Exhibit E

PCWA
FIFTY YEARS

PLACER COUNTY WATER AGENCY

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June 30, 2008
File No. 01030A

RE: Middle Fork American River Project Relicensing / Final 2007 Technical Study Report
AQ 11 – Water Quality

Dear Aquatic Resources Technical Working Group Member –

On February 1, 2008, Draft AQ 11 – Water Quality Technical Study Report (TSR) – 2007 was distributed to the Aquatic Resources Technical Working Group (TWG) for review and comment by April 4, 2008.

As no comments were received on draft TSR, PCWA deems AQ 11 – Water Quality Technical Study Report – 2007 approved.

Attached for your use is the CD containing the final study report.

If you have any questions, please don't hesitate to call me at (530) 823-4889.

Sincerely,
PLACER COUNTY WATER AGENCY

Mal Toy

Mal Toy
Director of Resource Development

MT:bb

Enclosure
Final AQ 11 – Water Quality Technical Study Report – 2007

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Placer County Water Agency
Middle Fork American River Project
(FERC No. 2079)

FINAL

AQ 11 - WATER QUALITY
TECHNICAL STUDY REPORT - 2007

Placer County Water Agency
P.O. Box 6570
Auburn, CA 95604

June 2008

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1.0 INTRODUCTION

This report describes water quality studies conducted by the Placer County Water Agency (PCWA) in accordance with the AQ 11 - Water Quality Technical Study Plan (AQ 11 - TSP) for the Middle Fork American River Project (MFP or Project). The stakeholder-approved TSP was included in Supporting Document (SD) H of the Pre-Application Document (PAD) filed with the Federal Energy Regulatory Commission (FERC or Commission) on December 13, 2007 (PCWA 2007). A draft report was distributed to the Aquatics Technical Working Group (TWG) on February 1, 2008 for a 60 day comment period. The comment period ended on April 4, 2008. Oral comments were received at the March 10, 2008 Aquatics TWG meeting and have been addressed in this report. No written comments were received.

Water quality studies were conducted in the vicinity of the MFP during the spring and fall 2007 to characterize the physical, chemical, and bacterial water quality conditions upstream and downstream of Project facilities. The study consisted of summarizing current water quality objectives from the literature, implementing a water quality field sampling field program, and comparing water quality data from field with pertinent regulatory objectives and criteria. In addition, a screening level study of methyl mercury concentrations in sport fish tissue muscle was completed.

The water quality field sampling program included: (1) *in-situ* measurements; (2) collection of water quality samples for laboratory chemical analysis, hereafter referred to as the general water quality sampling; (3) voluntary water quality sampling that enhanced the approach described in the AQ 11 - TSP; (4) coliform sampling; and (5) measurement of water temperature and dissolved oxygen (profiles) in Project reservoirs. Fish for the methyl mercury muscle tissue analysis were also collected from the Project reservoirs and one location in the Middle Fork American River peaking reach (downstream of Oxbow Powerhouse, the lowermost Project facility) near Otter Creek.

The following sections provide a detailed description of the study objectives, study implementation, extent of the study area, study approach, study results, and literature cited.

2.0 STUDY OBJECTIVES

The objective of the water quality studies described in the AQ 11 - TSP is to characterize physical, chemical, and bacterial water quality conditions in the bypass reaches and the peaking reach, comparison reaches, and Project reservoirs and diversion pools and compare to the Central Valley Regional Water Quality Control Board (CVRWQCB 1998) Basin Plan objectives and water quality objectives.

3.0 STUDY IMPLEMENTATION

Figure 11-1 shows the AQ 11 - TSP objective and the study elements and activities that relate to completion of the study. It also shows how information developed through the water quality studies will be documented and provided to the stakeholders. The

following sections summarize the study elements completed, any deviations from the TSP and the rationale, outstanding study elements, and proposed modifications to the TSP.

3.1 STUDY ELEMENTS COMPLETED

The following study elements have been completed:

- Collected *in-situ* and general water quality measurements on the bypass reaches, peaking reaches, reservoirs, and diversion pools in spring (39 locations) and fall (36 locations).
- Collected fecal coliform samples at 17 sites.
- Collected fish samples at Project reservoirs (Hell Hole, French Meadows, Ralston Afterbay, Middle Fork Interbay) and at one river site (Middle Fork American River downstream of Ralston Afterbay) for mercury fish tissue analyses.
- Provided water quality samples to State-certified laboratories approved by the State Water Resources Control Board for chemical analyses.
- Compared water quality results to the CVRWQCB Basin Plan objectives and water quality objectives (CVRWQCB, Fourth Edition revised February 2007).
- Compared fish tissue results to the California's Office of Environmental Health Hazard Assessment (OEHHA) guidelines.

3.2 DEVIATIONS FROM TECHNICAL STUDY PLAN

The water quality studies proceeded as described in the AQ 11 - TSP except for the following deviations:

General Water Quality Sampling

- Water quality samples were not collected during high and low flow events at all of the sampling locations along the peaking reach of the Middle Fork American River during the spring and fall sampling events, as indicated in the TSP. Instead, water quality samples were collected in the peaking reach once during the spring sampling event and again during the fall sampling event. During each event, water quality samples were collected at each of the locations identified in the TSP, under a range of flow conditions.
- One metal (manganese) was not analyzed during the spring sampling event due to a transcription error. Manganese was sampled during the fall sampling event.

Coliform Sampling

- According to the fecal coliform sampling protocols, fecal coliform samples were to be collected five times within a 30 day period between July 4 and Labor Day. Two of the fecal coliform sampling locations were sampled the week after Labor

Day (the fifth sample in 30 days) because of a sampling location change late in the summer. Two of the sampling locations were changed to better meet the water quality sampling objectives. The location changes were agreed to by the Aquatics TWG.

Voluntary Enhancements

- *In-situ* measurements were taken at three additional locations (leakage channels and main channel) downstream of Hell Hole Reservoir and five additional locations (leakage channels and main channel) downstream of French Meadows Reservoir.
- Additional water samples were collected and analyzed for dissolved metals and total mercury due to the presence of a rust-color staining on the substrate and precipitate at these selected locations described above.
- The TSP states that the water quality analytical results would be compared to the Water Quality Control Plan (Basin Plan) for the California Regional Water Quality Control Board Central Valley Region, Fourth Edition, published in September 1998. The analytical results were compared to the most recent version of the Basin Plan, which was updated with amendments in February 2007.

Fish Tissue Sampling

- Five of the 10 recommended fish caught at French Meadows Reservoir (two brown trout and three rainbow trout) were analyzed for individual methyl mercury concentrations in the fish muscle tissue. The remaining five fish (brown trout) that were caught should have been analyzed individually. However, these five fish were analyzed as a composite.

