16. Periphyton densities by date – Fall River upstream from Feather Falls (tributary to Lake Oroville Middle Fork)**



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**Appendix 7.17. Periphyton densities by date – Feather River South Fork upstream from Ponderosa Reservoir**



Preliminary Information – Subject to Revision – For Collaborative Process Purposes Only

## Appendix 8a-1. Results of toxicity bioassays for Ceriodaphnia dubia - Survival.

Ambient Samples		Year	2002												2003											
Station Number	Treatment/ Sample ID	Date	4/24	5/15	5/16	5/21	5/30	6/25	7/15	7/24	8/21	9/24	9/25	10/22	11/12	11/13	11/14	12/11	1/14	2/18	2/20	3/19	3/26	4/15	4/17	4/24
		Survival (%)																								
A5-2260.50	Concow C A Jordan Hill Rd. (CCJHR)		100	100	90	90	90	90	90	100	100	100	100	100	100	100	90	100	90	100	100/100	100	100	100	90	100
A5-2600.00	West Branch Near Paradise (WBNPA)			90					90				80		100				100	100				100		
A5-2350.50	West Branch A Oroville Res. (WBAOR)		90			70			100										90					100		
A5-3130.50	NF Feather R DS Poe PH (NFPPH)			70					100				90						100					100		
A5-3931.50	Poe Powerhouse Discharge (PPHDI)								100				70		100				100					100		
A5-5100.00	Feather R MF NR Merrimack (MFMBR)			100					100				100		100				100					100		
A5-5050.50	Fall R US Feather Falls (FRUFF)				80				90				100			90			100					90		
A5-6110.50	SF Feather R AS Ponderosa Res. (SFUPR)				20				90				100		100				100					90		
A5-6050.50	SF Feather R DS Ponderosa Res. (SF DPR)																		100					90		
A5-6925.00	Miners Ranch Canal (MIRAC)												100		100				90							
A5-6075.00	Sucker Run NR Forbestown (SRNFT)				90				80				100		100				100					100		
ASR93191297	Thermolito Diversion Pool DS PP (DIVDPP)																							80		
A5-1800.00	Feather R A Oroville (FRFBD)					60			90		100		90	100			100	90			80	100				100
ASR93101333	Feather R Hatchery Settling Pond (FRHSP)																								90	
A5-1780.50	Feather R DS from Hatchery (FRDFH)		10			80			90		90		90	90			100	100	90		100	100			100	
A5-1695.50	Feather R US from Afterbay Outlet (FRUAO)		90			80			100		100		100	90			100	100	100		100	100			90	
ASC92751383	Afterbay Outlet Canal to Feather R (AOCFR)		80			80			100		90		90	100			100	90	100		80	100			90	
A5-1687.70	Feather R DS from Afterbay Outlet (FRDAO)		90			90			100		90		100	100			100	100	100		90	100			100	
A5-1687.20	Feather R DS from SCOR Outfall (FRDSO)		90			90			100		100		100	90			90	100	90		80	100			50	
A5-1645.50	Feather R DS from Project Boundary (FRDPB)		100			100			100		100		100	70			100	100	80		80	100			90	
ASL92951347	Oroville Wildlife Area Fishing Pond (OWAFP)							100			100												100			90
ASL92541377	Oroville Wildlife Area Mile Long Pond (OWAMP)							70			100												100			100
ASL92551372	Oroville Wildlife Area Lower Pacific Heights Pond (OWALP)							90			90												100			90

Bold = Significantly less than the Control treatment at  $p < 0.05$ .

Ambient Samples		Year	2003																				2004					
Station Number	Treatment/ Sample ID	Date	5/15	6/3	6/17	6/24	7/8	7/14	7/15	7/24	8/11	8/21	9/15	9/24	10/22	10/27	11/12	11/13	11/17	11/18	12/15	12/16	1/13	2/10	2/18	3/10	4/7	
		Survival (%)																										
Laboratory Control			100	100	100	100	90	100	90	100/100	100/100	100	100	100	100	100	100	100/100	100	100	100	100/100	100	100	100	100	100	100/90
A5-2260.50	Concow C A Jordan Hill Rd. (CCJHR)								100				60					100/100								100		100
A5-2600.00	West Branch Near Paradise (WBNPA)								100				100					80/100								90		
A5-2350.50	West Branch A Oroville Res. (WBAOR)																											
A5-3130.50	NF Feather R DS Poe PH (NFPPH)								80				50					90/100								100		
A5-3931.50	Poe Powerhouse Discharge (PPHDI)								100				90					90/90								100		
A5-5100.00	Feather R MF NR Merrimack (MFMBR)								100				40					100/100								89		
A5-5050.50	Fall R US Feather Falls (FRUFF)								100				90						100							100		
A5-6110.50	SF Feather R AB Ponderosa Res. (SFUPR)									100			100					100/100								100		
A5-6050.50	SF Feather R DS Ponderosa Res. (SF DPR)									100			100					90/90								90		
A5-6925.00	Miners Ranch Canal (MIRAC)																											
A5-6075.00	Sucker Run NR Forbestown (SRNFT)									100			10					90/90								100		
ASR93191297	Thermolito Diversion Pool DS PP (DIVDPP)																											
A5-1800.00	Feather R A Oroville (FRFBD)		90		60		30				0/0		100				100		100		100/100		100	60		100		
ASR93101333	Feather R Hatchery Settling Pond (FRHSP)		70		100		30				0/0		20				30		100		50/100		100	100		90		
A5-1780.50	Feather R DS from Hatchery (FRDFH)		10/90		80		0				70/100		100				60		100		20/100		100	100		100		
A5-1695.50	Feather R US from Afterbay Outlet (FRUAO)		100		90		100				0/10		90				90		100		70/100		100	90		90		
ASC92751383	Afterbay Outlet Canal to Feather R (AOCFR)		90		100		80				0/0		100				90		100		100/100		100	100		100		
A5-1687.70	Feather R DS from Afterbay Outlet (FRDAO)		100		80		50				0/0		100				100		100		70/100		100	80		100		
A5-1687.20	Feather R DS from SCOR Outfall (FRDSO)		70		100		10				0/0		90				100		100		90/100		100	90		70		
A5-1645.50	Feather R DS from Project Boundary (FRDPB)		100		100		0				0/30		100				100		100		0/100		100	90		100		
ASL92951347	Oroville Wildlife Area Fishing Pond (OWAFP)			100		100				100		90		90	100		100		100				90	100	100	100	100	100/100
ASL92541377	Oroville Wildlife Area Mile Long Pond (OWAMP)			100/100		80/90				100/100		100		100	100		100		100				80	100	90	90	100	100/100
ASL92551372	Oroville Wildlife Area Lower Pacific Heights Pond (OWALP)			100/100		70/90				100/100		90		100	100		100		100				100	100	100	80	100	100/100

\* = pH adjusted samples

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## Appendix 8a-2. Results of toxicity bioassays for Ceriodaphnia dubia - Reproduction.

Ambient Samples		Year	2002																2003							
Station Number	Treatment/ Sample ID	Date	4/24	5/15	5/16	5/21	5/30	6/25	7/15	7/24	8/21	9/24	9/25	10/22	11/12	11/13	11/14	12/11	1/14	2/18	2/20	3/19	3/26	4/15	4/17	4/24
		# Neonates/Female																								
	Laboratory Control		29.0	26.5	23.6	23.7	30.7	25.3	28.3	25.4	23.9	20.9	21.5	42.8	33.0	20.8	19.3	28.7	29.7	29.7	20.3/29.7	26.1	22.1	28.4	15.3	24.2
A5-2280.50	Concow C A Jordan Hill Rd. (CCJHR)			26.5					22.0						46.1					27.9				20.8		
A5-2600.00	West Branch Near Paradise (WBNA)			25.6					32.3						50.3					25.2				24.6		
A5-2350.50	West Branch A Oroville Res. (WBAOR)					6.4			30.0																	
A5-3130.50	NF Feather R DS Poe PH (NFPFH)			9.2					29.4				15.2		53.7					27.4				12.9		
A5-3931.50	Poe Powerhouse Discharge (PPHD)												15.8		51.5					24.6				25.8		
A5-5100.00	Feather R MF NR Merrimack (MFMBR)												19.8		32.5					29.2				26.1		
A5-5050.50	Fall R US Feather Falls (FRUFF)				12.4				16.0				21.0			15.7				24.1				24.6		
A5-6110.50	SF Feather R AB Ponderosa Res. (SFUPR)				0.7				21.4				28.4		49.8					25.8				3.8		
A5-6050.50	SF Feather R DS Ponderosa Res. (SF DPR)																			22.2				17.7		
A5-6825.00	Miners Ranch Canal (MIRAC)												13.7		53.6											
A5-6075.00	Sucker Run NR Forbestown (SRNFT)				16.6				13.3				27.1		31.8					30.3				22.5		
ASR93191297	Thermolito Diversion Pool DS PP (DIVDPP)																							20.1		
A5-1800.00	Feather R A Oroville (FRFBD)		24.6			7.9		16.3		25.5	26.1		35.1	42.3				22.2	27.6	30.1		11.0	15.7		38.1	
ASR93101333	Feather R Hatchery Settling Pond (FRHSP)																								36.8	
A5-1780.50	Feather R DS from Hatchery (FRDFH)		2.0			7.3		24.1		11.7	23.6		19.9	34.3				6.9	25.9	27.8		18.1	18.2		36.9	
A5-1695.50	Feather R US from Afterbay Outlet (FRUAO)		27.9			5.6		23.7		25.3	24.5		25.9	37.4				17.9	25.1	30.9		14.3	26.8		37.6	
ASC92751383	Afterbay Outlet Canal to Feather R (AOCFR)		28.5			7.9		18.8		24.0	24.0		17.2	43.3				20.9	29.0	32.7		9.5	18.3		33.1	
A5-1687.70	Feather R DS from Afterbay Outlet (FRDAO)		27.4			6.6		23.5		27.6	24.3		21.3	44.1				14.7	26.9	34.3		15.7	23.8		39.6	
A5-1687.20	Feather R DS from SCOR Outfall (FRDSO)		22.5			4.8		13.5		26.1	28.1		21.9	37.5				18.7	26.9	31.4		12.1	24.9		29.5	
A5-1645.50	Feather R DS from Project Boundary (FRDPB)		31.0			11.2		13.7		22.3	31.2		20.7	33.5				7.0	27.1	24.9		11.0	21.3		39.3	
ASL92951347	Oroville Wildlife Area Fishing Pond (OWAFP)						34.1			28.6													22.4			14.1
ASL92541377	Oroville Wildlife Area Mile Long Pond (OWAMP)						27.6			28.7													20.2			23.0
ASL92551372	Oroville Wildlife Area Lower Pacific Heights Pond (OWALP)						27.5			25.2													17.6			17.8

Bold = Significantly less than the Control treatment at  $p < 0.05$ .

Ambient Samples		Year	2003																				2004					
Station Number	Treatment/ Sample ID	Date	5/15	6/3	6/17	6/24	7/8	7/14	7/15	7/24	8/11	8/21	9/15	9/27	10/22	11/2	11/13	11/17	11/18	12/15	12/16	1/13	2/18	3/10	4/7			
		# neonates/Female																										
	Laboratory Control		20.2	18.3/11.7*	18.5	28.9/20.9	22.6	34.1	24.3	46.5/37.9*	25.4	21.8	10.9	20.7	25.1	32.8	34.7	38.8/36.1	32.9	29.0	30.7	26.9/22.0	34.3	20.2	18.7	26.2	15.2	23.8/20.8
A5-2280.50	Concow C A Jordan Hill Rd. (CCJHR)									26.6								22.9/25.5								24.0		
A5-2600.00	West Branch Near Paradise (WBNA)									25.1								22.0/23.9								14.3		
A5-2350.50	West Branch A Oroville Res. (WBAOR)																											
A5-3130.50	NF Feather R DS Poe PH (NFPFH)								5.8									15.9/24.3								16.0		
A5-3931.50	Poe Powerhouse Discharge (PPHD)									28.9								26.5/24.7								9.4		
A5-5100.00	Feather R MF NR Merrimack (MFMBR)									25.1								25.1/13.9								16.0		
A5-5050.50	Fall R US Feather Falls (FRUFF)							26.5					16.5						27.8							21.0		
A5-6110.50	SF Feather R AB Ponderosa Res. (SFUPR)									25.1								26.9/23.7								18.4		
A5-6050.50	SF Feather R DS Ponderosa Res. (SF DPR)									24.5								27.5/26.0								16.0		
A5-6825.00	Miners Ranch Canal (MIRAC)																											
A5-6075.00	Sucker Run NR Forbestown (SRNFT)							27.8					15.2													20.8		
ASR93191297	Thermolito Diversion Pool DS PP (DIVDPP)																											
A5-1800.00	Feather R A Oroville (FRFBD)		8.0		16.7		3.0				0/0			20.9		26.1		23.9			12.9/13.0		19.2	3.9		9.9		
ASR93101333	Feather R Hatchery Settling Pond (FRHSP)		4.5		6.7		4.0				0/0					7.3		22.5			8.2/8.3		12.2	17.0		3.7		
A5-1780.50	Feather R DS from Hatchery (FRDFH)		0.4/10.8		10.7		0.6				6.0/13.6				16.7			21.5			2.0/9.6		17.7	11.7		9.2		
A5-1695.50	Feather R US from Afterbay Outlet (FRUAO)		22.7		13.8		19.0				0/1.3				5.4		16.3	25.1			15.5/11.4		20.4	10.3		9.9		
ASC92751383	Afterbay Outlet Canal to Feather R (AOCFR)		20.2		13.1		13.3				0/0				22.1		18.0	26.9			23.4		21.9	10.8		12.8		
A5-1687.70	Feather R DS from Afterbay Outlet (FRDAO)		25.7		11.7		3.9				0/0				23.8		19.0	22.6			11.1/12.6		17.3	8.9		9.3		
A5-1687.20	Feather R DS from SCOR Outfall (FRDSO)		12.3		15.1		6.3				0/0				15.2		20.7				15.9/15.5		18.3	9.6		5.9		
A5-1645.50	Feather R DS from Project Boundary (FRDPB)		21.9		16.0		6.1				0/8.4				8.8		20.0				8.9/17.4		19.8	10.2		9.4		
ASL92951347	Oroville Wildlife Area Fishing Pond (OWAFP)			22.3		18.5				44.6		29.4			36.9	28.7						27.2	17.8	20.8		11.9	24.0/19.5	
ASL92541377	Oroville Wildlife Area Mile Long Pond (OWAMP)			7.1/16.6*		13.4/10.1*				47.7/45.1*		24.5			36.4	29.6						28.4	32.1	18.8	14.8		7.2	21.1/20.8
ASL92551372	Oroville Wildlife Area Lower Pacific Heights Pond (OWALP)			10.1/22.2*		6.9/13.3*				45.9/30.3*		26.4			35.7	30.5						27.0	36.5	22.7	16.3		13.7	22.8/20.4

\* = pH adjusted samples

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# Appendix 8b-1. Results of toxicity bioassays for the fathead minnow – Ambient Survival.

Ambient Samples		Year	2002														2003										
		Date	4/24	5/15	5/16	5/21	5/30	6/26	7/15	7/24	8/21	9/11	9/22	10/22	11/12	11/13	11/14	12/11	1/14	2/18	2/20	3/19	3/28	4/15	4/17	4/24	
Station Number	Treatment/ Sample ID	Overall Mean (%) Survival														Overall Mean (%) Survival											
	Laboratory Control		97.5	100	83.3	93.3	73.3	96.7	90.0	100	97.0	100	100	90	96.7	100	96.7	96.7	100	86.7	100		97	100	80	100	100
A5-2260.50	Concow C A Jordan Hill Rd. (CCJHR)			80					83.3			96.7		70						70					50		
A5-2600.00	West Branch Near Paradise (WBNPA)											96.7			0					26.7					70		
A5-2350.50	West Branch A Oroville Res. (WBAOR)					53.3			93.3																		
A5-3130.50	NF Feather R DS Poe PH (NFPPH)			26.7					26.7			96.7		13						40					6.7		
A5-3931.50	Poe Powerhouse Discharge (PPHDI)								23.3			100		20						60					63.3		
A5-5100.00	Feather R MF NR Merrimack (MFMBR)			100					40.0			96.7		40						43.3					66.7		
A5-5050.50	Fall R US Feather Falls (FRUFF)					56.7			50.0			90				40				66.7					73.3		
A5-6110.50	SF Feather R AB Ponderosa Res. (SFUPR)					56.7			53.3			100			56.7					33.3					96.7		
A5-6050.50	SF Feather R DS Ponderosa Res. (SFDPR)																			96.7					96.7		
A5-6925.00	Miners Ranch Canal (MIRAC)											100		90													
A5-6075.00	Sucker Run NR Forbestown (SRNFT)					16.7			53.3			93.3		40						3.3					80		
ASR93191297	Thermolito Diversion Pool DS PP (DIVDPP)																								46.7		
A5-1800.00	Feather R A Oroville (FRFBD)		0.0			73.3		100	87	33.0		80.0	90		63.3	86.7	56.7			96.7	66.7				100		
ASR93101333	Feather R Hatchery Settling Pond (FRHSP)																								100		
A5-1780.50	Feather R DS from Hatchery (FRDFH)		0.0			53.3		30.0	0	30.0		76.7	76.7		83.3	60	76.7			70	10				73.3		
A5-1695.50	Feather R US from Afterbay Outlet (FRUAO)		20.0			96.7		90.0	47	17.0		96.7	90		78.7	26.7	56.7			100	53.3				80		
ASC92751383	Afterbay Outlet Canal to Feather R (AOCFR)		0.0			93.3		70.0	73.3		50.0	100	53.3		66.6	70	80			93.3	93.3				66.7		
A5-1687.70	Feather R DS from Afterbay Outlet (FRDAO)		52.5			76.7		80.0	70	23.0		96.7	73.3		96.7	36.7	50			96.7	43.3				80		
A5-1687.20	Feather R DS from SCOR Outfall (FRDSO)		0.0			66.7		93.3	40	20.0		76.7	96.7		83.3	36.7	96.7			66.7	56.7				60		
A5-1645.50	Feather R DS from Project Boundary (FRDPB)		15.0			46.7		93.3	87	43.0		96.7	70		96.7	40	73.3			93.3	34.4				33.3		
ASL92951347	Oroville Wildlife Area Fishing Pond (OWAFP)					73.3			90													90				70	
ASL92541377	Oroville Wildlife Area Mile Long Pond (OWAMP)					70.0			70													80				80	
ASL92551372	Oroville Wildlife Area Lower Pacific Heights Pond (OWALP)					36.7			33													26.7				33.3	

Bold = Significantly less than the Control treatment at  $p < 0.05$ .

Ambient Samples		Year	2003																		2004							
Station Number	Treatment/ Sample ID	Date	5/15	5/22	5/27	6/24	7/8	7/14	7/15	7/24	8/11	8/21	9/11	9/18	9/22	10/12	11/12	11/13	11/17	11/18	12/15	12/16	1/13	2/10	2/18	3/10	4/7	
			Overall Mean (%) Survival																		Overall Mean (%) Survival							
	Laboratory Control		100	96.7	96.7	93.3	100	90	93	100/100	100	100	100	96.7	96.7	100	96.7	100	96.7	100	93.3	96.7	100	100	100	100	100	96.7/96.7
AS-2260.50	Concow C A Jordan Hill Rd. (CCJHR)													93.3												93.3		
AS-2600.00	West Branch Near Paradise (WBNPA)													80												86.7		
AS-2350.50	West Branch A Oroville Res. (WBAOR)																											
AS-3130.50	NF Feather R DS Poe PH (NFPPH)								90					93.3												100		
AS-3931.50	Poe Powerhouse Discharge (PPHDI)									100				90						78.7						83.3		
AS-5100.00	Feather R MF NR Merrimack (MFMBR)									87				100						53.3						70		
AS-5050.50	Fall R US Feather Falls (FRUFF)							70					90						96.7							100		
AS-6110.50	SF Feather R AB Ponderosa Res. (SFUPR)								90					90						86.7						100		
AS-6050.50	SF Feather R DS Ponderosa Res. (SFDPR)									100				100						80						96.7		
AS-6925.00	Miners Ranch Canal (MIRAC)																											
AS-6075.00	Sucker Run NR Forbestown (SRNFT)							43					76.7							36.7						90		
ASR93191297	Thermolito Diversion Pool DS PP (DIVDPP)																											
AS-1800.00	Feather R A Oroville (FRFBD)		96.7		73.3		57				83.3			96.7		43.3			93.3		56.7			96.7	93.3		66.7	
ASR93101333	Feather R Hatchery Settling Pond (FRHSP)		80		46.7		30				73.3			83.3		80			43.3		41.3			33.3	100		96.7	
AS-1780.50	Feather R DS from Hatchery (FRDFH)		96.7		50		30				0			96.7		3.3			53.3		3.3			23.3	60		86.7	
AS-1695.50	Feather R US from Afterbay Outlet (FRUAO)		76.7		86.7		23				40			93.3		80			40		50.0			43.3	76.7		70	
ASC92751383	Afterbay Outlet Canal to Feather R (AOCFR)		66.7		83.3		60				73.3			83.3		100			93.3		36.7			93.3	93.3		86.7	
AS-1687.70	Feather R DS from Afterbay Outlet (FRDAO)		83.3		53.3		30				73.3			83.3		76.7			56.7		63.0			43.3	86.7		96.7	
AS-1687.20	Feather R DS from SCOR Outfall (FRDSO)		90		96.7		13				56.7			76.7		96.7			76.7		53.0			63.3	86.7		66.7	
AS-1645.50	Feather R DS from Project Boundary (FRDPB)		33.3		50		27				50			96.7		80			83.3		60.0			63.3	26.7		33.7	
ASL92951347	Oroville Wildlife Area Fishing Pond (OWAFP)			93.3		86.7				100			100		100					56.7			93.3	80	96.7		100	
ASL92541377	Oroville Wildlife Area Mile Long Pond (OWAMP)			96.7		96.7				70/77			96.7		96.7					50.0			100	86.7	50		93.3	
ASL92551372	Oroville Wildlife Area Lower Pacific Heights Pond (OWALP)			93.3/93.3		83.3/60				67/13			66.7		100					33			40	50	30		70	

\* = pH adjusted samples

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## Appendix 8b-2. Results of toxicity bioassays for the fathead minnow – Filtered Survival.

Filtered Samples		Year	2002																2003							
Station Number	Treatment/ Sample ID	Date	5/15	5/16	5/21	5/30	6/25	7/15	7/24	8/21	9/22	9/24	10/22	11/12	11/13	11/14	12/11	1/14	2/18	2/20	3/19	3/26	4/15	4/17	4/24	
		Overall Mean (%) Survival																Overall Mean (%) Survival								
	Laboratory Control		100	90.0	100	76.7	96.7	96.7	97	100	100	100	100	96.7	100	93.3	90.0	96.7	100		100/96.7	83	93.3	90	100	
A5-2260.50	Concow C A Jordan Hill Rd. (CCJHR)		100					90						53.3				63.3					93.3			
A5-2600.00	West Branch Near Paradise (WBNPA)													96.7				26.7					53.3			
A5-2350.50	West Branch A Oroville Res. (WBAOR)				96.7			90																		
A5-3130.50	NF Feather R DS Poe PH (NFPPH)		100					70						96.7				93.3						83.3		
A5-3931.50	Poe Powerhouse Discharge (PPHD)							86.6						100				96.7						70		
A5-5100.00	Feather R MF NR Merrimack (MFMBR)		96.7					70						96.7				26.7						96.7		
A5-5050.50	Fall R US Feather Falls (FRUFF)			70				60						100				96.7						73.3		
A5-6110.50	SF Feather R AB Ponderosa Res. (SFUPR)			86.7				90						96.7				20						93.3		
A5-6050.50	SF Feather R DS Ponderosa Res. (SFDPR)																	100						80		
A5-6925.00	Miners Ranch Canal (MIRAC)													100				63.3								
A5-6075.00	Sucker Run NR Forbestown (SRNFT)			93.3				86.7						100				100						73.3		
ASR93191297	Thermolito Diversion Pool DS PP (DIVDPP)																		96.7					83.3		
A5-1800.00	Feather R A Oroville (FRFBD)				96.7		83.3	90	97			93.3	93.3			90	25.6	83.3			100			100		
ASR93101333	Feather R Hatchery Settling Pond (FRHSP)																							100		
A5-1780.50	Feather R DS from Hatchery (FRDFH)				93.3		100	80	97			96.7	80			73.3	83.3	93.3			93.3			93.3		
A5-1695.50	Feather R US from Afterbay Outlet (FRUAO)				86.7		83.3	90	70			93.3	93.3			70	96.7	90			80/96.7			100		
ASC82751383	Afterbay Outlet Canal to Feather R (AOCFR)				93.3		36.7	93.3	100			96.7	93.3			93.3	80	96.7			100			93.3		
A5-1687.70	Feather R DS from Afterbay Outlet (FRDAO)				86.7		60	90	100			100	96.7			100	93.3	66.7			100			96.7		
A5-1687.20	Feather R DS from SCOR Outfall (FRDSO)				96.7		73.3	87	97			96.7	100			46.7	90	100			73.3			100		
A5-1645.50	Feather R DS from Project Boundary (FRDPB)				96.7		40	100	97			96.7	96.7			90	93.3	96.7			96.7			100		
ASL92951347	Oroville Wildlife Area Fishing Pond (OWAFP)					70.0			97													80			100	
ASL92541377	Oroville Wildlife Area Mile Long Pond (OWAMP)					76.7			77													80			90	
ASL92551372	Oroville Wildlife Area Lower Pacific Heights Pond (OWALP)					63.3			100													86.7			93.3	

Sample water filtered w/ sterile 0.45 micron filter to remove pathogens

Bold = Significantly less than the Control treatment at  $p < 0.05$ .

Filtered Samples		Year	2003																		2004								
Station Number	Treatment/ Sample ID	Date	5/15	5/16	5/17	5/24	7/8	7/14	7/15	7/24	8/11	8/21	9/3	9/7	9/22	10/20	10/27	11/12	11/13	11/17	11/18	12/15	12/16	1/13	2/10	2/18	3/10	4/7	
			Overall Mean (%) Survival																		Overall Mean (%) Survival								
	Laboratory Control		100	96.7	96.7	93.3/93.3	100	100	100	97	100	100	96.7	96.7	90	96.7	93.3	100	96.7	93.3	100	96.7/100	100	100	100	100	100	100	100/96.7
A5-2260.50	Concow C A Jordan Hill Rd. (CCJHR)									100																			
A5-2600.00	West Branch Near Paradise (WBNPA)									100																			
A5-2350.50	West Branch A Oroville Res. (WBAOR)																												
A5-3130.50	NF Feather R DS Poe PH (NFPPH)									90																			
A5-3931.50	Poe Powerhouse Discharge (PPHD)									100																			
A5-5100.00	Feather R MF NR Merrimack (MFMBR)									90																			
A5-5050.50	Fall R US Feather Falls (FRUFF)							93																					
A5-6110.50	SF Feather R AB Ponderosa Res. (SFUPR)									97																			
A5-6050.50	SF Feather R DS Ponderosa Res. (SFDPR)									80																			
A5-6925.00	Miners Ranch Canal (MIRAC)																												
A5-6075.00	Sucker Run NR Forbestown (SRNFT)									100																			
ASR93191297	Thermolito Diversion Pool DS PP (DIVDPP)																												
A5-1800.00	Feather R A Oroville (FRFBD)		86.7		76.7		90				96.7			96.7	90					100		36.7/83.3		93.3	100		96.7		
ASR93101333	Feather R Hatchery Settling Pond (FRHSP)		86.7		60		100				100			100	79.7					100		73.3		100	83.3		100		
A5-1780.50	Feather R DS from Hatchery (FRDFH)		86.7		83.3		100				100			93.3	70					100		33.0/90.0		90	96.7		100		
A5-1695.50	Feather R US from Afterbay Outlet (FRUAO)		93.3		96.7		83				96.7			96.7	90					100		100		100	95		100		
ASC92751383	Afterbay Outlet Canal to Feather R (AOCFR)		51.0		66.7		100				100			96.7	66.7					100		83.3/70.0		93.3	90		100		
A5-1687.70	Feather R DS from Afterbay Outlet (FRDAO)		96.7		93.3		100				100			93.3	70					100		83.0		100	90		100		
A5-1687.20	Feather R DS from SCOR Outfall (FRDSO)		83.3		96.7		100				93.3			100	70					96.7		96.7		100	100		100		
A5-1645.50	Feather R DS from Project Boundary (FRDPB)		53.3		93.3		100				90			96.7	83.3					100		80.0		100	100		100		
ASL92951347	Oroville Wildlife Area Fishing Pond (OWAFP)			90		86.7				100		96.7		100	96.7							80.0		100	93.3	93.3		96.7	100
ASL92541377	Oroville Wildlife Area Mile Long Pond (OWAMP)			86.7/93.3*		96.7/93.3*				97/83*		96.7		93.3	100							100		96.7	80	100		96.7	100
ASL92551372	Oroville Wildlife Area Lower Pacific Heights Pond (OWALP)			90/90*		86.7/80*				97/83*		93.3		100	90							96.7		96.7	100	100		100	100

Sample water filtered w/ sterile 0.45 micron filter to remove pathogens

\* = pH adjusted samples

Preliminary Information – Subject to Revision – For Collaborative Process Purposes Only



### Appendix 8b-3. Results of toxicity bioassays for the fathead minnow – Ambient Growth.

Ambient Samples		Year	2002																2003							
Station Number	Treatment/ Sample ID	Date	4/24	5/15	5/16	5/21	5/30	6/25	7/15	7/24	8/21	9/24	9/25	10/22	11/12	11/15	11/14	12/11	1/14	2/18	2/20	3/19	3/26	4/15	4/17	4/24
		Overall Mean Biomass (mg)																Overall Mean Biomass (mg)								
	Laboratory Control		0.31	0.49	0.25	0.30	0.23	0.44	0.22	0.417	0.33	0.39	0.32	0.43	0.34	0.48	0.32	0.41	0.44	0.31	0.40	0.29	0.20	0.21	0.39	0.35
A5-2260.50	Concow C A Jordan Hill Rd. (CCJHR)			0.38					0.16			0.34			0.29					0.27				0.16		
A5-2600.00	West Branch Near Paradise (WBNPA)											0.43			0.00					0.11				0.18		
A5-2350.50	West Branch A Oroville Res. (WBAOR)					0.27			0.20																	
A5-3130.50	NF Feather R DS Poe PH (NFPFH)			0.16					0.09			0.44			0.08					0.15				0.03		
A5-3931.50	Poe Powerhouse Discharge (PPHDI)								0.05			0.46			0.09					0.23				0.20		
A5-5100.00	Feather R MF NR Merrimack (MFMBR)			0.38					0.09			0.29			0.17					0.18				0.17		
A5-5050.50	Fall R US Feather Falls (FRUFF)					0.18			0.16			0.40			0.21					0.23				0.25		
A5-6110.50	SF Feather R AB Ponderosa Res. (SFUPR)					0.17			0.15			0.37			0.26					0.15				0.27		
A5-6050.50	SF Feather R DS Ponderosa Res. (SFDPR)																			0.35				0.28		
A5-6925.00	Miners Ranch Canal (MIRAC)											0.36			0.36											
A5-6075.00	Sucker Run NR Forbestown (SRNFT)					0.09			0.14			0.40			0.17					0.02				0.26		
ASR93191297	Thermolito Diversion Pool DS PP (DIVDPP)																							0.09		
A5-1800.00	Feather R A Oroville (FRFBD)	0				0.22		0.54		0.393	0.10		0.36	0.39			0.30	0.45	0.29		0.44	0.29			0.29	
ASR93101333	Feather R Hatchery Settling Pond (FRHSP)																								0.35	
A5-1780.50	Feather R DS from Hatchery (FRDFH)	0				0.23		0.17		0	0.16		0.36	0.35			0.40	0.34	0.38		0.33	0.05		0.23		
A5-1695.50	Feather R US from Afterbay Outlet (FRUAO)	0.06				0.36		0.43		0.242	0.09		0.31	0.36			0.35	0.14	0.29		0.40	0.19		0.32		
ASC92751383	Afterbay Outlet Canal to Feather R (AOCFR)	0				0.32		0.39	0.22		0.17		0.46	0.26			0.28	0.30	0.43		0.39	0.34		0.23		
A5-1687.70	Feather R DS from Afterbay Outlet (FRDAO)	0.25				0.30		0.40		0.350	0.10		0.33	0.34			0.44	0.17	0.24		0.38	0.21		0.21		
A5-1687.20	Feather R DS from SCOR Outfall (FRDSO)	0				0.24		0.41		0.149	0.10		0.37	0.44			0.41	0.20	0.41		0.32	0.23		0.19		
A5-1645.50	Feather R DS from Project Boundary (FRDPB)	0.07				0.20		0.46		0.437	0.19		0.37	0.34			0.37	0.24	0.36		0.38	0.18		0.12		
ASL92951347	Oroville Wildlife Area Fishing Pond (OWAFP)						0.24			0.357													0.22			0.33
ASL92541377	Oroville Wildlife Area Mile Long Pond (OWAMP)						0.19			0.246													0.17			0.30
ASL92551372	Oroville Wildlife Area Lower Pacific Heights Pond (OWALP)						0.13			0.140													0.08			0.15

Bold = Significantly less than the Control treatment at  $p < 0.05$ .

