

Water

Quality Monitoring Plan

Sacramento Municipal Utility District

Hydro License Implementation • May 2015

Upper American River Project

FERC Project No. 2101



Table of Contents

1.0 Introduction	1
2.0 Monitoring Plan Objectives	1
3.0 Frequency	2
4.0 Study Area and Sampling Locations	3
5.0 Methods	3
5.1 <i>In Situ Parameters</i>	3
5.2 <i>General Chemistry</i>	6
5.3 <i>QA/QC</i>	11
5.4 <i>Laboratory Reporting</i>	12
5.5 <i>Bacteria</i>	12
5.6 <i>Metals Bioaccumulation</i>	12
6.0 Analysis	14
6.1 <i>Study Output</i>	14
7.0 Literature Cited.....	16

Table of Tables, Appendices, and Figures

Table 1. Sampling frequency of four water quality constituents under the monitoring program for the UARP Project.....	2
Table 2. Representative sampling locations on UARP Project reservoirs for <i>in situ</i> parameters.....	4
Table 3. Representative sampling locations on diverted stream reaches	5
Table 4. Representative sampling locations on UARP reservoirs for general chemistry monitoring.....	6
Table 5. General chemistry constituents, laboratory methods, detection/reporting limits, and water quality objectives.	7
Table 6. Bacteria sampling locations at UARP Project reservoirs.....	13
Table 7. Metals, method, detection and reporting limits for fish tissue analysis. .	14
Figure 1. Water Quality In-Situ sites.....	19
Figure 2. Water Quality General Chemistry sites.....	20
Figure 3. Water Quality Bacterial Monitoring Buck Island.....	21
Figure 4. Water Quality Bacterial Monitoring Loon Lake.....	22
Figure 5. Water Quality Bacterial Monitoring Union Valley.....	23
Figure 6. Water Quality Bacterial Monitoring Icehouse.....	24
Figure 7. Water Quality Bacterial Monitoring Slab Creek and Brush Creek.....	25
Attachment 1. State Water Resources Control Board 401 Certification for the UARP Condition 8.J	26
Attachment 2. Settlement Agreement Article 1-5.9 Water Quality Monitoring.....	30

1.0 Introduction

This Water Quality Monitoring Plan (Plan) addresses monitoring set forth in Condition 8.J of Appendix A of the Order Issuing New License issued by the Federal Energy Regulatory Commission (FERC) on July 23, 2014 (FERC 2014) and License Appendix B Condition 1-5.10 for the Upper American River Project (UARP; FERC Project 2101), owned and operated by the Sacramento Municipal Utility District (SMUD). Appendix A of the License contains the State Water Resources Control Board (SWRCB) Water Quality Certification and Appendix B of the License contains the U.S. Forest Service (USFS) 4(e) conditions. Attachments 1 and 2 contain the language from the two documents as applicable to this monitoring plan. There are small differences between these two License requirements. SMUD followed the more extensive of the two requirements. SMUD also ensured that all stipulations in both requirements were addressed.

The UARP lies within El Dorado and Sacramento counties, primarily within lands of the Eldorado National Forest. The UARP consists of three major storage reservoirs—Loon Lake, Union Valley and Ice House (with a combined capacity of approximately 379,000 acre-feet), eight smaller regulating or diversion reservoirs, and eight powerhouses. The UARP has an authorized installed capacity of 637.3 megawatts (MW). The UARP also includes recreation facilities containing over 700 campsites, five boat ramps, hiking paths, and bicycle trails at the reservoirs.

This Plan describes the regular monitoring of four general constituents of project water quality: (1) basic *in situ* parameters, (2) general water chemistry, (3) bacterial, and (4) metals bioaccumulation.

Condition 8.J of Appendix A of the FERC license requires monitoring throughout the duration of the license term, with sampling frequency varying by water quality constituent. However, as described in the Articles, the plan may be modified pursuant to adaptive management program needs following review of monitoring results. Nevertheless, the sampling frequency over the first five years of the monitoring program is dictated by the Articles and will, at a minimum, include annual sampling for *in situ* parameters and bacteria, and one-time sampling for general chemistry and metals bioaccumulation (Table 1).

At the completion of the first five years of monitoring, SMUD will consult with the State Water Resources Control Board (SWRCB), Regional Water Quality Control Board (RWQCB), California Department of Fish and Wildlife (CDFW), U.S. Forest Service (USFS), and U.S. Bureau of Land Management (BLM) to determine if the results warrant modifying the Plan.

2.0 Monitoring Plan Objectives

This monitoring plan is designed to simultaneously meet the objectives and rationale of the SWRCB Water Quality Certification Condition 8.J and Article 1-5.10 of the settlement agreement. The rationale for water quality monitoring, as described by the SWRCB Water Quality Certification, is as follows:

Water quality monitoring is important for determining compliance with state and federal water quality standards and examining long-term trends in water quality. The frequency of monitoring for any compound can be reduced if shown to be at background or non-detect levels for a statistically significant period of time. Fish sampling for the analysis of metal bioaccumulation allows for an evaluation of health risks to humans and wildlife and creates a long-term data set to detect trends in bioaccumulation through the license term.

The Settlement Agreement has similar rationale statements and specifications for water quality monitoring for the UARP (see Attachment 2).

3.0 Frequency

Article 1-5 requires monitoring throughout the duration of the license term with sampling frequency varying by water quality constituent. However, as described in the Articles, the plan may be modified pursuant to adaptive management program needs following review of monitoring results. Nevertheless, the sampling frequency over the first five years of the monitoring program is dictated by the Articles and will, at a minimum, include annual sampling for *in situ* parameters and bacteria and one-time sampling for general chemistry and metals bioaccumulation (Table 1).