Voluntary Enhancements

- In addition to the ten fish caught at Hell Hole Reservoir (brown trout, rainbow trout, and lake trout that were analyzed for individual methyl mercury concentration), five additional fish (brown trout) were caught and analyzed as a composite sample.

3.3 Outstanding Study Elements

The following describes the only outstanding element of the water quality study:

- Consult with Aquatic TWG to discuss contingency water quality related studies.

3.4 Proposed Modification to Technical Study Plan

These are no proposed modifications to the AQ 11 - TSP.

4.0 EXTENT OF STUDY AREA

The study area included bypass and comparison reaches, the peaking reach, Project reservoirs, and diversion pools. The sampled locations are listed in Table AQ 11-1 and are shown on Maps AQ 11-1 and 11-2.

5.0 STUDY APPROACH

This section describes the study approach used to conduct the water quality studies in the study area. This section first describes the sources that were reviewed to identify the existing water quality objectives relevant to the physical, chemical, and bacterial constituents that were analyzed during this study. The section next describes the field sampling methods and associated laboratory analyses methods and reporting employed during the collection of *in-situ* measurements, general water quality sampling, coliform sampling, and fish tissue sampling. This section concludes with a discussion of quality assurance / quality control procedures.

5.1 EXISTING WATER QUALITY OBJECTIVES

Existing water quality objectives for the physical, chemical, and bacterial constituents analyzed in this study were identified by reviewing The Sacramento River Basin and San Joaquin River Basin Water Quality Control Plan (CVRWQCB, Fourth Edition revised February 2007), California Toxics Rule (CTR) "Water Quality Standards: Establishment of Numeric Criteria for Priority Toxic Pollutants for the State of California" (Federal Register, 65 FR 31682, EPA 2000) and the National Toxics Rule (NTR) "Water Quality Standards: Establishment of Numeric Criteria for Priority Toxic Pollutants" (Federal Register, 57 FR 60848, EPA 1992). The Basin Plan includes water quality objectives established by the State Water Resources Control Board (SWRCB) for waters in the Upper American River Watershed. The CTR and NTR, which consider background levels based on criteria that protect both human health and aquatic life, were also reviewed. The SWRCB selects the most controlling (most stringent) of these values to determine compliance with the Clean Water Act.

The California's Office of Environmental Health Hazard Assessment (OEHHA) guidelines (Cal EPA 2005 and Klasing and Brodberg 2006) were also reviewed for fish tissue analysis.

5.2 WATER QUALITY FIELD SAMPLING PROGRAM

The water quality field sampling program was conducted during spring and fall 2007 and included collection of: (1) *in-situ* measurements; (2) general water quality samples; (3) voluntary enhanced water quality samples; (4) coliform samples; and (5) fish tissue samples. The locations of sampling stations for each of these sampling activities are summarized in Tables AQ 11-1 and 11-3 and are shown on Maps AQ 11-1 through 11-4.

Three spring sampling locations within the Project area were not sampled in the fall. These locations included Duncan Creek above Middle Fork American River confluence

(DC-3 RM0.2) and the Middle Fork American River above and below Duncan Creek confluence (MFAR-3 RM39.9 and MFAR-4 RM39.5). After the spring sampling event and following consultation with the Aquatic TWG, access to these locations was determined to be unsafe for continued sampling.

5.2.1 *In-situ* Measurements

In-situ measurements in the stream and river study reaches were made at each of the sampling locations listed in Table AQ 11-1 during the spring runoff period (May 14 through 31, 2007) and during the low flow (base flow) period in the fall (September 24 through October 3, 2007). The *in-situ* measurements included dissolved oxygen (DO), pH, specific conductance, and water temperature. These four parameters were measured at each sampling location on the stream and river reaches and Middle Fork Interbay using portable multi-probe water quality meters (YSI® or Hydrolab Quanta). Hach Environmental (Loveland, CO) and Equipco (Concord, CA) calibrated the water quality meters prior to the spring and fall sampling events, respectively. In addition, the DO sensor was calibrated in the field to adjust for changes in elevations and barometric pressure at each sampling location prior to data collection. The *in-situ* measurements were taken just below the water surface at representative locations within the stream.

In-situ water quality measurements were also collected during the general water quality sampling program at Project reservoirs (French Meadows Reservoir, Hell Hole Reservoir, and Ralston Afterbay) as outlined in the AQ 11 - TSP (Table AQ 11-1) using portable, multi-probe water quality meters (YSI® or Hydrolab Quanta). A secchi depth was also measured at these locations to determine the clarity of the water column. Middle Fork Interbay was only sampled at the surface as outlined in the AQ 11 - TSP.

5.2.2 General Water Quality Sampling

General water quality samples were collected once during the spring runoff period (May 14 through 31, 2007) and once during the low flow (base flow) period in the fall (September 24 through October 4, 2007) at sampling locations listed in Table AQ 11-1. The location of all the sampling sites were identified using a Global Positioning System (GPS) unit and the coordinates recorded in a field log book. Water quality samples in bypass reaches, peaking reach, and comparison reaches were collected in representative portions of the stream channel, using methods consistent with the Environmental Protection Agency (EPA) 1669 sampling protocol *Sampling Ambient Water for Trace Metals at EPA Water Quality Criteria*. Water quality samples collected from the streams and rivers were analyzed for the parameters listed in Table AQ 11-2, which include a suite of general parameters, dissolved metals, total mercury, and total and fecal coliform.

General water quality samples were also collected once during the spring and fall at Project reservoirs (Table AQ 11-1). In Hell Hole Reservoir, French Meadows Reservoir, and Ralston Afterbay, the samples were collected at the surface and immediately below the thermocline, if the reservoir was thermally stratified. If the Project reservoir was not thermally stratified, then water quality samples were collected at mid-depth of the

reservoir. A boat with gasoline engine was used to access the various reservoir sampling locations. Prior to sample collection, the engine was turned off for five to ten minutes to minimize the potential for sample contamination.

Surface water quality samples from Project reservoirs were collected using similar methods as those used for the stream water quality collection. Sub-surface water quality samples for laboratory analysis were collected using a Teflon® Kemmerer style sampler to ensure integrity of the sample collected from depth. Water quality samples collected from the reservoirs were analyzed for the parameters listed in Table AQ 11-2. Laboratory analysis for hydrocarbons were conducted on water quality samples collected from French Meadows and Hell Hole reservoirs and Ralston Afterbay, where motorized boating may occur.