Ambient Samples		Year	2003																				2004							
Station Number	Treatment/ Sample ID	Date	5/15	6/3	6/17	6/24	7/8	7/14	7/15	7/24	8/11	8/21	9/15	9/16	9/17	9/22	10/20	10/27	11/12	11/13	11/17	11/18	12/15	12/16	1/13	2/10	2/18	3/10	4/7	
		Overall Mean Biomass (mg)																				Overall Mean Biomass (mg)								
Laboratory Control			0.32	0.370.42*	0.51	0.610.70*	0.58	0.51	0.53	0.38/0.45*	0.61	0.43	0.61	0.40	0.70	0.36	0.34	0.60	0.32	0.33	0.48	0.40	0.38	0.26	0.38	0.40	0.34	0.35/0.38		
A5-2260.50	Concow C A Jordan Hill Rd. (CCJHR)								0.55					0.59				0.30									0.35			
A5-2600.00	West Branch Near Paradise (WBNPA)								0.60					0.62				0.30									0.34			
A5-2350.50	West Branch A Oroville Res. (WBAOR)																													
A5-3130.50	NF Feather R DS Pos PH (NFPFH)								0.49				0.63					0.43									0.37			
A5-3931.50	Poe Powerhouse Discharge (PPHDI)								0.53				0.54					0.33									0.36			
A5-5100.00	Feather R MF NR Merrimack (MFMBR)								0.55				0.62					0.29									0.26			
A5-5050.50	Fall R US Feather Falls (FRUFF)						0.43					0.56							0.31							0.39				
A5-6110.50	SF Feather R AB Ponderosa Res. (SFUPR)								0.52				0.46					0.76								0.37				
A5-6050.50	SF Feather R DS Ponderosa Res. (SFDPR)								0.57				0.64					0.42								0.36				
A5-6925.00	Miners Ranch Canal (MIRAC)																													
A5-6075.00	Sucker Run NR Forbestown (SRNFT)							0.30				0.77						0.26								0.40				
ASR93191297	Thermolito Diversion Pool DS PP (DIVDPP)																													
A5-1800.00	Feather R A Oroville (FRFBD)		0.38		0.32		0.32				0.46		0.52		0.17			0.30				0.29		0.26	0.34		0.23			
ASR93101333	Feather R Hatchery Settling Pond (FRHSP)		0.36		0.21		0.18			0.40		0.51		0.16				0.23				0.23		0.12	0.40		0.36			
A5-1780.50	Feather R DS from Hatchery (FRDFH)		0.43		0.30		0.16					0.59		0.01				0.21				0.01	0.09	0.26		0.30				
A5-1695.50	Feather R US from Afterbay Outlet (FRUAO)		0.34		0.34		0.13			0.28		0.70		0.15				0.21				0.26	0.22	0.33		0.23				
ASC92751383	Afterbay Outlet Canal to Feather R (AOCFR)		0.25		0.34		0.30			0.37		0.49		0.25				0.40				0.14	0.31	0.39		0.34				
A5-1687.70	Feather R DS from Afterbay Outlet (FRDAO)		0.34		0.28		0.23			0.41		0.52		0.26				0.32				0.24	0.15	0.38		0.33				
A5-1687.20	Feather R DS from SCOR Outfall (FRDSO)		0.36		0.30		0.06			0.31		0.53		0.18				0.34				0.24	0.26	0.37		0.27				
A5-1645.50	Feather R DS from Project Boundary (FRDPB)		0.12		0.23		0.19			0.31		0.54		0.25				0.30				0.25	0.24	0.23		0.20				
ASL92951347	Oroville Wildlife Area Fishing Pond (OWAFP)			0.46		0.50				0.49		0.45		0.50	0.43							0.30		0.38	0.27	0.45	0.40	0.34		
ASL92541377	Oroville Wildlife Area Mile Long Pond (OWAMP)			0.370.42*		0.46/0.56*				0.350.37*		0.46		0.66	0.34							0.27	0.38	0.31	0.23		0.32	0.37		
ASL92551372	Oroville Wildlife Area Lower Pacific Heights Pond (OWALP)			0.350.41*		0.500.44*				0.210.06*		0.30		0.37	0.18							0.14	0.16	0.17	0.11		0.31	0.24		

\* = pH adjusted samples

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# Appendix 8b-4. Results of toxicity bioassays for the fathead minnow – Filtered Growth.

Filtered Samples		Year	2002														2003									
Station Number	Treatment/ Sample ID	Date	5/15	5/18	5/21	5/30	6/05	7/15	7/24	8/21	8/24	9/25	10/22	11/12	11/13	11/14	12/11	1/14	2/18	2/20	3/19	3/26	4/15	4/17	4/24	
			Overall Mean Biomass (mg)																Overall Mean Biomass (mg)							
	Laboratory Control		0.53	0.25	0.33	0.25	0.43	0.27	0.437	0.31	0.42	0.33	0.3	0.37	0.42	0.36	0.44	0.40	0.32		0.30/0.24	0.19	0.20	0.39	0.39	
A5-2260.50	Concow C A Jordan Hill Rd. (CCJHR)		0.44					0.18			0.34			0.22					0.20					0.19		
A5-2600.00	West Branch Near Paradise (WBPA)										0.44			0.05					0.25					0.16		
A5-2350.50	West Branch A Oroville Res. (WBAOR)				0.32			0.25																		
A5-3130.50	NF Feather R DS Poe PH (NFPPH)		0.46					0.17			0.37			0.04					0.30					0.25		
A5-3931.50	Poe Powerhouse Discharge (PPHD)							0.19			0.47			0.10					0.28					0.18		
A5-5100.00	Feather R MF NR Merrimack (MFMBR)		0.37					0.17			0.46			0.12					0.27					0.23		
A5-5050.50	Fall R US Feather Falls (FRUFF)			0.19				0.15			0.37				0.42				0.28					0.16		
A5-6110.50	SF Feather R AB Ponderosa Res. (SFUPR)			0.23				0.19			0.43			0.08					0.35					0.23		
A5-6050.50	SF Feather R DS Ponderosa Res. (SFDPR)																		0.35				0.24			
A5-6925.00	Miners Ranch Canal (MIRAC)										0.38			0.21												
A5-6075.00	Sucker Run NR Forbestown (SRNFT)			0.25				0.21			0.43			0.42					0.34					0.20		
ASR93191297	Thermolito Diversion Pool DS PP (DIVDPP)																						0.21			
A5-1800.00	Feather R A Oroville (FRFBD)				0.33			0.27		0.374	0.36		0.37			0.37	0.26	0.42				0.33			0.47	
ASR93101333	Feather R Hatchery Settling Pond (FRHSP)																							0.33		
A5-1780.50	Feather R DS from Hatchery (FRDFH)				0.35			0.27		0.263	0.32		0.41	0.38			0.23	0.31	0.42			0.34			0.42	
A5-1695.50	Feather R US from Afterbay Outlet (FRUAO)				0.32			0.21		0.367	0.21		0.42	0.41			0.32	0.36	0.40			0.27/0.22			0.45	
A5C92751383	Afterbay Outlet Canal to Feather R (AOCFR)				0.29			0.12	0.22		0.34		0.39	0.40			0.34	0.37	0.55			0.35			0.43	
A5-1687.70	Feather R DS from Afterbay Outlet (FRDAO)				0.32			0.21		0.305	0.27		0.34	0.40			0.42	0.41	0.28			0.32			0.45	
A5-1687.20	Feather R DS from SCOR Outfall (FRDSO)				0.29			0.18		0.291	0.26		0.35	0.45			0.22	0.48	0.45			0.27			0.45	
A5-1645.50	Feather R DS from Project Boundary (FRDPB)				0.35			0.19		0.365	0.30		0.33	0.43			0.36	0.43	0.46			0.35			0.46	
ASL92951347	Oroville Wildlife Area Fishing Pond (OWAFP)					0.24				0.458												0.19			0.32	
ASL92541377	Oroville Wildlife Area Mile Long Pond (OWAMP)					0.23				0.285												0.20			0.24	
ASL92551372	Oroville Wildlife Area Lower Pacific Heights Pond (OWALP)					0.22				0.400												0.20			0.32	

Sample water filtered w/ sterile 0.45 micron filter to remove pathogens

Bold = Significantly less than the Control treatment at  $p < 0.05$ .

Filtered Samples		Year	2003																		2004								
Station Number	Treatment/ Sample ID	Date	5/15	5/2	5/17	5/24	7/8	7/14	7/15	7/24	8/11	8/21	8/25	9/1	9/8	9/25	10/2	10/12	10/13	10/17	10/18	12/15	12/16	1/13	2/10	2/18	3/10	4/7	
		Overall Mean Biomass (mg)																											
Laboratory Control			0.3	0.31/0.42*	0.26	0.46	0.62	0.60	0.50	0.37	0.65	0.38				0.36	0.33	0.40	0.32	0.31	0.32	0.46	0.41	0.26	0.41	0.37	0.35	0.33/0.33	
A5-2260.50	Concow C A Jordan Hill Rd. (CCJHR)								0.50				0.65					0.44								0.30			
A5-2600.00	West Branch Near Paradise (WBPA)								0.55				0.55					0.42								0.35			
A5-2350.50	West Branch A Oroville Res. (WBAOR)																												
A5-3130.50	NF Feather R DS Poe PH (NFPPH)								0.44				0.67					0.47								0.29			
A5-3931.50	Poe Powerhouse Discharge (PPHD)								0.53				0.46					0.48								0.31			
A5-5100.00	Feather R MF NR Merrimack (MFMBR)								0.49				0.60					0.44								0.27			
A5-5050.50	Fall R US Feather Falls (FRUFF)							0.60					0.30					0.3								0.34			
A5-6110.50	SF Feather R AB Ponderosa Res. (SFUPR)								0.52				0.33					0.43								0.34			
A5-6050.50	SF Feather R DS Ponderosa Res. (SFDPR)								0.39				0.72					0.43								0.34			
A5-6925.00	Miners Ranch Canal (MIRAC)																												
A5-6075.00	Sucker Run NR Forbestown (SRNFT)							0.60					0.30					0.45								0.29			
ASR93191297	Thermolito Diversion Pool DS PP (DIVDPP)																												
A5-1800.00	Feather R A Oroville (FRFBD)		0.27		0.30		0.53			0.38			0.63			0.24		0.29		0.15		0.24	0.38		0.33				
ASR93101333	Feather R Hatchery Settling Pond (FRHSP)		0.29		0.2		0.60			0.50			0.61			0.21		0.30		0.29		0.26	0.36		0.38				
A5-1780.50	Feather R DS from Hatchery (FRDFH)		0.34		0.31		0.54			0.52			0.48			0.19		0.31		0.14		0.25	0.41		0.39				
A5-1695.50	Feather R US from Afterbay Outlet (FRUAO)		0.34		0.36		0.48			0.47			0.64			0.23		0.28		0.34		0.26	0.39		0.40				
ASC92751383	Afterbay Outlet Canal to Feather R (AOCFR)		0.22		0.22		0.59			0.47			0.72			0.38		0.30		0.24		0.24	0.38		0.38				
A5-1687.70	Feather R DS from Afterbay Outlet (FRDAO)		0.35		0.36		0.43			0.41			0.50			0.22		0.35		0.29		0.27	0.36		0.35				
A5-1687.20	Feather R DS from SCOR Outfall (FRDSO)		0.27		0.36		0.44			0.52			0.63			0.28		0.31		0.31		0.26	0.40		0.36				
A5-1645.50	Feather R DS from Project Boundary (FRDPB)		0.19		0.39		0.61			0.43			0.66			0.27		0.34		0.25		0.29	0.37		0.40				
ASL92951347	Oroville Wildlife Area Fishing Pond (OWAFP)			0.33		0.61			0.46			0.40	0.72	0.36						0.29		0.42	0.30	0.40		0.43	0.37		
ASL92541377	Oroville Wildlife Area Mile Long Pond (OWAMP)			0.43/0.41*		0.50/0.48*			0.39/0.37*			0.51	0.71	0.36						0.39		0.40	0.20	0.40		0.34	0.32		
ASL92551372	Oroville Wildlife Area Lower Pacific Heights Pond (OWALP)			0.37/0.42*		0.45/0.50*			0.43/0.41*			0.44	0.71	0.36						0.31		0.38	0.28	0.44		0.41	0.36		

Sample water filtered w/ sterile 0.45 micron filter to remove pathogens

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**Appendix 9. Total suspended and settleable solids.**

Station Name	Date	Depth (meters)	Total Suspended Solids (mg/L)	Settleable Solids (mL/L)
SF FEATHER AB POND. RES	03/28/02		<1	a
SF FEATHER AB POND. RES	04/23/02		<1	a
SF FEATHER AB POND. RES	05/16/02		2	a
SF FEATHER AB POND. RES	06/17/02		3	a
SF FEATHER AB POND. RES	07/15/02		<1	a
SF FEATHER AB POND. RES	08/20/02		<1	a
SF FEATHER AB POND. RES	09/24/02		<1	a
SF FEATHER AB POND. RES	10/17/02		<1	4
SF FEATHER AB POND. RES	11/12/02		<1	-
SF FEATHER AB POND. RES	12/10/02		6	trace <sup>1</sup>
SF FEATHER AB POND. RES (storm)	12/16/02		37	0.3
SF FEATHER AB POND. RES	01/09/03		<1	a
SF FEATHER AB POND. RES (storm)	02/03/04		2	trace
SF FEATHER AB POND. RES	02/18/03		1	a
SF FEATHER AB POND. RES	03/12/03		2	a
SF FEATHER AB POND. RES	04/15/03		<1	a
SF FEATHER AB POND. RES	05/13/03		2	a
SF FEATHER AB POND. RES	06/11/03		2	a
SF FEATHER AB POND. RES	07/15/03			a
SF FEATHER AB POND. RES	08/19/03		1	a
SF FEATHER AB POND. RES	09/16/03		<1	a
SF FEATHER AB POND. RES	10/16/03		<1	-
SF FEATHER AB POND. RES	11/12/03		<1	trace
SF FEATHER AB POND. RES	12/09/03		7	a
SF FEATHER AB POND. RES	01/15/04		12	a
SF FEATHER AB POND. RES	02/18/04		18	trace

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Station Name	Date	Depth (meters)	Total Suspended Solids (mg/L)	Settleable Solids (mL/L)
SF FEATHER AB POND. RES	03/15/04		<1	trace
SF FEATHER AB POND. RES	04/13/04		<1	trace
SF FEATHER DS PONDEROSA RES	01/09/03		2	a
SF FEATHER DS PONDEROSA RES	02/18/03		1	a
SF FEATHER DS PONDEROSA RES	03/12/03		<1	a
SF FEATHER DS PONDEROSA RES	04/15/03		2	a
SF FEATHER DS PONDEROSA RES	05/13/03		<1	a
SF FEATHER DS PONDEROSA RES	06/11/03		2	a
SF FEATHER DS PONDEROSA RES	07/15/03		3	a
SF FEATHER DS PONDEROSA RES	08/19/03		2	a
SF FEATHER DS PONDEROSA RES	09/16/03		<1	a
SF FEATHER DS PONDEROSA RES	10/16/03		<1	-
SF FEATHER DS PONDEROSA RES	11/12/03		<1	a
SF FEATHER DS PONDEROSA RES	12/09/03		2	a
SF FEATHER DS PONDEROSA RES	01/14/03		<1	a
SF FEATHER DS PONDEROSA RES (storm)	02/03/04		1	a
SF FEATHER DS PONDEROSA RES	02/18/04		17	a
SF FEATHER DS PONDEROSA RES	03/15/04		1	a
SF FEATHER DS PONDEROSA RES	04/13/04		4	trace
MINERS RANCH CANAL	08/20/02		<1	a
MINERS RANCH CANAL	09/24/02		<1	a
MINERS RANCH CANAL	10/17/02		2	a
MINERS RANCH CANAL	11/12/02		1	-
MINERS RANCH CANAL	12/09/02		<1	a
MINERS RANCH CANAL	12/16/02		6	trace
MINERS RANCH CANAL	01/09/03		1	a

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Station Name	Date	Depth (meters)	Total Suspended Solids (mg/L)	Settleable Solids (mL/L)
SUCKER RUN NR FORBESTOWN	03/28/02		2	a
SUCKER RUN NR FORBESTOWN	04/23/02		<1	a
SUCKER RUN NR FORBESTOWN	05/16/02		2	trace
SUCKER RUN NR FORBESTOWN	06/17/02		2	a
SUCKER RUN NR FORBESTOWN	07/15/02		<1	a
SUCKER RUN NR FORBESTOWN	08/20/02		<1	a
SUCKER RUN NR FORBESTOWN	09/24/02		<1	trace
SUCKER RUN NR FORBESTOWN	10/17/02		1	a
SUCKER RUN NR FORBESTOWN	11/12/02		2	-
SUCKER RUN NR FORBESTOWN	12/09/02		2	a
SUCKER RUN NR FORBESTOWN	12/16/02		31	a
SUCKER RUN NR FORBESTOWN	01/09/03		<1	a
SUCKER RUN NR FORBESTOWN	02/18/03		4	a
SUCKER RUN NR FORBESTOWN	03/12/03		1	a
SUCKER RUN NR FORBESTOWN	04/15/03		4	trace
SUCKER RUN NR FORBESTOWN	05/13/03		2	trace
SUCKER RUN NR FORBESTOWN	06/11/03		2	a
SUCKER RUN NR FORBESTOWN	07/14/03		5	trace
SUCKER RUN NR FORBESTOWN	08/18/03		2	a
SUCKER RUN NR FORBESTOWN	09/15/03		2	a
SUCKER RUN NR FORBESTOWN	10/15/03		2	-
SUCKER RUN NR FORBESTOWN	11/12/03		<1	a
SUCKER RUN NR FORBESTOWN	12/09/03		<1	a
SUCKER RUN NR FORBESTOWN	01/14/04		<1	a
SUCKER RUN NR FORBESTOWN (storm)	02/03/04		3	a
SUCKER RUN NR FORBESTOWN	02/18/04		57	0.7
SUCKER RUN NR FORBESTOWN	03/15/04		2	trace
SUCKER RUN NR FORBESTOWN	04/13/04		1	a

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Station Name	Date	Depth (meters)	Total Suspended Solids (mg/L)	Settleable Solids (mL/L)
FEATHER R MF NR MERRIMAC	03/28/02		2	a
FEATHER R MF NR MERRIMAC	04/23/02		2	a
FEATHER R MF NR MERRIMAC	05/15/02		3	a
FEATHER R MF NR MERRIMAC	06/17/02		4	a
FEATHER R MF NR MERRIMAC	07/15/02		<1	a
FEATHER R MF NR MERRIMAC	08/20/02		<1	a
FEATHER R MF NR MERRIMAC	09/24/02		<1	a
FEATHER R MF NR MERRIMAC	10/17/02		2	a
FEATHER R MF NR MERRIMAC	11/12/02		2	-
FEATHER R MF NR MERRIMAC	12/10/02		8	a
FEATHER R MF NR MERRIMAC	01/09/03		1	a
FEATHER R MF NR MERRIMAC (storm)	02/03/04		1	a
FEATHER R MF NR MERRIMAC	02/18/03		<1	a
FEATHER R MF NR MERRIMAC	03/12/03		1	0.1
FEATHER R MF NR MERRIMAC	04/15/03		4	a
FEATHER R MF NR MERRIMAC	05/13/03		2	a
FEATHER R MF NR MERRIMAC	06/11/03		4	a
FEATHER R MF NR MERRIMAC	07/15/03		2	a
FEATHER R MF NR MERRIMAC	08/19/03		<1	a
FEATHER R MF NR MERRIMAC	09/16/03		1	a
FEATHER R MF NR MERRIMAC	10/16/03		<1	-
FEATHER R MF NR MERRIMAC	11/12/03		<1	a
FEATHER R MF NR MERRIMAC	12/09/03		2	a
FEATHER R MF NR MERRIMAC	01/14/04		3	a
FEATHER R MF NR MERRIMAC	02/18/04		69	0.5
FEATHER R MF NR MERRIMAC	03/15/04		3	a
FEATHER R MF NR MERRIMAC	04/13/04		3	a
FALL R US FEATHER FALLS	03/28/02		1	a

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Station Name	Date	Depth (meters)	Total Suspended Solids (mg/L)	Settleable Solids (mL/L)
FALL R US FEATHER FALLS	04/22/02		<1	a
FALL R US FEATHER FALLS	05/16/02		<1	a
FALL R US FEATHER FALLS	06/18/02		3	a
FALL R US FEATHER FALLS	07/15/02		<1	a
FALL R US FEATHER FALLS	08/20/02		<1	a
FALL R US FEATHER FALLS	09/24/02		<1	trace
FALL R US FEATHER FALLS	10/17/02		<1	a
FALL R US FEATHER FALLS	11/13/02		<1	-
FALL R US FEATHER FALLS	12/09/02		3	a
FALL R US FEATHER FALLS	12/16/02		28	0.1
FALL R US FEATHER FALLS	01/08/03		<1	a
FALL R US FEATHER FALLS	02/18/03		2	a
FALL R US FEATHER FALLS	03/12/03		<1	a
FALL R US FEATHER FALLS	04/15/03		1	a
FALL R US FEATHER FALLS	05/13/03		<1	a
FALL R US FEATHER FALLS	06/11/03		1	a
FALL R US FEATHER FALLS	07/14/03		2	a
FALL R US FEATHER FALLS	08/18/03		2	a
FALL R US FEATHER FALLS	09/15/03		1	a
FALL R US FEATHER FALLS	10/15/03		2	-
FALL R US FEATHER FALLS	11/13/03		<1	a
FALL R US FEATHER FALLS	12/09/03		<1	a
FALL R US FEATHER FALLS	01/14/04		4	a
FALL R US FEATHER FALLS(storm)	02/03/04		1	a
FALL R US FEATHER FALLS	02/18/04		74	0.4
FALL R US FEATHER FALLS	03/15/04		<1	a
FALL R US FEATHER FALLS	04/13/04		<1	a
NF FEATHER R US POE PH	07/15/02		1	a

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Station Name	Date	Depth (meters)	Total Suspended Solids (mg/L)	Settleable Solids (mL/L)
NF FEATHER R US POE PH	08/20/02		1	a
NF FEATHER R US POE PH	09/24/02		<1	a
NF FEATHER R US POE PH	10/18/02		2	a
NF FEATHER R US POE PH	11/12/02		2	-
NF FEATHER R US POE PH	12/10/02		3	a
NF FEATHER R US POE PH	12/16/02		45	0.2
NF FEATHER R US POE PH	01/08/03		<1	a
NF FEATHER R US POE PH	02/18/03		<1	a
NF FEATHER R US POE PH	03/12/03		<1	a
NF FEATHER R US POE PH	04/15/03		<1	a
NF FEATHER R US POE PH	05/13/03		<1	trace
NF FEATHER R US POE PH	06/11/03		4	a
NF FEATHER R US POE PH	07/15/03		2	trace
NF FEATHER R US POE PH	08/19/03		2	a
NF FEATHER R US POE PH	09/16/03		<1	a
NF FEATHER R US POE PH	10/16/03		<1	-
NF FEATHER R US POE PH	11/12/03		10	trace
NF FEATHER R US POE PH	12/09/03		1	trace
NF FEATHER R US POE PH	01/14/04		<1	a
NF FEATHER R US POE PH (storm)	02/03/04		<1	a
NF FEATHER R US POE PH	02/18/04		393	1.0
NF FEATHER R US POE PH	03/15/04		6	a
NF FEATHER R US POE PH	04/13/04		2	trace
NF FEATHER R DS POE PH	03/28/02		70	a
NF FEATHER R DS POE PH	05/15/02		8	trace
NF FEATHER R DS POE PH	06/17/02		2	trace
CONCOW C A JORDAN HILL RD.	03/28/02		<1	trace

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Station Name	Date	Depth (meters)	Total Suspended Solids (mg/L)	Settleable Solids (mL/L)
CONCOW C A JORDAN HILL RD.	04/23/02		2	trace
CONCOW C A JORDAN HILL RD.	05/15/02		<1	trace
CONCOW C A JORDAN HILL RD.	06/17/02		2	a
CONCOW C A JORDAN HILL RD.	07/15/02		<1	a
CONCOW C A JORDAN HILL RD.	08/20/02		<1	a
CONCOW C A JORDAN HILL RD.	09/24/02		2	a
CONCOW C A JORDAN HILL RD.	10/18/02		25	a
CONCOW C A JORDAN HILL RD.	11/12/02		<1	-
CONCOW C A JORDAN HILL RD.	12/10/02		<1	a
CONCOW C A JORDAN HILL RD.	12/16/02		3	a
CONCOW C A JORDAN HILL RD.	01/08/03		<1	trace
CONCOW C A JORDAN HILL RD.	02/18/03		2	a
CONCOW C A JORDAN HILL RD.	03/12/03		2	a
CONCOW C A JORDAN HILL RD.	04/15/03		2	a
CONCOW C A JORDAN HILL RD.	05/13/03		<1	trace
CONCOW C A JORDAN HILL RD.	06/11/03		<1	a
CONCOW C A JORDAN HILL RD.	07/15/03		<1	trace
CONCOW C A JORDAN HILL RD.	08/19/03		<1	a
CONCOW C A JORDAN HILL RD.	09/16/03		2	a
CONCOW C A JORDAN HILL RD.	10/16/03		<1	-
CONCOW C A JORDAN HILL RD.	11/12/03		2	a
CONCOW C A JORDAN HILL RD.	12/09/03		<1	a
CONCOW C A JORDAN HILL RD.	01/14/04		1	a
CONCOW C A JORDAN HILL RD. (storm)	02/03/04		2	a
CONCOW C A JORDAN HILL RD.	02/18/04		8	0.1
CONCOW C A JORDAN HILL RD.	03/15/04		<1	a
CONCOW C A JORDAN HILL RD.	04/13/04		<1	trace
POE PH OUTFLOW	07/15/02		2	a

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Station Name	Date	Depth (meters)	Total Suspended Solids (mg/L)	Settleable Solids (mL/L)
POE PH OUTFLOW	08/20/02		1	a
POE PH OUTFLOW	09/24/02		2	a
POE PH OUTFLOW	10/17/02		2	a
POE PH OUTFLOW	11/12/02		3	-
POE PH OUTFLOW	12/10/02		3	a
POE PH OUTFLOW	12/16/02		57	0.1
POE PH OUTFLOW	01/08/03		2	a
POE PH OUTFLOW	02/18/03		5	a
POE PH OUTFLOW	03/12/03		<1	a
POE PH OUTFLOW	04/15/03		4	a
POE PH OUTFLOW	05/13/03		5	trace
POE PH OUTFLOW	06/11/03		3	a
POE PH OUTFLOW	07/15/03		2	a
POE PH OUTFLOW	08/19/03		2	a
POE PH OUTFLOW	09/16/03		1	a
POE PH OUTFLOW	10/16/03		2	-
POE PH OUTFLOW	11/12/03		1	a
POE PH OUTFLOW	12/09/03		5	a
POE PH OUTFLOW	01/14/04		2	a
POE PH OUTFLOW (storm)	02/03/04		2	a
POE PH OUTFLOW	02/18/04		262	1.1
POE PH OUTFLOW	03/15/04		7	a
POE PH OUTFLOW	04/13/04		3	a
W BRANCH FEATHER RIVER	03/28/02	0.15	2	
W BRANCH FEATHER RIVER	04/23/02	0.15	2	a
W BRANCH FEATHER RIVER	05/21/02	0.15		a
W BRANCH FEATHER RIVER	06/25/02	0.15	26	a
W BRANCH FEATHER RIVER	07/15/02	0.15	<1	a

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Station Name	Date	Depth (meters)	Total Suspended Solids (mg/L)	Settleable Solids (mL/L)
W BRANCH FEATHER RIVER	08/20/02		<1	a
W BRANCH FEATHER RIVER	09/24/02		<1	a
W BRANCH FEATHER RIVER	10/18/02		<1	a
W BRANCH FEATHER RIVER	11/12/02		<1	-
W BRANCH FEATHER RIVER	12/10/02		2	a
W BRANCH FEATHER RIVER	12/16/02		44	0.2
W BRANCH FEATHER RIVER	01/08/03		<1	a
W BRANCH FEATHER RIVER	02/18/03		3	a
W BRANCH FEATHER RIVER	03/12/03		2	a
W BRANCH FEATHER RIVER	04/15/03		2	a
W BRANCH FEATHER RIVER	05/13/03		1	a
W BRANCH FEATHER RIVER	06/11/03		<1	a
W BRANCH FEATHER RIVER	07/15/03		3	a
W BRANCH FEATHER RIVER	08/19/03		<1	a
W BRANCH FEATHER RIVER	09/16/03		<1	a
W BRANCH FEATHER RIVER	10/16/03		<1	-
W BRANCH FEATHER RIVER	11/12/03		<1	a
W BRANCH FEATHER RIVER	12/09/03		<1	a
W BRANCH FEATHER RIVER	01/14/04		<1	a
W BRANCH FEATHER RIVER (storm)	02/03/04		1	a
W BRANCH FEATHER RIVER	02/18/04		144	0.5
W BRANCH FEATHER RIVER	03/15/04		<1	a
W BRANCH FEATHER RIVER	04/13/04		2	trace
Lake Oroville - Middle Fork	04/29/02	0.15	2	a
Lake Oroville - Middle Fork	04/29/02	75	1	a
Lake Oroville - Middle Fork	05/23/02	0.15	<1	a
Lake Oroville - Middle Fork	05/23/02	72	<1	a
Lake Oroville - Middle Fork	06/18/02	0.15	4	a

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Station Name	Date	Depth (meters)	Total Suspended Solids (mg/L)	Settleable Solids (mL/L)
Lake Oroville - Middle Fork	06/18/02	78	4	a
Lake Oroville - Middle Fork	07/16/02	0.15	2	a
Lake Oroville - Middle Fork	07/16/02	51	<1	a
Lake Oroville - Middle Fork	08/14/02	0.15	2	a
Lake Oroville - Middle Fork	08/14/02	60	2	a
Lake Oroville - Middle Fork	09/19/02	0.15		a
Lake Oroville - Middle Fork	09/19/02	81		trace
Lake Oroville - Middle Fork	10/23/02	0.15	<1	a
Lake Oroville - Middle Fork	10/23/02	75	6	a
Lake Oroville - Middle Fork	11/21/02	0.15	2	a
Lake Oroville - Middle Fork	11/21/02	51	10	
Lake Oroville - Middle Fork	12/17/02	0.15	10	a
Lake Oroville - Middle Fork	12/17/02	60	8	a
Lake Oroville - Middle Fork	01/15/03	0.15	1	a
Lake Oroville - Middle Fork	02/20/03	0.15	<1	a
Lake Oroville - Middle Fork	02/20/03	105	1	a
Lake Oroville - Middle Fork	03/24/03	0.15	2	a
Lake Oroville - Middle Fork	03/24/03	100	4	a
Lake Oroville - Middle Fork	04/22/03	0.15	2	a
Lake Oroville - Middle Fork	04/22/03	105		a
Lake Oroville - Middle Fork	08/26/03	0.15	<5.0	
Lake Oroville - Middle Fork	08/26/03	78	<5.0	
Lake Oroville - Middle Fork	09/23/03	0.15	2	
Lake Oroville - Middle Fork	10/22/03	0.15	<1	
Lake Oroville - Middle Fork	10/22/03	105	4	
Lake Oroville - Middle Fork	11/19/03	0.15	4	a
Lake Oroville - Middle Fork	11/19/03	96	3	a
Lake Oroville - Middle Fork	12/16/03	0.15	<1	a
Lake Oroville - Middle Fork	12/16/03	96	<1	a