Table 1. Sampling frequency of four water quality constituents under the monitoring program for the UARP Project. This 5 year cycle will repeat throughout the duration of the license, except for the potential modification of General Chemistry and Bacterial schedules.				
	In-Situ Parameters	General Chemistry	Bacterial	Metals Bioaccumulation
Calendar Year				
2015 (Plan Approval)				
2015 (Year 1)	X		X	
2016 (Year 2)	X		X	X
2017 (Year 3)	X	X	X	
2018 (Year 4)	X		X	
2019 (Year 5)	X		X	
Frequency within monitoring year	Seasonal (4 samples/yr)	Seasonal (4 samples/yr)	Summer only	Fall only

At the completion of the first five years of monitoring, SMUD will consult with the State Water Resources Control Board (SWRCB), Regional Water Quality Control Board (RWQCB), California Department of Fish and Wildlife (CDFW), U.S. Forest Service (USFS), and U.S. Bureau of Land Management (BLM) to determine if the results warrant modifying the Plan.

4.0 Study Area and Sampling Locations

The study area includes project reservoirs and diverted stream reaches. Reservoirs included in the monitoring program include all UARP reservoirs (Rubicon, Buck Island, Loon Lake, Gerle Creek, Ice House, Union Valley, Junction, Camino, Brush Creek, and Slab Creek) except for the relatively small Robbs Peak Reservoir (30 acre-feet). *[Note: Rockbound Lake, although associated with the UARP, is not included as a Project feature or within the FERC-defined UARP boundary.]* The diverted stream reaches included in this monitoring program represent all streams and rivers downstream of project reservoirs. Specific sampling locations within reservoirs and diverted stream reaches vary depending on the general constituent under study (*in situ*, general chemistry, bacteria, etc.), as discussed in constituent-specific methods below, and as depicted in Figures 1-7.

5.0 Methods

5.1 *In Situ* Parameters

Annual *in situ* parameter sampling will occur at 15 representative UARP reservoir locations and 19 diverted stream reach locations downstream of UARP reservoirs (Tables 2 and 3, respectively, and Figure 1). The seasonality of sampling will vary between reservoir and riverine sampling. For reservoirs, sampling will be performed once in spring (April or May) and again in fall (October or November). For riverine locations, sampling will be performed once in winter (January or February), spring (April or May), summer (August), and fall (November). Because some of the sampling sites are located in high elevations without road, winter samples will only be taken when snow and weather conditions do not compromise worker safety.

Table 2. Representative sampling locations on UARP Project reservoirs for *in situ* parameters.

Upper American River Project
Loon Lake, near dam
Loon Lake, mid-reservoir (west body)
Loon Lake, upper reservoir (northeast body)
Gerle Creek Reservoir, mid-lake
Union Valley Reservoir, near dam
Union Valley Reservoir, mid-reservoir
Union Valley Reservoir, Robbs PH tailrace zone
Union Valley Reservoir, Jones Fork Silver Creek arm
Ice House Reservoir, near dam
Ice House Reservoir, mid-reservoir
Ice House Reservoir, upper lake body
Junction Reservoir, mid-reservoir between arms
Camino Reservoir, mid-reservoir
Slab Creek Reservoir, mid-reservoir
Slab Creek Reservoir, upper-reservoir

Table 3. Representative sampling locations on diverted stream reaches downstream of UARP Project reservoirs for *in situ* and general chemistry monitoring.

Rubicon River outflow from Rubicon Reservoir
Little Rubicon River outflow from Rockbound Lake
Little Rubicon outflow from Buck Island Lake
Gerle Creek outflow from Loon Lake
Gerle Creek inflow to Gerle Creek Reservoir
Gerle Creek Canal inflow to Robbs Forebay
Gerle Creek outflow from Gerle Creek Reservoir
S.F. Rubicon downstream of Gerle Creek confluence
S.F. Rubicon upstream of Gerle Creek confluence
S.F. Silver Creek outflow from Ice House
S.F. Silver Creek inflow to Junction Reservoir
Silver Creek outflow from Junction Reservoir
Silver Creek inflow to Camino Reservoir
Silver Creek outflow from Camino Reservoir
SFAR upstream of Camino Powerhouse
Brush Creek outflow from Brush Creek Reservoir
SFAR downstream of Camino Powerhouse
SFAR downstream of Slab Creek Reservoir
SFAR upstream of White Rock Power House

In situ parameters collected will include dissolved oxygen, conductivity, temperature, turbidity, and pH. *In situ* data will be collected using standard multi-parameter instruments (YSI® or equivalent). At diverted stream reach sites, instrument readings will be obtained where sufficient stream turbulence provides good lateral and vertical mixing of the water as near as possible to the stream thalweg. In the case of reservoir sampling, SMUD will deploy boats and instrument readings will be taken at one-meter intervals down the water column. Water transparency will be measured at all reservoirs with a standard 7.9-inch-diameter Secchi disk.

In situ parameter quality control will consist of instrument calibration and comprehensive field data recording, pursuant to EPA approved general-purpose water sampling protocols. Prior to each monitoring season, instrument calibration will be performed to ensure quality of data retrieval. Parameter readings will be taken twice at each location to inspect for variability. Field or electronic data sheets will record date, time, stream/lake name, sampling location, collector's name, weather conditions and any pertinent site-specific information that may clarify data interpretation.

All *in situ* data gathered at reservoirs and diverted stream reaches will be loaded into a database for data archiving and report production.

5.2 General Chemistry

In accordance with the Water Quality Certification, general chemistry samples will be collected at 19 UARP bypass stream reach locations and 18 reservoir locations (Tables 3 and 4, respectively, and Figure 2). General chemistry samples will be collected seasonally in spring, summer, fall, and immediately following either the second or third measurable rain event of the fall-winter period. A “measurable” rain event is defined as an event resulting in 0.50” of precipitation over a 24-hr period. Given access and safety concerns of sampling at high elevations, monitoring will only occur when snow and weather conditions do not compromise worker safety. Secchi disk measurements will be collected in the summer and fall sampling periods.