All water quality samples were decanted into laboratory-supplied sample containers. Sample bottles requiring chemical preservation (HCl, HNO_3, or H_2SO_4) were preserved by Test America Laboratory (Morgan Hill, California). Samples collected for dissolved metals were filtered in the field with pre-cleaned 0.45 µm filtration units supplied by Brooks Rand Laboratory (Seattle, Washington). The sample containers were labeled with the sampling site ID and the date and time that the sample was collected. The sample container was stored on ice and delivered to a State-certified water quality laboratory for analyses in accordance with maximum holding periods. A chain-of-custody record was also maintained with the samples at all times.

5.2.3 Voluntary Enhanced Water Quality Sampling

Voluntary enhanced water quality samples not specified in the AQ 11 - TSP were collected during the spring and fall general water quality sampling program. The additional sampling was initiated by PCWA when field personnel observed and reported the presence of rust color staining of the substrate and a precipitate at select locations below Hell Hole Dam and French Meadows Dam. Based on experience in other relicensing water quality studies, the staining was thought to be result of iron oxidation and warranted further investigation. The locations of the voluntary enhanced water quality samples are described in Table AQ 11-3 and identified on Maps AQ 11-3 and AQ 11-4. The additional samples were collected immediately downstream of Hell Hole Dam (May 22, 2007) and French Meadows Dam (August 6, 2007) in the leakage channels and river locations upstream and downstream of the confluence of the leakage channel. Water quality samples collected from the leakage and river channel were analyzed for hardness, dissolved metals (arsenic, cadmium, copper, iron, lead, manganese, nickel and total chromium), and total mercury.

5.2.4 Coliform Sampling

Total and fecal coliform sampling was conducted to determine if the study waters met Basin Plan objectives for contact recreational activities. Samples were collected at all locations listed in Table AQ 11-1 in the spring (May 14 through 31, 2007) and fall (September 24 through October 3, 2007) concurrent with the general water quality sampling program. These samples were analyzed for total and fecal coliform in accordance with the AQ 11 - TSP.

Sampling for fecal coliform also occurred at near-shore locations adjacent to recreation facilities at Project reservoirs and along bypass reaches where substantial contact recreation (swimming, fishing, rafting, etc.) occurs. These sampling locations were identified in the AQ 11 - TSP and are provided in Table AQ 11-1 and depicted on Map AQ 11-2.

The samples for fecal coliform analysis at 15 of the 17 locations with substantial contact recreation were collected five times within a thirty-day period between August 6, 2007 and Labor Day. The sampling was conducted over Labor Day weekend, rather than July 4th to attempt to capture the highest holiday recreation use. July 4 occurred in the middle of the week in 2007 and therefore recreation use was assumed to be higher during the Labor Day weekend. Two of the coliform sampling locations (FC-9 and FC-11) were not sampled during the first week (August 6, 2007) due to a location change after the first sampling event. Sampling at these two locations extended one additional week after Labor Day until September 10, 2007 in order to complete the 5 samples in a 30-day period.

The sample containers were provided by Diamond Water Laboratory (Auburn, California). The containers were labeled with the sampling site ID and the date and time that the sample was collected. The sample container was stored on ice and delivered to the local State-certified water quality laboratory for analyses in accordance with maximum holding periods. A chain-of-custody record was also maintained with the samples at all times.

5.2.5 Water Quality Laboratory Analysis and Reporting

Water quality samples collected during the general water quality sampling program and coliform sampling were submitted for laboratory analysis at a State-certified laboratory approved by the State Water Resources Control Board (SWRCB) for chemical analysis (total of 31 analytes). The analytes tested are listed in Table AQ 11-2 and are described in Appendix A. Twenty analytes (general parameters and hydrocarbons) were submitted to Test America Laboratory, nine analytes (a suite of dissolved metals and total mercury) were submitted to Brooks Rand Laboratory, and two analytes (total and fecal coliform) were submitted to Diamond Water Laboratory. The laboratories provided reports of each chemical parameter analyzed and the associated laboratory method detection limit, reporting limit, and practical quantification limit.

The reporting units from Test America and Brooks Rand laboratories were reported in mg/L (ppm), µg/L (ppb), or ng/L (ppt). To keep the data results consistent with the reporting parameters listed for the Basin Plan, CTR, and NTR, all lab results were converted to the appropriate unit, if necessary. If these sources do not have a criterion for an analyte, then the units provided in the laboratory reports were used. Conversions between the units are shown in Appendix B.

5.3 WATER TEMPERATURE AND DISSOLVED OXYGEN RESERVOIR PROFILES

Reservoir profiles were completed at selected sampling locations in Hell Hole Reservoir, French Meadows Reservoir, and Ralston Afterbay during the spring and fall sampling period as described in the AQ 11 - TSP. The reservoir profile measurements included water temperature and DO at 1-meter (m) depth intervals to determine if thermal stratification was present. If a thermocline was present, the water quality parameters were measured below the thermocline at 2-m intervals or less to the bottom of the reservoir. If a thermocline was not present, measurements were made at 2-m intervals or less below the mid-depth point to the bottom of the reservoir. Results of the sampling were compiled and presented in tabular and graphical format in Appendix C.

The sampling locations within the Project reservoirs are described below.

Hell Hole Reservoir

Water quality depth profiles and sampling were conducted at three locations on May 30, 2007 and October 1-2, 2007 (Map AQ 11-1). HH-1 was located at the front of the reservoir near the dam, HH-2 was in the middle of the reservoir near the French Meadows Powerhouse, and HH-3 was the upstream most location within the reservoir. Between the spring and fall sampling events, the reservoir water surface elevation steadily declined, resulting in a decrease in the maximum depth sampled. Reservoir storage during the spring and fall sampling events was obtained from the California Department of Water Resources website (DWR 2007), and surface elevations were estimated from PCWA storage capacity curves (PCWA 2007). Water surface elevations were estimated at:

May 30, 2007: 4,583 ft msl
October 1, 2007: 4,514 ft msl.

French Meadows Reservoir

Water quality depth profiles and sampling were conducted at three locations on May 30, 2007 and October 3, 2007 (Map AQ 11-1). FM-1 was located at the front of the reservoir near the dam, FM-2 was in the middle of the reservoir, and FM-3 was just downstream from the French Meadows boat ramp in the middle of the reservoir. Between the spring and fall sampling events, the reservoir water surface elevation steadily declined, resulting in a decrease in the maximum depth sampled. Reservoir storage during the spring and fall sampling events was obtained from the California Department of Water Resources website (DWR 2007), and surface elevations were estimated from PCWA storage capacity curves (PCWA 2007). Water surface elevations during the spring and fall sampling events were estimated at:

May 30, 2007: 5,243 ft msl
October 3, 2007: 5,206 ft msl.