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Station Name	Date	Depth (meters)	Total Suspended Solids (mg/L)	Settleable Solids (mL/L)
Lake Oroville - Middle Fork	01/21/04	0.15	1	a
Lake Oroville - Middle Fork	01/21/04	80	2	a
Lake Oroville - Middle Fork	02/26/04	0.15	<1	a
Lake Oroville - Middle Fork	02/26/04	90	<1	a
Lake Oroville - Middle Fork	03/23/04	0.15	<1	a
Lake Oroville - Middle Fork	03/23/04	120	<1.	a
Lake Oroville - North Fork	04/23/02	0.15		
Lake Oroville - North Fork	04/23/02	89		0.4
Lake Oroville - North Fork	04/23/02	110	7	
Lake Oroville - North Fork	05/21/02	0.15		a
Lake Oroville - North Fork	05/21/02	102		a
Lake Oroville - North Fork	06/25/02	0.15	<1	a
Lake Oroville - North Fork	06/25/02	87	<1	a
Lake Oroville - North Fork	07/22/02	0.15	1	a
Lake Oroville - North Fork	07/22/02	103	<1	a
Lake Oroville - North Fork	08/13/02	SFC	1	a
Lake Oroville - North Fork	08/13/02	105	2	a
Lake Oroville - North Fork	09/20/02	0.15		a
Lake Oroville - North Fork	10/28/02	0.15	2	a
Lake Oroville - North Fork	10/28/02	99	6	a
Lake Oroville - North Fork	11/21/02	0.15	<1	a
Lake Oroville - North Fork	11/21/02	63	2	a
Lake Oroville - North Fork	01/17/03	0.15	1	
Lake Oroville - North Fork	01/17/03	90	26	
Lake Oroville - North Fork	02/24/03	0.15	2	a
Lake Oroville - North Fork	02/24/03	114		a
Lake Oroville - North Fork	03/20/03	0.15	2	a
Lake Oroville - North Fork	03/20/03	96		a

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Station Name	Date	Depth (meters)	Total Suspended Solids (mg/L)	Settleable Solids (mL/L)
Lake Oroville - North Fork	04/30/03	0.15	<1	
Lake Oroville - North Fork	08/26/03	0.15	<5.0	
Lake Oroville - North Fork	08/26/03	123	<5.0	
Lake Oroville - North Fork	09/10/03	100	2	
Lake Oroville - North Fork	09/10/03	105	2	
Lake Oroville - North Fork	10/21/03	114	<1	
Lake Oroville - North Fork	11/18/03	0.15	<1	
Lake Oroville - North Fork	12/16/03	0.15	<1	a
Lake Oroville - North Fork	12/16/03	114		a
Lake Oroville - North Fork	01/21/04	0.15	1	a
Lake Oroville - North Fork	01/21/04	100	4	a
Lake Oroville - North Fork	03/01/04	0.15	1	a
Lake Oroville - North Fork	03/01/04	140	2	a
Lake Oroville - North Fork	03/22/04	0.15	<1	trace
Lake Oroville - North Fork	03/22/04	141		a
Lake Oroville - North Fork	04/26/04	0.15	2	a
Lake Oroville - North Fork	04/26/04	105	3	a
Lake Oroville - South Fork	04/25/02	0.15	<1	
Lake Oroville - South Fork	04/25/02	12		a
Lake Oroville - South Fork	04/25/02	51	7	0.1
Lake Oroville - South Fork	05/24/02	0.15	<1	a
Lake Oroville - South Fork	05/24/02	54	<1	a
Lake Oroville - South Fork	06/20/02	0.15	5	a
Lake Oroville - South Fork	06/20/02	44	23	a
Lake Oroville - South Fork	07/16/02	0.15	2	a
Lake Oroville - South Fork	07/16/02	51	<1	a
Lake Oroville - South Fork	08/19/02	0.15	5	a
Lake Oroville - South Fork	08/19/02	36	1	a

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Station Name	Date	Depth (meters)	Total Suspended Solids (mg/L)	Settleable Solids (mL/L)
Lake Oroville - South Fork	09/19/02	0.15		a
Lake Oroville - South Fork	09/19/02	36		a
Lake Oroville - South Fork	10/23/02	0.15	3	a
Lake Oroville - South Fork	10/23/02	33	5	a
Lake Oroville - South Fork	11/21/02	0.15	3	a
Lake Oroville - South Fork	11/21/02	29	36	trace
Lake Oroville - South Fork	12/17/02	0.15	23	trace
Lake Oroville - South Fork	12/17/02	29	18	a
Lake Oroville - South Fork	01/15/03	0.15	2	a
Lake Oroville - South Fork	01/15/03	51		0.8
Lake Oroville - South Fork	02/20/03	0.15	2	a
Lake Oroville - South Fork	02/20/03	42	<1	a
Lake Oroville - South Fork	03/24/03	0.15	4	a
Lake Oroville - South Fork	03/24/03	45	2	a
Lake Oroville - South Fork	04/22/03	0.15	2	a
Lake Oroville - South Fork	04/22/03	54		a
Lake Oroville - South Fork	08/26/03	0.15	<5.0	
Lake Oroville - South Fork	08/26/03	50	<5.0	
Lake Oroville - South Fork	09/23/03	0.15	3	
Lake Oroville - South Fork	09/23/03	65	2	
Lake Oroville - South Fork	10/22/03	0.15	2	
Lake Oroville - South Fork	10/22/03	60	1	
Lake Oroville - South Fork	11/19/03	0.15	2	a
Lake Oroville - South Fork	11/19/03	56	2	a
Lake Oroville - South Fork	12/16/03	0.15	<1	a
Lake Oroville - South Fork	12/16/03	60	1	a
Lake Oroville - South Fork	01/20/04	0.15	<1	a
Lake Oroville - South Fork	01/20/04	60	<1	a
Lake Oroville - South Fork	02/23/04	0.15	<1	a

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Station Name	Date	Depth (meters)	Total Suspended Solids (mg/L)	Settleable Solids (mL/L)
Lake Oroville - South Fork	02/23/04	75	1	a
Lake Oroville - South Fork	03/23/04	0.15	<1	a
Lake Oroville - South Fork	03/23/04	60	<1	a
Lake Oroville - Main Body	04/30/02	0.15	2	
Lake Oroville - Main Body	04/30/02	126	1	
Lake Oroville - Main Body	05/28/02	0.15	<1	a
Lake Oroville - Main Body	05/28/02	132		a
Lake Oroville - Main Body	05/28/02	143	<1	
Lake Oroville - Main Body	06/26/02	0.15	<1	a
Lake Oroville - Main Body	06/26/02	105	<1	a
Lake Oroville - Main Body	07/17/02	0.15	<1	a
Lake Oroville - Main Body	07/17/02	105	1	
Lake Oroville - Main Body	08/14/02	0.15	1	
Lake Oroville - Main Body	08/14/02	75	<1	a
Lake Oroville - Main Body	09/23/02	0.15	1	a
Lake Oroville - Main Body	09/23/02	93		a
Lake Oroville - Main Body	09/23/02	95	1	
Lake Oroville - Main Body	10/23/02	0.15	<1	a
Lake Oroville - Main Body	10/23/02	75		a
Lake Oroville - Main Body	01/15/03	0.15		a
Lake Oroville - Main Body	02/19/03	0.15	<1	a
Lake Oroville - Main Body	02/19/03	123	<1	a
Lake Oroville - Main Body	03/25/03	0.15	2	a
Lake Oroville - Main Body	03/25/03	96	2	a
Lake Oroville - Main Body	04/30/03	0.15	2	
Lake Oroville - Main Body	08/25/03	0.15	<5.0	
Lake Oroville - Main Body	08/25/03	51	<5.0	
Lake Oroville - Main Body	10/21/03	0.15	<1	

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Station Name	Date	Depth (meters)	Total Suspended Solids (mg/L)	Settleable Solids (mL/L)
Lake Oroville - Main Body	10/21/03	110	<1	
Lake Oroville - Main Body	11/18/03	0.15	<1	
Lake Oroville - Main Body	12/15/03	0.15	<1	a
Lake Oroville - Main Body	12/15/03	110	<1	a
Lake Oroville - Main Body	01/20/04	0.15	<1	a
Lake Oroville - Main Body	01/20/04	150	<1	a
Lake Oroville - Main Body	02/23/04	0.15	<1	a
Lake Oroville - Main Body	02/23/04	135	<1	a
Lake Oroville - Main Body	03/22/04	0.15	2	
Lake Oroville at Dam	05/02/02	0.15	<1	
Lake Oroville at Dam	05/02/02	153	<1	
Lake Oroville at Dam	05/29/02	0.15	<1	
Lake Oroville at Dam	05/29/02	68	<1	
Lake Oroville at Dam	05/29/02	69		a
Lake Oroville at Dam	06/26/02	0.15	1	a
Lake Oroville at Dam	06/26/02	59	2	
Lake Oroville at Dam	06/26/02	60		a
Lake Oroville at Dam	06/26/02	105	<1	a
Lake Oroville at Dam	07/17/02	0.15	<1	a
Lake Oroville at Dam	07/17/02	16	2	
Lake Oroville at Dam	07/17/02	123	<1	a
Lake Oroville at Dam	08/15/02	0.15	1	a
Lake Oroville at Dam	08/15/02	60	<1	a
Lake Oroville at Dam	08/15/02	123	2	a
Lake Oroville at Dam	09/18/02	0.15		a
Lake Oroville at Dam	09/18/02	56	<1	
Lake Oroville at Dam	09/18/02	60		a
Lake Oroville at Dam	09/18/02	150		a

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Station Name	Date	Depth (meters)	Total Suspended Solids (mg/L)	Settleable Solids (mL/L)
Lake Oroville at Dam	10/21/02	0.15	1	a
Lake Oroville at Dam	10/21/02	60		a
Lake Oroville at Dam	10/21/02	141	<1	a
Lake Oroville at Dam	11/20/02	0.15	1	
Lake Oroville at Dam	11/20/02	69	2	
Lake Oroville at Dam	01/17/03	0.15	1	
Lake Oroville at Dam	01/17/03	60	<1	
Lake Oroville at Dam	01/17/03	141	1	
Lake Oroville at Dam	02/19/03	0.15	<1	a
Lake Oroville at Dam	02/19/03	78	<1	a
Lake Oroville at Dam	02/19/03	168	<1	a
Lake Oroville at Dam	03/25/03	0.15	3	a
Lake Oroville at Dam	03/25/03	78	3	
Lake Oroville at Dam	03/25/03	177	2	a
Lake Oroville at Dam	04/21/03	0.15	2	a
Lake Oroville at Dam	04/21/03	78	2	a
Lake Oroville at Dam	04/21/03	178	2	a
Lake Oroville at Dam	06/23/03	0.15	2	
Lake Oroville at Dam	06/23/03	100	1	
Lake Oroville at Dam	06/23/03	170	2	
Lake Oroville at Dam	07/21/03	0.15	2	
Lake Oroville at Dam	07/21/03	80	2	
Lake Oroville at Dam	07/21/03	150	2	
Lake Oroville at Dam	08/25/03	0.15	<5	
Lake Oroville at Dam	08/25/03	69	<5	
Lake Oroville at Dam	08/25/03	150	<5	
Lake Oroville at Dam	10/20/03	0.15	<1	
Lake Oroville at Dam	11/17/03	0.15	<1	a
Lake Oroville at Dam	11/17/03	60	<1	a

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Station Name	Date	Depth (meters)	Total Suspended Solids (mg/L)	Settleable Solids (mL/L)
Lake Oroville at Dam	11/17/03	126	<1	a
Lake Oroville at Dam	12/15/03	1	<1	a
Lake Oroville at Dam	12/15/03	60	2	a
Lake Oroville at Dam	12/15/03	128	<1	a
Lake Oroville at Dam	01/20/04	0.15	<1	a
Lake Oroville at Dam	01/20/04	60	<1	a
Lake Oroville at Dam	01/20/04	100	<1	a
Lake Oroville at Dam	02/23/04	0.15	<1	a
Lake Oroville at Dam	02/23/04	60	<1	a
Lake Oroville at Dam	02/23/04	130	<1	a
Lake Oroville at Dam	03/22/04	0.15	1	a
Lake Oroville at Dam	03/22/04	60	2	a
Lake Oroville at Dam	03/22/04	150		a
Lake Oroville at Dam	04/22/04	0.15	2	a
Lake Oroville at Dam	04/22/04	90	1	a
Lake Oroville at Dam	04/22/04	130	1	a
Thermalito Diversion Pool US of Power Plant	04/03/02	0.15	1	
Thermalito Diversion Pool US of Power Plant	04/22/02	0.15	<1	trace
Thermalito Diversion Pool US of Power Plant	05/22/02	0.15	<1	
Thermalito Diversion Pool US of Power Plant	06/18/02	0.15	2	0.2
Thermalito Diversion Pool US of Power Plant	07/23/02	0.15	<1	a
Thermalito Diversion Pool US of Power Plant	08/20/02	0.15	2	a
Thermalito Diversion Pool US of Power Plant	09/24/02	0.15	2	a
Thermalito Diversion Pool US of Power Plant	10/24/02	0.15	2	a
Thermalito Diversion Pool US of Power Plant	11/17/03	0.15	<1	a
Thermalito Diversion Pool US of Power Plant	11/18/02	0.15	3	
Thermalito Diversion Pool US of Power Plant	12/16/02	SFC	4	a
Thermalito Diversion Pool US of Power Plant	01/13/03	0.15	2	a

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Station Name	Date	Depth (meters)	Total Suspended Solids (mg/L)	Settleable Solids (mL/L)
Thermalito Diversion Pool US of Power Plant	02/25/03	0.15	<1	
Thermalito Diversion Pool US of Power Plant	03/18/03	0.15	1	a
Thermalito Diversion Pool US of Power Plant	04/14/03	0.15	<1	
Thermalito Diversion Pool US of Power Plant	08/26/03	0.15	<5.0	
Thermalito Diversion Pool US of Power Plant	09/23/03	0.15	2	
Thermalito Diversion Pool US of Power Plant	11/17/03	0.15	<1	
Thermalito Diversion Pool US of Power Plant	12/15/03	0.15	<1	a
Thermalito Diversion Pool US of Power Plant	01/21/04	0.15	2	a
Thermalito Diversion Pool US of Power Plant	02/23/04	0.15	<1	a
Thermalito Diversion Pool US of Power Plant	03/22/04	0.15	<1	a
Thermalito Diversion Pool US of Power Plant	04/20/04	0.15	<1	a
Thermalito Diversion Pool DS power plant	05/22/02	0.15		a
Thermalito Diversion Pool DS power plant	02/25/03	0.15		a
Thermalito Diversion Pool DS power plant	03/18/03	0.15	1	trace
Thermalito Diversion Pool DS power plant	04/14/03	0.15	1	
Thermalito Diversion Pool DS power plant	08/26/03	0.15	6	
Thermalito Diversion Pool DS power plant	09/23/03	0.15	4	
Thermalito Diversion Pool DS power plant	10/20/03	0.15	<1	
Thermalito Diversion Pool DS power plant	11/17/03	0.15	1	a
Thermalito Diversion Pool DS power plant	12/15/03	0.15	6	trace
Thermalito Diversion Pool DS power plant	01/21/04	0.15	1	a
Thermalito Diversion Pool DS power plant	02/23/04	0.15	5	0.5
Thermalito Diversion Pool DS power plant	03/22/04	0.15		0.1
Thermalito Diversion Pool DS power plant	04/20/04	0.15	<1	a
Thermalito Diversion Pool US Dam	04/03/02	0.15	<1	
Thermalito Diversion Pool US Dam	04/22/02	0.15	<1	a
Thermalito Diversion Pool US Dam	04/22/02	18	1	a

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Station Name	Date	Depth (meters)	Total Suspended Solids (mg/L)	Settleable Solids (mL/L)
Thermalito Diversion Pool US Dam	05/22/02	0.15	<1	a
Thermalito Diversion Pool US Dam	05/22/02	24	2	a
Thermalito Diversion Pool US Dam	06/18/02	0.15	3	a
Thermalito Diversion Pool US Dam	06/18/02	27	5	a
Thermalito Diversion Pool US Dam	07/22/02	0.15	<1	a
Thermalito Diversion Pool US Dam	07/22/02	19	<1	a
Thermalito Diversion Pool US Dam	08/20/02	0.15	1	a
Thermalito Diversion Pool US Dam	08/20/02	15	2	0.1
Thermalito Diversion Pool US Dam	09/24/02	0.15	<1	a
Thermalito Diversion Pool US Dam	09/24/02	24	3	trace
Thermalito Diversion Pool US Dam	10/24/02	0.15	2	a
Thermalito Diversion Pool US Dam	10/24/02	14	4	a
Thermalito Diversion Pool US Dam	11/18/02	0.15	3	
Thermalito Diversion Pool US Dam	11/18/02	21	<1	
Thermalito Diversion Pool US Dam	12/16/03	0.15	3	a
Thermalito Diversion Pool US Dam	12/16/03	14	2	a
Thermalito Diversion Pool US Dam	01/13/03	0.15	3	a
Thermalito Diversion Pool US Dam	01/13/03	17	3	a
Thermalito Diversion Pool US Dam	02/27/03	0.15	<1	a
Thermalito Diversion Pool US Dam	02/27/03	15	1	a
Thermalito Diversion Pool US Dam	03/18/03	0.15	3	a
Thermalito Diversion Pool US Dam	03/18/03	20	3	a
Thermalito Diversion Pool US Dam	04/14/03	0.15	2	
Thermalito Diversion Pool US Dam	04/14/03	14	1	expired
Thermalito Diversion Pool US Dam	05/28/03	0.15	1	
Thermalito Diversion Pool US Dam	05/28/03	17	2	
Thermalito Diversion Pool US Dam	06/24/03	0.15	2	a
Thermalito Diversion Pool US Dam	06/24/03	21	<1	a
Thermalito Diversion Pool US Dam	08/05/03	0.15	2	

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Station Name	Date	Depth (meters)	Total Suspended Solids (mg/L)	Settleable Solids (mL/L)
Thermalito Diversion Pool US Dam	08/05/03	18	<1	
Thermalito Diversion Pool US Dam	08/26/03	0.15	<5	
Thermalito Diversion Pool US Dam	08/26/03	18	<5	
Thermalito Diversion Pool US Dam	08/26/03	23	<5	
Thermalito Diversion Pool US Dam	09/23/03	0.15	1	
Thermalito Diversion Pool US Dam	09/23/03	25	2	
Thermalito Diversion Pool US Dam	11/17/03	0.15	<1	a
Thermalito Diversion Pool US Dam	11/17/03	25	1	a
Thermalito Diversion Pool US Dam	12/16/03	0.15	<1	a
Thermalito Diversion Pool US Dam	12/16/03	24	<1	a
Thermalito Diversion Pool US Dam	01/21/04	0.15	<1	a
Thermalito Diversion Pool US Dam	01/21/04	20	1	a
Thermalito Diversion Pool US Dam	02/23/04	0.15	1	a
Thermalito Diversion Pool US Dam	02/23/04	25	1	
Thermalito Diversion Pool US Dam	03/22/04	0.15	<1	a
Thermalito Diversion Pool US Dam	03/22/04	27	<1	a
Thermalito Diversion Pool US Dam	04/20/04	0.15	<1	a
Thermalito Diversion Pool US Dam	04/20/04	21	<1	a
Thermalito Forebay, north	04/02/02	0.15	<1	a
Thermalito Forebay, north	04/02/02	1		a
Thermalito Forebay, north	04/02/02	2		a
Thermalito Forebay, north	04/02/02	3		a
Thermalito Forebay, north	04/02/02	4		a
Thermalito Forebay, north	04/02/02	5		a
Thermalito Forebay, north	04/02/02	6		a
Thermalito Forebay, north	04/02/02	7		a
Thermalito Forebay, north	04/02/02	7.2	<1	a
Thermalito Forebay, north	04/29/02	0.15	2	n/a

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Station Name	Date	Depth (meters)	Total Suspended Solids (mg/L)	Settleable Solids (mL/L)
Thermalito Forebay, north	04/29/02	1		a
Thermalito Forebay, north	04/29/02	5.5	3	a
Thermalito Forebay, north	05/22/02	0.15	<1	a
Thermalito Forebay, north	05/22/02	8	8	0.1
Thermalito Forebay, north	06/17/02	0.15	3	a
Thermalito Forebay, north	06/17/02	5	4	a
Thermalito Forebay, north	07/18/02	0.15	2	
Thermalito Forebay, north	07/18/02	6	2	a
Thermalito Forebay, north	08/19/02	0.15	2	a
Thermalito Forebay, north	08/19/02	6	<1	a
Thermalito Forebay, north	09/17/02	0.15	2	a
Thermalito Forebay, north	09/17/02	3.5	1	a
Thermalito Forebay, north	10/22/02	0.15	1	a
Thermalito Forebay, north	10/22/02	8	<1	a
Thermalito Forebay, north	11/19/02	0.15	2	a
Thermalito Forebay, north	11/19/02	8	2	a
Thermalito Forebay, north	12/12/02	0.15	2	a
Thermalito Forebay, north	12/12/02	8	3	a
Thermalito Forebay, north	01/14/03	0.15	2	a
Thermalito Forebay, north	01/14/03	8	3	a
Thermalito Forebay, north	02/26/03	0.15	1	a
Thermalito Forebay, north	02/26/03	8	2	a
Thermalito Forebay, north	03/19/03	0.15	2	a
Thermalito Forebay, north	03/19/03	7	2	a
Thermalito Forebay, north	04/15/03	0.15	<1	a
Thermalito Forebay, north	04/15/03	8	2	a
Thermalito Forebay, north	05/20/03	0.15	2	a
Thermalito Forebay, north	05/20/03	8	2	a
Thermalito Forebay, north	06/23/03	0.15	<1	a

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Station Name	Date	Depth (meters)	Total Suspended Solids (mg/L)	Settleable Solids (mL/L)
Thermalito Forebay, north	06/23/03	8	3	a
Thermalito Forebay, north	07/21/03	0.15	2	a
Thermalito Forebay, north	07/21/03	9	3	a
Thermalito Forebay, north	08/25/03	0.15	<5.0	a
Thermalito Forebay, north	08/25/03	8	<5.0	a
Thermalito Forebay, north	09/22/03	0.15	9	a
Thermalito Forebay, north	09/22/03	8	<1	a
Thermalito Forebay, north	10/21/03	0.15	<1	a
Thermalito Forebay, north	10/21/03	8	<1	a
Thermalito Forebay, north	11/18/03	0.15	<1	a
Thermalito Forebay, north	11/18/03	8	<1	a
Thermalito Forebay, north	12/16/03	0.15	<1	a
Thermalito Forebay, north	12/16/03	8	<1	a
Thermalito Forebay, north	01/20/04	0.15	<1	a
Thermalito Forebay, north	01/20/04	6	28	a
Thermalito Forebay, north	02/23/04	0.15	<1	a
Thermalito Forebay, north	02/23/04	8	1	a
Thermalito Forebay, north	03/22/04	0.15	2	
Thermalito Forebay, north	03/22/04	8	2	
Thermalito Forebay, north	04/19/04	0.15	<1	a
Thermalito Forebay, north	04/19/04	8	<1	a
Thermalito Forebay, south	04/02/02	0.15	<1	a
Thermalito Forebay, south	04/02/02	1	n/a	n/a
Thermalito Forebay, south	04/02/02	9	1	a
Thermalito Forebay, south	04/29/02	0.15	1	a
Thermalito Forebay, south	04/29/02	7	2	a
Thermalito Forebay, south	05/22/02	0.15	<1	a
Thermalito Forebay, south	05/22/02	9	1	a

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Station Name	Date	Depth (meters)	Total Suspended Solids (mg/L)	Settleable Solids (mL/L)
Thermalito Forebay, south	06/17/02	0.15	2	a
Thermalito Forebay, south	06/17/02	9	4	a
Thermalito Forebay, south	07/18/02	0.15	<1	a
Thermalito Forebay, south	07/18/02	11	2	a
Thermalito Forebay, south	08/19/02	0.15	2	a
Thermalito Forebay, south	08/19/02	7.5	1	a
Thermalito Forebay, south	09/17/02	0.15	2	a
Thermalito Forebay, south	09/17/02	6	1	a
Thermalito Forebay, south	10/22/02	0.15	<1	a
Thermalito Forebay, south	10/22/02	10	1	a
Thermalito Forebay, south	11/19/02	0.15	2	a
Thermalito Forebay, south	11/19/02	9	3	a
Thermalito Forebay, south	12/12/02	0.15	4	a
Thermalito Forebay, south	12/12/02	9	4	a
Thermalito Forebay, south	01/14/03	0.15	3	a
Thermalito Forebay, south	01/14/03	10	2	a
Thermalito Forebay, south	02/26/03	0.15	1	a
Thermalito Forebay, south	02/26/03	10	3	a
Thermalito Forebay, south	03/19/03	0.15	1	a
Thermalito Forebay, south	03/19/03	10	2	a
Thermalito Forebay, south	04/15/03	0.15	<1	a
Thermalito Forebay, south	04/15/03	10	<1	a
Thermalito Forebay, south	05/20/03	0.15	2	a
Thermalito Forebay, south	05/20/03	11	<1	a
Thermalito Forebay, south	06/23/03	0.15	1	
Thermalito Forebay, south	06/23/03	11	2	
Thermalito Forebay, south	07/21/03	0.15	2	a
Thermalito Forebay, south	07/21/03	10	4	a
Thermalito Forebay, south	08/25/03	0.15	<5	a

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Station Name	Date	Depth (meters)	Total Suspended Solids (mg/L)	Settleable Solids (mL/L)
Thermalito Forebay, south	08/25/03	9	<5	a
Thermalito Forebay, south	09/22/03	0.15	<1	a
Thermalito Forebay, south	09/22/03	9	2	a
Thermalito Forebay, south	10/21/03	0.15	<1	a
Thermalito Forebay, south	10/21/03	10	<1	a
Thermalito Forebay, south	11/18/03	0.15	2	a
Thermalito Forebay, south	11/18/03	8.5	20	trace
Thermalito Forebay, south	12/16/03	0.15	<1	a
Thermalito Forebay, south	12/16/03	10	<1	a
Thermalito Forebay, south	01/20/04	0.15	<1	a
Thermalito Forebay, south	01/20/04	11	<1	a
Thermalito Forebay, south	02/23/04	0.15	<1	a
Thermalito Forebay, south	02/23/04	9	1	
Thermalito Forebay, south	03/22/04	0.15	3	
Thermalito Forebay, south	03/22/04	10	1	
Thermalito Forebay, south	04/19/04	0.15	<1	a
Thermalito Forebay, south	04/19/04	8.5	<1	trace
Thermalito Afterbay, north	04/02/02	0.15	2	a
Thermalito Afterbay, north	04/02/02	1		a
Thermalito Afterbay, north	04/02/02	2		a
Thermalito Afterbay, north	04/02/02	3		a
Thermalito Afterbay, north	04/02/02	4	2	a
Thermalito Afterbay, north	04/24/02	0.15	<1	a
Thermalito Afterbay, north	04/24/02	3.5	<1	a
Thermalito Afterbay, north	05/23/02	0.15	<1	a
Thermalito Afterbay, north	05/23/02	4	2	a
Thermalito Afterbay, north	06/17/02	0.15	4	a
Thermalito Afterbay, north	06/17/02	2.75	4	a

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Station Name	Date	Depth (meters)	Total Suspended Solids (mg/L)	Settleable Solids (mL/L)
Thermalito Afterbay, north	07/18/02	0.15	2	a
Thermalito Afterbay, north	07/18/02	5	4	a
Thermalito Afterbay, north	08/19/02	0.15	2	a
Thermalito Afterbay, north	08/19/02	3.5	2	a
Thermalito Afterbay, north	09/17/02	0.15	<1	a
Thermalito Afterbay, north	09/17/02	4	2	a
Thermalito Afterbay, north	10/22/02	0.15	1	a
Thermalito Afterbay, north	10/22/02	3.5	2	a
Thermalito Afterbay, north	11/19/02	0.15	2	a
Thermalito Afterbay, north	11/19/02	4	2	a
Thermalito Afterbay, north	12/12/02	0.15	4	a
Thermalito Afterbay, north	12/12/02	4	5	a
Thermalito Afterbay, north	01/14/03	0.15	2	a
Thermalito Afterbay, north	01/14/03	3	3	a
Thermalito Afterbay, north	02/26/03	0.15	3	a
Thermalito Afterbay, north	02/26/03	3	1	a
Thermalito Afterbay, north	03/19/03	0.15	2	a
Thermalito Afterbay, north	03/19/03	5	2	a
Thermalito Afterbay, north	04/15/03	0.15	1	a
Thermalito Afterbay, north	04/15/03	5	2	a
Thermalito Afterbay, north	05/20/03	0.15	1	a
Thermalito Afterbay, north	05/20/03	4	3	a
Thermalito Afterbay, north	06/24/03	0.15	2	a
Thermalito Afterbay, north	06/24/03	5	1	a
Thermalito Afterbay, north	07/21/03	0.15	2	a
Thermalito Afterbay, north	07/21/03	5	3	a
Thermalito Afterbay, north	08/25/03	0.15	<5	a
Thermalito Afterbay, north	08/25/03	3.2	<5	a
Thermalito Afterbay, north	09/22/03	0.15	<1	a

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Station Name	Date	Depth (meters)	Total Suspended Solids (mg/L)	Settleable Solids (mL/L)
Thermalito Afterbay, north	09/22/03	4	2	a
Thermalito Afterbay, north	10/21/03	0.15	<1	a
Thermalito Afterbay, north	10/21/03	4	1	a
Thermalito Afterbay, north	11/18/03	0.15	<1	a
Thermalito Afterbay, north	11/18/03	4	<1	a
Thermalito Afterbay, north	12/16/03	0.15	2	a
Thermalito Afterbay, north	12/16/03	4	1	a
Thermalito Afterbay, north	01/20/04	0.15	1	a
Thermalito Afterbay, north	01/20/04	5	<1	a
Thermalito Afterbay, north	02/23/04	0.15	2	
Thermalito Afterbay, north	02/23/04	5	2	a
Thermalito Afterbay, north	03/22/04	0.15	2	
Thermalito Afterbay, north	03/22/04	5	2	
Thermalito Afterbay, north	04/22/04	0.15	2	trace
Thermalito Afterbay, north	04/22/04	5.5	3	a
Thermalito Afterbay, south	04/02/02	0.15	2	a
Thermalito Afterbay, south	04/02/02	1		a
Thermalito Afterbay, south	04/02/02	2		a
Thermalito Afterbay, south	04/02/02	3		a
Thermalito Afterbay, south	04/02/02	4		a
Thermalito Afterbay, south	04/02/02	5	4	a
Thermalito Afterbay, south	04/24/02	0.15	1	a
Thermalito Afterbay, south	04/24/02	4.5	1	a
Thermalito Afterbay, south	05/23/02	0.15	<1	a
Thermalito Afterbay, south	05/23/02	5	2	a
Thermalito Afterbay, south	06/17/02	0.15	4	a
Thermalito Afterbay, south	06/17/02	3	6	a
Thermalito Afterbay, south	07/18/02	0.15	3	a

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Station Name	Date	Depth (meters)	Total Suspended Solids (mg/L)	Settleable Solids (mL/L)
Thermalito Afterbay, south	07/18/02	6	2	n/a
Thermalito Afterbay, south	08/19/02	0.15	3	a
Thermalito Afterbay, south	08/19/02	4.5	3	a
Thermalito Afterbay, south	09/17/02	0.15	<1	a
Thermalito Afterbay, south	09/17/02	4.5	6	a
Thermalito Afterbay, south	10/22/02	0.15	<1	a
Thermalito Afterbay, south	10/22/02	4	4	a
Thermalito Afterbay, south	11/19/02	0.15	<1	a
Thermalito Afterbay, south	11/19/02	3	3	a
Thermalito Afterbay, south	12/12/02	0.15	<1	a
Thermalito Afterbay, south	12/12/02	5	4	a
Thermalito Afterbay, south	01/14/03	0.15	2	a
Thermalito Afterbay, south	01/14/03	4	2	a
Thermalito Afterbay, south	02/26/03	0.15	1	a
Thermalito Afterbay, south	02/26/03	3.8	3	a
Thermalito Afterbay, south	03/19/03	0.15	2	a
Thermalito Afterbay, south	03/19/03	6	3	a
Thermalito Afterbay, south	04/15/03	0.15	2	a
Thermalito Afterbay, south	04/15/03	6	4	a
Thermalito Afterbay, south	05/20/03	0.15	3	a
Thermalito Afterbay, south	05/20/03	4	7	a
Thermalito Afterbay, south	06/24/03	0.15	<1	a
Thermalito Afterbay, south	06/24/03	6	<1	a
Thermalito Afterbay, south	07/21/03	0.15	2	a
Thermalito Afterbay, south	07/21/03	5	3	a
Thermalito Afterbay, south	08/25/03	0.15	<5	a
Thermalito Afterbay, south	08/25/03	3.1	<5	a
Thermalito Afterbay, south	09/22/03	0.15	<1	a
Thermalito Afterbay, south	09/22/03	3	6	a