Table 4. Representative sampling locations on UARP reservoirs for general chemistry monitoring.

Rubicon Reservoir, mid-lake
Buck Island Reservoir, mid-lake
Loon Lake, near dam
Loon Lake, mid-reservoir (west body)
Loon Lake, upper reservoir (northeast body)
Gerle Creek Reservoir, mid-lake
Union Valley Reservoir, near dam
Union Valley Reservoir, mid-reservoir
Union Valley Reservoir, Robbs PH tailrace zone
Union Valley Reservoir, Jones Fork Silver Creek arm
Ice House Reservoir, near dam
Ice House Reservoir, mid-reservoir
Ice House Reservoir, upper lake body
Junction Reservoir, mid-reservoir between arms
Camino Reservoir, mid-reservoir
Brush Creek Reservoir, mid-reservoir
Slab Creek Reservoir, mid-reservoir
Slab Creek Reservoir, upper-reservoir site

A list of general chemistry constituents, laboratory methods, detection/reporting limits, and water quality objectives is provided below (Table 5).

Table 5. General chemistry constituents, laboratory methods, detection/reporting limits, and water quality objectives. All metals will be analyzed for total and dissolved factions.

Analysis	Method	Units	Method Detection Limit (MDL)*	Method Reporting Limit (MRL)*	California Toxics Rule (CTR)	Basin Plan	National Standards	Hold Time
In Situ Parameters								
pH	Instrument	unitless	NA	NA	NA	6.5-8.5	6.5-9[i]	NA
Water Temperature	Instrument	Celsius	NA	NA	NA	[xi]	NA	NA
Dissolved Oxygen	Instrument	mg/L	NA	NA	NA	7	NA	NA
Specific Conductance	Instrument	µS/cm	NA	NA	NA	NA	NA	NA
Turbidity	Instrument	NTU	NA	NA	NA	[xii]	NA	NA
Miscellaneous								
Total Suspended Solids	EPA 160.2	mg/L	NA	5	NA	NA	NA	7 days
Total Dissolved Solids	EPA 160.1	mg/L	NA	10	NA	500[v]	NA	7 days
Total Organic Carbon	EPA 415.1	mg/L	NA	1	NA	NA	NA	28 days
Cyanide	EPA 335.2	µg/L	NA	5	22/5.2[ii, iii, vi]	NA	22/5.2[ii, iii, vi]	14 days
Oil & Grease	EPA 1664	mg/L	NA	5	NA	NA	NA	28 days

Table 5. General chemistry constituents, laboratory methods, detection/reporting limits, and water quality objectives. All metals will be analyzed for total and dissolved fractions.

Analysis	Method	Units	Method Detection Limit (MDL)*	Method Reporting Limit (MRL)*	California Toxics Rule (CTR)	Basin Plan	National Standards	Hold Time
Total Petrol Hydrocarbons	SW 5030B	µg/L	NA	50	NA	NA	NA	7 days
MTBE	EPA 8260	mg/L	NA	0.5	151/51 [i, vi]	5	NA	14 days
Hardness (CaCO ₃)	EPA 130.2	mg/L	NA	1	NA	NA	NA	180 days
Total Alkalinity (CaCO ₃)	EPA 305.1	mg/L	NA	5	NA	NA	>20 [i]	14 days
Nutrients								
Nitrate/Nitrite	EPA 300.0	mg/L	NA	0.4 as N	NA	1	10 [i, vii]	28 days
Total Kjeldahl Nitrogen	EPA 351.3	mg/L	NA	0.2	NA	NA	NA	28 days
Ammonia as N	EPA 350.2	mg/L	NA	0.1	NA	1.5	[iv]	28 days
Total Phosphorous	EPA 365.2	mg/L	NA	0.05	NA	NA	NA	28 days
Orthophosphate	EPA 365.3	mg/L	NA	0.15	NA	NA	NA	48 hours
Trace Elements*								
Aluminum	EPA 200.8	µg/L	1.55	20	NA	NA	750/87 [i, vi]	28 days
Arsenic	EPA 1640	µg/L	0.0018	0.0054	340/150 [i, iii, vi]	10	340/150 [i, iii, vi]	28 days
Barium	EPA 200.8	µg/L	0.14	5	NA	NA	1000 [i, vii]	28 days

Table 5. General chemistry constituents, laboratory methods, detection/reporting limits, and water quality objectives. All metals will be analyzed for total and dissolved fractions.

Analysis	Method	Units	Method Detection Limit (MDL)*	Method Reporting Limit (MRL)*	California Toxics Rule (CTR)	Basin Plan	National Standards	Hold Time
Cadmium	EPA 1640	µg/L	0.0024	0.01	0.29/0.22 [iii, vi, viii]	5	0.14/0.037 [i, viii, ix]	28 days
Copper	EPA 1640	µg/L	0.024	0.1	1.0/0.9 [iii, vi, viii]	1	[i,x]	28 days
Iron	EPA 200.7	mg/L	0.00914	0.1	NA	0.3	1 [i]	28 days
Lead	EPA 1640	µg/L	0.0081	0.02	3/0.12 [iii, vi, viii]	15	3/0.12 [i, vi, viii]	28 days
Manganese	EPA 200.8	µg/L	0.05	2	NA	50	50 [i, v]	28 days
Mercury (Total)	EPA 245.7 or 1631E	µg/L	0.015	0.1	0.05 [vii]	NA	1.4/0.77[i, vi]	90 days
Methyl mercury (Total)	EPA 1630	µg/L	0.00002	0.00006	NA	NA	0.3 [vii]	6 months
Nickel	EPA 1640	µg/L	0.029	0.1	610 [iii, vii]	100	50/5 [i, vi, viii]	28 days
Selenium	EPA 200.8	µg/L	0.75	5	20/5 [iii,vi]	NA	258/5 [i, vi]	28 days
Silver	EPA 200.7	µg/L	0.0017	0.002	0.03 [iii, viii]	NA	0.03 [i, viii]	28 days
Zinc	EPA 1640	µg/L	0.32	0.96	12/12 [iii, vi, viii]	NA	12/12 [i, vi, viii]	28 days
Standard Minerals								
Calcium	EPA 200.7	mg/L	NA	1	NA	NA	NA	6 months
Chloride	SM 4500Cl-B	mg/L	NA	0.5	NA	250	860/230 [i, vi]	28 days
Magnesium	EPA 200.7	mg/L	NA	1	NA	NA	NA	6 months

Table 5. General chemistry constituents, laboratory methods, detection/reporting limits, and water quality objectives. All metals will be analyzed for total and dissolved fractions.