Ralston Afterbay

Water quality depth profiles and sampling were conducted at one location just behind the float barriers on May 29, 2007 and September 26, 2007 (Map AQ 11-1). Water surface elevations during the spring and fall sampling events were estimated by PCWA at:

May 29, 2007: 1,177 ft msl
September 26, 2007: 1,175 ft msl.

Monthly reservoir profiles (consisting of temperature, DO, and specific conductance) at the same reservoir locations described above were also completed by PCWA in 2005-2007 as part of early relicensing studies. The results of the 2005 and 2006 reservoir profiles are presented in the PAD, SD (G) (PCWA 2007). The 2007 reservoir profile results will be summarized in early 2008 and provided to the Aquatics TWG under separate cover.

5.4 Fish Tissue Collection and Analysis for Methyl Mercury

A screening level study of methyl mercury concentrations in sport fish muscle tissue was conducted at selected locations in the study area. As identified in the AQ 11 - TSP, at least 10 non-hatchery sport fish of edible size were collected from each of the following locations: Hell Hole Reservoir, French Meadows Reservoir, Middle Fork Interbay, Ralston Afterbay, and the Middle Fork American River near the Otter Creek confluence. Larger fish and species with greater potential for bioaccumulation were targeted for collection and analysis. The initial goal of the study was to collect five fish each of two different species from each location based on the following priority ranking. The two species present with the highest priority ranking would be targeted for collection (1 = highest priority) as follows:

1) bass
2) pikeminnow
3) lake trout
4) brown trout
5) rainbow trout

If five fish of two different species were not caught, then fish from a third species was included in the analysis.

At the four reservoirs, fish were captured in clean nylon gill nets. In the Middle Fork American River near Otter Creek fish were captured by electrofishing and hook-and-line sampling. For each fish collected, the species, fork length, total length, and weight were recorded.

The field handling procedures were consistent with those outlined in California Environmental Protection Agency (Cal EPA 2005) and those used at the Department of Fish and Game Marine Pollution Studies Laboratory at Moss Landing (Method # MPSL-

102a). The fish were placed into zipper-closure bags and immediately placed on ice in a cooler. The fish were then stored in a freezer prior to shipment to the analytical laboratory. All fish were shipped in an ice chest packed with ice and delivered by an overnight courier to Brooks Rand Laboratory (Seattle, Washington). Each cooler was shipped with a chain of custody form showing the sample identification number and collection date and time of each sample.

Muscle tissue from individual fish was analyzed for concentrations of methyl mercury in accordance with the General Protocol for Sport Fish Sampling and Analysis developed by the Cal EPA (2005) and with methods comparable to those used at the Department of Fish and Game Marine Pollution Studies Laboratory at Moss Landing. The results of the fish fillet analyses were reported in ng/g. These were converted to mg/kg fish (ppm) to be consistent with the OEHHA guidelines. The conversion is provided in Appendix B.

In one instance at French Meadows Reservoir, five brown trout were sent to the laboratory for analysis as one composite sample. For Hell Hole Reservoir, in addition to the 10 individual fish analyzed, a composite sample of five brown trout was analyzed.

5.5 Quality Assurance/ Quality Control Procedures

Standard precautions were established for the collection of water quality samples. At each station, all samples were collected by the same person, wearing ultra-trace sampling gloves. Water quality samples were collected using the designated collection bottle supplied by the appropriate laboratory. Upon collection, each sample was immediately labeled with the date and time and logged on a chain-of-custody form and placed into a cooler filled with ice.

Water quality samples were delivered to the analytical laboratory within the appropriate holding times. Coliform samples were delivered to the laboratory on the same day of collection, while all other samples were delivered between 24 to 48 hours of the sample collection time by courier. A chain-of-custody form accompanied all samples from the time of collection to delivery and submittal to the analytical laboratory.

In-stream water samples were collected just below the water surface in areas of steady flow. Water samples from the reservoirs and impoundments were collected below the water surface following the same quality control (QC) procedures. Additional precautions were followed when sampling from a motorized boat. Samples were collected from the bow of the boat after the motor was turned off for at least five to ten minutes to avoid possible hydrocarbon contamination from the motor boat. Sampling equipment was cleaned with a cleaning solution and distilled water prior to sample collection.

Standard quality assurance (QA) procedures were performed by the laboratories during analyses of water samples. These included matrix and laboratory spikes and spike duplicates, matrix duplicates, and method blanks as appropriate. A summary of the QA measures were included with each certified laboratory report.

A QA/QC screening level review was also conducted on all of these laboratory analytical reports. Results of the QA/QC review are presented in Appendix D.

6.0 STUDY RESULTS

6.1 REVIEW OF EXISTING WATER QUALITY OBJECTIVES

The Basin Plan identifies specific water quality objectives of allowable limits or levels of water quality constituents. These objectives are established for the protection of beneficial uses of the waters associated with the MFP (CVRWQCB 2007). If water quality is maintained at levels that meet these objectives, the beneficial uses of the waters are considered to be protected. The beneficial uses identified in the Basin Plan that pertain to water associated with the MFP include: (1) municipal and domestic supply; (2) agricultural irrigation and stock watering; (3) power generation; (4) contact recreation; (5) non-contact recreation; (6) coldwater habitat and spawning habitat for fisheries; and (7) wildlife habitat. The definition of each of these beneficial uses is provided in Table AQ 11-4.

Water quality objectives include both numeric and narrative objectives (Table AQ 11-2). The Basin Plan provides specific numeric objectives for bacteria, *in-situ* measurements, and for chemical or metal constituents. The objectives for chemical and metal constituents are derived from various sources such as maximum contaminant levels (MCLs) that are provided in Title 22 of the California Code of Regulations or from the CTR or NTR. The most stringent objectives were used for this study.

Often more stringent objectives are provided by the CTR and the NTR to protect aquatic life and human health. The CTR and NTR numeric objective for cadmium (Cd), copper (Cu), lead (Pb) and nickel (Ni) is more stringent than the Basin Plan objective. The CTR and NTR have established more stringent criteria for these metals to protect freshwater aquatic life. The CTR and NTR set acute and chronic criteria that are hardness-dependent and must be calculated on a location-by-location basis. For each of these metals, the water quality criterion decreases with decreasing water hardness. These calculated criteria and laboratory results are shown in Tables AQ 11-9, AQ 11-12, and AQ 11-15. The formulas for calculating hardness-dependent criteria are provided in the CTR and NTR guidance documents (US EPA 2007 and 2007a).

The Basin Plan also specifies a water temperature thermal heating objective that states, "Natural water temperatures shall not be altered unless it can be demonstrated to the satisfaction of the Regional Board that such alteration does not adversely affect beneficial uses. At no time or place shall the temperature be increased more than 5°F (2.8°C) above the natural receiving water."