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Station Name	Date	Depth (meters)	Total Suspended Solids (mg/L)	Settleable Solids (mL/L)
Thermalito Afterbay, south	10/21/03	0.15	<1	a
Thermalito Afterbay, south	10/21/03	4	<1	a
Thermalito Afterbay, south	11/18/03	0.15	1	a
Thermalito Afterbay, south	11/18/03	4	2	a
Thermalito Afterbay, south	12/16/03	0.15	3	a
Thermalito Afterbay, south	12/16/03	4	2	a
Thermalito Afterbay, south	01/20/04	0.15	<1	a
Thermalito Afterbay, south	01/20/04	5	<1	a
Thermalito Afterbay, south	02/23/04	0.15	2	a
Thermalito Afterbay, south	02/23/04	5	2	a
Thermalito Afterbay, south	03/22/04	0.15	2	a
Thermalito Afterbay, south	03/22/04	4.5	<1	a
Thermalito Afterbay, south	04/22/04	0.15	3	trace
Thermalito Afterbay, south	04/22/04	7	3	a
Thermalito AFBY OL A Feather R	03/28/02	0.15	23	a
Thermalito AFBY OL A Feather R	04/24/02	0.15	23	a
Thermalito AFBY OL A Feather R	05/20/02	0.15	7	a
Thermalito AFBY OL A Feather R	06/25/02	0.15	4	a
Thermalito AFBY OL A Feather R	07/15/02	0.15	2	a
Thermalito AFBY OL A Feather R	08/13/02	0.15	n/a	n/a
Thermalito AFBY OL A Feather R	08/21/02	0.15	3	a
Thermalito AFBY OL A Feather R	09/25/02	0.15	2	a
Thermalito AFBY OL A Feather R	10/22/02	0.15	4	a
Thermalito AFBY OL A Feather R	11/14/02	0.15	n/a	a
Thermalito AFBY OL A Feather R	12/11/02	0.15	10	a
Thermalito AFBY OL A Feather R	12/17/02	0.15	5	a
Thermalito AFBY OL A Feather R	01/14/03	0.15	14	a
Thermalito AFBY OL A Feather R	02/20/03	0.15	7	a

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Station Name	Date	Depth (meters)	Total Suspended Solids (mg/L)	Settleable Solids (mL/L)
Thermolito AFBY OL A Feather R	03/19/03	0.15	15	a
Thermolito AFBY OL A Feather R	04/17/03	0.15	4	a
Thermolito AFBY OL A Feather R	05/15/03	0.15	7	a
Thermolito AFBY OL A Feather R	06/17/03	0.15	3	a
Thermolito AFBY OL A Feather R	07/08/03	0.15	6	a
Thermolito AFBY OL A Feather R	08/11/03	0.15	3	a
Thermolito AFBY OL A Feather R	09/17/03	0.15	2	a
Thermolito AFBY OL A Feather R	10/27/03	0.15	5	a
Thermolito AFBY OL A Feather R	11/17/03	0.15	2	trace
Thermolito AFBY OL A Feather R	12/15/03	0.15	1	a
Thermolito AFBY OL A Feather R	01/13/04	0.15	5	a
Thermolito AFBY OL A Feather R	02/03/04	0.15	9	trace
Thermolito AFBY OL A Feather R	02/10/04	0.15	8	a
Thermolito AFBY OL A Feather R	02/19/04	0.15	5	trace
Thermolito AFBY OL A Feather R	02/27/04	0.15	2	
Thermolito AFBY OL A Feather R	03/10/04	0.15	4	
Thermolito AFBY OL A Feather R	04/06/04	0.15	2	
UPPER PACIFIC HEIGHTS POND	05/30/02	SFC	7	a
UPPER PACIFIC HEIGHTS POND	06/28/02	SFC	<1	
UPPER PACIFIC HEIGHTS POND	07/24/02	SFC	14	a
UPPER PACIFIC HEIGHTS POND	08/22/02	SFC	<1.0	a
UPPER PACIFIC HEIGHTS POND	09/18/02	SFC	<1	a
UPPER PACIFIC HEIGHTS POND	10/23/02	SFC	<1	a
UPPER PACIFIC HEIGHTS POND	11/14/02	SFC	1	
UPPER PACIFIC HEIGHTS POND	12/19/02	SFC	1	trace
UPPER PACIFIC HEIGHTS POND	01/21/03	SFC	<1	a
UPPER PACIFIC HEIGHTS POND	02/10/03	SFC	2	a
UPPER PACIFIC HEIGHTS POND	03/26/03	SFC	3	a

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Station Name	Date	Depth (meters)	Total Suspended Solids (mg/L)	Settleable Solids (mL/L)
UPPER PACIFIC HEIGHTS POND	04/24/03	SFC	4	a
UPPER PACIFIC HEIGHTS POND	06/03/03	SFC	<1	a
UPPER PACIFIC HEIGHTS POND	06/25/03	SFC	2	a
UPPER PACIFIC HEIGHTS POND	07/24/03	SFC	2	a
UPPER PACIFIC HEIGHTS POND	08/21/03	SFC	<1	a
UPPER PACIFIC HEIGHTS POND	09/22/03	SFC	<1	a
UPPER PACIFIC HEIGHTS POND	10/20/03	SFC	<1	a
UPPER PACIFIC HEIGHTS POND	11/18/03	SFC	<1	a
UPPER PACIFIC HEIGHTS POND	12/16/03	SFC	2	a
UPPER PACIFIC HEIGHTS POND	01/13/04	SFC	<1	a
UPPER PACIFIC HEIGHTS POND	02/10/04	SFC	1	a
UPPER PACIFIC HEIGHTS POND	03/10/04	SFC	2	a
UPPER PACIFIC HEIGHTS POND	04/07/04	SFC	2	trace
LOWER PACIFIC HEIGHTS POND	05/30/02	SFC	2	a
LOWER PACIFIC HEIGHTS POND	06/28/02	SFC	<1.0	a
LOWER PACIFIC HEIGHTS POND	07/24/02	SFC	4	trace
LOWER PACIFIC HEIGHTS POND	08/22/02	SFC	2	a
LOWER PACIFIC HEIGHTS POND	09/18/02	SFC	1	a
LOWER PACIFIC HEIGHTS POND	10/23/02	SFC	2	a
LOWER PACIFIC HEIGHTS POND	11/14/02	SFC	2	
LOWER PACIFIC HEIGHTS POND	12/19/02	SFC	4	trace
LOWER PACIFIC HEIGHTS POND	01/21/03	SFC	1	a
LOWER PACIFIC HEIGHTS POND	02/10/03	SFC	2	a
LOWER PACIFIC HEIGHTS POND	03/26/03	SFC	6	trace
LOWER PACIFIC HEIGHTS POND	04/24/03	SFC	3	a
LOWER PACIFIC HEIGHTS POND	06/03/03	SFC	<1	a
LOWER PACIFIC HEIGHTS POND	06/25/03	SFC	11	a
LOWER PACIFIC HEIGHTS POND	07/24/03	SFC	3	a

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Station Name	Date	Depth (meters)	Total Suspended Solids (mg/L)	Settleable Solids (mL/L)
LOWER PACIFIC HEIGHTS POND	08/21/03	SFC	<1	a
LOWER PACIFIC HEIGHTS POND	09/22/03	SFC	<1	a
LOWER PACIFIC HEIGHTS POND	10/20/03	SFC	<1	a
LOWER PACIFIC HEIGHTS POND	11/18/03	SFC	<1	a
LOWER PACIFIC HEIGHTS POND	12/16/03	SFC	<1	a
LOWER PACIFIC HEIGHTS POND	01/13/04	SFC	<1	a
LOWER PACIFIC HEIGHTS POND	02/10/04	SFC	3	a
LOWER PACIFIC HEIGHTS POND	03/10/04	SFC	2	a
LOWER PACIFIC HEIGHTS POND	04/07/04	SFC	3	trace
MILE LONG POND	05/30/02	SFC		trace
MILE LONG POND	06/03/02	SFC		a
MILE LONG POND	06/03/02	2		a
MILE LONG POND	06/28/02	SFC	<1	-
MILE LONG POND	06/28/02	3	<1	
MILE LONG POND	07/24/02	SFC		a
MILE LONG POND	07/24/02	3		2
MILE LONG POND	08/22/02	SFC	3	a
MILE LONG POND	08/22/02	2.5	4	a
MILE LONG POND	08/22/02	3		a
MILE LONG POND	09/18/02	SFC	2	a
MILE LONG POND	09/18/02	2.5	12	0.3
MILE LONG POND	10/23/02	SFC	2	a
MILE LONG POND	10/23/02	2	2	a
MILE LONG POND	11/14/02	SFC	1	-
MILE LONG POND	11/14/02	3	15	-
MILE LONG POND	12/19/02	SFC	2	-
MILE LONG POND	12/19/02	3	61	-
MILE LONG POND	01/21/03	SFC	<1	a

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Station Name	Date	Depth (meters)	Total Suspended Solids (mg/L)	Settleable Solids (mL/L)
MILE LONG POND	01/21/03	3	<1	
MILE LONG POND	02/10/03	SFC	2	a
MILE LONG POND	02/10/03	2.5	16	trace
MILE LONG POND	03/26/03	SFC	2	a
MILE LONG POND	03/26/03	2.5	1	a
MILE LONG POND	04/24/03	SFC	2	a
MILE LONG POND	04/24/03	3	4	
MILE LONG POND	06/03/03	SFC	<1	a
MILE LONG POND	06/03/03	BTM	18	a
MILE LONG POND	06/25/03	SFC	4	trace
MILE LONG POND	06/25/03	1.5	4	a
MILE LONG POND	07/24/03	SFC	1	a
MILE LONG POND	07/24/03	3	8	0.7
MILE LONG POND	08/21/03	SFC	<1	a
MILE LONG POND	08/21/03	3		6
MILE LONG POND	09/22/03	SFC	<1	a
MILE LONG POND	09/22/03	3	11	
MILE LONG POND	10/20/03	SFC	2	a
MILE LONG POND	10/20/03	3.5	3	a
MILE LONG POND	11/18/03	SFC	<1	a
MILE LONG POND	11/18/03	4	<1	a
MILE LONG POND	12/16/03	SFC	<1	a
MILE LONG POND	12/16/03	4	21	trace
MILE LONG POND	01/13/04	SFC	2	a
MILE LONG POND	01/13/04	4	1	trace
MILE LONG POND	02/10/04	SFC	2	a
MILE LONG POND	03/10/04	SFC	1	a
MILE LONG POND	03/10/04	4	<1	a
MILE LONG POND	04/07/04	SEC	<1	trace

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Station Name	Date	Depth (meters)	Total Suspended Solids (mg/L)	Settleable Solids (mL/L)
MILE LONG POND	04/07/04	4	3	0.3
OROVILLE FISHING POND	05/30/02	SFC	4	trace
OROVILLE FISHING POND	06/27/02	SFC	2	a
OROVILLE FISHING POND	07/24/02	SFC	14	a
OROVILLE FISHING POND	08/22/02	SFC	7	a
OROVILLE FISHING POND	09/18/02	SFC	<1	trace
OROVILLE FISHING POND	10/23/02	SFC	3	a
OROVILLE FISHING POND	11/14/02	SFC	4	
OROVILLE FISHING POND	12/19/02	SFC	4	a
OROVILLE FISHING POND	01/21/03	SFC	6	a
OROVILLE FISHING POND	02/10/03	SFC	4	a
OROVILLE FISHING POND	03/26/03	SFC	4	a
OROVILLE FISHING POND	04/24/03	SFC	7	a
OROVILLE FISHING POND	06/03/03	SFC	2	a
OROVILLE FISHING POND	06/25/03	SFC	2	a
OROVILLE FISHING POND	07/24/03	SFC	5	a
OROVILLE FISHING POND	08/21/03	SFC	2	trace
OROVILLE FISHING POND	09/22/03	SFC	2	a
OROVILLE FISHING POND	10/20/03	SFC	8	a
OROVILLE FISHING POND	11/18/03	SFC	2	trace
OROVILLE FISHING POND	12/16/03	SFC	4	a
OROVILLE FISHING POND	01/13/04	SFC	5	a
OROVILLE FISHING POND	02/10/04	SFC	3	a
OROVILLE FISHING POND	03/10/04	SFC	1	trace
OROVILLE FISHING POND	04/07/04	SFC	2	trace
ROBINSON RIFFLE POND	05/30/02	SFC	5	a
ROBINSON RIFFLE POND	06/27/02	SFC		-

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Station Name	Date	Depth (meters)	Total Suspended Solids (mg/L)	Settleable Solids (mL/L)
ROBINSON RIFFLE POND	07/24/02	SFC		2
ROBINSON RIFFLE POND	08/22/02	SFC	45	
ROBINSON RIFFLE POND	09/18/02	SFC	50	4.9
ROBINSON RIFFLE POND	09/18/02	1		8.8
ROBINSON RIFFLE POND	10/23/02	SFC	42	7
ROBINSON RIFFLE POND	11/14/02	SFC	5	
ROBINSON RIFFLE POND	12/19/02	SFC	4	0.1
ROBINSON RIFFLE POND	01/21/03	SFC	<1	a
ROBINSON RIFFLE POND	02/10/03	SFC	3	trace
ROBINSON RIFFLE POND	03/26/03	SFC	4	a
ROBINSON RIFFLE POND	04/24/03	SFC		0.1
ROBINSON RIFFLE POND	06/03/03	SFC	40	1.0
ROBINSON RIFFLE POND	06/25/03	SFC	148	8
ROBINSON RIFFLE POND	07/24/03	SFC	32	
ROBINSON RIFFLE POND	08/21/03	SFC	95	13
ROBINSON RIFFLE POND	09/22/03	SFC	55	2
ROBINSON RIFFLE POND	10/20/03	SFC	80	8.5
ROBINSON RIFFLE POND	11/18/03	SFC	47	0.2
ROBINSON RIFFLE POND	12/16/03	SFC	12	0.3
ROBINSON RIFFLE POND	01/13/04	SFC	<1	a
ROBINSON RIFFLE POND	02/10/04	SFC	2	a
ROBINSON RIFFLE POND	03/10/04	SFC	<1	a
ROBINSON RIFFLE POND	04/07/04	SFC	64	1.5
Thermalito Forebay Creek, north	09/19/02	0.15	5	a
Thermalito Forebay Creek, north	10/21/02	0.15	7	a
Thermalito Forebay Creek, north	11/19/02	0.15	2	a
Thermalito Forebay Creek, north	12/12/02	0.15	2	a
Thermalito Forebay Creek, north	01/13/03	0.15	51	0.2

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Station Name	Date	Depth (meters)	Total Suspended Solids (mg/L)	Settleable Solids (mL/L)
Thermalito Forebay Creek, north	02/26/03	0.15	<1	a
Thermalito Forebay Creek, north	03/19/03	0.15	<1	a
Thermalito Forebay Creek, north	04/14/03	0.15	2	a
Thermalito Forebay Creek, north	05/20/03	0.15	2	a
Thermalito Forebay Creek, north	06/23/03	0.15	4	a
Thermalito Forebay Creek, north	07/22/03	0.15	4	a
Thermalito Forebay Creek, north	08/25/03	0.15	<5	a
Thermalito Forebay Creek, north	09/22/03	0.15	2	a
Thermalito Forebay Creek, north	10/20/03	0.15	<1	a
Thermalito Forebay Creek, north	11/17/03	0.15	2	a
Thermalito Forebay Creek, north	12/15/03	0.15	17	trace
Thermalito Forebay Creek, north	01/21/04	0.15	2	a
Thermalito Forebay Creek, north	02/03/04	0.15	6	a
Thermalito Forebay Creek, north	02/16/04	0.15	39	0.1
Thermalito Forebay Creek, north	02/23/04	0.15	3	a
Thermalito Forebay Creek, north	03/22/04	0.15	<1	trace
Thermalito Forebay Creek, north	04/19/04	0.15	<1	trace
Glen Creek US Glen Pond	03/28/02	0.15	2	
Glen Creek US Glen Pond	04/22/02	0.15	<1	a
Glen Creek US Glen Pond	05/21/02	0.15	2	trace
Glen Creek US Glen Pond	06/18/02	0.15	9	0.2
Glen Creek US Glen Pond	07/15/02	0.15	14	0.2
Glen Creek US Glen Pond	08/13/02	0.15	14	0.3
Glen Creek US Glen Pond	09/16/02	0.15		trace
Glen Creek US Glen Pond	10/28/02	0.15	8	0.3
Glen Creek US Glen Pond	11/22/02	0.15	<1	
Glen Creek US Glen Pond	12/16/03	0.15	14	trace
Glen Creek US Glen Pond	01/13/03	0.15	28	trace

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Station Name	Date	Depth (meters)	Total Suspended Solids (mg/L)	Settleable Solids (mL/L)
Glen Creek US Glen Pond	02/25/03	0.15	<1	a
Glen Creek US Glen Pond	03/18/03	0.15	3	a
Glen Creek US Glen Pond	04/18/03	0.15	4	a
Glen Creek US Glen Pond	06/24/03	0.15	8	
Glen Creek US Glen Pond	08/26/03	0.15	12	
Glen Creek US Glen Pond	09/23/03	0.15	2	
Glen Creek US Glen Pond	10/22/03	0.15	5	
Glen Creek US Glen Pond	11/19/03	0.15	3	a
Glen Creek US Glen Pond	12/15/03	0.15	<1	trace
Glen Creek US Glen Pond	01/19/04	0.15	<1	a
Glen Creek US Glen Pond	02/16/04	0.15	9	trace
Glen Creek US Glen Pond	02/24/04	0.15	8	trace
Glen Creek US Glen Pond	03/24/04	0.15	9	a
Glen Creek US Glen Pond	04/19/04	0.15	<1	a
Glen Pond	03/28/02	0.15	11	
Glen Pond	04/22/02	0.15	3	trace
Glen Pond	05/22/02	0.15	40	trace
Glen Pond	06/18/02	0.15	4	trace
Glen Pond	07/22/02	0.15	6	trace
Glen Pond	08/20/02	0.15	4	a
Glen Pond	09/24/02	0.15	23	0.2
Glen Pond	10/02/02	0.15	2	
Glen Pond	10/28/02	0.15		trace
Glen Pond	11/22/02	0.15	5	
Glen Pond	12/16/02	0.15	14	trace
Glen Pond	01/13/03	0.15	6	trace
Glen Pond	02/25/03	0.15	4	a
Glen Pond	03/18/03	0.15	5	trace

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Station Name	Date	Depth (meters)	Total Suspended Solids (mg/L)	Settleable Solids (mL/L)
Glen Pond	04/18/03	0.15	7	a
Glen Pond	06/24/03	0.15	13	
Glen Pond	08/26/03	0.15	8	
Glen Pond	09/23/03	0.15	14	
Glen Pond	10/22/03	0.15	5	
Glen Pond	11/17/03	0.15	2	a
Glen Pond	12/15/03	0.15	12	trace
Glen Pond	01/19/04	0.15	<1	a
Glen Pond	02/16/04	0.15	2	trace
Glen Pond	02/24/04	0.15	3	a
Glen Pond	03/24/04	0.15	4	trace
Glen Pond	04/19/04	0.15	8	trace
Morris Ravine A Mouth	08/26/03		47	
Morris Ravine A Mouth	09/23/03	0.15	7	
Morris Ravine A Mouth	10/20/03	0.15	<1	
Morris Ravine A Mouth	11/17/03	0.15	4	trace
Morris Ravine A Mouth	12/15/03	0.15		a
Morris Ravine A Mouth	01/19/04	0.15	<1	a
Morris Ravine A Mouth	02/03/04	0.15	48	0.1
Morris Ravine A Mouth	02/16/04	0.15	44	trace
Morris Ravine A Mouth	02/23/04	0.15	77	
Morris Ravine A Mouth	03/24/04	0.15	<1	a
Morris Ravine A Mouth	04/20/04	0.15	6	a
Feather R Hatchery Settling Pond	05/21/02		<1	trace
Feather R Hatchery Settling Pond	06/25/02		<1	a
Feather R Hatchery Settling Pond	07/24/02		5	trace
Feather R Hatchery Settling Pond	08/21/02		2	a

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Station Name	Date	Depth (meters)	Total Suspended Solids (mg/L)	Settleable Solids (mL/L)
Feather R Hatchery Settling Pond	09/25/02		1	a
Feather R Hatchery Settling Pond	10/22/02		2	trace
Feather R Hatchery Settling Pond	11/14/02		7	
Feather R Hatchery Settling Pond	12/11/02		2	a
Feather R Hatchery Settling Pond	12/17/02		7	a
Feather R Hatchery Settling Pond	01/14/03		2	a
Feather R Hatchery Settling Pond	02/20/03		<1	a
Feather R Hatchery Settling Pond	03/19/03		2	a
Feather R Hatchery Settling Pond	04/17/03		9	trace
Feather R Hatchery Settling Pond	05/15/03		4	a
Feather R Hatchery Settling Pond	06/17/03		<1	a
Feather R Hatchery Settling Pond	07/08/03		2	a
Feather R Hatchery Settling Pond	08/11/03		2	a
Feather R Hatchery Settling Pond	09/17/03		<1	a
Feather R Hatchery Settling Pond	10/27/03		2	a
Feather R Hatchery Settling Pond	11/17/03		2	a
Feather R Hatchery Settling Pond	12/15/03		1	trace
Feather R Hatchery Settling Pond	01/13/04		2	a
Feather R Hatchery Settling Pond	02/03/04		2	a
Feather R Hatchery Settling Pond	02/10/04		4	a
Feather R Hatchery Settling Pond	02/19/04		29	trace
Feather R Hatchery Settling Pond	03/10/04		4	a
Feather R Hatchery Settling Pond	04/06/04		1	a
Feather R DS Diversion Dam	03/26/02		1	a
Feather R A Oroville	03/26/02		2	a
Feather R A Oroville	04/24/02		1	
Feather R A Oroville	05/21/02		<1	a

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Station Name	Date	Depth (meters)	Total Suspended Solids (mg/L)	Settleable Solids (mL/L)
Feather R A Oroville	06/25/02		<1	a
Feather R A Oroville	07/24/02		<1	a
Feather R A Oroville	08/21/02		2	a
Feather R A Oroville	09/25/02		5	trace
Feather R A Oroville	10/22/02		3	a
Feather R A Oroville	11/14/02		13	
Feather R A Oroville	12/11/02		5	a
Feather R A Oroville	12/17/02		3	a
Feather R A Oroville	01/14/03		5	trace
Feather R A Oroville	02/20/03		4	a
Feather R A Oroville	03/19/03		3	a
Feather R A Oroville	04/17/03		8	a
Feather R A Oroville	05/15/03		2	a
Feather R A Oroville	06/17/03		2	a
Feather R A Oroville	07/08/03		3	a
Feather R A Oroville	08/11/03		2	a
Feather R A Oroville	09/17/03		2	a
Feather R A Oroville	10/27/03		2	a
Feather R A Oroville	11/17/03		1	a
Feather R A Oroville	12/15/03		<1	trace
Feather R A Oroville	01/13/04		<1	a
Feather R A Oroville	02/03/04		1	a
Feather R A Oroville	02/10/04		3	a
Feather R A Oroville	02/19/04		21	0.1
Feather R A Oroville	03/10/04		1	trace
Feather R A Oroville	04/06/04		<1	a
Feather R US from Hatchery	03/26/02		2	a
Feather R US from Hatchery	04/24/02		<1	

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Station Name	Date	Depth (meters)	Total Suspended Solids (mg/L)	Settleable Solids (mL/L)
Feather R US from Hatchery	05/21/02		<1	a
Feather R US from Hatchery	06/25/02		<1	a
Feather R US from Hatchery	07/24/02		1	a
Feather R US from Hatchery	08/21/02		1	a
Feather R US from Hatchery	09/25/02		2	trace
Feather R US from Hatchery	10/22/02		2	a
Feather R US from Hatchery	11/05/02		1.4	
Feather R US from Hatchery	11/14/02		5	
Feather R US from Hatchery	12/11/02		4	a
Feather R US from Hatchery	12/17/02		2	a
Feather R US from Hatchery	01/14/03		5	a
Feather R US from Hatchery	02/20/03		<1	a
Feather R US from Hatchery	03/19/03		2	a
Feather R US from Hatchery	04/17/03		1	a
Feather R US from Hatchery	05/15/03		2	0.2
Feather R US from Hatchery	06/17/03		<1	a
Feather R US from Hatchery	07/08/03		1	a
Feather R US from Hatchery	08/11/03		<1	a
Feather R US from Hatchery	09/17/03		2	a
Feather R US from Hatchery	10/27/03		2	a
Feather R US from Hatchery	11/17/03		<1	a
Feather R US from Hatchery	12/15/03		<1	a
Feather R US from Hatchery	01/13/04		2	trace
Feather R US from Hatchery	02/03/04		<1	a
Feather R US from Hatchery	02/10/04		1	a
Feather R US from Hatchery	02/19/04		16	a
Feather R US from Hatchery	02/27/04		2	a
Feather R US from Hatchery	03/10/04		1	a
Feather R US from Hatchery	04/06/04		2	a

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Station Name	Date	Depth (meters)	Total Suspended Solids (mg/L)	Settleable Solids (mL/L)
Feather R DS from Hatchery	03/26/02		1	a
Feather R DS from Hatchery	04/24/02		<1	
Feather R DS from Hatchery	05/21/02		1	a
Feather R DS from Hatchery	06/25/02		<1	a
Feather R DS from Hatchery	07/24/02		2	a
Feather R DS from Hatchery	08/21/02		5	a
Feather R DS from Hatchery	09/25/02		6	a
Feather R DS from Hatchery	10/22/02		2	a
Feather R DS from Hatchery	11/14/02		33	
Feather R DS from Hatchery	12/11/02		5	a
Feather R DS from Hatchery	12/17/02		8	trace
Feather R DS from Hatchery	01/14/03		<1	0.2
Feather R DS from Hatchery	02/20/03		<1	a
Feather R DS from Hatchery	03/19/03		2	a
Feather R DS from Hatchery	04/17/03		5	a
Feather R DS from Hatchery	05/15/03		2	a
Feather R DS from Hatchery	06/17/03		2	a
Feather R DS from Hatchery	07/08/03		<1	a
Feather R DS from Hatchery	08/11/03		2	a
Feather R DS from Hatchery	09/17/03		4	a
Feather R DS from Hatchery	10/27/03		2	a
Feather R DS from Hatchery	11/17/03		<1	a
Feather R DS from Hatchery	12/15/03		6	trace
Feather R DS from Hatchery	01/13/04		1	a
Feather R DS from Hatchery	02/03/04		4	
Feather R DS from Hatchery	02/10/04		4	a
Feather R DS from Hatchery	02/19/04		8	a
Feather R DS from Hatchery	03/10/04		2	a

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Station Name	Date	Depth (meters)	Total Suspended Solids (mg/L)	Settleable Solids (mL/L)
Feather R DS from Hatchery	04/06/04		<1	a
Feather R DS from Hwy 162	03/26/02		<1	a
Feather R DS from Hwy 162	04/24/02		<1	
Feather R DS from Hwy 162	05/21/02		1	a
Feather R DS from Hwy 162	06/25/02		3	a
Feather R DS from Hwy 162	07/24/02		2	a
Feather R DS from Hwy 162	08/21/02		3	a
Feather R DS from Hwy 162	09/25/02		4	a
Feather R DS from Hwy 162	10/22/02		2	a
Feather R DS from Hwy 162	11/14/02		8	
Feather R DS from Hwy 162	12/11/02		3	a
Feather R DS from Hwy 162	12/17/02		13	a
Feather R DS from Hwy 162	01/14/03		3	a
Feather R DS from Hwy 162	02/20/03		1	a
Feather R DS from Hwy 162	03/19/03		3	a
Feather R DS from Hwy 162	04/17/03		2	a
Feather R DS from Hwy 162	05/15/03		<1	a
Feather R DS from Hwy 162	06/17/03		2	a
Feather R DS from Hwy 162	07/08/03		3	a
Feather R DS from Hwy 162	08/11/03		2	a
Feather R DS from Hwy 162	09/17/03		2	a
Feather R DS from Hwy 162	10/27/03		2	a
Feather R DS from Hwy 162	11/17/03		<1	a
Feather R DS from Hwy 162	12/15/03		<1	a
Feather R DS from Hwy 162	01/13/04		3	a
Feather R DS from Hwy 162	02/03/04		2	trace
Feather R DS from Hwy 162	02/10/04		2	trace
Feather R DS from Hwy 162	02/19/04		5	trace

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Station Name	Date	Depth (meters)	Total Suspended Solids (mg/L)	Settleable Solids (mL/L)
Feather R DS from Hwy 162	03/10/04		1	a
Feather R DS from Hwy 162	04/06/04		1	a
Feather R A Robinson Riffle	03/26/02		<1	a
Feather R A Robinson Riffle	04/24/02		<1	
Feather R A Robinson Riffle	05/21/02		1	a
Feather R A Robinson Riffle	06/25/02		4	a
Feather R A Robinson Riffle	07/24/02		<1	a
Feather R A Robinson Riffle	08/21/02		1	a
Feather R A Robinson Riffle	09/25/02		3	a
Feather R A Robinson Riffle	10/22/02		2	a
Feather R A Robinson Riffle	11/14/02		3	
Feather R A Robinson Riffle	12/11/02		2	a
Feather R A Robinson Riffle	12/17/02		2	a
Feather R A Robinson Riffle	01/14/03		5	a
Feather R A Robinson Riffle	02/20/03		2	a
Feather R A Robinson Riffle	03/19/03		2	a
Feather R A Robinson Riffle	04/17/03		3	a
Feather R A Robinson Riffle	05/15/03		2	a
Feather R A Robinson Riffle	06/17/03		2	a
Feather R A Robinson Riffle	07/08/03		2	a
Feather R A Robinson Riffle	08/11/03		2	a
Feather R A Robinson Riffle	09/17/03		2	a
Feather R A Robinson Riffle	10/27/03		2	a
Feather R A Robinson Riffle	11/17/03		13	a
Feather R A Robinson Riffle	12/15/03		<1	a
Feather R A Robinson Riffle	01/13/04		4	a
Feather R A Robinson Riffle	02/03/04		2	
Feather R A Robinson Riffle	02/10/04		2	a

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Station Name	Date	Depth (meters)	Total Suspended Solids (mg/L)	Settleable Solids (mL/L)
Feather R A Robinson Riffle	02/19/04		6	trace
Feather R A Robinson Riffle	03/10/04		3	a
Feather R A Robinson Riffle	04/06/04		2	a
Feather R US from Afterbay Outlet	03/26/02		2	a
Feather R US from Afterbay Outlet	04/24/02		2	
Feather R US from Afterbay Outlet	05/21/02		2	a
Feather R US from Afterbay Outlet	06/25/02		2	a
Feather R US from Afterbay Outlet	07/24/02		<1	a
Feather R US from Afterbay Outlet	08/21/02		3	a
Feather R US from Afterbay Outlet	09/25/02		2	a
Feather R US from Afterbay Outlet	10/22/02		2	a
Feather R US from Afterbay Outlet	11/14/02		3	
Feather R US from Afterbay Outlet	12/11/02		3	a
Feather R US from Afterbay Outlet	12/17/02		3	a
Feather R US from Afterbay Outlet	01/14/03		2	trace
Feather R US from Afterbay Outlet	02/20/03		<1	a
Feather R US from Afterbay Outlet	03/19/03		4	a
Feather R US from Afterbay Outlet	04/17/03		5	a
Feather R US from Afterbay Outlet	05/15/03		2	a
Feather R US from Afterbay Outlet	06/17/03		1	a
Feather R US from Afterbay Outlet	07/08/03		<1	
Feather R US from Afterbay Outlet	08/11/03		2	a
Feather R US from Afterbay Outlet	09/17/03		2	a
Feather R US from Afterbay Outlet	10/27/03		2	a
Feather R US from Afterbay Outlet	11/17/03		<1	a
Feather R US from Afterbay Outlet	12/15/03		<1	a
Feather R US from Afterbay Outlet	01/13/04		1	a
Feather R US from Afterbay Outlet	02/03/04		<1	trace