Analysis	Method	Units	Method Detection Limit (MDL)*	Method Reporting Limit (MRL)*	California Toxics Rule (CTR)	Basin Plan	National Standards	Hold Time
Potassium	EPA 200.7	mg/L	NA	1	NA	NA	NA	6 months
Sodium	EPA 200.7	mg/L	NA	1	NA	NA	NA	6 months
Sulfate	EPA 300.1	mg/L	NA	0.5	NA	250	250 [i, v]	6 months

*Method detection limits and reporting limits vary by laboratory. Contracted laboratory will be required to provide evidence that recent calibration provides a reporting limit less than or equal to the lowest threshold value for each contaminant

** Metals will be measured for both dissolved and total recoverable. The thresholds between the two differ slightly, and most are dependent on water hardness. Final thresholds will be calculated as a function of method and water hardness

[i] National Recommended Water Quality Criteria for Freshwater Aquatic Life Protection

[ii] U.S. Environmental Protection Agency, Federal Register, Volume 57, No. 246

[iii] U.S. Environmental Protection Agency, Federal Register, Vol. 65 No. 97

[iv] Aquatic Life Ambient Water Quality for Ammonia – Freshwater 2013

[v] This threshold is based off a "secondary" Maximum Contaminant Level that is primarily concerned with taste and odor

[vi] Values correspond to 1-hour Average/4-day Average

[vii] National Recommended Water Quality Criteria for Human Health & Welfare Protection (Water & Fish Consumption)

[viii] Hardness dependent. Value(s) are approximated based on an average hardness value of 6.5 mg/L, taken during FERC re-licensing. Actual thresholds will be computed based on the water hardness of the sample

[ix] Values correspond to 24-hour Average/ 4-day Average

[x] See U.S. Environmental Protection Agency, Aquatic Life Ambient Freshwater Quality Criteria – Copper

[xi] Per the Water Quality Control Plan (Basin Plan) for the Sacramento River and San Joaquin River basins: "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."

[xii] See Water Quality Control Plan (Basin Plan) for the Sacramento River and San Joaquin River basins for narrative of turbidity requirements.

Water column sampling procedures in reservoirs will vary depending on thermal stratification, which will be determined using the in-situ methods described above prior to collecting water samples. During periods of reservoir stratification, samples will be collected within the upper epilimnion layer and also in the hypolimnion layer a few feet above the reservoir bottom. When the reservoir is isothermal, or mixed, samples will be collected at a point below the water surface equivalent to approximately one-third of water depth. Thermal stratification is defined as temperature change of more than 1.0°C per 1.0 meter of depth in the reservoir, which is referred to as the location of the thermocline (Horne and Goldman, 1994).

Procedures used for the purpose of collecting, preserving and analyzing samples will follow established USEPA approved general-purpose protocols. All water samples will be collected manually into certified pre-cleaned Nalgene or glass containers provided by the laboratory and placed on ice during transport to the laboratory. At stream reach sites, a single grab sample will be obtained where sufficient turbulence provides good lateral and vertical mixing and when possible near the approximate thalweg of the stream. Reservoir samples will be obtained from a boat using a deepwater water quality sampling device. Reservoir transparency will be measured with a standard 7.9-inch-diameter Secchi disk.

5.3 QA/QC

All samples will be collected, handled and delivered to the lab consistent with specific EPA methods (Table 5) or other approved sampling/handling protocols including, but not limited to, Standard Methods for the Examination of Water and Wastewater. Appropriate QA/QC methods and documentation will be followed. Field QA/QC methods may vary somewhat by chemical constituents, but certain methods will be uniformly applied to all field sampling. Clean sampling techniques will be applied throughout the sampling effort. This includes the use of disposable gloves for all field crew members. All sample bottles will be prepared by a California state-certified laboratory (ELAP) approved by the SWRCB and will be wrapped with clean parafilm around the top when samples have been collected. The laboratory will prepare all sample bottles and, where necessary, place the appropriate amount and type of preservative in sample bottles. All sample collection devices (e.g., grab samplers) will be rinsed between sampling events with de-ionized water and then rinsed with water from the water body to be collected from. The labeled samples will be placed in closed, lightproof coolers filled with ice. Samples will be delivered to the laboratory in accordance with maximum holding times. QA/QC in the field will be assured by accurate and thoroughly completed sample labels, field sheets, chain of custody and sample log forms. Sample labels will include sample identification code, date, time, stream/lake name, sampling location, collector's name, sample type and preservative if applicable.

5.4 Laboratory Reporting

The analytical laboratory will for each sample achieve the lowest method detection limits (MDL) and reporting limits (RL) practicable for the water quality samples. These will be at or below the level of analytical resolution needed to assess regulatory compliance with the Sacramento and San Joaquin River Basin Plan (Basin Plan) numerical water quality objectives. Method Detection Limit (MDL) is a measure of the method sensitivity and represents the minimum concentration of an analyte that undergoes the entire analytical process and can be reported with a 99 percent level of confidence that the analyte concentration is greater than zero. Reporting Limit (RL) is the lowest quantifiable concentration (vs. estimated) that the laboratory can determine. The RL should be equal to or lower than the regulatory compliance minimum identified in the Basin Plan.