Several of the parameters analyzed do not have established objectives. Various literature sources were reviewed for each parameter to identify guidelines or ranges of the different parameters that might be expected for the MFP area. The ranges are described in Appendix A.

The results of the water quality sampling field program were compared to the most stringent water quality objectives identified Table AQ 11-2. The locations where the objectives have not been met were identified and are discussed in the following results section.

6.2 WATER QUALITY SAMPLING AND ANALYTICAL RESULTS

The following sections provide a discussion of the results of the water quality field sampling program (including the *in-situ* measurements, general water quality sampling, voluntary enhanced water quality sampling, and coliform sampling) associated with the spring and fall sampling events. Within this section the results from the stream and river reaches are discussed first, followed by the results of the sampling on Project reservoirs. The results of the *in-situ* measurements and coliform sampling for the spring and fall sampling events are summarized below. For the other general water quality parameters in the streams and rivers, only those that do not meet the most stringent Basin Plan, CTR, or NTR water quality objective are summarized.

6.2.1 Water Quality Results from Streams and Rivers

All the parameters measured in Project area streams and rivers during the spring and fall sampling event met with the Basin Plan, CTR, and NTR objectives with the exception of dissolved oxygen at three locations near the confluence of Duncan Creek and Middle Fork American River in the spring, and manganese in the fall at one location on the Middle Fork American River below French Meadows Dam at the gaging station.

In-situ Field Measurements

The results of *in-situ* measurements collected in streams and rivers in the vicinity of the MFP during the sampling periods are shown in Tables AQ 11-5 and 11-6. The results of the measurements indicate that three sampling locations did not meet the Basin Plan objectives for dissolved oxygen in the spring. All measurements met the Basin Plan objectives for pH. There are no Basin Plan objectives for temperature, and specific conductance, but measurements were all within expected ranges.

Dissolved Oxygen

According to the Basin Plan objectives, DO concentrations shall not be reduced below a minimum level of 7.0 mg/L for waters designated as COLD. DO concentration will vary with other parameters such as temperature, elevation, photosynthetic activity, biotic activity, stream discharge, and the concentration of other solutes (Hem 1989, Michaud 1994). Increasing temperature or elevation will result in lower DO (MELP 1998).

Dissolved oxygen measurements typically ranged between 7.1 and 11.7 during the spring and fall sampling events. These measurements are consistent with Basin Plan objective. However, at three locations during the spring sampling event, DO was below the Basin Plan objective of 7.0 mg/L. These locations included Duncan Creek above Middle Fork American River confluence (DC-3 RM0.2) and the Middle Fork American River above and below the Duncan Creek confluence (MFAR-3 RM39.9 and MFAR-4

RM39.5). DO concentrations at these locations were measured at 6.2 and 6.3. Based on DO concentrations measured at locations upstream and downstream from these sampling locations, these data are believed to be incorrect due to instrument malfunction or sampling error. These locations were not sampled in the fall due to the unsafe field conditions accessing the sampling locations.

Water Temperature

Measured surface water temperatures generally warm in the downstream direction during both the spring and fall sampling events (Tables AQ 11-5 and AQ 11-6).

Additional water temperature monitoring in rivers and streams in the vicinity of the MFP have been conducted by PCWA as part of ongoing studies. Water temperature data has been collected annually from 2005 through 2007. This monitoring program will continue through summer 2008. The data collected will be summarized and used to evaluate compliance with temperature objectives defined in the Basin Plan. Preliminary water temperature data are presented in the PAD, SD (G), 2005 Water Temperature Report and the 2006 Water Temperature Report (PCWA 2007).

pH

According to the Basin Plan, pH should not be below 6.5 or above 8.5. Furthermore, changes in normal ambient pH levels shall not exceed 0.5 in fresh waters designated as COLD or WARM beneficial uses. Values above 9.5 or below 4.5 are considered lethal to aquatic organisms (EPA 1996; MELP 1998).

Measured pH values were within the range required in the Basin Plan (between 6.5 and 8.5) at all sampling locations.

Specific Conductance

There are no specific Basin Plan objectives for specific conductance. The conductivity of freshwater at 25° C varies between 50 and 1,500 µS/cm (Hem 1989; MELP 1998).

Specific conductance measurements during the spring sampling event ranged from 51 to 82 µS/cm and ranged from 16 to 107 µS/cm during the fall sampling event (Tables AQ 11-5 and AQ 11-6).

General Water Quality Parameters

The laboratory analytical results for the spring and fall sampling programs are summarized in Tables AQ 11-7 through AQ 11-12. Electronic copies of laboratory reports are available on CD. The analytes collected and submitted for laboratory analysis including 17 general parameters, eight dissolved metals, and total mercury. Refer to Table AQ 11-2 for the list of analytes.

During the spring and fall sampling events, all general parameters measured and total mercury samples met the Basin Plan, CTR, or NTR objectives, or were within the expected ranges for the ones that do not have established objectives. All dissolved metal analyses with the exception of dissolved manganese at one location (Middle Fork American River below French Meadows Dam at gaging station) met Basin Plan, CTR, or NTR objectives. The results of the general water quality parameters are summarized in Tables AQ 11-7 through AQ 11-12.

Manganese

The Basin Plan objectives for manganese is 50 µg/L. One sampling location below French Meadows Reservoir, MFAR-2 RM46.6 (Middle Fork American River below French Meadows Dam at gaging station) did not meet the Basin Plan objective (Figure AQ 11-2). The laboratory measured a concentration of 57.7 µg/L. Manganese was not analyzed during the spring sampling event, so it is unknown if MFAR-2 RM46.6 met the Basin Plan objective in the spring (runoff flow). Manganese concentrations in the fall (base flow) met the Basin Plan objective at the sampling locations farther downstream on the Middle Fork American River (Table AQ 11-10).

Voluntary Enhanced Water Quality Sampling

Voluntary enhanced water quality samples, not specified in the AQ 11 - TSP, were collected immediately downstream of Hell Hole Dam (May 22, 2007) and French Meadows Dam (August 6, 2007) in the leakage channels and river locations upstream and downstream of the confluence of the leakage channel. Three locations were sampled below Hell Hole Dam and five locations were sampled below French Meadows Dam. Analyses included *in-situ* measurements, calculated hardness, eight dissolved metals, and total mercury. Flows within the leakage weirs below French Meadows and Hell Hole dams are provided in Appendix E.

Similar to the discussion above, the *in-situ* measurements collected are summarized at each location and only the water quality objectives that did not meet the Basin Plan, CTR or NTR objectives are discussed. The *in-situ* measurements and sampling results are presented in Tables AQ 11-13 through 11-15.