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Station Name	Date	Depth (meters)	Total Suspended Solids (mg/L)	Settleable Solids (mL/L)
Feather R US from Afterbay Outlet	02/10/04		<1	a
Feather R US from Afterbay Outlet	02/19/04		7	a
Feather R US from Afterbay Outlet	02/27/04		6	a
Feather R US from Afterbay Outlet	03/10/04		<1	trace
Feather R US from Afterbay Outlet	04/06/04		1	a
Feather R DS from Afterbay Outlet	03/26/02		3	a
Feather R DS from Afterbay Outlet	04/24/02		<1	
Feather R DS from Afterbay Outlet	05/21/02		6	trace
Feather R DS from Afterbay Outlet	06/25/02		8	a
Feather R DS from Afterbay Outlet	07/24/02		3	a
Feather R DS from Afterbay Outlet	08/21/02		3	a
Feather R DS from Afterbay Outlet	09/25/02		1	a
Feather R DS from Afterbay Outlet	10/22/02		3	a
Feather R DS from Afterbay Outlet	11/14/02		4	
Feather R DS from Afterbay Outlet	12/11/02		2	a
Feather R DS from Afterbay Outlet	12/17/02		<1	a
Feather R DS from Afterbay Outlet	01/14/03		2	a
Feather R DS from Afterbay Outlet	02/20/03		6	a
Feather R DS from Afterbay Outlet	03/19/03		4	a
Feather R DS from Afterbay Outlet	04/17/03		3	a
Feather R DS from Afterbay Outlet	05/15/03		2	a
Feather R DS from Afterbay Outlet	06/17/03		2	a
Feather R DS from Afterbay Outlet	07/08/03		2	a
Feather R DS from Afterbay Outlet	08/11/03		4	a
Feather R DS from Afterbay Outlet	09/17/03		4	a
Feather R DS from Afterbay Outlet	10/27/03		3	a
Feather R DS from Afterbay Outlet	11/17/03		<1	a
Feather R DS from Afterbay Outlet	12/15/03		5	a

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Station Name	Date	Depth (meters)	Total Suspended Solids (mg/L)	Settleable Solids (mL/L)
Feather R DS from Afterbay Outlet	01/13/04		<1	trace
Feather R DS from Afterbay Outlet	02/03/04		8	
Feather R DS from Afterbay Outlet	02/10/04		3	a
Feather R DS from Afterbay Outlet	02/19/04		10	trace
Feather R DS from Afterbay Outlet	02/27/04		10	trace
Feather R DS from Afterbay Outlet	03/10/04		3	a
Feather R DS from Afterbay Outlet	04/06/04		4	trace
Feather R DS from SCOR Outlet	03/26/02		4	trace
Feather R DS from SCOR Outlet	04/24/02		4	
Feather R DS from SCOR Outlet	05/21/02		7	trace
Feather R DS from SCOR Outlet	06/25/02		6	a
Feather R DS from SCOR Outlet	07/24/02		1	a
Feather R DS from SCOR Outlet	08/21/02		4	a
Feather R DS from SCOR Outlet	09/25/02		4	trace
Feather R DS from SCOR Outlet	10/22/02		1	a
Feather R DS from SCOR Outlet	11/14/02		2	
Feather R DS from SCOR Outlet	12/11/02		2	a
Feather R DS from SCOR Outlet	12/17/02		2	trace
Feather R DS from SCOR Outlet	01/14/03		3	trace
Feather R DS from SCOR Outlet	02/20/03		7	a
Feather R DS from SCOR Outlet	03/19/03		6	a
Feather R DS from SCOR Outlet	04/17/03		3	a
Feather R DS from SCOR Outlet	05/15/03		5	a
Feather R DS from SCOR Outlet	06/17/03		2	a
Feather R DS from SCOR Outlet	07/08/03		7	a
Feather R DS from SCOR Outlet	08/11/03		2	a
Feather R DS from SCOR Outlet	09/17/03		4	a
Feather R DS from SCOR Outlet	10/27/03		2	a

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Station Name	Date	Depth (meters)	Total Suspended Solids (mg/L)	Settleable Solids (mL/L)
Feather R DS from SCOR Outlet	11/17/03		3	a
Feather R DS from SCOR Outlet	12/15/03		5	a
Feather R DS from SCOR Outlet	01/13/04		5	a
Feather R DS from SCOR Outlet	02/03/04		2	a
Feather R DS from SCOR Outlet	02/10/04		4	a
Feather R DS from SCOR Outlet	02/19/04		10	trace
Feather R DS from SCOR Outlet	03/10/04		6	trace
Feather R DS from SCOR Outlet	04/06/04		2	a
Feather R NR Mile Long Pond	03/26/02		3	a
Feather R NR Mile Long Pond	04/24/02		1	
Feather R NR Mile Long Pond	05/21/02		5	trace
Feather R NR Mile Long Pond	06/25/02		6	a
Feather R NR Mile Long Pond	07/24/02		2	a
Feather R NR Mile Long Pond	08/21/02		3	1.0
Feather R NR Mile Long Pond	09/25/02		<1	a
Feather R NR Mile Long Pond	10/22/02		2	trace
Feather R NR Mile Long Pond	11/14/02		1	
Feather R NR Mile Long Pond	12/11/02		6	a
Feather R NR Mile Long Pond	12/17/02		3	a
Feather R NR Mile Long Pond	01/14/03		2	a
Feather R NR Mile Long Pond	02/20/03		6	a
Feather R NR Mile Long Pond	03/19/03		3	a
Feather R NR Mile Long Pond	04/17/03		2	a
Feather R NR Mile Long Pond	05/15/03		4	a
Feather R NR Mile Long Pond	06/17/03		2	a
Feather R NR Mile Long Pond	07/08/03		4	
Feather R NR Mile Long Pond	08/11/03		2	a
Feather R NR Mile Long Pond	09/17/03		2	a

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Station Name	Date	Depth (meters)	Total Suspended Solids (mg/L)	Settleable Solids (mL/L)
Feather R NR Mile Long Pond	10/27/03		4	a
Feather R NR Mile Long Pond	11/17/03		1	a
Feather R NR Mile Long Pond	12/15/03		<1	a
Feather R NR Mile Long Pond	01/13/04		2	a
Feather R NR Mile Long Pond	02/03/04		2	a
Feather R NR Mile Long Pond	02/10/04		4	a
Feather R NR Mile Long Pond	02/19/04		11	a
Feather R NR Mile Long Pond	03/10/04		4	
Feather R NR Mile Long Pond	04/06/04		3	a
Feather R DS from Project Boundary	03/26/02		3	a
Feather R DS from Project Boundary	04/24/02		8	
Feather R DS from Project Boundary	05/21/02		6	trace
Feather R DS from Project Boundary	06/25/02		4	trace
Feather R DS from Project Boundary	07/24/02		3	a
Feather R DS from Project Boundary	08/21/02		5	a
Feather R DS from Project Boundary	09/25/02		10	a
Feather R DS from Project Boundary	10/22/02		4	a
Feather R DS from Project Boundary	11/14/02		4	
Feather R DS from Project Boundary	12/11/02		3	a
Feather R DS from Project Boundary	12/17/02		3	0.1
Feather R DS from Project Boundary	01/14/03		3	a
Feather R DS from Project Boundary	02/20/03		6	a
Feather R DS from Project Boundary	03/19/03		3	a
Feather R DS from Project Boundary	04/17/03		<1	a
Feather R DS from Project Boundary	05/15/03		7	a
Feather R DS from Project Boundary	06/17/03		4	a
Feather R DS from Project Boundary	07/08/03		5	a
Feather R DS from Project Boundary	08/11/03		5	a

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Station Name	Date	Depth (meters)	Total Suspended Solids (mg/L)	Settleable Solids (mL/L)
Feather R DS from Project Boundary	09/17/03		2	a
Feather R DS from Project Boundary	10/27/03		3	a
Feather R DS from Project Boundary	11/17/03		6	a
Feather R DS from Project Boundary	12/15/03		2	a
Feather R DS from Project Boundary	01/13/04		<1	a
Feather R DS from Project Boundary	02/03/04		1	a
Feather R DS from Project Boundary	02/10/04		4	a
Feather R DS from Project Boundary	02/19/04		17	0.1
Feather R DS from Project Boundary	02/27/04		21	trace
Feather R DS from Project Boundary	03/10/04		4	a
Feather R DS from Project Boundary	04/06/04		4	a
Feather R A Singh AB Riviera RD	03/26/02		2	a
Feather R A Singh AB Riviera RD	04/24/02		10	
Feather R A Singh AB Riviera RD	05/21/02		6	trace
Feather R A Singh AB Riviera RD	06/25/02		5	trace
Feather R A Singh AB Riviera RD	07/24/02		4	a
Feather R A Singh AB Riviera RD	08/21/02		4	trace
Feather R A Singh AB Riviera RD	09/25/02		2	trace
Feather R A Singh AB Riviera RD	10/22/02		1	a
Feather R A Singh AB Riviera RD	11/14/02		3	
Feather R A Singh AB Riviera RD	12/11/02		2	trace
Feather R A Singh AB Riviera RD	12/17/02		5	0.2
Feather R A Singh AB Riviera RD	01/14/03		2	a
Feather R A Singh AB Riviera RD	02/20/03		7	a
Feather R A Singh AB Riviera RD	03/19/03		2	trace
Feather R A Singh AB Riviera RD	04/17/03		3	a
Feather R A Singh AB Riviera RD	05/15/03		3	a
Feather R A Singh AB Riviera RD	06/17/03		3	a

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Station Name	Date	Depth (meters)	Total Suspended Solids (mg/L)	Settleable Solids (mL/L)
Feather R A Singh AB Riviera RD	07/08/03		5	a
Feather R A Singh AB Riviera RD	08/11/03		2	a
Feather R A Singh AB Riviera RD	09/17/03		4	a
Feather R A Singh AB Riviera RD	10/27/03		4	a
Feather R A Singh AB Riviera RD	11/17/03		4	a
Feather R A Singh AB Riviera RD	12/15/03		4	a
Feather R A Singh AB Riviera RD	01/13/04		4	a
Feather R A Singh AB Riviera RD	02/03/04		2	a
Feather R A Singh AB Riviera RD	02/10/04		4	a
Feather R A Singh AB Riviera RD	02/27/04		10	a
Feather R A Singh AB Riviera RD	03/10/04		3	trace
Feather R A Singh AB Riviera RD	04/06/04		5	a
Feather R A Archer Ave	03/27/02		5	a
Feather R A Archer Ave	04/24/02		9	
Feather R A Archer Ave	05/21/02		9	trace
Feather R A Archer Ave	06/25/02		5	a
Feather R A Archer Ave	07/24/02		4	a
Feather R A Archer Ave	08/21/02		15	2.0
Feather R A Archer Ave	09/25/02		5	trace
Feather R A Archer Ave	10/22/02		4	a
Feather R A Archer Ave	11/14/02		4	
Feather R A Archer Ave	12/11/02		2	a
Feather R A Archer Ave	12/17/02		12	trace
Feather R A Archer Ave	01/14/03		9	trace
Feather R A Archer Ave	02/20/03		5	a
Feather R A Archer Ave	03/19/03		3	a
Feather R A Archer Ave	04/17/03		12	a
Feather R A Archer Ave	05/15/03		7	trace

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Station Name	Date	Depth (meters)	Total Suspended Solids (mg/L)	Settleable Solids (mL/L)
Feather R A Archer Ave	06/17/03		4	a
Feather R A Archer Ave	07/08/03		6	
Feather R A Archer Ave	08/11/03		2	a
Feather R A Archer Ave	09/17/03		2	a
Feather R A Archer Ave	10/27/03		9	a
Feather R A Archer Ave	11/17/03		<1	a
Feather R A Archer Ave	12/15/03		13	trace
Feather R A Archer Ave	01/13/04		2	trace
Feather R A Archer Ave	02/03/04		7	trace
Feather R A Archer Ave	02/10/04		15	trace
Feather R A Archer Ave	02/19/04		80	trace
Feather R A Archer Ave	03/10/04		14	a
Feather R A Archer Ave	04/06/04		6	
Feather R US from Yuba R	03/27/02		4	a
Feather R US from Yuba R	04/24/02		5	
Feather R US from Yuba R	05/21/02		17	0.1
Feather R US from Yuba R	06/25/02		11	trace
Feather R US from Yuba R	07/24/02		8	trace
Feather R US from Yuba R	08/21/02		9	1.0
Feather R US from Yuba R	09/25/02		6	trace
Feather R US from Yuba R	10/22/02		4	a
Feather R US from Yuba R	11/14/02		4	
Feather R US from Yuba R	12/11/02		1	trace
Feather R US from Yuba R	12/17/02		4	0.2
Feather R US from Yuba R	01/14/03		14	trace
Feather R US from Yuba R	02/20/03		14	0.1
Feather R US from Yuba R	03/19/03		4	a
Feather R US from Yuba R	04/17/03		4	a

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Station Name	Date	Depth (meters)	Total Suspended Solids (mg/L)	Settleable Solids (mL/L)
Feather R US from Yuba R	05/15/03		6	trace
Feather R US from Yuba R	06/17/03		5	a
Feather R US from Yuba R	07/08/03		12	
Feather R US from Yuba R	08/11/03		6	a
Feather R US from Yuba R	09/17/03		7	a
Feather R US from Yuba R	10/27/03		6	a
Feather R US from Yuba R	11/17/03		4	a
Feather R US from Yuba R	12/15/03		14	trace
Feather R US from Yuba R	01/13/04		2	a
Feather R US from Yuba R	02/03/04		19	trace
Feather R US from Yuba R	02/10/04		5	trace
Feather R US from Yuba R	02/19/04		98	0.1
Feather R US from Yuba R	02/27/04		59	0.3
Feather R US from Yuba R	03/10/04		14	trace
Feather R US from Yuba R	04/06/04		13	trace
Feather R A Shanghai Bend	08/11/03		6	a
Feather R A Shanghai Bend	03/26/02		5	a
Feather R A Shanghai Bend	04/24/02		3	
Feather R A Shanghai Bend	05/21/02		14	trace
Feather R A Shanghai Bend	06/25/02		8	trace
Feather R A Shanghai Bend	07/24/02		8	a
Feather R A Shanghai Bend	08/21/02		19	a
Feather R A Shanghai Bend	09/25/02		5	trace
Feather R A Shanghai Bend	10/22/02		4	a
Feather R A Shanghai Bend	11/14/02		9	
Feather R A Shanghai Bend	12/11/02		5	a
Feather R A Shanghai Bend	12/17/02		41	0.2
Feather R A Shanghai Bend	01/14/03		16	0.1

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Station Name	Date	Depth (meters)	Total Suspended Solids (mg/L)	Settleable Solids (mL/L)
Feather R A Shanghai Bend	02/20/03		17	0.1
Feather R A Shanghai Bend	03/19/03		<1	trace
Feather R A Shanghai Bend	04/17/03		4	a
Feather R A Shanghai Bend	05/15/03		6	a
Feather R A Shanghai Bend	06/17/03		4	trace
Feather R A Shanghai Bend	07/08/03		21	
Feather R A Shanghai Bend	09/17/03		26	a
Feather R A Shanghai Bend	10/27/03		4	
Feather R A Shanghai Bend	11/17/03		2	a
Feather R A Shanghai Bend	12/15/03		12	trace
Feather R A Shanghai Bend	01/13/04		5	a
Feather R A Shanghai Bend	02/03/04		11	
Feather R A Shanghai Bend	02/10/04		17	a
Feather R A Shanghai Bend	02/19/04		87	0.1
Feather R A Shanghai Bend	02/27/04		58	0.1
Feather R A Shanghai Bend	03/10/04		9	trace
Feather R A Shanghai Bend	04/06/04		10	a
Feather R NR Verona	03/27/02		14	trace
Feather R NR Verona	04/24/02		9	
Feather R NR Verona	05/21/02		5	trace
Feather R NR Verona	06/25/02		25	0.1
Feather R NR Verona	07/24/02		11	trace
Feather R NR Verona	08/21/02		4	a
Feather R NR Verona	09/25/02		8	a
Feather R NR Verona	10/22/02		5	a
Feather R NR Verona	11/14/02		4	
Feather R NR Verona	12/11/02		6	trace
Feather R NR Verona	12/17/02		33	0.1

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Station Name	Date	Depth (meters)	Total Suspended Solids (mg/L)	Settleable Solids (mL/L)
Feather R NR Verona	01/14/03		13	trace
Feather R NR Verona	02/20/03		17	0.1
Feather R NR Verona	03/19/03		12	a
Feather R NR Verona	04/17/03		11	a
Feather R NR Verona	05/15/03		11	a
Feather R NR Verona	06/17/03		6	a
Feather R NR Verona	07/08/03		14	a
Feather R NR Verona	08/11/03		8	a
Feather R NR Verona	09/17/03		11	trace
Feather R NR Verona	10/27/03		8	
Feather R NR Verona	11/17/03		4	a
Feather R NR Verona	12/15/03		7	trace
Feather R NR Verona	01/13/04		103	a
Feather R NR Verona	02/03/04		9	trace
Feather R NR Verona	02/10/04		3	a
Feather R NR Verona	02/19/04		48	trace
Feather R NR Verona	02/27/04		24	a
Feather R NR Verona	03/10/04		10	trace
Feather R NR Verona	04/06/04		14	trace
Bear R NR Mouth	03/27/02		20	trace
Bear R NR Mouth	04/24/02		18	
Bear R NR Mouth	05/21/02		33	0.1
Bear R NR Mouth	06/25/02		13	trace
Bear R NR Mouth	07/24/02		13	trace
Bear R NR Mouth	08/21/02		11	trace
Bear R NR Mouth	09/25/02		4	a
Bear R NR Mouth	10/22/02		15	a
Bear R NR Mouth	11/14/02		8	

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Station Name	Date	Depth (meters)	Total Suspended Solids (mg/L)	Settleable Solids (mL/L)
Bear R NR Mouth	12/11/02		8	trace
Bear R NR Mouth	12/17/02		23	0.1
Bear R NR Mouth	01/14/03		19	trace
Bear R NR Mouth	02/20/03		12	a
Bear R NR Mouth	03/19/03		<1	a
Bear R NR Mouth	04/17/03		31	a
Bear R NR Mouth	05/15/03		11	a
Bear R NR Mouth	06/17/03		17	a
Bear R NR Mouth	07/08/03		17	a
Bear R NR Mouth	08/11/03		8	a
Bear R NR Mouth	09/17/03		27	0.2
Bear R NR Mouth	10/27/03		10	a
Bear R NR Mouth	11/17/03		9	a
Bear R NR Mouth	12/15/03		44	0.1
Bear R NR Mouth	01/13/04		18	trace
Bear R NR Mouth	02/03/04		57	0.1
Bear R NR Mouth	02/10/04		13	a
Bear R NR Mouth	02/19/04		57	0.1
Bear R NR Mouth	03/10/04		14	trace
Bear R NR Mouth	04/06/04		8	trace
Yuba R A Mouth	03/27/02		3	a
Yuba R A Mouth	04/24/02		2	
Yuba R A Mouth	05/21/02		<1	a
Yuba R A Mouth	06/25/02		<1	a
Yuba R A Mouth	07/24/02		2	a
Yuba R A Mouth	08/21/02		3	trace
Yuba R A Mouth	09/25/02		8	trace
Yuba R A Mouth	10/22/02		2	a

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Station Name	Date	Depth (meters)	Total Suspended Solids (mg/L)	Settleable Solids (mL/L)
Yuba R A Mouth	11/14/02		<0.1	
Yuba R A Mouth	12/11/02		2	a
Yuba R A Mouth	12/17/02		14	trace
Yuba R A Mouth	01/14/03		4	trace
Yuba R A Mouth	02/20/03		6	a
Yuba R A Mouth	03/19/03		7	a
Yuba R A Mouth	04/17/03		4	0.2
Yuba R A Mouth	05/15/03		20	0.1
Yuba R A Mouth	06/17/03		4	a
Yuba R A Mouth	07/08/03		2	
Yuba R A Mouth	08/11/03		17	a
Yuba R A Mouth	09/17/03		2	a
Yuba R A Mouth	10/27/03		5	a
Yuba R A Mouth	11/17/03		5	a
Yuba R A Mouth	12/15/03		3	a
Yuba R A Mouth	01/13/04		4	a
Yuba R A Mouth	02/03/04		3	
Yuba R A Mouth	02/10/04		2	a
Yuba R A Mouth	02/19/04		18	trace
Yuba R A Mouth	02/27/04		16	a
Yuba R A Mouth	03/10/04		7	a
Yuba R A Mouth	04/06/04		<1	trace
Honcut C A Pacific Ranch NR Palermo	03/27/02		9	a
Honcut C A Pacific Ranch NR Palermo	04/24/02		5	
Honcut C A Pacific Ranch NR Palermo	05/21/02		7	a
Honcut C A Pacific Ranch NR Palermo	06/25/02		2	a
Honcut C A Pacific Ranch NR Palermo	07/24/02		2	a
Honcut C A Pacific Ranch NR Palermo	08/21/02		2	a

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Station Name	Date	Depth (meters)	Total Suspended Solids (mg/L)	Settleable Solids (mL/L)
Honcut C A Pacific Ranch NR Palermo	09/25/02		4	a
Honcut C A Pacific Ranch NR Palermo	10/22/02		1	a
Honcut C A Pacific Ranch NR Palermo	11/14/02		4	
Honcut C A Pacific Ranch NR Palermo	12/11/02		12	0.2
Honcut C A Pacific Ranch NR Palermo	12/17/02		25	0.2
Honcut C A Pacific Ranch NR Palermo	01/14/03		16	trace
Honcut C A Pacific Ranch NR Palermo	02/20/03		6	a
Honcut C A Pacific Ranch NR Palermo	03/19/03		4	a
Honcut C A Pacific Ranch NR Palermo	04/17/03		6	a
Honcut C A Pacific Ranch NR Palermo	05/15/03		5	a
Honcut C A Pacific Ranch NR Palermo	06/17/03		4	a
Honcut C A Pacific Ranch NR Palermo	07/08/03		<1	a
Honcut C A Pacific Ranch NR Palermo	08/11/03		2	a
Honcut C A Pacific Ranch NR Palermo	09/17/03		4	a
Honcut C A Pacific Ranch NR Palermo	10/27/03		3	a
Honcut C A Pacific Ranch NR Palermo	11/17/03		4	a
Honcut C A Pacific Ranch NR Palermo	12/15/03		14	trace
Honcut C A Pacific Ranch NR Palermo	01/13/04		5	trace
Honcut C A Pacific Ranch NR Palermo	02/03/04		30	trace
Honcut C A Pacific Ranch NR Palermo	02/10/04		5	a
Honcut C A Pacific Ranch NR Palermo	02/19/04		53	0.2
Honcut C A Pacific Ranch NR Palermo	03/10/04		7	trace
Honcut C A Pacific Ranch NR Palermo	04/06/04		6	trace
Sacramento R US from Feather R	03/27/02		46	a
Sacramento R US from Feather R	04/24/02		25	
Sacramento R US from Feather R	05/21/02		32	trace
Sacramento R US from Feather R	06/25/02		12	trace
Sacramento R US from Feather R	07/24/02		15	a

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Station Name	Date	Depth (meters)	Total Suspended Solids (mg/L)	Settleable Solids (mL/L)
Sacramento R US from Feather R	08/21/02			trace
Sacramento R US from Feather R	09/25/02		17	trace
Sacramento R US from Feather R	10/22/02		69	3.0
Sacramento R US from Feather R	11/14/02		30	
Sacramento R US from Feather R	12/11/02		20	a
Sacramento R US from Feather R	12/17/02			
Sacramento R US from Feather R	01/14/03		111	0.3
Sacramento R US from Feather R	02/20/03		132	a
Sacramento R US from Feather R	03/19/03		100	0.2
Sacramento R US from Feather R	04/17/03		70	8.1
Sacramento R US from Feather R	05/15/03		42	0.1
Sacramento R US from Feather R	06/17/03		34	a
Sacramento R US from Feather R	07/08/03		15	
Sacramento R US from Feather R	08/11/03		22	a
Sacramento R US from Feather R	09/17/03		38	0.1
Sacramento R US from Feather R	10/27/03		10	a
Sacramento R US from Feather R	11/17/03		18	a
Sacramento R US from Feather R	12/15/03		75	0.1
Sacramento R US from Feather R	01/13/04		52	0.1
Sacramento R US from Feather R	02/03/04		34	trace
Sacramento R US from Feather R	02/10/04		170	a
Sacramento R US from Feather R	02/19/04		193	trace
Sacramento R US from Feather R	03/10/04		41	trace
Sacramento R US from Feather R	04/06/04		37	trace

a = settleable solids at level too low to be measured

1 = trace amount is too little to be quantified, but can be seen

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# Appendix 10. Water Color.

Station Name	Date	Time (pst)	Color (color units)
SF Feather AB Ponderosa Res	03/28/02	0815	
SF Feather AB Ponderosa Res	04/23/02	0830	
SF Feather AB Ponderosa Res	05/16/02	1315	
SF Feather AB Ponderosa Res	06/17/02	1200	
SF Feather AB Ponderosa Res	07/15/02	1015	4
SF Feather AB Ponderosa Res	08/20/02	1430	2
SF Feather AB Ponderosa Res	09/24/02	1215	2
SF Feather AB Ponderosa Res	10/17/02	1115	2
SF Feather AB Ponderosa Res	11/12/02	1310	4
SF Feather AB Ponderosa Res	12/10/02	1000	6
SF Feather AB Ponderosa Res (storm)	12/16/02	1130	12
SF Feather AB Ponderosa Res	01/09/03	1500	4
SF Feather AB Ponderosa Res	02/18/03	1430	4
SF Feather AB Ponderosa Res	03/12/03	0930	0-10
SF Feather AB Ponderosa Res	04/15/03	0915	0-10
SF Feather AB Ponderosa Res	05/13/03	1130	0-10
SF Feather AB Ponderosa Res	06/11/03	0930	0-10
SF Feather AB Ponderosa Res	07/15/03	1235	0-10
SF Feather AB Ponderosa Res	08/19/03	0830	0-10
SF Feather AB Ponderosa Res	09/16/03	1015	0-10
SF Feather AB Ponderosa Res	10/16/03	0945	0-10
SF Feather AB Ponderosa Res	11/12/03	0930	25
SF Feather AB Ponderosa Res	12/09/03	0850	0-10
SF Feather AB Ponderosa Res	01/15/04	1130	30
SF Feather AB Ponderosa Res (storm)	02/03/04	1245	
SF Feather AB Ponderosa Res	02/18/04	1330	25-30
SF Feather AB Ponderosa Res	03/15/04	1010	10
SF Feather AB Ponderosa Res	04/13/04	0845	
SF Feather DS Ponderosa Res	01/09/03	1320	2
SF Feather DS Ponderosa Res	02/18/03	1245	4
SF Feather DS Ponderosa Res	03/12/03	1030	0-10
SF Feather DS Ponderosa Res	04/15/03	0815	0-10
SF Feather DS Ponderosa Res	05/13/03	1030	0-10
SF Feather DS Ponderosa Res	06/11/03	0830	0-10
SF Feather DS Ponderosa Res	07/15/03	1130	0-10
SF Feather DS Ponderosa Res	08/19/03	0740	0-10
SF Feather DS Ponderosa Res	09/16/03	1230	0-10
SF Feather DS Ponderosa Res	10/16/03	1100	0-10

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Station Name	Date	Time (pst)	Color (color units)
SF Feather DS Ponderosa Res	11/12/03	1130	0-10
SF Feather DS Ponderosa Res	12/09/03	1025	0-10
SF Feather DS Ponderosa Res	01/14/03	1200	0-10
SF Feather DS Ponderosa Res (storm)	02/03/04	1115	0-10
SF Feather DS Ponderosa Res	02/18/04	1530	0-20
SF Feather DS Ponderosa Res	03/15/04	1220	15
SF Feather DS Ponderosa Res	04/13/04	0800	0-5
Sucker Run NR Forbestown	03/28/02	0900	
Sucker Run NR Forbestown	04/23/02	0945	
Sucker Run NR Forbestown	05/16/02	1215	
Sucker Run NR Forbestown	06/17/02	1300	
Sucker Run NR Forbestown	07/15/02	1120	3
Sucker Run NR Forbestown	08/20/02	1450	3
Sucker Run NR Forbestown	09/24/02	1420	3
Sucker Run NR Forbestown	10/17/02	1000	3
Sucker Run NR Forbestown	11/12/02	1430	4
Sucker Run NR Forbestown	12/09/02	1200	5
Sucker Run NR Forbestown	12/16/02	1330	15
Sucker Run NR Forbestown	01/09/03	1220	10
Sucker Run NR Forbestown	02/18/03	1215	2
Sucker Run NR Forbestown	03/12/03	1330	2
Sucker Run NR Forbestown	04/15/03	0730	0-10
Sucker Run NR Forbestown	05/13/03	0945	0-10
Sucker Run NR Forbestown	06/11/03	0800	0-10
Sucker Run NR Forbestown	07/14/03	1130	0-10
Sucker Run NR Forbestown	08/18/03	1310	0-10
Sucker Run NR Forbestown	09/15/03	1225	0-10
Sucker Run NR Forbestown	10/15/03	1315	0-5
Sucker Run NR Forbestown	11/12/03	1215	0-10
Sucker Run NR Forbestown	12/09/03	1000	0-10
Sucker Run NR Forbestown	01/14/04	1110	0-10
Sucker Run NR Forbestown (storm)	02/03/04	1040	25
Sucker Run NR Forbestown	02/18/04	1440	20-30
Sucker Run NR Forbestown	03/15/04	1145	15
Sucker Run NR Forbestown	04/13/04	0730	
Fall R US Feather Falls	03/28/02	1145	
Fall R US Feather Falls	04/22/02	1310	
Fall R US Feather Falls	05/16/02	0910	
Fall R US Feather Falls	06/18/02	0915	

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Station Name	Date	Time (pst)	Color (color units)
Fall R US Feather Falls	07/15/02	1200	2
Fall R US Feather Falls	08/20/02	1100	2
Fall R US Feather Falls	09/24/02	1030	2
Fall R US Feather Falls	10/17/02	1300	2
Fall R US Feather Falls	11/13/02	1030	2
Fall R US Feather Falls	12/09/02	0930	10
Fall R US Feather Falls	12/16/02	0945	20
Fall R US Feather Falls	01/08/03	1100	5
Fall R US Feather Falls	02/18/03	1035	5
Fall R US Feather Falls	03/12/03	1045	5
Fall R US Feather Falls	04/15/03	1100	0-10
Fall R US Feather Falls	05/13/03	1000	0-10
Fall R US Feather Falls	06/11/03	1000	0-10
Fall R US Feather Falls	07/14/03	0830	0-10
Fall R US Feather Falls	08/18/03	1030	0-10
Fall R US Feather Falls	09/15/03	0950	0-10
Fall R US Feather Falls	10/15/03	1020	0-5
Fall R US Feather Falls	11/13/03	1115	0-10
Fall R US Feather Falls	12/09/03	1045	0-10
Fall R US Feather Falls	01/14/04	1230	0-10
Fall R US Feather Falls (storm)	02/03/04	1130	0-10
Fall R US Feather Falls	02/18/04	1050	10-15
Fall R US Feather Falls	03/15/04	1145	0-10
Fall R US Feather Falls	04/13/04	1000	
Feather R MF NR Merrimac	03/28/02	1530	
Feather R MF NR Merrimac	04/23/02	1145	
Feather R MF NR Merrimac	05/15/02	1300	
Feather R MF NR Merrimac	06/17/02	0945	
Feather R MF NR Merrimac	07/15/02	1330	1
Feather R MF NR Merrimac	08/20/02	1200	1
Feather R MF NR Merrimac	09/24/02	1530	1
Feather R MF NR Merrimac	10/17/02	0800	4
Feather R MF NR Merrimac	11/12/02	1010	3
Feather R MF NR Merrimac	12/10/02	1230	5
Feather R MF NR Merrimac	12/16/02		
Feather R MF NR Merrimac	01/09/03	1015	20
Feather R MF NR Merrimac	02/18/03	1000	10
Feather R MF NR Merrimac	03/12/03	1245	5
Feather R MF NR Merrimac	04/15/03	1200	0-10
Feather R MF NR Merrimac	05/13/03	0740	0-10