5.5 Bacteria

Bacteria monitoring will consist of collecting water samples for fecal coliform and *E. coli* analysis at eight UARP reservoirs. The monitoring program will include sampling at a minimum of four annually-rotating stations at Union Valley Reservoir swim areas and a minimum of two beach locations each at Buck Island Reservoir, Loon Lake, Ice House Reservoir, and Gerle Creek Reservoir, along with three other selected stations (Table 6 and Figures 3 - 7), resulting in a total of fifteen stations sampled annually. Each year, five independent samples will be collected over a 30-day period at each of the fifteen stations. SMUD will consult with USFS, SWRCB, USFWS, and other listed parties for final determination of the locations to be sampled no later than May 31 of each designated sampling year and shall submit the list of sampling locations to the Deputy Director for approval. Sampling will be targeted so that the midpoint of the 30-day period falls near a holiday of high recreational use, centering on Independence Day for the middle elevation UARP reservoirs and Labor Day for upper elevation UARP reservoirs (e.g., Loon Lake and Buck Island). All water samples will be collected near-shore in shallow water, placed on ice and processed within 24 hours of collection by a California certified laboratory approved by the SWRCB, using EPA method SM 9222B.

Bacterial monitoring will be conducted annually for the first five years after license issuance, after which it may be decreased in frequency to every other year at reservoir locations where no exceedances of Basin Plan objectives for protection of REC-1 designated waters have been identified during Years 1 - 5. SMUD will notify the Central Valley Regional Water Board if monitoring data demonstrate bacterial concentrations that present risks to human health at specific reservoir(s) or riverine sites. SMUD will continue annual monitoring at those sites until agreement is reached between SMUD, the SWRCB and the USFS (and any other interested parties) that the monitoring frequency can be reduced and the SWRCB Deputy Director has approves the agreement.

5.6 Metals Bioaccumulation

Fish tissues will be sampled to assess potential bioaccumulation of metals in resident fish within specific reservoirs of the UARP Project. Resident fish will be collected from locations within Loon Lake, Gerle, Ice House, Union Valley, Camino, and Slab Creek reservoirs, in accordance with protocols of the SWRCB Surface Water Ambient Monitoring Program (SWAMP).

Fish collection will be conducted using gill netting, electrofishing, or other fish collection techniques approved by the CDFW. Target species include brown trout (*Salmo trutta*),

Table 6. Bacteria sampling locations at UARP Project reservoirs.
Union Valley Reservoir (4 annually rotating stations)
At Fashoda Beach
Near Camino Cove Campground
Near Yellowjacket Campground
Near Wench Creek Campground
Buck Island Reservoir
On northshore, near dam and OHV camping
On southshore, near Rubicon Hiking Trail
Loon Lake Reservoir
West of main dam, near Red Fir Campground
West of Loon Lake Campground, near boat launch
Gerle Creek Reservoir
Near Gerle Creek Campground
Near Angel Creek picnic area
Ice House Reservoir
Northshore near private campground access
East of boat launch and picnic area
Other UARP Locations
Junction Reservoir, near boat launch
Brush Creek Reservoir, near boat launch
Slab Creek Reservoir, near boat launch

smallmouth bass (*Micropterus dolomieu*), rainbow trout (*Oncorhynchus mykiss*) and Sacramento pikeminnow (*Ptychocheilus grandis*). Collection effort will target a minimum of three fish per species. As hardhead (*Mylopharodon conocephalus*) are a “near-threatened” species, SMUD will make a good-faith effort to returning these fish to the pool unharmed. However, actual species and number of fish collected will vary between reservoirs, based on population density, collection success, and species present. All collected fish will be initially preserved in wet ice for transport, and then transferred to an ultra-cold freezer.

At the laboratory each fish will be assigned an identification number and a sample identification code based on the fish fork length, total length, and species. The

analytical laboratory will analyze muscle tissue from each fish for concentrations of heavy metals and methyl mercury in accordance with the General Protocol for Sport Fish Sampling and Analysis developed by the Cal EPA and with methods comparable to those used at the CDFW Marine Pollution Studies Laboratory at Moss Landing. Tissue samples will be developed by removing skin from an area above the lateral line then extracting a 9-13 gram “plug” of tissue. Samples will be weighed for percent moisture analysis and metal analyses will employ EPA Method 1630 or 1638 (Table 7). Results will be reported on both a dry and wet weight basis with percent moisture.

Metal	EPA Method	Method Detection Limit (mg/Kg fish)	Reporting Limit (mg/Kg fish)
Copper	EPA 1638	0.0006	0.0018
Lead	EPA 1638	0.0004	0.0012
Methyl mercury	EPA 1631B	0.001	0.003
Silver	EPA 1638	0.002	0.006

6.0 Analysis

6.1 Study Output

All data collected from this plan will be stored in a SWAMP-compatible database (Microsoft SQL Server). Study output will consist of a written report covering the UARP. The report will include a list and description of sampling locations, methods, laboratory reports and QA/QC, analysis, and results. A summary of results will be provided in tabular format that will include specific method detection limits for each constituent and analytical data reported. This report will also include relevant graphs depicting the seasonal relationship between DO, temperature and pH at sampling locations. Additional graphs will be provided, as appropriate, to more clearly demonstrate any changes in specific water quality parameters over time, depth, or longitudinal movement of flow through the system. All monitoring data will be summarized to characterize existing water quality conditions, and will be compared to regulatory criteria, standards and goals as identified by the SWRCB. Discussion appropriate to results and supportive of analyses and conclusions will be provided.

SMUD will submit a draft annual water quality monitoring report to the USFS, CDFW, BLM, SWRCB, and RWRCB at the conclusion of each calendar year covering the results of seasonal sampling throughout that year. SMUD will submit the draft report to the resource agencies on or before March 1. SMUD will then convene the annual Review of Ecological Conditions meeting by April 1 of each year to discuss the draft report, after which the licensees will allow the agencies at least 30 days to review and comment on the report.