Hell Hole Dam

In Situ Field Measurements

All in-situ field measurements collected below Hell Hole Dam met Basin Plan objectives or were within the expected ranges for the ones that do not have established objectives.

General Water Quality Parameters

The three voluntary enhanced water quality samples collected below Hell Hole Dam met all listed Basin Plan, CTR and NTR objectives.

French Meadows Dam

In Situ Field Measurements

In-situ measurements results indicated that pH and DO did not meet water quality objectives.

- *pH*

The five sampling locations below French Meadows Dam were all below the Basin Plan objective of 6.5 and ranged between 5.3 and 5.3. The results are listed in Table AQ 11-13.

- *Dissolved Oxygen*

Two sampling locations (FM-D and FM-E, both located within the main channel) below French Meadows Dam met the Basin Plan objective of 7.0 mg/L. Three sampling locations in the leakage channel (FM-A, FM-B, and FM-C) did not meet the Basin Plan objective and were below 7.0 mg/L. The results are listed in Table AQ 11-13 and are shown in Figure AQ 11-2.

General Water Quality Parameters

Iron and manganese concentrations in the five samples collected below French Meadows Dam exceeded Basin Plan or NTR objectives. These locations are shown with the sampled locations further downstream in Figure AQ 11-2. All other analytes met the listed Basin Plan or NTR objectives (Tables AQ 11-14 and AQ 11-15).

- *Iron*

The Basin Plan objective for iron is 0.3 mg/L and the NTR objective is 1 mg/L. The Basin Plan specifies a criterion for iron of 0.3 mg/L, based on secondary maximum contaminant levels for drinking water. This criterion is based on a taste, odor, and visual threshold (CTR 2000). When iron is precipitated out of solution due to oxidation, it causes a reddish brown color in the water. The EPA has recommended a value of 1.0 mg/L for a 4-day average continuous concentration for the protection of freshwater aquatic life.

Three of the five samples collected below French Meadows Dam did not meet the Basin Plan and NTR objectives for iron and ranged from 16.0 mg/L to 20.4 mg/L. All of these locations are in the small leakage channels draining from the base of French Meadows Dam. These locations are shown on Map AQ 11-4. The laboratory results for iron are summarized in Table AQ 11-14 and Figure AQ 11-2.

Iron staining was observed along the ground and drainage channels at these three locations, as well as in the Middle Fork American River channel downstream. However, iron results in the plunge pool at the outlet pipe for French Meadow Reservoir (FM-E) and several hundred feet downstream (FM-D) met the Basin Plan and NTR objectives.

- *Manganese*

The Basin Plan objective for manganese is 50 µg/L and is based on secondary maximum contaminant levels for drinking water. Four of the five locations sampled below French Meadows Dam did not meet the Basin Plan objective. Three of these locations are in the small leakage channels draining from the base of French Meadows Dam (results range from 3,610 µg/L and 4,040 µg/L) and the fourth is in the channel downstream of the dam (62.6 µg/L). These locations are shown on Map AQ 11-4. The laboratory results are summarized in Table AQ 11-14 and Figure AQ 11-2.

Coliform Sampling

Total and fecal coliform samples were collected from streams and rivers in the vicinity of the MFP to determine if study waters met Basin Plan objectives for recreational activities. Coliform concentrations are reported at the number of bacteria colonies per 100 mL of sample water (MPN/100 mL). An objective of 200 colonies/100 mL was used to determine if fecal coliform concentrations met Basin Plan objectives for contact recreational activities. There are no Basin Plan objectives for total coliform.

Total and fecal coliform samples were collected during the spring and fall sampling events (Map AQ 11-2). The laboratory results of the total and fecal coliform concentrations are provided in Tables AQ 11-7 and AQ 11-10 and are summarized below.

The fecal coliform results met Basin Plan objectives during the spring sampling event and ranged from less than 2 to 4/100 mL. Total coliform results during the spring sampling event ranged from less than 2/100 mL to 30/100 mL.

During the fall sampling event, one location (NFLC-2 RM2.9) exceeded the objective for fecal coliform (300/100 mL). The remainder of the fecal coliform results met Basin Plan objectives. Total coliform results ranged from less than 2/100 mL to 900/100 mL.

30-Day, Five Sample Fecal Coliform Sampling

The Basin Plan states that "...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 samples during any 30-day period exceed 400/100 mL." Seventeen locations throughout the study area were sampled five times over a 30-day period (Table AQ 11-16 and Map AQ 11-2). Sampling began on August 6, 2007 and continued for five subsequent weeks and concluded on Labor Day. At two locations (FC-9 and FC-11), sampling continued until September 10, 2007 due to a sampling location change after the first sampling event on August 6, 2007.

The geometric mean at each of the 17 sampling locations was below the objective of 200/100 mL. However, at one location (FC-15, Ralston Afterbay near the Ralston picnic area) on August 27, 2007, the sample result was 1,600/100 mL. Although, the

geometric mean at this location was 30/100 mL, which is below the Basin Plan objective.

6.2.2 Water Quality Results: Reservoir Profiling and Laboratory Analysis

Water quality depth profiles and the water quality sampling program (including *in-situ* measurements, secchi depth, general water quality sampling, and coliform sampling) associated with the spring and fall sampling events were conducted at various locations in Hell Hole Reservoir, French Meadows Reservoir, and Ralston Afterbay. The following provides a summary of the water quality profiling and sampling results for Ralston Afterbay, Hell Hole Reservoir, and French Meadows Reservoir. The temperature and DO profiling measurements are presented in Appendix C. The results of the profiles and *in-situ* measurements are summarized for each reservoir. For the other general water quality parameters, only those that do not meet the most stringent Basin Plan, CTR, or NTR water quality objectives are summarized.

All parameters measured in Hell Hole Reservoir, French Meadows Reservoir, and Ralston Afterbay during the spring and fall sampling program met with the Basin Plan, CTR, and NTR objectives with the exception of dissolved oxygen in Hell Hole and French Meadows reservoirs.

Hell Hole Reservoir

Water Quality Temperature and Dissolved Oxygen Profile Results

The spring water temperature profiles at the three sampling locations were similar. Spring surface temperatures ranged from 12.7°C at HH-3 to 14.5°C at HH-1. Temperatures steadily declined with depth until 30 to 35m below the water surface, where temperatures remained relatively steady at 6 to 7°C down to the bottom of the reservoir. The fall temperature profiles at the three locations were also similar. Fall surface temperatures were slightly warmer than spring surface water temperatures. Fall water temperatures varied only slightly with depth from the surface to approximately 35 to 40 m. At greater depths, temperatures steadily declined to 11 to 15°C. Reservoir bottom temperatures were approximately 5 to 7°C warmer in the fall than those recorded during the spring sampling event. There was no distinct thermal stratification or thermocline measured in either the spring or fall temperature profiles.