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Station Name	Date	Time (pst)	Color (color units)
Feather R MF NR Merrimac	06/11/03	1200	0-10
Feather R MF NR Merrimac	07/15/03	0945	0-10
Feather R MF NR Merrimac	08/19/03	1115	0-10
Feather R MF NR Merrimac	09/16/03	0745	0-10
Feather R MF NR Merrimac	10/16/03	1300	0-10
Feather R MF NR Merrimac	11/12/03	0945	0-10
Feather R MF NR Merrimac	12/09/03	1220	0-10
Feather R MF NR Merrimac	01/14/04	0900	10-20
Feather R MF NR Merrimac (storm)	02/03/04	0820	0-5
Feather R MF NR Merrimac	02/18/04	1050	15-20
Feather R MF NR Merrimac	03/15/04	1420	25
Feather R MF NR Merrimac	04/13/04	1100	
NF Feather R DS Poe PH	03/28/02	1730	
NF Feather R DS Poe PH	05/15/02	0930	
NF Feather R DS Poe PH	06/17/02	0830	
NF Feather R US Poe PH	07/15/02	0745	2
NF Feather R US Poe PH	08/20/02	0900	2
NF Feather R US Poe PH	09/24/02	0900	3
NF Feather R US Poe PH	10/18/02	0945	3
NF Feather R US Poe PH	11/12/02	0930	2
NF Feather R US Poe PH	12/10/02	0900	5
NF Feather R US Poe PH	12/16/02	1015	4
NF Feather R US Poe PH	01/08/03	0745	2
NF Feather R US Poe PH	02/18/03	1045	3
NF Feather R US Poe PH	03/12/03	0900	
NF Feather R US Poe PH	04/15/03	0815	0-20
NF Feather R US Poe PH	05/13/03	0745	0-20
NF Feather R US Poe PH	06/11/03	0720	0-20
NF Feather R US Poe PH	07/15/03	0840	20
NF Feather R US Poe PH	08/19/03	0815	0-20
NF Feather R US Poe PH	09/16/03	0840	0-20
NF Feather R US Poe PH	10/16/03	0930	0-20
NF Feather R US Poe PH	11/12/03	1230	0-20
NF Feather R US Poe PH	12/09/03	0915	0-20
NF Feather R US Poe PH	01/14/04	0840	0-10
NF Feather R US Poe PH (storm)	02/03/04	0740	0-5
NF Feather R US Poe PH	02/18/04	0800	0-25
NF Feather R US Poe PH	03/15/04	0950	20
NF Feather R US Poe PH	04/13/04	0740	

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Station Name	Date	Time (pst)	Color (color units)
Concow C A Jordan Hill RD.	03/28/02	1815	
Concow C A Jordan Hill RD.	04/23/02	1330	
Concow C A Jordan Hill RD.	05/15/02	0830	
Concow C A Jordan Hill RD.	06/17/02	0630	1
Concow C A Jordan Hill RD.	07/15/02	0645	1
Concow C A Jordan Hill RD.	08/20/02	0800	1
Concow C A Jordan Hill RD.	09/24/02	0800	2
Concow C A Jordan Hill RD.	10/18/02	0900	2
Concow C A Jordan Hill RD.	11/12/02	1150	5
Concow C A Jordan Hill RD.	12/10/02	1040	10
Concow C A Jordan Hill RD.	12/16/02	1230	15
Concow C A Jordan Hill RD.	01/08/03	0845	4
Concow C A Jordan Hill RD.	02/18/03	1230	3
Concow C A Jordan Hill RD.	03/12/03	1100	
Concow C A Jordan Hill RD.	04/15/03	1015	0-15
Concow C A Jordan Hill RD.	05/13/03	0930	0-20
Concow C A Jordan Hill RD.	06/11/03	0845	0-10
Concow C A Jordan Hill RD.	07/15/03	1035	0-10
Concow C A Jordan Hill RD.	08/19/03	0900	0-10
Concow C A Jordan Hill RD.	09/16/03	1015	0-20
Concow C A Jordan Hill RD.	10/16/03	1135	0-20
Concow C A Jordan Hill RD.	11/12/03	1400	0-20
Concow C A Jordan Hill RD.	12/09/03	1110	0-20
Concow C A Jordan Hill RD.	01/14/04	1020	15-25
Concow C A Jordan Hill RD. (storm)	02/03/04	0945	10
Concow C A Jordan Hill RD.	02/18/04	0940	0-20
Concow C A Jordan Hill RD.	03/15/04	1120	30
Concow C A Jordan Hill RD.	04/13/04	1000	
Poe PH Outflow	07/15/02	0800	
Poe PH Outflow	08/20/02	0930	1
Poe PH Outflow	09/24/02	0930	2
Poe PH Outflow	10/17/02	1010	2
Poe PH Outflow	11/12/02	1000	2
Poe PH Outflow	12/10/02	0945	1
Poe PH Outflow	12/16/02	1115	2
Poe PH Outflow	01/08/03	0810	1
Poe PH Outflow	02/18/03	1110	1
Poe PH Outflow	03/12/03	0950	1
Poe PH Outflow	04/15/03	0830	0-15

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Station Name	Date	Time (pst)	Color (color units)
Poe PH Outflow	05/13/03	0815	0-20
Poe PH Outflow	06/11/03	0750	0-10
Poe PH Outflow	07/15/03	0920	0-10
Poe PH Outflow	08/19/03	0800	0-10
Poe PH Outflow	09/16/03	0915	0-20
Poe PH Outflow	10/16/03	1015	0-20
Poe PH Outflow	11/12/03	1300	0-20
Poe PH Outflow	12/09/03	1000	0-20
Poe PH Outflow	01/14/04	0915	20
Poe PH Outflow (storm)	02/03/04	0835	0
Poe PH Outflow	02/18/04	0830	0-25
Poe PH Outflow	03/15/04	1050	30
Poe PH Outflow	04/13/04	0830	
Miners Ranch Canal	08/20/02	1530	0-10
Miners Ranch Canal	09/24/02	1415	0-10
Miners Ranch Canal	10/17/02	1020	0-10
Miners Ranch Canal	11/12/02	1510	0-10
Miners Ranch Canal	12/09/02	1240	0-10
Miners Ranch Canal	12/16/02	1400	0-10
Miners Ranch Canal	01/09/03	1350	0-10
W Branch Feather River	08/20/02	0645	2
W Branch Feather River	09/24/02	0630	3
W Branch Feather River	10/18/02	0745	4
W Branch Feather River	11/12/02	1245	4
W Branch Feather River	12/10/02	1200	6
W Branch Feather River	12/16/02	1345	8
W Branch Feather River	01/08/03	1000	4
W Branch Feather River	02/18/03	1415	4
W Branch Feather River	03/12/03	1230	0-10
W Branch Feather River	04/15/03	1145	0-10
W Branch Feather River	05/13/03	1045	0-10
W Branch Feather River	06/11/03	1000	0-10
W Branch Feather River	07/15/03	1200	0-10
W Branch Feather River	08/19/03	1015	0-10
W Branch Feather River	09/16/03	1140	0-10
W Branch Feather River	10/16/03	1315	0-10
W Branch Feather River	11/12/03	1515	0-10
W Branch Feather River	12/09/03	1230	10
W Branch Feather River	01/14/04	1020	5-15

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<b>Station Name</b>	<b>Date</b>	<b>Time (pst)</b>	<b>Color (color units)</b>
W Branch Feather River (storm)	02/03/04	1130	10
W Branch Feather River	02/18/04	1100	0-20
W Branch Feather River	03/15/04	1245	15
W Branch Feather River	04/13/04	1130	
Feather R A Oroville	03/26/02	0815	
Feather R A Oroville	04/24/02	0700	
Feather R A Oroville	05/21/02	0645	33
Feather R A Oroville	06/25/02	0645	0-20
Feather R A Oroville	07/24/02	0715	0-20
Feather R A Oroville	08/21/02	0830	0-20
Feather R A Oroville	09/25/02	0810	15
Feather R A Oroville	10/22/02	1010	0-20
Feather R A Oroville	11/05/02	0830	
Feather R A Oroville	11/14/02	0830	
Feather R A Oroville	12/11/02	0845	
Feather R A Oroville	12/17/02	0900	
Feather R A Oroville	01/14/03	0835	
Feather R A Oroville	02/20/03	0845	
Feather R A Oroville	03/19/03	0830	0-20
Feather R A Oroville	04/17/03	0845	0-15
Feather R A Oroville	05/15/03	0745	0-20
Feather R A Oroville	06/17/03	0645	5-15
Feather R A Oroville	07/08/03	0730	0-10
Feather R A Oroville	08/11/03	0700	0-10
Feather R A Oroville	09/17/03	0715	0-10
Feather R A Oroville	10/27/03	0830	0-5
Feather R A Oroville	11/17/03	0900	0-10
Feather R A Oroville	12/15/03	0810	10-12
Feather R A Oroville	01/13/04	0730	5-15
Feather R A Oroville	02/03/04	0715	0-15
Feather R A Oroville	02/10/04	0740	5-15
Feather R A Oroville	02/19/04	0745	20
Feather R A Oroville	03/10/04	0800	10
Feather R A Oroville	04/06/04	0700	10
Feather R US from Hatchery	03/26/02	0915	
Feather R US from Hatchery	04/24/02	0810	
Feather R US from Hatchery	05/21/02	0740	28
Feather R US from Hatchery	06/25/02	0745	0-20
Feather R US from Hatchery	07/24/02	0840	0-20

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Station Name	Date	Time (pst)	Color (color units)
Feather R US from Hatchery	08/21/02	0910	0-20
Feather R US from Hatchery	09/25/02	0845	17
Feather R US from Hatchery	10/22/02	0700	0-20
Feather R US from Hatchery	11/05/02	0915	
Feather R US from Hatchery	11/14/02	1000	
Feather R US from Hatchery	12/11/02	0940	
Feather R US from Hatchery	12/17/02	0945	
Feather R US from Hatchery	01/14/03	0940	
Feather R US from Hatchery	02/20/03	1015	
Feather R US from Hatchery	03/19/03	0930	0-15
Feather R US from Hatchery	04/17/03	0745	0-15
Feather R US from Hatchery	05/15/03	0830	0-15
Feather R US from Hatchery	06/17/03	0725	0-15
Feather R US from Hatchery	07/08/03	0830	0-15
Feather R US from Hatchery	08/11/03	0745	0-10
Feather R US from Hatchery	09/17/03	0800	0-10
Feather R US from Hatchery	10/27/03	0930	0-5
Feather R US from Hatchery	11/17/03	1015	0-10
Feather R US from Hatchery	12/15/03	0900	10-14
Feather R US from Hatchery	01/13/04	0830	0-10
Feather R US from Hatchery	02/03/04	0740	0-15
Feather R US from Hatchery	02/10/04	0820	0-15
Feather R US from Hatchery	02/19/04	0830	20
Feather R US from Hatchery	02/27/04	0800	17
Feather R US from Hatchery	03/10/04	0900	15
Feather R US from Hatchery	04/06/04	0740	10
Feather R Hatchery Settling Pond	05/21/02	0825	26
Feather R Hatchery Settling Pond	06/25/02	1505	
Feather R Hatchery Settling Pond	07/24/02	0950	
Feather R Hatchery Settling Pond	08/21/02	0950	
Feather R Hatchery Settling Pond	09/25/02	0925	10
Feather R Hatchery Settling Pond	10/22/02	0800	0-20
Feather R Hatchery Settling Pond	11/14/02	1100	
Feather R Hatchery Settling Pond	12/11/02	1030	
Feather R Hatchery Settling Pond	12/17/02	1030	
Feather R Hatchery Settling Pond	01/14/03	1020	
Feather R Hatchery Settling Pond	02/20/03	1115	
Feather R Hatchery Settling Pond	03/19/03	1015	0-20
Feather R Hatchery Settling Pond	04/17/03	0945	0-15
Feather R Hatchery Settling Pond	05/15/03	0930	0-20

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Station Name	Date	Time (pst)	Color (color units)
Feather R Hatchery Settling Pond	06/17/03	0800	0-15
Feather R Hatchery Settling Pond	07/08/03	0915	5-20
Feather R Hatchery Settling Pond	08/11/03	0900	
Feather R Hatchery Settling Pond	09/17/03	0900	0-20
Feather R Hatchery Settling Pond	10/27/03	1015	0-5
Feather R Hatchery Settling Pond	11/17/03	1100	0-10
Feather R Hatchery Settling Pond	12/15/03	1000	14-18
Feather R Hatchery Settling Pond	01/13/04	0910	0-15
Feather R Hatchery Settling Pond	02/03/04	0810	0-10
Feather R Hatchery Settling Pond	02/10/04	0910	0-20
Feather R Hatchery Settling Pond	02/19/04	0850	20
Feather R Hatchery Settling Pond	03/10/04	0930	12
Feather R Hatchery Settling Pond	04/06/04	0830	10
Feather R DS from Hatchery	03/26/02	1015	
Feather R DS from Hatchery	04/24/02	0955	
Feather R DS from Hatchery	05/21/02	1000	45
Feather R DS from Hatchery	06/25/02	0945	
Feather R DS from Hatchery	07/24/02	1035	
Feather R DS from Hatchery	08/21/02	1030	
Feather R DS from Hatchery	09/25/02	1030	20
Feather R DS from Hatchery	10/22/02	0900	0-20
Feather R DS from Hatchery	11/05/02	0945	
Feather R DS from Hatchery	11/14/02	1145	
Feather R DS from Hatchery	12/11/02	1120	
Feather R DS from Hatchery	12/17/02	1115	
Feather R DS from Hatchery	01/14/03	1055	
Feather R DS from Hatchery	02/20/03	1200	
Feather R DS from Hatchery	03/19/03	1115	0-20
Feather R DS from Hatchery	04/17/03	1045	0-15
Feather R DS from Hatchery	05/15/03	1215	0-10
Feather R DS from Hatchery	06/17/03	1000	0-15
Feather R DS from Hatchery	07/08/03	1200	0-10
Feather R DS from Hatchery	08/11/03	1130	0-10
Feather R DS from Hatchery	09/17/03	1115	0-20
Feather R DS from Hatchery	10/27/03	1215	0-5
Feather R DS from Hatchery	11/17/03	1300	0-10
Feather R DS from Hatchery	12/15/03	1210	8-10
Feather R DS from Hatchery	01/13/04	1100	5-15
Feather R DS from Hatchery	02/03/04	1015	10-20
Feather R DS from Hatchery	02/10/04	1200	5-25

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Station Name	Date	Time (pst)	Color (color units)
Feather R DS from Hatchery	02/19/04	1100	20
Feather R DS from Hatchery	03/10/04	1200	20
Feather R DS from Hatchery	04/06/04	1100	15
Feather R DS from Hwy 162	03/26/02	1200	
Feather R DS from Hwy 162	04/24/02	1130	
Feather R DS from Hwy 162	05/21/02	1135	23
Feather R DS from Hwy 162	06/25/02	1130	0-20
Feather R DS from Hwy 162	07/24/02	1205	0-20
Feather R DS from Hwy 162	08/21/02	0730	0-20
Feather R DS from Hwy 162	09/25/02	0730	0-20
Feather R DS from Hwy 162	10/22/02	0700	0-20
Feather R DS from Hwy 162	11/05/02	1025	
Feather R DS from Hwy 162	11/14/02	1200	
Feather R DS from Hwy 162	12/11/02	1045	
Feather R DS from Hwy 162	12/17/02	0900	
Feather R DS from Hwy 162	01/14/03	0830	
Feather R DS from Hwy 162	02/20/03	0710	
Feather R DS from Hwy 162	03/19/03	0630	0-15
Feather R DS from Hwy 162	04/17/03	0830	0-15
Feather R DS from Hwy 162	05/15/03	0730	
Feather R DS from Hwy 162	06/17/03	0810	0-20
Feather R DS from Hwy 162	07/08/03	0715	0-15
Feather R DS from Hwy 162	08/11/03	0800	0-20
Feather R DS from Hwy 162	09/17/03	0830	0-15
Feather R DS from Hwy 162	10/27/03	0930	0-5
Feather R DS from Hwy 162	11/17/03	0940	0-10
Feather R DS from Hwy 162	12/15/03	0920	8-12
Feather R DS from Hwy 162	01/13/04	0900	5-15
Feather R DS from Hwy 162	02/03/04	0800	0-15
Feather R DS from Hwy 162	02/10/04	0810	0-10
Feather R DS from Hwy 162	02/19/04	0920	15
Feather R DS from Hwy 162	03/10/04	0815	0-10
Feather R DS from Hwy 162	04/06/04	0700	0-10
Feather R A Robinson Riffle	03/26/02	1115	15
Feather R A Robinson Riffle	04/24/02	1230	15
Feather R A Robinson Riffle	05/21/02	1220	19
Feather R A Robinson Riffle	06/24/02	1230	0-20
Feather R A Robinson Riffle	07/24/02	1200	0-20
Feather R A Robinson Riffle	08/21/02	0920	0-20

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Station Name	Date	Time (pst)	Color (color units)
Feather R A Robinson Riffle	09/25/02	0845	0-20
Feather R A Robinson Riffle	10/22/02	0830	0-20
Feather R A Robinson Riffle	11/05/02	1105	
Feather R A Robinson Riffle	11/14/02	1245	
Feather R A Robinson Riffle	12/11/02	1130	
Feather R A Robinson Riffle	12/17/02	0945	
Feather R A Robinson Riffle	01/14/03	0910	
Feather R A Robinson Riffle	02/20/03	0800	
Feather R A Robinson Riffle	03/19/03	0730	0-10
Feather R A Robinson Riffle	04/17/03	1440	0-15
Feather R A Robinson Riffle	05/15/03	0815	
Feather R A Robinson Riffle	06/17/03	0820	0-15
Feather R A Robinson Riffle	07/08/03	0840	0-5
Feather R A Robinson Riffle	08/11/03	0845	0-20
Feather R A Robinson Riffle	09/17/03	0915	0-2
Feather R A Robinson Riffle	10/27/03	1055	0-5
Feather R A Robinson Riffle	11/15/03	1030	0-10
Feather R A Robinson Riffle	01/13/04	1010	5-15
Feather R A Robinson Riffle	02/03/04	0840	0-15
Feather R A Robinson Riffle	02/10/04	0900	0-10
Feather R A Robinson Riffle	02/19/04	1315	25
Feather R A Robinson Riffle	03/10/04	0930	0-10
Feather R A Robinson Riffle	04/06/04	0800	0-10
Feather R US from Afterbay Outlet	03/26/02	1250	
Feather R US from Afterbay Outlet	04/24/02	1525	
Feather R US from Afterbay Outlet	05/21/02	1520	38
Feather R US from Afterbay Outlet	06/25/02	1600	
Feather R US from Afterbay Outlet	07/24/02	1315	
Feather R US from Afterbay Outlet	08/21/02	1150	
Feather R US from Afterbay Outlet	09/25/02	1215	18
Feather R US from Afterbay Outlet	10/22/02	1205	0-20
Feather R US from Afterbay Outlet	11/05/02	1425	
Feather R US from Afterbay Outlet	11/14/02	1410	
Feather R US from Afterbay Outlet	12/11/02	1315	
Feather R US from Afterbay Outlet	12/17/02	1245	
Feather R US from Afterbay Outlet	01/14/03	1300	
Feather R US from Afterbay Outlet	02/20/03	1415	
Feather R US from Afterbay Outlet	03/19/03	1315	0-20
Feather R US from Afterbay Outlet	04/17/03	1245	0-15
Feather R US from Afterbay Outlet	05/15/03	1330	0-20

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Station Name	Date	Time (pst)	Color (color units)
Feather R US from Afterbay Outlet	06/17/03	1100	0-15
Feather R US from Afterbay Outlet	07/08/03	0800	0-10
Feather R US from Afterbay Outlet	08/11/03	1245	0-10
Feather R US from Afterbay Outlet	09/17/03	1300	0-15
Feather R US from Afterbay Outlet	10/27/03	1400	0-5
Feather R US from Afterbay Outlet	11/17/03	1440	0-10
Feather R US from Afterbay Outlet	12/15/03	1350	12-16
Feather R US from Afterbay Outlet	01/13/04	1200	0-20
Feather R US from Afterbay Outlet	02/03/04	1200	10-20
Feather R US from Afterbay Outlet	02/10/04	1310	10-20
Feather R US from Afterbay Outlet	02/19/04	1150	20
Feather R US from Afterbay Outlet	02/27/04	0850	10
Feather R US from Afterbay Outlet	03/10/04	1300	10
Feather R US from Afterbay Outlet	04/06/04	1200	10
Feather R DS from Afterbay Outlet	03/26/02	1325	
Feather R DS from Afterbay Outlet	04/24/02	1655	
Feather R DS from Afterbay Outlet	05/21/02	1640	39
Feather R DS from Afterbay Outlet	06/25/02	1715	
Feather R DS from Afterbay Outlet	07/24/02	1445	
Feather R DS from Afterbay Outlet	08/21/02	1245	
Feather R DS from Afterbay Outlet	09/25/02	1300	40
Feather R DS from Afterbay Outlet	10/22/02	1320	25
Feather R DS from Afterbay Outlet	11/05/02	1310	
Feather R DS from Afterbay Outlet	11/14/02	1520	
Feather R DS from Afterbay Outlet	12/11/02	1420	
Feather R DS from Afterbay Outlet	12/17/02	1345	
Feather R DS from Afterbay Outlet	01/14/03	1400	
Feather R DS from Afterbay Outlet	02/20/03	1510	
Feather R DS from Afterbay Outlet	03/19/03	1420	0-15
Feather R DS from Afterbay Outlet	04/17/03	1345	0-15
Feather R DS from Afterbay Outlet	05/15/03	1430	0-20
Feather R DS from Afterbay Outlet	06/17/03	1200	0-10
Feather R DS from Afterbay Outlet	07/08/03	0945	0-10
Feather R DS from Afterbay Outlet	08/11/03	1415	0-10
Feather R DS from Afterbay Outlet	09/17/03	1400	0-10
Feather R DS from Afterbay Outlet	10/27/03	1500	0-5
Feather R DS from Afterbay Outlet	11/17/03	1530	0-10
Feather R DS from Afterbay Outlet	12/15/03	1440	13-15
Feather R DS from Afterbay Outlet	01/13/04	1300	0-15
Feather R DS from Afterbay Outlet	02/03/04	1230	10-20

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Station Name	Date	Time (pst)	Color (color units)
Feather R DS from Afterbay Outlet	02/10/04	1400	10-20
Feather R DS from Afterbay Outlet	02/19/04	1230	20
Feather R DS from Afterbay Outlet	02/27/04	1030	10
Feather R DS from Afterbay Outlet	03/10/04	1350	10
Feather R DS from Afterbay Outlet	04/06/04	1445	10
Feather R DS from SCOR Outlet	03/26/02	1350	20
Feather R DS from SCOR Outlet	04/24/02	1455	25
Feather R DS from SCOR Outlet	05/21/02	1345	36
Feather R DS from SCOR Outlet	06/25/02	1345	0-25
Feather R DS from SCOR Outlet	07/24/02	1330	0-25
Feather R DS from SCOR Outlet	08/21/02	1030	0-25
Feather R DS from SCOR Outlet	09/25/02	0950	0-20
Feather R DS from SCOR Outlet	10/22/02	0940	0-20
Feather R DS from SCOR Outlet	11/05/02	1140	
Feather R DS from SCOR Outlet	11/14/02	1345	
Feather R DS from SCOR Outlet	12/11/02	1230	
Feather R DS from SCOR Outlet	12/17/02	1040	
Feather R DS from SCOR Outlet	01/14/03	1030	
Feather R DS from SCOR Outlet	02/20/03	0915	
Feather R DS from SCOR Outlet	03/19/03	0845	0-15
Feather R DS from SCOR Outlet	04/17/03	1330	0-15
Feather R DS from SCOR Outlet	05/15/03	0930	
Feather R DS from SCOR Outlet	06/17/03	0925	0-20
Feather R DS from SCOR Outlet	07/08/03	0940	0-20
Feather R DS from SCOR Outlet	08/11/03	0945	0-20
Feather R DS from SCOR Outlet	09/17/03	1030	0-20
Feather R DS from SCOR Outlet	10/27/03	1220	0-5
Feather R DS from SCOR Outlet	11/17/03	1115	0-10
Feather R DS from SCOR Outlet	12/15/03	1100	8-12
Feather R DS from SCOR Outlet	01/13/04	1110	0-20
Feather R DS from SCOR Outlet	02/03/04	0920	0-15
Feather R DS from SCOR Outlet	02/10/04	0955	0-10
Feather R DS from SCOR Outlet	02/19/04	1415	10
Feather R DS from SCOR Outlet	03/10/04	1050	15-20
Feather R DS from SCOR Outlet	04/06/04	0900	0-5
Feather R NR Mile Long Pond	03/26/02	1445	20
Feather R NR Mile Long Pond	04/24/02	1745	15
Feather R NR Mile Long Pond	05/21/02	1745	19
Feather R NR Mile Long Pond	06/25/02	1810	0-20

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Station Name	Date	Time (pst)	Color (color units)
Feather R NR Mile Long Pond	07/24/02	1540	0-20
Feather R NR Mile Long Pond	08/21/02	1400	0-20
Feather R NR Mile Long Pond	09/25/02	1430	0-20
Feather R NR Mile Long Pond	10/22/02	1430	0-20
Feather R NR Mile Long Pond	11/05/02	1345	0-20
Feather R NR Mile Long Pond	11/14/02	1615	0-15
Feather R NR Mile Long Pond	12/11/02	1515	0-15
Feather R NR Mile Long Pond	12/17/02	1430	0-10
Feather R NR Mile Long Pond	01/14/03	1440	0-20
Feather R NR Mile Long Pond	02/20/03	1615	0-15
Feather R NR Mile Long Pond	03/19/03	1515	0-20
Feather R NR Mile Long Pond	04/17/03	1445	0-15
Feather R NR Mile Long Pond	05/15/03	1345	0-10
Feather R NR Mile Long Pond	06/17/03	1400	0-20
Feather R NR Mile Long Pond	07/08/03	1020	0-10
Feather R NR Mile Long Pond	08/11/03	1340	0-20
Feather R NR Mile Long Pond	09/17/03	1440	0-15
Feather R NR Mile Long Pond	10/27/03	1615	0-5
Feather R NR Mile Long Pond	11/17/03	1610	0-10
Feather R NR Mile Long Pond	12/15/03	1500	12-14
Feather R NR Mile Long Pond	01/13/04	1415	15-25
Feather R NR Mile Long Pond	02/03/04	2130	0-15
Feather R NR Mile Long Pond	02/10/04	1450	10-20
Feather R NR Mile Long Pond	02/19/04	1545	15
Feather R NR Mile Long Pond	03/10/04	1420	0-10
Feather R NR Mile Long Pond	04/06/04	1215	0-10
Feather R DS from Project Boundary	03/26/02	1550	15
Feather R DS from Project Boundary	04/24/02	1850	15
Feather R DS from Project Boundary	05/21/02	1855	21
Feather R DS from Project Boundary	06/25/02	0620	0-20
Feather R DS from Project Boundary	07/24/02	1640	
Feather R DS from Project Boundary	08/21/02	1150	0-20
Feather R DS from Project Boundary	09/25/02	1120	0-20
Feather R DS from Project Boundary	10/22/02	1110	0-20
Feather R DS from Project Boundary	11/05/02	1225	0-15
Feather R DS from Project Boundary	11/14/02	1045	0-10
Feather R DS from Project Boundary	12/11/02	1320	0-10
Feather R DS from Project Boundary	12/17/02	1130	0-15
Feather R DS from Project Boundary	01/14/03	1135	0-10
Feather R DS from Project Boundary	02/20/03	1000	0-10

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<b>Station Name</b>	<b>Date</b>	<b>Time (pst)</b>	<b>Color (color units)</b>
Feather R DS from Project Boundary	03/19/03	1000	10-20
Feather R DS from Project Boundary	04/17/03	1230	0-15
Feather R DS from Project Boundary	05/15/03	1020	
Feather R DS from Project Boundary	06/17/03	1045	0-15
Feather R DS from Project Boundary	07/08/03	1030	0-10
Feather R DS from Project Boundary	08/11/03	1100	0-20
Feather R DS from Project Boundary	09/17/03	1150	0-15
Feather R DS from Project Boundary	10/27/03	1320	0-5
Feather R DS from Project Boundary	11/17/03	1215	0-10
Feather R DS from Project Boundary	12/15/03	1215	10-12
Feather R DS from Project Boundary	01/13/04	1200	0-10
Feather R DS from Project Boundary	02/03/04	1010	0-15
Feather R DS from Project Boundary	02/10/04	1045	0-10
Feather R DS from Project Boundary	02/19/04	1745	10
Feather R DS from Project Boundary	02/27/04	1330	20
Feather R DS from Project Boundary	03/10/04	1155	0-10
Feather R DS from Project Boundary	04/06/04	0950	0-10
 Honcut C A Pacific Ranch NR Palermo	 03/27/02	 0740	 15
Honcut C A Pacific Ranch NR Palermo	04/24/02	0630	15
Honcut C A Pacific Ranch NR Palermo	05/21/02	0630	20
Honcut C A Pacific Ranch NR Palermo	06/25/02	0715	0-20
Honcut C A Pacific Ranch NR Palermo	07/24/02	1845	0-20
Honcut C A Pacific Ranch NR Palermo	08/21/02	1300	0-20
Honcut C A Pacific Ranch NR Palermo	09/25/02	1220	0-20
Honcut C A Pacific Ranch NR Palermo	10/22/02	1215	0-20
Honcut C A Pacific Ranch NR Palermo	11/14/02	1000	
Honcut C A Pacific Ranch NR Palermo	12/11/02	0945	20
Honcut C A Pacific Ranch NR Palermo	12/17/02	1215	
Honcut C A Pacific Ranch NR Palermo	01/14/03	1230	
Honcut C A Pacific Ranch NR Palermo	02/20/03	1100	
Honcut C A Pacific Ranch NR Palermo	03/19/03	1100	0-15
Honcut C A Pacific Ranch NR Palermo	04/17/03	1145	0-30
Honcut C A Pacific Ranch NR Palermo	05/15/03	1140	
Honcut C A Pacific Ranch NR Palermo	06/17/03	1145	0-15
Honcut C A Pacific Ranch NR Palermo	07/08/03	1105	0-25
Honcut C A Pacific Ranch NR Palermo	08/11/03	1200	0-20
Honcut C A Pacific Ranch NR Palermo	09/17/03	1250	0-15
Honcut C A Pacific Ranch NR Palermo	10/27/03	1410	0-5
Honcut C A Pacific Ranch NR Palermo	11/17/03	1300	0-10
Honcut C A Pacific Ranch NR Palermo	12/15/03	1300	45-50

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<b>Station Name</b>	<b>Date</b>	<b>Time (pst)</b>	<b>Color (color units)</b>
Honcut C A Pacific Ranch NR Palermo	01/13/04	1250	30-35
Honcut C A Pacific Ranch NR Palermo	02/03/04	1050	45-55
Honcut C A Pacific Ranch NR Palermo	02/10/04	1125	10-30
Honcut C A Pacific Ranch NR Palermo	02/19/04	1700	45
Honcut C A Pacific Ranch NR Palermo	03/10/04	1250	15-20
Honcut C A Pacific Ranch NR Palermo	04/06/04	1045	25-30
Feather R A Singh AB Riviera RD	03/26/02	1640	10
Feather R A Singh AB Riviera RD	04/24/02	0830	5
Feather R A Singh AB Riviera RD	05/21/02	0745	10
Feather R A Singh AB Riviera RD	06/25/02	0830	0-20
Feather R A Singh AB Riviera RD	07/24/02	0705	0-20
Feather R A Singh AB Riviera RD	08/21/02	1410	0-20
Feather R A Singh AB Riviera RD	09/25/02	1330	0-20
Feather R A Singh AB Riviera RD	10/22/02	1320	0-20
Feather R A Singh AB Riviera RD	11/14/02	0830	0-10
Feather R A Singh AB Riviera RD	12/11/02	0840	0-15
Feather R A Singh AB Riviera RD	12/17/02	1315	0-15
Feather R A Singh AB Riviera RD	01/14/03	1330	0-20
Feather R A Singh AB Riviera RD	02/20/03	1200	0-20
Feather R A Singh AB Riviera RD	03/19/03	1215	15-20
Feather R A Singh AB Riviera RD	04/17/03	1050	0-15
Feather R A Singh AB Riviera RD	05/15/03	1245	
Feather R A Singh AB Riviera RD	06/17/03	1300	5-15
Feather R A Singh AB Riviera RD	07/08/03	1115	5-15
Feather R A Singh AB Riviera RD	08/11/03	1245	0-20
Feather R A Singh AB Riviera RD	09/17/03	1340	0-15
Feather R A Singh AB Riviera RD	10/27/03	1515	0-5
Feather R A Singh AB Riviera RD	11/17/03	1400	0-10
Feather R A Singh AB Riviera RD	12/15/03	1400	10-12
Feather R A Singh AB Riviera RD	01/13/04	1415	0-20
Feather R A Singh AB Riviera RD	02/03/04	1140	0-15
Feather R A Singh AB Riviera RD	02/10/04	1235	0-10
Feather R A Singh AB Riviera RD	02/27/04	1120	12
Feather R A Singh AB Riviera RD	03/10/04	1345	0-10
Feather R A Singh AB Riviera RD	04/06/04	1125	5-15
Feather R A Archer Ave	03/27/02	0915	
Feather R A Archer Ave	04/24/02	0910	5
Feather R A Archer Ave	05/21/02	0840	10
Feather R A Archer Ave	06/25/02	0930	0-20