The final annual report will be filed with FERC by June 30. SMUD will include in the final report any comments and recommendations made by the agencies on the draft report. If SMUD does not adopt a recommendation, the filing shall include the SMUD's reasons based on project-specific information.



7.0 Literature Cited

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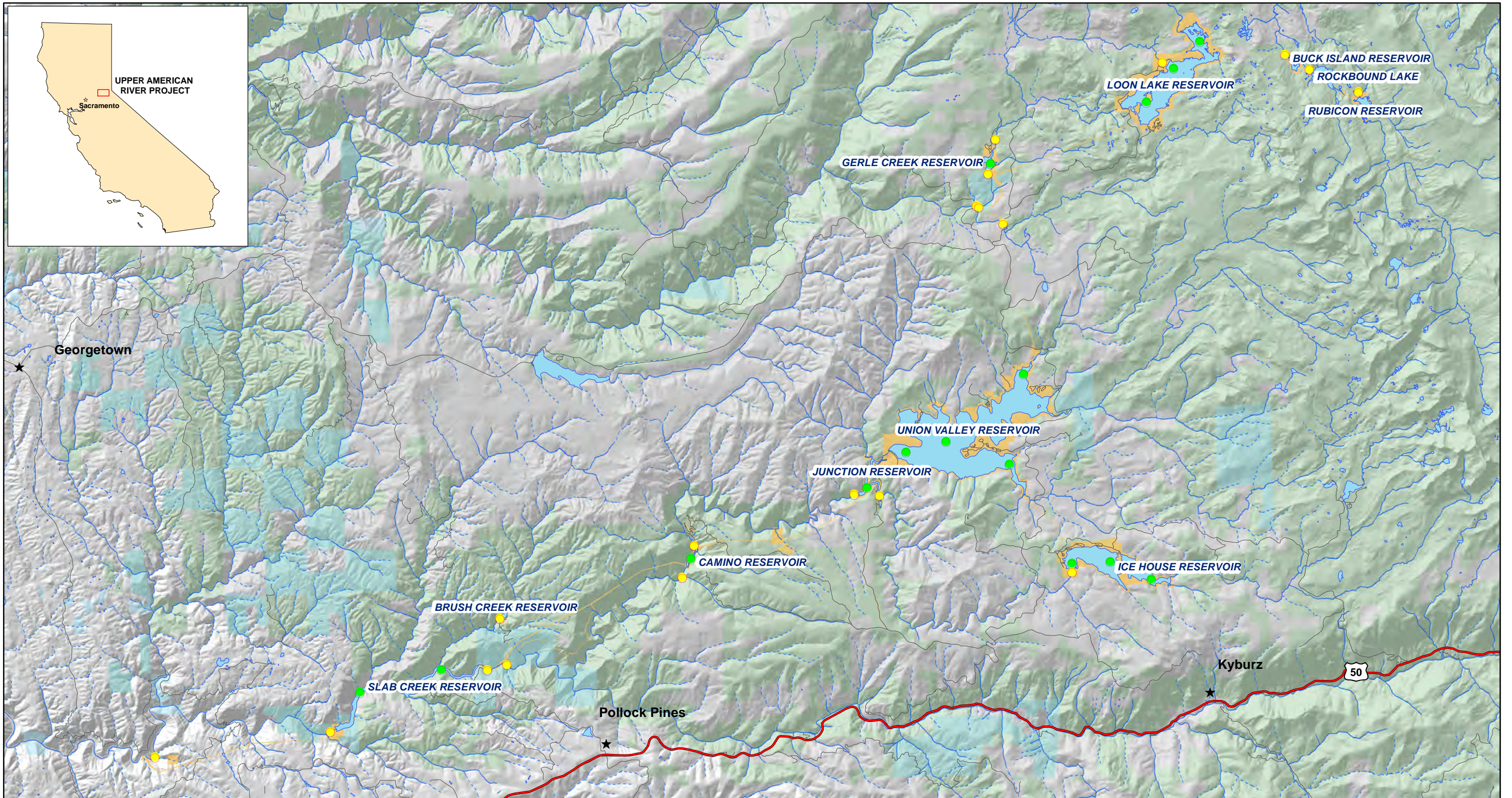
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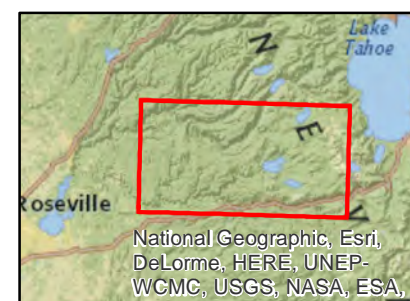


Upper American River Project
 Water Quality Monitoring Plan
 Figure 1. In-Situ Monitoring Site Locations