The DO profiles during the spring sampling were similar between the three locations. DO concentrations ranged from 8.1 mg/L to 8.8 mg/L at the surface and ranged from 8.4 mg/L to 8.7 mg/L near the bottom. DO concentrations varied little with depth. The spring DO profiles were also similar between each sampling location. Fall concentrations were slightly lower than those measured during the spring sampling event. Surface concentrations ranged from 6.3 mg/L to 7.1 mg/L and decreased to 5.4 mg/L to 5.8 mg/L near the bottom of the reservoir. DO concentrations had a slight decreasing trend with depth. The DO concentrations for most of the three sampling locations during the fall sampling events were below the Basin Plan objective of 7.0 mg/L for COLD water bodies except at the surface for HH-1. The lowest DO

measurement of 5.4 mg/L was recorded at the bottom of the reservoir at the HH-2 sampling location. Based on other DO concentrations collected in the fall in 2005 and 2006 from Hell Hole Reservoir (PCWA 2007), these fall 2007 data from Hell Hole Reservoir are believed to be incorrect due to instrument malfunction or sampling error.

In-Situ Field Measurements

In-situ measurements were collected at the surface and at approximately mid-depth in the profile. The sampling depths at the three locations for the spring and fall sampling events are shown below.

Site ID	Spring Sampling Depths (m)	Fall Sampling Depths (m)
HH-1	0 and 30	0 and 23
HH-2	0 and 30	0 and 27
HH-3	0 and 30	0 and 20

The results of the measurements are shown in Tables AQ 11-5 and AQ 11-6.

In-situ temperature and DO measurements followed the same trends as discussed above in the profiles for the spring and fall sampling events. Surface water temperatures were warmer than the mid-depth measurements. DO concentration measurements were slightly higher at mid-depth than at the surface for the spring sampling, but were slightly lower at two of the three sampling locations in the fall.

All pH measurements are within the objective listed in the Basin Plan. Surface pH measurements were higher than mid-depth measurements for all three sampling locations during the spring and fall sampling events. Surface pH measurements ranged from 6.9 to 7.1 in the spring and 6.7 to 7.9 in the fall. Mid-depth pH measurements ranged from 6.7 to 6.8 in the spring and 6.8 to 7.1 in the fall. Surface pH measurements were greater in the fall than in the spring at HH-1 and HH-3, but were less at HH-2. All mid-depth pH measurements were greater during the fall sampling event than in the spring sampling event.

Specific conductance measurements were similar between the surface and mid-depth and between the spring and fall sampling events. Spring measurements were approximately 20 µS/cm and fall measurements were ranged between 30 and 40 µS/cm.

Secchi depth measurements were conducted at the three sampling locations. The secchi depths for each sampling location during the spring and fall sampling events are shown below.

Site ID	Spring Sampling Secchi Depth (m)	Fall Sampling Secchi Depth (m)
HH-1	9	10
HH-2	11	10
HH-3	8	9.4

General Water Quality Parameters

All the spring and fall parameters analyzed met the Basin Plan, CTR, or NTR objectives. All sampling locations were within or below the suggested ranges discussed in Appendix A for parameters analyzed without established objectives.

Coliform Sampling

All fecal coliform concentrations met the 200/100 mL objective during the spring and fall sampling events.

French Meadows Reservoir

Water Quality Temperature and Dissolved Oxygen Profile Results

The spring water temperature profiles at the three locations were similar (surface temperatures at approximately 16°C). Temperatures steadily declined until approximately 20 m in depth, where temperatures remained relatively steady at 7 to 8°C down to the bottom. The fall temperature profiles at the three locations were similar with surface temperatures (approximately 15°C) and were slightly cooler than spring surface water temperatures. Fall water temperature profiles were different from the spring water temperature profiles. In the fall, water temperatures varied only slightly in depth from the surface to approximately 20 m. Below this depth, temperatures rapidly declined to 8°C at FM-1 and FM-2. Bottom temperatures were warmer at FM-3 (the shallowest location) than at the other two sampling locations. A thermocline was measured in the spring temperature profiles between 10 and 15 m and during the fall between 20 and 25 m.

The DO profiles during the spring sampling were similar at the three locations. Spring DO concentrations ranged from 7.7 mg/L to 7.9 mg/L at the surface and generally increased to the thermocline, then slowly decreased to the bottom of the reservoir. DO concentrations near the bottom of the reservoir ranged from 6.1 mg/L to 8.4 mg/L. The fall DO profiles were also similar at each sampling location. Fall DO surface concentrations were slightly higher than during the spring sampling event. Surface concentrations ranged from 8.2 mg/L to 8.5 mg/L and stayed relatively constant down to the thermocline. DO concentrations then increased at the thermocline (only at FM-1 and FM-2), followed by decreasing concentrations to the bottom of the reservoir (4.3 mg/L to 7.4 mg/L). The DO concentrations for most of the three sampling locations during the spring and fall sampling events met the Basin Plan objective of 7.0 mg/L for COLD water bodies. DO measurements below 7 mg/L were measured at FM-1 during the spring, and at FM-2 during the spring and fall near the bottom of the reservoir sampling areas.

In-Situ Field Measurements

In-situ measurements were collected at the surface and at approximately mid-depth or at the thermocline. The sampling depths at the three locations for the spring and fall

sampling events are shown below. The results of the measurements are shown in Tables 11-5 and 11-6.

Site ID	Spring Sampling Depths (m)	Fall Sampling Depths (m)
FM-1	0 and 30	0 and 22.5
FM-2	0 and 20	0 and 22.5
FM-3	0 and 15	0 and 22.5

In-situ temperature and DO measurements followed the same trends as discussed above in the profiles for the spring and fall sampling events. Surface water temperatures were warmer than the mid-depth measurements. DO concentration measurements were slightly higher at mid-depth than at the surface for the spring sampling. In comparison, in the fall, DO concentrations were greater at the surface that at mid-depth.

All pH measurements were within the acceptable ranges of 6.5 to 8.5, as listed in the Basin Plan. Surface pH measurements were higher than mid-depth measurements for all three sampling locations during the spring and fall sampling events. Spring surface and mid-depth pH measurements were overall slightly higher during the fall sampling event. Surface pH measurements ranged from 6.6 to 6.9 in the spring and from 7.2 to 7.9 in the fall. Mid-depth pH measurements ranged from 6.5 to 6.6 in the spring and from 6.5 to 6.7 in the fall.