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Station Name	Date	Time (pst)	Color (color units)
Feather R A Archer Ave	07/24/02	0750	0-20
Feather R A Archer Ave	08/21/02	0730	0-20
Feather R A Archer Ave	09/25/02	0835	0-20
Feather R A Archer Ave	10/22/02	0720	0-20
Feather R A Archer Ave	11/14/02	0820	
Feather R A Archer Ave	12/11/02	0900	
Feather R A Archer Ave	12/17/02	0815	
Feather R A Archer Ave	01/14/03	0815	
Feather R A Archer Ave	02/20/03	0730	0-25
Feather R A Archer Ave	03/19/03	1810	0-10
Feather R A Archer Ave	04/17/03	0930	
Feather R A Archer Ave	05/15/03	0835	
Feather R A Archer Ave	06/17/03	1055	0-15
Feather R A Archer Ave	07/08/03	1230	0-20
Feather R A Archer Ave	08/11/03	1215	0-15
Feather R A Archer Ave	09/17/03	0815	0-15
Feather R A Archer Ave	10/27/03	1250	0-10
Feather R A Archer Ave	11/17/03	1100	0-10
Feather R A Archer Ave	12/15/03	1430	12-15
Feather R A Archer Ave	01/13/04	1400	10-20
Feather R A Archer Ave	02/03/04	1335	0-10
Feather R A Archer Ave	02/10/04	1345	0-10
Feather R A Archer Ave	02/19/04	0815	30
Feather R A Archer Ave	03/10/04	1650	0-10
Feather R A Archer Ave	04/06/04	1615	5-10
Yuba R A Mouth	03/27/02	1120	
Yuba R A Mouth	04/24/02	1115	5
Yuba R A Mouth	05/21/02	1000	15
Yuba R A Mouth	06/25/02	1020	0-20
Yuba R A Mouth	07/24/02	0850	0-20
Yuba R A Mouth	08/21/02	0820	0-20
Yuba R A Mouth	09/25/02	0950	0-20
Yuba R A Mouth	10/22/02	0820	0-20
Yuba R A Mouth	11/14/02	0915	0-20
Yuba R A Mouth	12/11/02	0945	
Yuba R A Mouth	12/17/02	0900	
Yuba R A Mouth	01/14/03	0910	
Yuba R A Mouth	02/20/03	0840	0-25
Yuba R A Mouth	03/19/03	0910	0-25
Yuba R A Mouth	04/17/03	0930	

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Station Name	Date	Time (pst)	Color (color units)
Yuba R A Mouth	05/15/03	0835	
Yuba R A Mouth	06/17/03	1055	0-15
Yuba R A Mouth	07/08/03	1230	
Yuba R A Mouth	08/11/03	1215	
Yuba R A Mouth	09/17/03	0815	
Yuba R A Mouth	10/27/03	1250	0-10
Yuba R A Mouth	11/17/03	1200	0-10
Yuba R A Mouth	12/15/03	1220	14-18
Yuba R A Mouth	01/13/04	1310	10-20
Yuba R A Mouth	02/03/04	1140	0-10
Yuba R A Mouth	02/10/04	1150	0-10
Yuba R A Mouth	02/19/04	1015	15
Yuba R A Mouth	02/27/04	1230	28
Yuba R A Mouth	03/10/04	1610	20-30
Yuba R A Mouth	04/06/04	1100	5-10
Feather R US from Yuba R	03/27/02	1030	
Feather R US from Yuba R	04/24/02	1030	10
Feather R US from Yuba R	05/21/02	1040	15
Feather R US from Yuba R	06/25/02	1100	0-20
Feather R US from Yuba R	07/24/02	1015	0-20
Feather R US from Yuba R	08/21/02	0905	0-20
Feather R US from Yuba R	09/25/02	0920	0-20
Feather R US from Yuba R	10/22/02	0840	0-20
Feather R US from Yuba R	11/14/02	0945	
Feather R US from Yuba R	12/11/02	1015	
Feather R US from Yuba R	12/17/02	0930	
Feather R US from Yuba R	01/14/03	0940	
Feather R US from Yuba R	02/20/03	0920	0-20
Feather R US from Yuba R	03/19/03	0950	
Feather R US from Yuba R	04/17/03	0900	
Feather R US from Yuba R	05/15/03	0910	
Feather R US from Yuba R	06/17/03	1120	0-20
Feather R US from Yuba R	07/08/03	1200	0-20
Feather R US from Yuba R	08/11/03	1200	0-15
Feather R US from Yuba R	09/17/03	0945	0-10
Feather R US from Yuba R	10/27/03	1330	0-10
Feather R US from Yuba R	11/17/03	1230	0-10
Feather R US from Yuba R	12/15/03	1300	15-17
Feather R US from Yuba R	01/13/04	1240	0-10
Feather R US from Yuba R	02/03/04	1215	0-15

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Station Name	Date	Time (pst)	Color (color units)
Feather R US from Yuba R	02/10/04	1215	0-10
Feather R US from Yuba R	02/19/04	0900	30
Feather R US from Yuba R	02/27/04	1025	20
Feather R US from Yuba R	03/10/04	1500	10-20
Feather R US from Yuba R	04/06/04	1130	5-10
Feather R A Shanghai Bend	03/26/02	1300	0-15
Feather R A Shanghai Bend	04/24/02	1210	15
Feather R A Shanghai Bend	05/21/02	1130	25
Feather R A Shanghai Bend	06/25/02	1150	0-15
Feather R A Shanghai Bend	07/24/02	0955	0-15
Feather R A Shanghai Bend	08/21/02	0945	0-15
Feather R A Shanghai Bend	09/25/02	1025	0-20
Feather R A Shanghai Bend	10/22/02	0930	0-20
Feather R A Shanghai Bend	11/14/02	1040	
Feather R A Shanghai Bend	12/11/02	1100	
Feather R A Shanghai Bend	12/17/02	1010	
Feather R A Shanghai Bend	01/14/03	1015	
Feather R A Shanghai Bend	02/20/03	1015	0-25
Feather R A Shanghai Bend	03/19/03	1030	0-25
Feather R A Shanghai Bend	04/17/03	1000	
Feather R A Shanghai Bend	05/15/03	0950	
Feather R A Shanghai Bend	06/17/03	1200	0-15
Feather R A Shanghai Bend	07/08/03	1300	0-10
Feather R A Shanghai Bend	08/11/03	1300	0-15
Feather R A Shanghai Bend	09/17/03	0940	0-10
Feather R A Shanghai Bend	10/27/03	1400	0-10
Feather R A Shanghai Bend	11/17/03	1300	0-10
Feather R A Shanghai Bend	12/15/03	1335	18-20
Feather R A Shanghai Bend	01/13/04	1200	0-10
Feather R A Shanghai Bend	02/03/04	1250	0-15
Feather R A Shanghai Bend	02/10/04	1245	0-15
Feather R A Shanghai Bend	02/19/04	0930	40
Feather R A Shanghai Bend	02/27/04	1115	22
Feather R A Shanghai Bend	03/10/04	1410	20-30
Feather R A Shanghai Bend	04/06/04	1300	15-20
Bear R NR Mouth	03/27/02	1430	25
Bear R NR Mouth	04/24/02	1430	25
Bear R NR Mouth	05/21/02	1240	30
Bear R NR Mouth	06/25/02	1310	0-25

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Station Name	Date	Time (pst)	Color (color units)
Bear R NR Mouth	07/24/02	1105	0-25
Bear R NR Mouth	08/21/02	1115	0-25
Bear R NR Mouth	09/25/02	1130	0-25
Bear R NR Mouth	10/22/02	1045	0-25
Bear R NR Mouth	11/14/02	1140	0-25
Bear R NR Mouth	12/11/02	1200	
Bear R NR Mouth	12/17/02	1110	
Bear R NR Mouth	01/14/03	1110	
Bear R NR Mouth	02/20/03	1140	0-25
Bear R NR Mouth	03/19/03	1135	0-20
Bear R NR Mouth	04/17/03	1115	
Bear R NR Mouth	05/15/03	1115	
Bear R NR Mouth	06/17/03	1020	0-20
Bear R NR Mouth	07/08/03	1115	5-15
Bear R NR Mouth	08/11/03	1100	0-15
Bear R NR Mouth	09/17/03	1100	0-20
Bear R NR Mouth	10/27/03	1145	0-10
Bear R NR Mouth	11/17/03	1400	0-10
Bear R NR Mouth	12/15/03	1130	25-30
Bear R NR Mouth	01/13/04	1045	20-30
Bear R NR Mouth	02/03/04	1100	0-15
Bear R NR Mouth	02/10/04	1050	0-15
Bear R NR Mouth	02/19/04	1100	40
Bear R NR Mouth	03/10/04	1240	20-30
Bear R NR Mouth	04/06/04	1000	15-20
Feather R NR Verona	03/27/02	1515	20
Feather R NR Verona	04/24/02	1520	20
Feather R NR Verona	05/21/02	1330	25
Feather R NR Verona	06/25/02	1400	0-25
Feather R NR Verona	07/24/02	1320	0-25
Feather R NR Verona	08/21/02	1215	0-25
Feather R NR Verona	09/25/02	1400	0-25
Feather R NR Verona	10/22/02	1135	0-25
Feather R NR Verona	11/14/02	1230	0-25
Feather R NR Verona	12/11/02	1300	
Feather R NR Verona	12/17/02	1210	
Feather R NR Verona	01/14/03	1215	
Feather R NR Verona	02/20/03	1230	0-25
Feather R NR Verona	03/19/03	1230	0-25
Feather R NR Verona	04/17/03	1215	

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<b>Station Name</b>	<b>Date</b>	<b>Time (pst)</b>	<b>Color (color units)</b>
Feather R NR Verona	05/15/03	1215	
Feather R NR Verona	06/17/03	0930	0-15
Feather R NR Verona	07/08/03	1015	5-15
Feather R NR Verona	08/11/03	1000	0-20
Feather R NR Verona	09/17/03	1200	
Feather R NR Verona	10/27/03	1100	0-10
Feather R NR Verona	11/17/03	1500	0-10
Feather R NR Verona	12/15/03	1030	12-16
Feather R NR Verona	01/13/04	0950	0-10
Feather R NR Verona	02/03/04	1005	0-15
Feather R NR Verona	02/10/04	0950	15-20
Feather R NR Verona	02/19/04	1200	30
Feather R NR Verona	02/27/04	0850	20
Feather R NR Verona	03/10/04	0915	10-20
Feather R NR Verona	04/06/04	0850	10-15
Sacramento R US from Feather R	03/27/02	1630	20
Sacramento R US from Feather R	04/24/02	1730	20
Sacramento R US from Feather R	05/21/02	1445	25
Sacramento R US from Feather R	06/25/02	1515	0-25
Sacramento R US from Feather R	07/24/02	1215	0-25
Sacramento R US from Feather R	08/21/02	1330	0-25
Sacramento R US from Feather R	09/25/02	1300	0-25
Sacramento R US from Feather R	10/22/02	1245	0-25
Sacramento R US from Feather R	11/14/02	1430	0-25
Sacramento R US from Feather R	12/11/02	1415	
Sacramento R US from Feather R	12/17/02		
Sacramento R US from Feather R	01/14/03	1330	
Sacramento R US from Feather R	02/20/03	1345	0-25
Sacramento R US from Feather R	03/19/03	1330	0-25
Sacramento R US from Feather R	04/17/03	1330	
Sacramento R US from Feather R	05/15/03	1330	
Sacramento R US from Feather R	06/17/03	0815	
Sacramento R US from Feather R	07/08/03	0855	0-20
Sacramento R US from Feather R	08/11/03	0830	0-20
Sacramento R US from Feather R	09/17/03	1315	0-20
Sacramento R US from Feather R	10/27/03	0930	0-5
Sacramento R US from Feather R	11/17/03	1620	0-10
Sacramento R US from Feather R	12/15/03	0920	18-22
Sacramento R US from Feather R	01/13/04	0830	0-10
Sacramento R US from Feather R	02/03/04	0850	0-10

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<b>Station Name</b>	<b>Date</b>	<b>Time (pst)</b>	<b>Color (color units)</b>
Sacramento R US from Feather R	02/10/04	0830	0-15
Sacramento R US from Feather R	02/19/04	1310	35
Sacramento R US from Feather R	03/10/04	1045	10-20
Sacramento R US from Feather R	04/06/04	0725	5-10

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**Appendix 11. Odors detected from monitored waters.**

<b>Station Number</b>	<b>Station Name</b>	<b>Date</b>	<b>Time</b>	<b>Odor</b>
A5-1860.50	Feather R DS Diversion Dam	03/26/02	0715	
A5-1800.00	Feather R A Oroville	03/26/02	0815	
A5-1800.00	Feather R A Oroville	04/24/02	0700	
A5-1800.00	Feather R A Oroville	05/21/02	0645	None
A5-1800.00	Feather R A Oroville	06/25/02	0645	None
A5-1800.00	Feather R A Oroville	07/24/02	0715	None
A5-1800.00	Feather R A Oroville	08/21/02	0830	None
A5-1800.00	Feather R A Oroville	09/25/02	0810	None
A5-1800.00	Feather R A Oroville	10/22/02	1010	None
A5-1800.00	Feather R A Oroville	11/05/02	0830	None
A5-1800.00	Feather R A Oroville	11/14/02	0830	None
A5-1800.00	Feather R A Oroville	12/11/02	0845	None
A5-1800.00	Feather R A Oroville	12/17/02	0900	None
A5-1800.00	Feather R A Oroville	01/14/03	0835	None
A5-1800.00	Feather R A Oroville	02/20/03	0845	None
A5-1800.00	Feather R A Oroville	03/19/03	0830	None
A5-1800.00	Feather R A Oroville	04/17/03	0845	Rotting fish
A5-1800.00	Feather R A Oroville	05/15/03	0745	None
A5-1800.00	Feather R A Oroville	06/17/03	0645	None
A5-1800.00	Feather R A Oroville	07/08/03	0730	None
A5-1800.00	Feather R A Oroville	08/11/03	0700	None
A5-1800.00	Feather R A Oroville	09/17/03	0715	None
A5-1800.00	Feather R A Oroville	10/27/03	0830	None
A5-1800.00	Feather R A Oroville	11/17/03	0900	None
A5-1800.00	Feather R A Oroville	12/15/03	0810	None
A5-1800.00	Feather R A Oroville	01/13/04	0730	None
A5-1800.00	Feather R A Oroville	02/03/04	0715	
A5-1800.00	Feather R A Oroville	02/10/04	0740	None
A5-1800.00	Feather R A Oroville	02/19/04	0745	None
A5-1800.00	Feather R A Oroville	03/10/04	0800	None
A5-1800.00	Feather R A Oroville	04/06/04	0700	None
A5-1789.50	Feather R US from Hatchery	03/26/02	0915	
A5-1789.50	Feather R US from Hatchery	04/24/02	0810	
A5-1789.50	Feather R US from Hatchery	05/21/02	0740	None
A5-1789.50	Feather R US from Hatchery	06/25/02	0745	None
A5-1789.50	Feather R US from Hatchery	07/24/02	0840	None
A5-1789.50	Feather R US from Hatchery	08/21/02	0910	None
A5-1789.50	Feather R US from Hatchery	09/25/02	0845	Rotting Fish
A5-1789.50	Feather R US from Hatchery	10/22/02	0700	Rotting Fish
A5-1789.50	Feather R US from Hatchery	11/05/02	0915	Rotting Fish

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<b>Station Number</b>	<b>Station Name</b>	<b>Date</b>	<b>Time</b>	<b>Odor</b>
A5-1789.50	Feather R US from Hatchery	11/14/02	1000	Rotting Fish
A5-1789.50	Feather R US from Hatchery	12/11/02	0940	Rotting Fish
A5-1789.50	Feather R US from Hatchery	12/17/02	0945	Fishy
A5-1789.50	Feather R US from Hatchery	01/14/03	0940	None
A5-1789.50	Feather R US from Hatchery	02/20/03	1015	None
A5-1789.50	Feather R US from Hatchery	03/19/03	0930	None
A5-1789.50	Feather R US from Hatchery	04/17/03	0745	None
A5-1789.50	Feather R US from Hatchery	05/15/03	0830	None
A5-1789.50	Feather R US from Hatchery	06/17/03	0725	None
A5-1789.50	Feather R US from Hatchery	07/08/03	0830	None
A5-1789.50	Feather R US from Hatchery	08/11/03	0745	None
A5-1789.50	Feather R US from Hatchery	09/17/03	0800	None
A5-1789.50	Feather R US from Hatchery	10/27/03	0930	Fishy
A5-1789.50	Feather R US from Hatchery	11/17/03	1015	Fishy
A5-1789.50	Feather R US from Hatchery	12/15/03	0900	None
A5-1789.50	Feather R US from Hatchery	01/13/04	0830	None
A5-1789.50	Feather R US from Hatchery	02/03/04	0740	
A5-1789.50	Feather R US from Hatchery	02/10/04	0820	None
A5-1789.50	Feather R US from Hatchery	02/19/04	0830	None
A5-1789.50	Feather R US from Hatchery	02/27/04	0800	None
A5-1789.50	Feather R US from Hatchery	03/10/04	0900	None
A5-1789.50	Feather R US from Hatchery	04/06/04	0740	None
A5R93101333	Feather R Hatchery Settling Pond	05/21/02	0825	None
A5R93101333	Feather R Hatchery Settling Pond	06/25/02	1505	Septic Odor
A5R93101333	Feather R Hatchery Settling Pond	07/24/02	0950	None
A5R93101333	Feather R Hatchery Settling Pond	08/21/02	0950	None
A5R93101333	Feather R Hatchery Settling Pond	09/25/02	0925	None
A5R93101333	Feather R Hatchery Settling Pond	10/22/02	0800	Dead Fish
A5R93101333	Feather R Hatchery Settling Pond	11/14/02	1100	None
A5R93101333	Feather R Hatchery Settling Pond	12/11/02	1030	None
A5R93101333	Feather R Hatchery Settling Pond	12/17/02	1030	None
A5R93101333	Feather R Hatchery Settling Pond	01/14/03	1020	None

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Station Number	Station Name	Date	Time	Odor
A5R93101333	Feather R Hatchery Settling Pond	02/20/03	1115	None
A5R93101333	Feather R Hatchery Settling Pond	03/19/03	1015	Fishy
A5R93101333	Feather R Hatchery Settling Pond	04/17/03	0945	None
A5R93101333	Feather R Hatchery Settling Pond	05/15/03	0930	
A5R93101333	Feather R Hatchery Settling Pond	06/17/03	0800	Fishy
A5R93101333	Feather R Hatchery Settling Pond	07/08/03	0915	None
A5R93101333	Feather R Hatchery Settling Pond	08/11/03	0900	None
A5R93101333	Feather R Hatchery Settling Pond	09/17/03	0900	None
A5R93101333	Feather R Hatchery Settling Pond	10/27/03	1015	None
A5R93101333	Feather R Hatchery Settling Pond	11/17/03	1100	Fishy
A5R93101333	Feather R Hatchery Settling Pond	12/15/03	1000	None
A5R93101333	Feather R Hatchery Settling Pond	01/13/04	0910	None
A5R93101333	Feather R Hatchery Settling Pond	02/03/04	0810	
A5R93101333	Feather R Hatchery Settling Pond	02/10/04	0910	
A5R93101333	Feather R Hatchery Settling Pond	02/19/04	0850	None
A5R93101333	Feather R Hatchery Settling Pond	03/10/04	0930	algae
A5R93101333	Feather R Hatchery Settling Pond	04/06/04	0830	fishy
A5-1780.50	Feather R DS from Hatchery	03/26/02	1015	
A5-1780.50	Feather R DS from Hatchery	04/24/02	0955	
A5-1780.50	Feather R DS from Hatchery	05/21/02	1000	None
A5-1780.50	Feather R DS from Hatchery	06/25/02	0945	None
A5-1780.50	Feather R DS from Hatchery	07/24/02	1035	None
A5-1780.50	Feather R DS from Hatchery	08/21/02	1030	None
A5-1780.50	Feather R DS from Hatchery	09/25/02	1030	None
A5-1780.50	Feather R DS from Hatchery	10/22/02	0900	Dead Fish
A5-1780.50	Feather R DS from Hatchery	11/05/02	0945	Dead Fish

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Station Number	Station Name	Date	Time	Odor
A5-1780.50	Feather R DS from Hatchery	11/14/02	1145	Dead Fish
A5-1780.50	Feather R DS from Hatchery	12/11/02	1120	Dead Fish
A5-1780.50	Feather R DS from Hatchery	12/17/02	1115	Dead Fish
A5-1780.50	Feather R DS from Hatchery	01/14/03	1055	Algae
A5-1780.50	Feather R DS from Hatchery	02/20/03	1200	None
A5-1780.50	Feather R DS from Hatchery	03/19/03	1115	None
A5-1780.50	Feather R DS from Hatchery	04/17/03	1045	None
A5-1780.50	Feather R DS from Hatchery	05/15/03	1215	None
A5-1780.50	Feather R DS from Hatchery	06/17/03	1000	None
A5-1780.50	Feather R DS from Hatchery	07/08/03	1200	
A5-1780.50	Feather R DS from Hatchery	08/11/03	1130	None
A5-1780.50	Feather R DS from Hatchery	09/17/03	1115	Fishy
A5-1780.50	Feather R DS from Hatchery	10/27/03	1215	
A5-1780.50	Feather R DS from Hatchery	11/17/03	1300	Fishy
A5-1780.50	Feather R DS from Hatchery	12/15/03	1210	None
A5-1780.50	Feather R DS from Hatchery	01/13/04	1100	None
A5-1780.50	Feather R DS from Hatchery	02/03/04	1015	
A5-1780.50	Feather R DS from Hatchery	02/10/04	1200	
A5-1780.50	Feather R DS from Hatchery	02/19/04	1100	None
A5-1780.50	Feather R DS from Hatchery	03/10/04	1200	None
A5-1780.50	Feather R DS from Hatchery	04/06/04	1100	None
A5-1740.50	Feather R DS from Hwy 162	03/26/02	1200	
A5-1740.50	Feather R DS from Hwy 162	04/24/02	1130	
A5-1740.50	Feather R DS from Hwy 162	05/21/02	1135	Moss
A5-1740.50	Feather R DS from Hwy 162	06/25/02	1130	None
A5-1740.50	Feather R DS from Hwy 162	07/24/02	1205	None
A5-1740.50	Feather R DS from Hwy 162	08/21/02	0730	None
A5-1740.50	Feather R DS from Hwy 162	09/25/02	0730	None
A5-1740.50	Feather R DS from Hwy 162	10/22/02	0700	Dead Fish
A5-1740.50	Feather R DS from Hwy 162	11/05/02	1025	Dead Fish
A5-1740.50	Feather R DS from Hwy 162	11/14/02	1200	Dead Fish
A5-1740.50	Feather R DS from Hwy 162	12/11/02	1045	
A5-1740.50	Feather R DS from Hwy 162	12/17/02	0900	
A5-1740.50	Feather R DS from Hwy 162	01/14/03	0830	
A5-1740.50	Feather R DS from Hwy 162	02/20/03	0710	
A5-1740.50	Feather R DS from Hwy 162	03/19/03	0630	
A5-1740.50	Feather R DS from Hwy 162	04/17/03	0830	
A5-1740.50	Feather R DS from Hwy 162	05/15/03	0730	
A5-1740.50	Feather R DS from Hwy 162	06/17/03	0810	
A5-1740.50	Feather R DS from Hwy 162	07/08/03	0715	
A5-1740.50	Feather R DS from Hwy 162	08/11/03	0800	
A5-1740.50	Feather R DS from Hwy 162	09/17/03	0830	
A5-1740.50	Feather R DS from Hwy 162	10/27/03	0930	Fish

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Station Number	Station Name	Date	Time	Odor
A5-1740.50	Feather R DS from Hwy 162	11/17/03	0940	Dead Fish
A5-1740.50	Feather R DS from Hwy 162	12/15/03	0920	
A5-1740.50	Feather R DS from Hwy 162	01/13/04	0900	
A5-1740.50	Feather R DS from Hwy 162	02/03/04	0800	
A5-1740.50	Feather R DS from Hwy 162	02/10/04	0810	
A5-1740.50	Feather R DS from Hwy 162	02/19/04	0920	None
A5-1740.50	Feather R DS from Hwy 162	03/10/04	0815	None
A5-1740.50	Feather R DS from Hwy 162	04/06/04	0700	None
A5-1712.50	Feather R A Robinson Riffle	03/26/02	1115	None
A5-1712.50	Feather R A Robinson Riffle	04/24/02	1230	None
A5-1712.50	Feather R A Robinson Riffle	05/21/02	1220	None
A5-1712.50	Feather R A Robinson Riffle	06/24/02	1230	None
A5-1712.50	Feather R A Robinson Riffle	07/24/02	1200	None
A5-1712.50	Feather R A Robinson Riffle	08/21/02	0920	None
A5-1712.50	Feather R A Robinson Riffle	09/25/02	0845	None
A5-1712.50	Feather R A Robinson Riffle	10/22/02	0830	Dead Fish
A5-1712.50	Feather R A Robinson Riffle	11/05/02	1105	Dead Fish
A5-1712.50	Feather R A Robinson Riffle	11/14/02	1245	Dead Fish
A5-1712.50	Feather R A Robinson Riffle	12/11/02	1130	Dead Fish
A5-1712.50	Feather R A Robinson Riffle	12/17/02	0945	
A5-1712.50	Feather R A Robinson Riffle	01/14/03	0910	
A5-1712.50	Feather R A Robinson Riffle	02/20/03	0800	
A5-1712.50	Feather R A Robinson Riffle	03/19/03	0730	
A5-1712.50	Feather R A Robinson Riffle	04/17/03	1440	Dirt
A5-1712.50	Feather R A Robinson Riffle	05/15/03	0815	
A5-1712.50	Feather R A Robinson Riffle	06/17/03	0820	
A5-1712.50	Feather R A Robinson Riffle	07/08/03	0840	
A5-1712.50	Feather R A Robinson Riffle	08/11/03	0845	
A5-1712.50	Feather R A Robinson Riffle	09/17/03	0915	
A5-1712.50	Feather R A Robinson Riffle	10/27/03	1055	Fish
A5-1712.50	Feather R A Robinson Riffle	11/15/03	1030	
A5-1712.50	Feather R A Robinson Riffle	01/13/04	1010	
A5-1712.50	Feather R A Robinson Riffle	02/03/04	0840	
A5-1712.50	Feather R A Robinson Riffle	02/10/04	0900	None
A5-1712.50	Feather R A Robinson Riffle	02/19/04	1315	
A5-1712.50	Feather R A Robinson Riffle	03/10/04	0930	None
A5-1712.50	Feather R A Robinson Riffle	04/06/04	0800	
A5-1695.50	Feather R US from Afterbay Outlet	03/26/02	1250	
A5-1695.50	Feather R US from Afterbay Outlet	04/24/02	1525	

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Station Number	Station Name	Date	Time	Odor
A5-1695.50	Feather R US from Afterbay Outlet	05/21/02	1520	None
A5-1695.50	Feather R US from Afterbay Outlet	06/25/02	1600	None
A5-1695.50	Feather R US from Afterbay Outlet	07/24/02	1315	Dead Fish
A5-1695.50	Feather R US from Afterbay Outlet	08/21/02	1150	
A5-1695.50	Feather R US from Afterbay Outlet	09/25/02	1215	None
A5-1695.50	Feather R US from Afterbay Outlet	10/22/02	1205	Dead Fish
A5-1695.50	Feather R US from Afterbay Outlet	11/05/02	1425	Dead Fish
A5-1695.50	Feather R US from Afterbay Outlet	11/14/02	1410	Dead Fish
A5-1695.50	Feather R US from Afterbay Outlet	12/11/02	1315	Dead Fish
A5-1695.50	Feather R US from Afterbay Outlet	12/17/02	1245	Dead Fish
A5-1695.50	Feather R US from Afterbay Outlet	01/14/03	1300	Dead Fish
A5-1695.50	Feather R US from Afterbay Outlet	02/20/03	1415	None
A5-1695.50	Feather R US from Afterbay Outlet	03/19/03	1315	None
A5-1695.50	Feather R US from Afterbay Outlet	04/17/03	1245	None
A5-1695.50	Feather R US from Afterbay Outlet	05/15/03	1330	None
A5-1695.50	Feather R US from Afterbay Outlet	06/17/03	1100	None
A5-1695.50	Feather R US from Afterbay Outlet	07/08/03	0800	None
A5-1695.50	Feather R US from Afterbay Outlet	08/11/03	1245	Fishy
A5-1695.50	Feather R US from Afterbay Outlet	09/17/03	1300	Fishy
A5-1695.50	Feather R US from Afterbay Outlet	10/27/03	1400	Fishy
A5-1695.50	Feather R US from Afterbay Outlet	11/17/03	1440	Fishy
A5-1695.50	Feather R US from Afterbay Outlet	12/15/03	1350	None

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Station Number	Station Name	Date	Time	Odor
A5-1695.50	Feather R US from Afterbay Outlet	01/13/04	1200	None
A5-1695.50	Feather R US from Afterbay Outlet	02/03/04	1200	None
A5-1695.50	Feather R US from Afterbay Outlet	02/10/04	1310	
A5-1695.50	Feather R US from Afterbay Outlet	02/19/04	1150	None
A5-1695.50	Feather R US from Afterbay Outlet	02/27/04	0850	None
A5-1695.50	Feather R US from Afterbay Outlet	03/10/04	1300	None
A5-1695.50	Feather R US from Afterbay Outlet	04/06/04	1200	None
A5-1687.70	Feather R DS from Afterbay Outlet	03/26/02	1325	
A5-1687.70	Feather R DS from Afterbay Outlet	04/24/02	1655	
A5-1687.70	Feather R DS from Afterbay Outlet	05/21/02	1640	
A5-1687.70	Feather R DS from Afterbay Outlet	06/25/02	1715	None
A5-1687.70	Feather R DS from Afterbay Outlet	07/24/02	1445	None
A5-1687.70	Feather R DS from Afterbay Outlet	08/21/02	1245	
A5-1687.70	Feather R DS from Afterbay Outlet	09/25/02	1300	
A5-1687.70	Feather R DS from Afterbay Outlet	10/22/02	1320	Dead Fish
A5-1687.70	Feather R DS from Afterbay Outlet	11/05/02	1310	Dead Fish
A5-1687.70	Feather R DS from Afterbay Outlet	11/14/02	1520	Dead Fish
A5-1687.70	Feather R DS from Afterbay Outlet	12/11/02	1420	Dead Fish
A5-1687.70	Feather R DS from Afterbay Outlet	12/17/02	1345	Dead Fish
A5-1687.70	Feather R DS from Afterbay Outlet	01/14/03	1400	None
A5-1687.70	Feather R DS from Afterbay Outlet	02/20/03	1510	None

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Station Number	Station Name	Date	Time	Odor
A5-1687.70	Feather R DS from Afterbay Outlet	03/19/03	1420	None
A5-1687.70	Feather R DS from Afterbay Outlet	04/17/03	1345	None
A5-1687.70	Feather R DS from Afterbay Outlet	05/15/03	1430	None
A5-1687.70	Feather R DS from Afterbay Outlet	06/17/03	1200	None
A5-1687.70	Feather R DS from Afterbay Outlet	07/08/03	0945	None
A5-1687.70	Feather R DS from Afterbay Outlet	08/11/03	1415	None
A5-1687.70	Feather R DS from Afterbay Outlet	09/17/03	1400	Fishy
A5-1687.70	Feather R DS from Afterbay Outlet	10/27/03	1500	Fishy
A5-1687.70	Feather R DS from Afterbay Outlet	11/17/03	1530	Fishy
A5-1687.70	Feather R DS from Afterbay Outlet	12/15/03	1440	None
A5-1687.70	Feather R DS from Afterbay Outlet	01/13/04	1300	
A5-1687.70	Feather R DS from Afterbay Outlet	02/03/04	1230	
A5-1687.70	Feather R DS from Afterbay Outlet	02/10/04	1400	
A5-1687.70	Feather R DS from Afterbay Outlet	02/19/04	1230	None
A5-1687.70	Feather R DS from Afterbay Outlet	02/27/04	1030	None
A5-1687.70	Feather R DS from Afterbay Outlet	03/10/04	1350	None
A5-1687.70	Feather R DS from Afterbay Outlet	04/06/04	1445	None
A5-1687.20	Feather R DS from SCOR Outlet	03/26/02	1350	None
A5-1687.20	Feather R DS from SCOR Outlet	04/24/02	1455	Moss/Algae
A5-1687.20	Feather R DS from SCOR Outlet	05/21/02	1345	None
A5-1687.20	Feather R DS from SCOR Outlet	06/25/02	1345	None