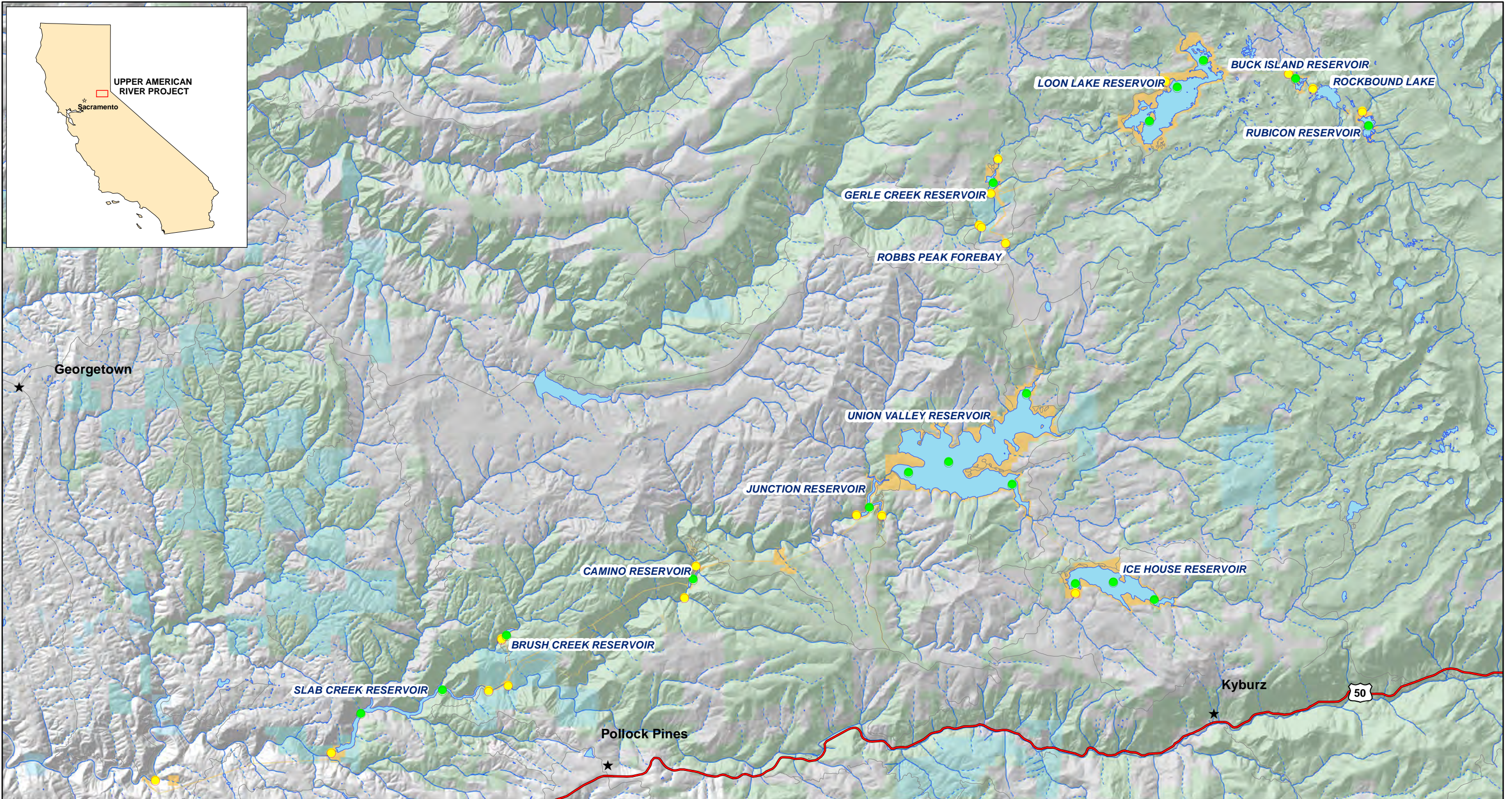


Map Features

- Stream Reach
- Reservoir
- Primary Roads
- US Highway 50
- FERC Project No. 2101 Boundary
- BLM
- National Forest Land
- Other



1 in = 2 miles



Upper American River Project
 Water Quality Monitoring Plan
 Figure 2. General Chemistry Monitoring Locations