Specific conductance measurements were similar between the surface and mid-depth and between the spring and fall sampling events. Spring measurements were approximately 30 µS/cm and fall measurements were approximately 20 µS/cm.

Secchi depth measurements were conducted at the three sampling locations during the spring event. Measurements were taken at only one location during the fall event due to high winds on the reservoir later in the day. The winds and water currents would have prevented accurate secchi depth measurements, as the disk would not drop vertically, skewing the results. At the one sampling location, water clarity was better during the fall than during the spring. The secchi depths for each sampling locations during the spring and fall sampling events are shown below.

Site ID	Spring Sampling Secchi Depth (m)	Fall Sampling Secchi Depth (m)
FM-1	6.5	9.5
FM-2	7.5	Too Windy*
FM-3	7	Too Windy*

*Conditions on the reservoir were too windy for collecting accurate measurements.

General Water Quality Parameters

All the spring and fall parameters analyzed met the Basin Plan, CTR, or NTR objectives. All sampling locations were within or below the expected ranges discussed in Appendix A for parameters analyzed without established objectives.

Coliform Sampling

All fecal coliform concentrations met the 200/100 mL objective during the spring and fall sampling events.

Ralston Afterbay

Water Quality Temperature and Dissolved Oxygen Profile Results

Spring surface temperature in Ralston Afterbay was measured at 19 °C and decreased to 10.5 °C near the bottom of the afterbay. In comparison, temperatures in the fall were fairly constant with depth, ranging from 13.5 °C at the surface to 12 °C near the bottom. Some thermal stratification was present during the spring profiling event, but not during the fall profiling event.

The DO at the surface was 10.3 mg/L and 11.0 mg/L for the spring and fall sampling events, respectively. The concentration of DO generally increased with increasing depth (and with decreasing water temperature) to 10 m below the water surface. During the spring when the depth exceeded 10 m, DO concentrations decreased. DO concentrations ranged between 10.0 mg/L and 11.6 mg/L during both sampling events throughout the entire profile.

In-Situ Field Measurements

In-situ measurements were collected at the surface and at approximately mid-depth in the profile. The sub-surface measurements were collected at 6 m and at 5 m during the spring and fall sampling events, respectively. The results of the measurements are shown in Tables AQ 11-5 and AQ 11-6.

In-situ temperature and DO measurements followed the same trend as discussed above in the profiles for the spring and fall sampling events. Surface water temperatures were warmer than the mid-depth measurements and conversely, DO measurements were higher at mid-depth than at the surface.

In-situ pH measurements were between 6.0 and 7.0, acceptable limits within the Basin Plan. Spring pH measurements were 6.6 at the surface and 6.5 at mid-depth. Fall pH measurements were 7.0 at the surface and 6.8 at mid-depth.

Specific conductance measurements were similar between the surface and mid-depth and between the spring and fall sampling events. Spring measurements ranged between 30 and 50 µS/cm. Fall measurements ranged between 30 and 40 µS/cm.

Secchi depth measurements were also collected at the sampling location. Water clarity remained the same between the two sampling periods, with secchi depth readings of 7 m for both the spring and fall sampling events.

General Water Quality Parameters

All the spring and fall parameters analyzed met the Basin Plan, CTR, or NTR objectives. In addition, the results of the analyses for the parameters without established objectives were within the expected ranges discussed in Appendix A.

Coliform Sampling

All fecal coliform concentrations met the 200/100 mL objective during the spring and fall sampling events.

6.3 Fish Tissue Analysis

The following section provides a discussion of the fish tissue analysis from the Project reservoirs, Ralston Afterbay, Middle Fork Interbay, and the Middle Fork American River near Otter Creek. Laboratory analyses of methyl mercury were conducted on muscle tissue samples from individual and composite fish samples. The screening value for methyl mercury in fish established by the OEHHA to determine if additional studies are warranted is 0.08 ppm (which is equal to 0.08 mg/kg fish).

Methyl mercury concentrations in at least one fish from each location exceeded the OEHHA screening value of 0.08 mg/kg fish. Twenty-three of the 45 individual fish analyzed exceeded the screening value. The highest concentrations (up to 1.140 mg/kg) were measured in fish from Hell Hole Reservoir, where the largest fish were caught. A summary of the fish that were caught, including the species, fork and total lengths, and weight, is provided in Table AQ 11-17. The direct relationship between methyl mercury concentrations and the weight of the fish for each of the sampling locations is shown in Figure AQ 11-3. The results of the fish tissue sampling at each location are summarized below.

In Hell Hole Reservoir, eight of the ten individual fish analyzed (brown trout, lake trout, and rainbow trout), as well as the composite sample of brown trout, exceeded the OEHHA guidelines. Methyl mercury concentrations in the fish tissue from Hell Hole Reservoir ranged from 0.004 mg/kg fish to 1.14 mg/kg fish. All the brown trout analyzed exceeded the screening level.

In French Meadows Reservoir, three of the five individual fish, including both brown trout exceeded 0.08 ppm. The composite sample of five brown trout also exceeded the screening value. The highest methyl mercury concentration measured in the fish from French Meadows Reservoir was 0.357 mg/kg fish.

Only one of the ten brown and rainbow trout caught in Middle Fork Interbay exceeded the screening value. The concentration of the rainbow trout measured was 0.135 mg/kg fish.

Eight of the ten fish caught, including all the Sacramento pikeminnows and the four largest brown trout, in Ralston Afterbay exceeded the screening value. The highest concentration measured in the fish caught in Ralston Afterbay was 0.348 mg/kg fish.

Methyl mercury concentrations in three of the ten fish caught in the Middle Fork American River near Otter Creek exceeded 0.08 mg/kg fish. Only rainbow trout were caught at this location. The exceedances occurred in the three of the four largest fish caught at this location. The greatest concentration measured in fish from the Middle Fork American River was 0.130 mg/kg fish.

6.4 QUALITY ASSURANCE/ QUALITY CONTROL PROCEDURES

A detailed summary of the QA/QC review of these reports can be found in Appendix D, Tables D-1 through D-4. A summary of potential issues identified in the QA/QC reports from each laboratory and sampling event is also provided in Appendix D.

The QA/QC review from the Test America (TA) and Brooks Rand (BR) laboratories indicated that most sample results (spring and fall sampling event, voluntary enhanced sampling below Project reservoirs, and fish tissue sampling) were acceptable, with only four sample results considered estimates. The results that were considered estimates include the spring sample at FM-3 (S) for TOC, and for three of the additional samples below French Meadows Dam (FM-A, FM-B, and FM-C) for manganese.

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