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Station Number	Station Name	Date	Time	Odor
A5-1687.20	Feather R DS from SCOR Outlet	07/24/02	1330	None
A5-1687.20	Feather R DS from SCOR Outlet	08/21/02	1030	Dirt
A5-1687.20	Feather R DS from SCOR Outlet	09/25/02	0950	None
A5-1687.20	Feather R DS from SCOR Outlet	10/22/02	0940	None
A5-1687.20	Feather R DS from SCOR Outlet	11/05/02	1140	Dead Fish
A5-1687.20	Feather R DS from SCOR Outlet	11/14/02	1345	Dead Fish
A5-1687.20	Feather R DS from SCOR Outlet	12/11/02	1230	
A5-1687.20	Feather R DS from SCOR Outlet	12/17/02	1040	
A5-1687.20	Feather R DS from SCOR Outlet	01/14/03	1030	
A5-1687.20	Feather R DS from SCOR Outlet	02/20/03	0915	
A5-1687.20	Feather R DS from SCOR Outlet	03/19/03	0845	
A5-1687.20	Feather R DS from SCOR Outlet	04/17/03	1330	
A5-1687.20	Feather R DS from SCOR Outlet	05/15/03	0930	
A5-1687.20	Feather R DS from SCOR Outlet	06/17/03	0925	None
A5-1687.20	Feather R DS from SCOR Outlet	07/08/03	0940	None
A5-1687.20	Feather R DS from SCOR Outlet	08/11/03	0945	None
A5-1687.20	Feather R DS from SCOR Outlet	09/17/03	1030	Fish
A5-1687.20	Feather R DS from SCOR Outlet	10/27/03	1220	Fish
A5-1687.20	Feather R DS from SCOR Outlet	11/17/03	1115	Fish
A5-1687.20	Feather R DS from SCOR Outlet	12/15/03	1100	Dead Fish
A5-1687.20	Feather R DS from SCOR Outlet	01/13/04	1110	
A5-1687.20	Feather R DS from SCOR Outlet	02/03/04	0920	

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Station Number	Station Name	Date	Time	Odor
A5-1687.20	Feather R DS from SCOR Outlet	02/10/04	0955	None
A5-1687.20	Feather R DS from SCOR Outlet	02/19/04	1415	
A5-1687.20	Feather R DS from SCOR Outlet	03/10/04	1050	None
A5-1687.20	Feather R DS from SCOR Outlet	04/06/04	0900	None
A5-1662.50	Feather R NR Mile Long Pond	03/26/02	1445	
A5-1662.50	Feather R NR Mile Long Pond	04/24/02	1745	
A5-1662.50	Feather R NR Mile Long Pond	05/21/02	1745	None
A5-1662.50	Feather R NR Mile Long Pond	06/25/02	1810	None
A5-1662.50	Feather R NR Mile Long Pond	07/24/02	1540	None
A5-1662.50	Feather R NR Mile Long Pond	08/21/02	1400	None
A5-1662.50	Feather R NR Mile Long Pond	09/25/02	1430	None
A5-1662.50	Feather R NR Mile Long Pond	10/22/02	1430	Dead Fish
A5-1662.50	Feather R NR Mile Long Pond	11/05/02	1345	Dead Fish
A5-1662.50	Feather R NR Mile Long Pond	11/14/02	1615	Dead Fish
A5-1662.50	Feather R NR Mile Long Pond	12/11/02	1515	Dead Fish
A5-1662.50	Feather R NR Mile Long Pond	12/17/02	1430	Dead Fish
A5-1662.50	Feather R NR Mile Long Pond	01/14/03	1440	None
A5-1662.50	Feather R NR Mile Long Pond	02/20/03	1615	None
A5-1662.50	Feather R NR Mile Long Pond	03/19/03	1515	None
A5-1662.50	Feather R NR Mile Long Pond	04/17/03	1445	None
A5-1662.50	Feather R NR Mile Long Pond	05/15/03	1345	None
A5-1662.50	Feather R NR Mile Long Pond	06/17/03	1400	None
A5-1662.50	Feather R NR Mile Long Pond	07/08/03	1020	None
A5-1662.50	Feather R NR Mile Long Pond	08/11/03	1340	Dirt
A5-1662.50	Feather R NR Mile Long Pond	09/17/03	1440	Fish
A5-1662.50	Feather R NR Mile Long Pond	10/27/03	1615	Fish
A5-1662.50	Feather R NR Mile Long Pond	11/17/03	1610	Fishy
A5-1662.50	Feather R NR Mile Long Pond	12/15/03	1500	Fishy
A5-1662.50	Feather R NR Mile Long Pond	01/13/04	1415	None
A5-1662.50	Feather R NR Mile Long Pond	02/03/04	2130	
A5-1662.50	Feather R NR Mile Long Pond	02/10/04	1450	None
A5-1662.50	Feather R NR Mile Long Pond	02/19/04	1545	
A5-1662.50	Feather R NR Mile Long Pond	03/10/04	1420	None
A5-1662.50	Feather R NR Mile Long Pond	04/06/04	1215	None
A5-1645.50	Feather R DS from Project Boundary	03/26/02	1550	None
A5-1645.50	Feather R DS from Project Boundary	04/24/02	1850	None

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<b>Station Number</b>	<b>Station Name</b>	<b>Date</b>	<b>Time</b>	<b>Odor</b>
A5-1645.50	Feather R DS from Project Boundary	05/21/02	1855	None
A5-1645.50	Feather R DS from Project Boundary	06/25/02	0620	Dirt
A5-1645.50	Feather R DS from Project Boundary	07/24/02	1640	
A5-1645.50	Feather R DS from Project Boundary	08/21/02	1150	Dirt
A5-1645.50	Feather R DS from Project Boundary	09/25/02	1120	Dirt
A5-1645.50	Feather R DS from Project Boundary	10/22/02	1110	None
A5-1645.50	Feather R DS from Project Boundary	11/05/02	1225	Dead Fish
A5-1645.50	Feather R DS from Project Boundary	11/14/02	1045	Dead Fish
A5-1645.50	Feather R DS from Project Boundary	12/11/02	1320	
A5-1645.50	Feather R DS from Project Boundary	12/17/02	1130	None
A5-1645.50	Feather R DS from Project Boundary	01/14/03	1135	None
A5-1645.50	Feather R DS from Project Boundary	02/20/03	1000	None
A5-1645.50	Feather R DS from Project Boundary	03/19/03	1000	None
A5-1645.50	Feather R DS from Project Boundary	04/17/03	1230	None
A5-1645.50	Feather R DS from Project Boundary	05/15/03	1020	
A5-1645.50	Feather R DS from Project Boundary	06/17/03	1045	None
A5-1645.50	Feather R DS from Project Boundary	07/08/03	1030	None
A5-1645.50	Feather R DS from Project Boundary	08/11/03	1100	None
A5-1645.50	Feather R DS from Project Boundary	09/17/03	1150	Dead Fish
A5-1645.50	Feather R DS from Project Boundary	10/27/03	1320	Dead Fish
A5-1645.50	Feather R DS from Project Boundary	11/17/03	1215	Dead Fish
A5-1645.50	Feather R DS from Project Boundary	12/15/03	1215	

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Station Number	Station Name	Date	Time	Odor
A5-1645.50	Feather R DS from Project Boundary	01/13/04	1200	
A5-1645.50	Feather R DS from Project Boundary	02/03/04	1010	
A5-1645.50	Feather R DS from Project Boundary	02/10/04	1045	None
A5-1645.50	Feather R DS from Project Boundary	02/19/04	1745	
A5-1645.50	Feather R DS from Project Boundary	02/27/04	1330	
A5-1645.50	Feather R DS from Project Boundary	03/10/04	1155	None
A5-1645.50	Feather R DS from Project Boundary	04/06/04	0950	None
A5-7010.50	Honcut C A Pacific Ranch NR Palermo	03/27/02	0740	
A5-7010.50	Honcut C A Pacific Ranch NR Palermo	04/24/02	0630	None
A5-7010.50	Honcut C A Pacific Ranch NR Palermo	05/21/02	0630	None
A5-7010.50	Honcut C A Pacific Ranch NR Palermo	06/25/02	0715	None
A5-7010.50	Honcut C A Pacific Ranch NR Palermo	07/24/02	1845	Dirt
A5-7010.50	Honcut C A Pacific Ranch NR Palermo	08/21/02	1300	Dirt
A5-7010.50	Honcut C A Pacific Ranch NR Palermo	09/25/02	1220	Dirt
A5-7010.50	Honcut C A Pacific Ranch NR Palermo	10/22/02	1215	None
A5-7010.50	Honcut C A Pacific Ranch NR Palermo	11/14/02	1000	None
A5-7010.50	Honcut C A Pacific Ranch NR Palermo	12/11/02	0945	None
A5-7010.50	Honcut C A Pacific Ranch NR Palermo	12/17/02	1215	None
A5-7010.50	Honcut C A Pacific Ranch NR Palermo	01/14/03	1230	None
A5-7010.50	Honcut C A Pacific Ranch NR Palermo	02/20/03	1100	None
A5-7010.50	Honcut C A Pacific Ranch NR Palermo	03/19/03	1100	None

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Station Number	Station Name	Date	Time	Odor
A5-7010.50	Honcut C A Pacific Ranch NR Palermo	04/17/03	1145	
A5-7010.50	Honcut C A Pacific Ranch NR Palermo	05/15/03	1140	
A5-7010.50	Honcut C A Pacific Ranch NR Palermo	06/17/03	1145	None
A5-7010.50	Honcut C A Pacific Ranch NR Palermo	07/08/03	1105	None
A5-7010.50	Honcut C A Pacific Ranch NR Palermo	08/11/03	1200	None
A5-7010.50	Honcut C A Pacific Ranch NR Palermo	09/17/03	1250	None
A5-7010.50	Honcut C A Pacific Ranch NR Palermo	10/27/03	1410	None
A5-7010.50	Honcut C A Pacific Ranch NR Palermo	11/17/03	1300	None
A5-7010.50	Honcut C A Pacific Ranch NR Palermo	12/15/03	1300	
A5-7010.50	Honcut C A Pacific Ranch NR Palermo	01/13/04	1250	
A5-7010.50	Honcut C A Pacific Ranch NR Palermo	02/03/04	1050	
A5-7010.50	Honcut C A Pacific Ranch NR Palermo	02/10/04	1125	None
A5-7010.50	Honcut C A Pacific Ranch NR Palermo	02/19/04	1700	
A5-7010.50	Honcut C A Pacific Ranch NR Palermo	03/10/04	1250	None
A5-7010.50	Honcut C A Pacific Ranch NR Palermo	04/06/04	1045	None
A5-1556.50	Feather R A Singh AB Riviera RD	03/26/02	1640	None
A5-1556.50	Feather R A Singh AB Riviera RD	04/24/02	0830	None
A5-1556.50	Feather R A Singh AB Riviera RD	05/21/02	0745	None
A5-1556.50	Feather R A Singh AB Riviera RD	06/25/02	0830	Algae
A5-1556.50	Feather R A Singh AB Riviera RD	07/24/02	0705	None
A5-1556.50	Feather R A Singh AB Riviera RD	08/21/02	1410	Dirt

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Station Number	Station Name	Date	Time	Odor
A5-1556.50	Feather R A Singh AB Riviera RD	09/25/02	1330	Dirt
A5-1556.50	Feather R A Singh AB Riviera RD	10/22/02	1320	None
A5-1556.50	Feather R A Singh AB Riviera RD	11/14/02	0830	Dead Fish
A5-1556.50	Feather R A Singh AB Riviera RD	12/11/02	0840	None
A5-1556.50	Feather R A Singh AB Riviera RD	12/17/02	1315	None
A5-1556.50	Feather R A Singh AB Riviera RD	01/14/03	1330	None
A5-1556.50	Feather R A Singh AB Riviera RD	02/20/03	1200	None
A5-1556.50	Feather R A Singh AB Riviera RD	03/19/03	1215	None
A5-1556.50	Feather R A Singh AB Riviera RD	04/17/03	1050	None
A5-1556.50	Feather R A Singh AB Riviera RD	05/15/03	1245	
A5-1556.50	Feather R A Singh AB Riviera RD	06/17/03	1300	None
A5-1556.50	Feather R A Singh AB Riviera RD	07/08/03	1115	None
A5-1556.50	Feather R A Singh AB Riviera RD	08/11/03	1245	Dirt
A5-1556.50	Feather R A Singh AB Riviera RD	09/17/03	1340	None
A5-1556.50	Feather R A Singh AB Riviera RD	10/27/03	1515	Fish
A5-1556.50	Feather R A Singh AB Riviera RD	11/17/03	1400	
A5-1556.50	Feather R A Singh AB Riviera RD	12/15/03	1400	
A5-1556.50	Feather R A Singh AB Riviera RD	01/13/04	1415	
A5-1556.50	Feather R A Singh AB Riviera RD	02/03/04	1140	
A5-1556.50	Feather R A Singh AB Riviera RD	02/10/04	1235	None
A5-1556.50	Feather R A Singh AB Riviera RD	02/27/04	1120	None
A5-1556.50	Feather R A Singh AB Riviera RD	03/10/04	1345	None

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Station Number	Station Name	Date	Time	Odor
A5-1556.50	Feather R A Singh AB Riviera RD	04/06/04	1125	None
A5-1516.50	Feather R A Archer Ave	03/27/02	0915	None
A5-1516.50	Feather R A Archer Ave	04/24/02	0910	None
A5-1516.50	Feather R A Archer Ave	05/21/02	0840	None
A5-1516.50	Feather R A Archer Ave	06/25/02	0930	None
A5-1516.50	Feather R A Archer Ave	07/24/02	0750	None
A5-1516.50	Feather R A Archer Ave	08/21/02	0730	Dirt
A5-1516.50	Feather R A Archer Ave	09/25/02	0835	None
A5-1516.50	Feather R A Archer Ave	10/22/02	0720	None
A5-1516.50	Feather R A Archer Ave	11/14/02	0820	None
A5-1516.50	Feather R A Archer Ave	12/11/02	0900	None
A5-1516.50	Feather R A Archer Ave	12/17/02	0815	None
A5-1516.50	Feather R A Archer Ave	01/14/03	0815	None
A5-1516.50	Feather R A Archer Ave	02/20/03	0730	
A5-1516.50	Feather R A Archer Ave	03/19/03	1810	None
A5-1516.50	Feather R A Archer Ave	04/17/03	0930	None
A5-1516.50	Feather R A Archer Ave	05/15/03	0835	
A5-1516.50	Feather R A Archer Ave	06/17/03	1055	None
A5-1516.50	Feather R A Archer Ave	07/08/03	1230	None
A5-1516.50	Feather R A Archer Ave	08/11/03	1215	None
A5-1516.50	Feather R A Archer Ave	09/17/03	0815	None
A5-1516.50	Feather R A Archer Ave	10/27/03	1250	None
A5-1516.50	Feather R A Archer Ave	11/17/03	1100	None
A5-1516.50	Feather R A Archer Ave	12/15/03	1430	None
A5-1516.50	Feather R A Archer Ave	01/13/04	1400	None
A5-1516.50	Feather R A Archer Ave	02/03/04	1335	None
A5-1516.50	Feather R A Archer Ave	02/10/04	1345	None
A5-1516.50	Feather R A Archer Ave	02/19/04	0815	None
A5-1516.50	Feather R A Archer Ave	03/10/04	1650	None
A5-1516.50	Feather R A Archer Ave	04/06/04	1615	None
A6-1010.50	Yuba R A Mouth	03/27/02	1120	None
A6-1010.50	Yuba R A Mouth	04/24/02	1115	None
A6-1010.50	Yuba R A Mouth	05/21/02	1000	None
A6-1010.50	Yuba R A Mouth	06/25/02	1020	None
A6-1010.50	Yuba R A Mouth	07/24/02	0850	None
A6-1010.50	Yuba R A Mouth	08/21/02	0820	None
A6-1010.50	Yuba R A Mouth	09/25/02	0950	None
A6-1010.50	Yuba R A Mouth	10/22/02	0820	None
A6-1010.50	Yuba R A Mouth	11/14/02	0915	None
A6-1010.50	Yuba R A Mouth	12/11/02	0945	None
A6-1010.50	Yuba R A Mouth	12/17/02	0900	None

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Station Number	Station Name	Date	Time	Odor
A6-1010.50	Yuba R A Mouth	01/14/03	0910	None
A6-1010.50	Yuba R A Mouth	02/20/03	0840	None
A6-1010.50	Yuba R A Mouth	03/19/03	0910	None
A6-1010.50	Yuba R A Mouth	04/17/03	0930	None
A6-1010.50	Yuba R A Mouth	05/15/03	0835	None
A6-1010.50	Yuba R A Mouth	06/17/03	1055	None
A6-1010.50	Yuba R A Mouth	07/08/03	1230	None
A6-1010.50	Yuba R A Mouth	08/11/03	1215	None
A6-1010.50	Yuba R A Mouth	09/17/03	0815	None
A6-1010.50	Yuba R A Mouth	10/27/03	1250	None
A6-1010.50	Yuba R A Mouth	11/17/03	1200	None
A6-1010.50	Yuba R A Mouth	12/15/03	1220	None
A6-1010.50	Yuba R A Mouth	01/13/04	1310	None
A6-1010.50	Yuba R A Mouth	02/03/04	1140	None
A6-1010.50	Yuba R A Mouth	02/10/04	1150	None
A6-1010.50	Yuba R A Mouth	02/19/04	1015	None
A6-1010.50	Yuba R A Mouth	02/27/04	1230	None
A6-1010.50	Yuba R A Mouth	03/10/04	1610	None
A6-1010.50	Yuba R A Mouth	04/06/04	1100	None

A5-1425.50	Feather R US from Yuba R	03/27/02	1030	None
A5-1425.50	Feather R US from Yuba R	04/24/02	1030	None
A5-1425.50	Feather R US from Yuba R	05/21/02	1040	None
A5-1425.50	Feather R US from Yuba R	06/25/02	1100	Algae
A5-1425.50	Feather R US from Yuba R	07/24/02	1015	None
A5-1425.50	Feather R US from Yuba R	08/21/02	0905	None
A5-1425.50	Feather R US from Yuba R	09/25/02	0920	None
A5-1425.50	Feather R US from Yuba R	10/22/02	0840	None
A5-1425.50	Feather R US from Yuba R	11/14/02	0945	None
A5-1425.50	Feather R US from Yuba R	12/11/02	1015	None
A5-1425.50	Feather R US from Yuba R	12/17/02	0930	None
A5-1425.50	Feather R US from Yuba R	01/14/03	0940	None
A5-1425.50	Feather R US from Yuba R	02/20/03	0920	None
A5-1425.50	Feather R US from Yuba R	03/19/03	0950	None
A5-1425.50	Feather R US from Yuba R	04/17/03	0900	None
A5-1425.50	Feather R US from Yuba R	05/15/03	0910	None
A5-1425.50	Feather R US from Yuba R	06/17/03	1120	None
A5-1425.50	Feather R US from Yuba R	07/08/03	1200	None
A5-1425.50	Feather R US from Yuba R	08/11/03	1200	None
A5-1425.50	Feather R US from Yuba R	09/17/03	0945	None
A5-1425.50	Feather R US from Yuba R	10/27/03	1330	None
A5-1425.50	Feather R US from Yuba R	11/17/03	1230	Fishy
A5-1425.50	Feather R US from Yuba R	12/15/03	1300	None
A5-1425.50	Feather R US from Yuba R	01/13/04	1240	None

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Station Number	Station Name	Date	Time	Odor
A5-1425.50	Feather R US from Yuba R	02/03/04	1215	None
A5-1425.50	Feather R US from Yuba R	02/10/04	1215	None
A5-1425.50	Feather R US from Yuba R	02/19/04	0900	None
A5-1425.50	Feather R US from Yuba R	02/27/04	1025	None
A5-1425.50	Feather R US from Yuba R	03/10/04	1500	None
A5-1425.50	Feather R US from Yuba R	04/06/04	1130	None
A5-1389.50	Feather R A Shanghai Bend	03/26/02	1300	None
A5-1389.50	Feather R A Shanghai Bend	04/24/02	1210	None
A5-1389.50	Feather R A Shanghai Bend	05/21/02	1130	None
A5-1389.50	Feather R A Shanghai Bend	06/25/02	1150	Dirt
A5-1389.50	Feather R A Shanghai Bend	07/24/02	0955	None
A5-1389.50	Feather R A Shanghai Bend	08/21/02	0945	Dirt
A5-1389.50	Feather R A Shanghai Bend	09/25/02	1025	Dirt
A5-1389.50	Feather R A Shanghai Bend	10/22/02	0930	None
A5-1389.50	Feather R A Shanghai Bend	11/14/02	1040	None
A5-1389.50	Feather R A Shanghai Bend	12/11/02	1100	None
A5-1389.50	Feather R A Shanghai Bend	12/17/02	1010	None
A5-1389.50	Feather R A Shanghai Bend	01/14/03	1015	None
A5-1389.50	Feather R A Shanghai Bend	02/20/03	1015	None
A5-1389.50	Feather R A Shanghai Bend	03/19/03	1030	None
A5-1389.50	Feather R A Shanghai Bend	04/17/03	1000	
A5-1389.50	Feather R A Shanghai Bend	05/15/03	0950	
A5-1389.50	Feather R A Shanghai Bend	06/17/03	1200	
A5-1389.50	Feather R A Shanghai Bend	07/08/03	1300	
A5-1389.50	Feather R A Shanghai Bend	08/11/03	1300	
A5-1389.50	Feather R A Shanghai Bend	09/17/03	0940	
A5-1389.50	Feather R A Shanghai Bend	10/27/03	1400	
A5-1389.50	Feather R A Shanghai Bend	11/17/03	1300	
A5-1389.50	Feather R A Shanghai Bend	12/15/03	1335	
A5-1389.50	Feather R A Shanghai Bend	01/13/04	1200	
A5-1389.50	Feather R A Shanghai Bend	02/03/04	1250	
A5-1389.50	Feather R A Shanghai Bend	02/10/04	1245	
A5-1389.50	Feather R A Shanghai Bend	02/19/04	0930	
A5-1389.50	Feather R A Shanghai Bend	02/27/04	1115	
A5-1389.50	Feather R A Shanghai Bend	03/10/04	1410	
A5-1389.50	Feather R A Shanghai Bend	04/06/04	1300	
A6-5010.50	Bear R NR Mouth	03/27/02	1430	None
A6-5010.50	Bear R NR Mouth	04/24/02	1430	Mud
A6-5010.50	Bear R NR Mouth	05/21/02	1240	Dirt
A6-5010.50	Bear R NR Mouth	06/25/02	1310	Dirt
A6-5010.50	Bear R NR Mouth	07/24/02	1105	Dirt
A6-5010.50	Bear R NR Mouth	08/21/02	1115	Dirt

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Station Number	Station Name	Date	Time	Odor
A6-5010.50	Bear R NR Mouth	09/25/02	1130	Dirt
A6-5010.50	Bear R NR Mouth	10/22/02	1045	Dirt
A6-5010.50	Bear R NR Mouth	11/14/02	1140	None
A6-5010.50	Bear R NR Mouth	12/11/02	1200	None
A6-5010.50	Bear R NR Mouth	12/17/02	1110	None
A6-5010.50	Bear R NR Mouth	01/14/03	1110	None
A6-5010.50	Bear R NR Mouth	02/20/03	1140	None
A6-5010.50	Bear R NR Mouth	03/19/03	1135	None
A6-5010.50	Bear R NR Mouth	04/17/03	1115	None
A6-5010.50	Bear R NR Mouth	05/15/03	1115	None
A6-5010.50	Bear R NR Mouth	06/17/03	1020	None
A6-5010.50	Bear R NR Mouth	07/08/03	1115	None
A6-5010.50	Bear R NR Mouth	08/11/03	1100	None
A6-5010.50	Bear R NR Mouth	09/17/03	1100	None
A6-5010.50	Bear R NR Mouth	10/27/03	1145	None
A6-5010.50	Bear R NR Mouth	11/17/03	1400	None
A6-5010.50	Bear R NR Mouth	12/15/03	1130	None
A6-5010.50	Bear R NR Mouth	01/13/04	1045	None
A6-5010.50	Bear R NR Mouth	02/03/04	1100	None
A6-5010.50	Bear R NR Mouth	02/10/04	1050	None
A6-5010.50	Bear R NR Mouth	02/19/04	1100	None
A6-5010.50	Bear R NR Mouth	03/10/04	1240	None
A6-5010.50	Bear R NR Mouth	04/06/04	1000	None
A5-1010.50	Feather R NR Verona	03/27/02	1515	None
A5-1010.50	Feather R NR Verona	04/24/02	1520	None
A5-1010.50	Feather R NR Verona	05/21/02	1330	None
A5-1010.50	Feather R NR Verona	06/25/02	1400	Dirt
A5-1010.50	Feather R NR Verona	07/24/02	1320	None
A5-1010.50	Feather R NR Verona	08/21/02	1215	None
A5-1010.50	Feather R NR Verona	09/25/02	1400	None
A5-1010.50	Feather R NR Verona	10/22/02	1135	None
A5-1010.50	Feather R NR Verona	11/14/02	1230	None
A5-1010.50	Feather R NR Verona	12/11/02	1300	None
A5-1010.50	Feather R NR Verona	12/17/02	1210	None
A5-1010.50	Feather R NR Verona	01/14/03	1215	None
A5-1010.50	Feather R NR Verona	02/20/00	1230	None
A5-1010.50	Feather R NR Verona	03/19/03	1230	None
A5-1010.50	Feather R NR Verona	04/17/03	1215	None
A5-1010.50	Feather R NR Verona	05/15/03	1215	None
A5-1010.50	Feather R NR Verona	06/17/03	0930	None
A5-1010.50	Feather R NR Verona	07/08/03	1015	None
A5-1010.50	Feather R NR Verona	08/11/03	1000	None
A5-1010.50	Feather R NR Verona	09/17/03	1200	None

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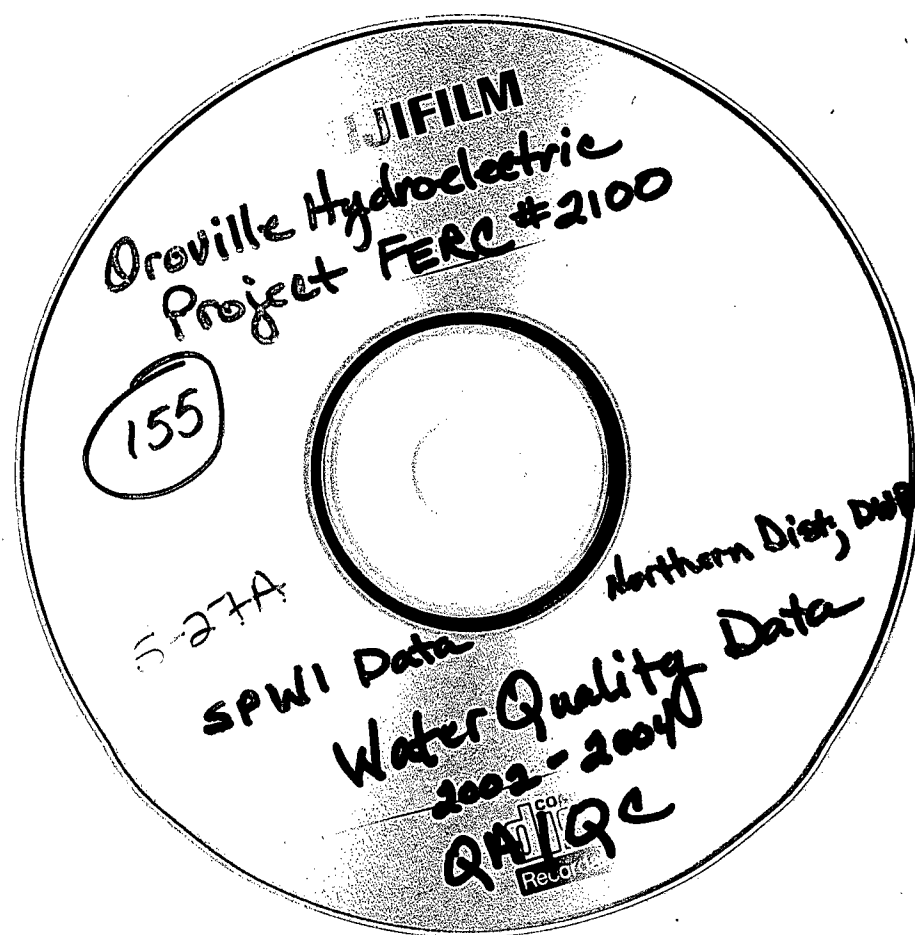
Station Number	Station Name	Date	Time	Odor
A5-1010.50	Feather R NR Verona	10/27/03	1100	None
A5-1010.50	Feather R NR Verona	11/17/03	1500	None
A5-1010.50	Feather R NR Verona	12/15/03	1030	None
A5-1010.50	Feather R NR Verona	01/13/04	0950	
A5-1010.50	Feather R NR Verona	02/03/04	1005	None
A5-1010.50	Feather R NR Verona	02/10/04	0950	None
A5-1010.50	Feather R NR Verona	02/19/04	1200	None
A5-1010.50	Feather R NR Verona	02/27/04	0850	None
A5-1010.50	Feather R NR Verona	03/10/04	0915	None
A5-1010.50	Feather R NR Verona	04/06/04	0850	None
AO-2157.50	Sacramento R US from			
	Feather R	03/27/02	1630	None
AO-2157.50	Sacramento R US from			
	Feather R	04/24/02	1730	Mud
AO-2157.50	Sacramento R US from			
	Feather R	05/21/02	1445	None
AO-2157.50	Sacramento R US from			
	Feather R	06/25/02	1515	None
AO-2157.50	Sacramento R US from			
	Feather R	07/24/02	1215	None
AO-2157.50	Sacramento R US from			
	Feather R	08/21/02	1330	None
AO-2157.50	Sacramento R US from			
	Feather R	09/25/02	1300	None
AO-2157.50	Sacramento R US from			
	Feather R	10/22/02	1245	None
AO-2157.50	Sacramento R US from			
	Feather R	11/14/02	1430	None
AO-2157.50	Sacramento R US from			
	Feather R	12/11/02	1415	None
AO-2157.50	Sacramento R US from			
	Feather R	12/17/02		
AO-2157.50	Sacramento R US from			
	Feather R	01/14/03	1330	None
AO-2157.50	Sacramento R US from			
	Feather R	02/20/03	1345	None
AO-2157.50	Sacramento R US from			
	Feather R	03/19/03	1330	None
AO-2157.50	Sacramento R US from			
	Feather R	04/17/03	1330	
AO-2157.50	Sacramento R US from			
AO-2157.50	Feather R	05/15/03	1330	

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Station Number	Station Name	Date	Time	Odor
AO-2157.50	Sacramento R US from Feather R	06/17/03	0815	
AO-2157.50	Sacramento R US from Feather R	07/08/03	0855	
AO-2157.50	Sacramento R US from Feather R	08/11/03	0830	
AO-2157.50	Sacramento R US from Feather R	09/17/03	1315	
AO-2157.50	Sacramento R US from Feather R	10/27/03	0930	None
AO-2157.50	Sacramento R US from Feather R	11/17/03	1620	None
AO-2157.50	Sacramento R US from Feather R	12/15/03	0920	None
AO-2157.50	Sacramento R US from Feather R	01/13/04	0830	None
AO-2157.50	Sacramento R US from Feather R	02/03/04	0850	None
AO-2157.50	Sacramento R US from Feather R	02/10/04	0830	None
AO-2157.50	Sacramento R US from Feather R	02/19/04	1310	None
AO-2157.50	Sacramento R US from Feather R	03/10/04	1045	None
AO-2157.50	Sacramento R US from Feather R	04/06/04	0725	None

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ME - working on  
metals food on  
crouille #2100

ME - working on  
metals food on  
crouille #2100