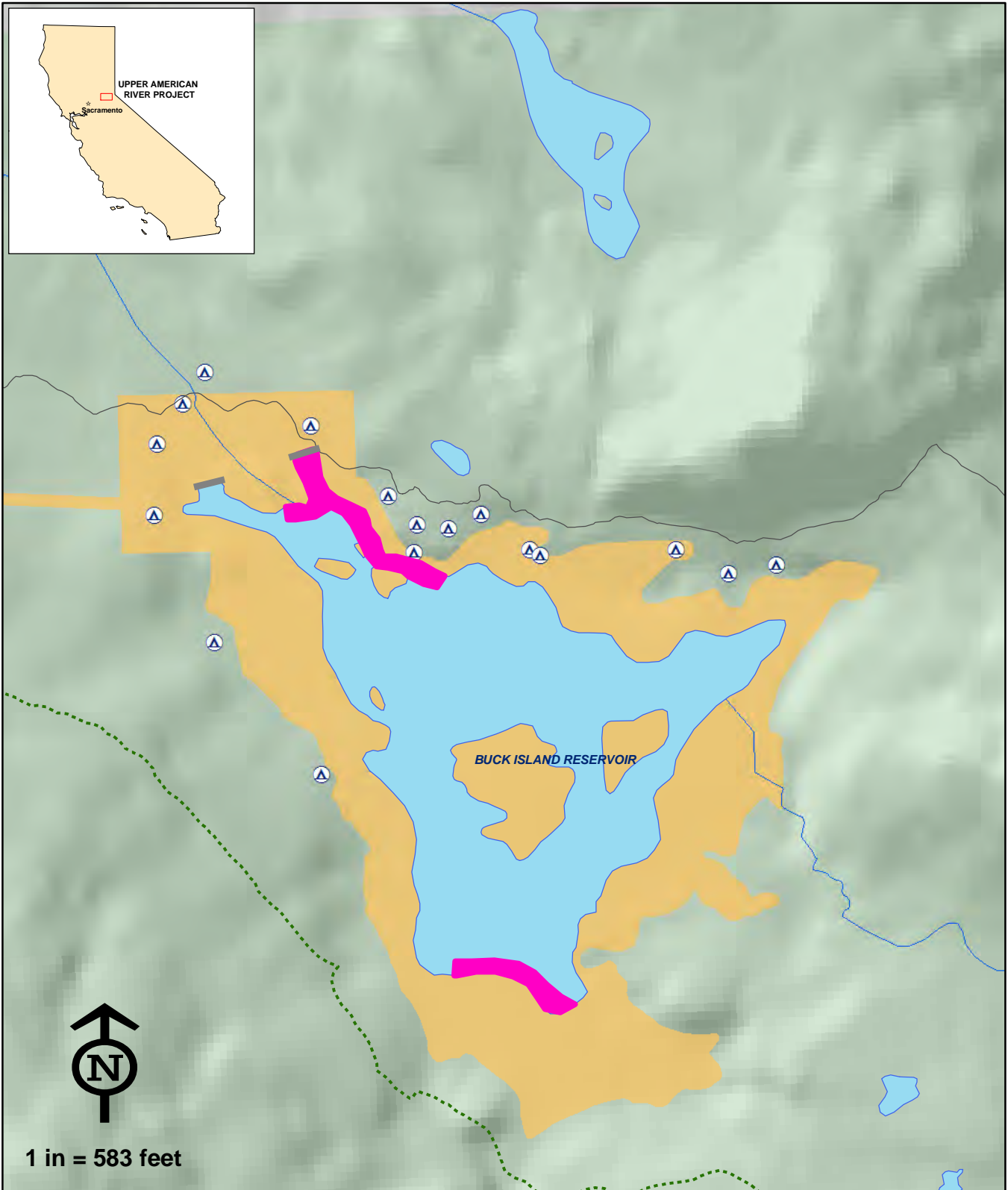


Map Features

- Stream Reach
- Reservoir
- US Highway 50
- Primary Roads
- FERC Project No. 2101 Boundary
- BLM
- National Forest
- Other



1 in = 2 miles



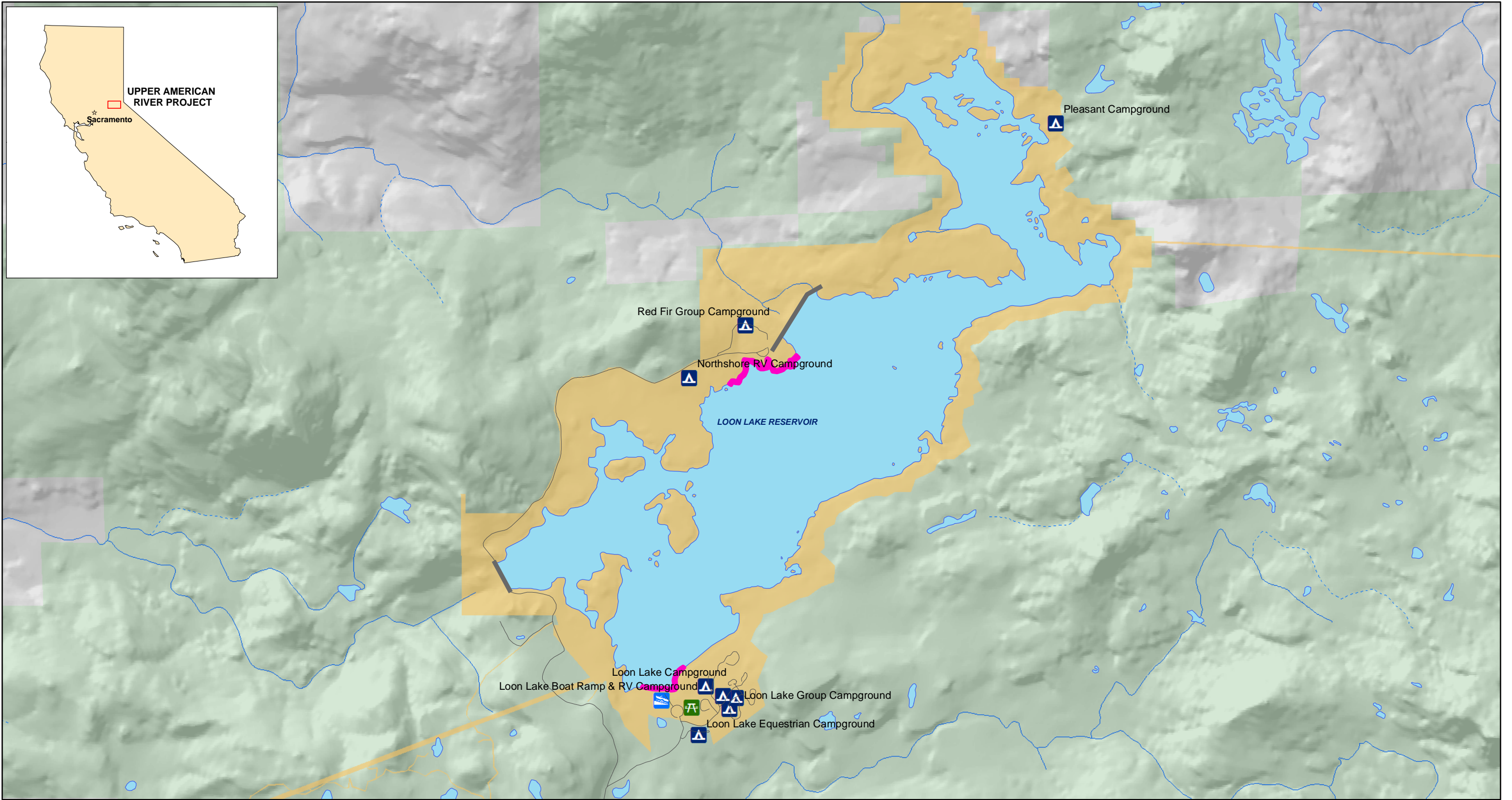
Upper American River Project
 Water Quality Monitoring Plan
 Figure 3. Bacterial Sampling
 Locations Buck Island Reservoir



Map Features

- Sampling Locations
- Rubicon OHV Trail
- Rubicon Hiking Trail
- ▲ Dispersed Camp Sites
- FERC Project Boundary
- National Forest
- Other





Upper American River Project
 Water Quality Monitoring Plan
 Figure 4. Bacterial Sampling Locations
 Loon Lake

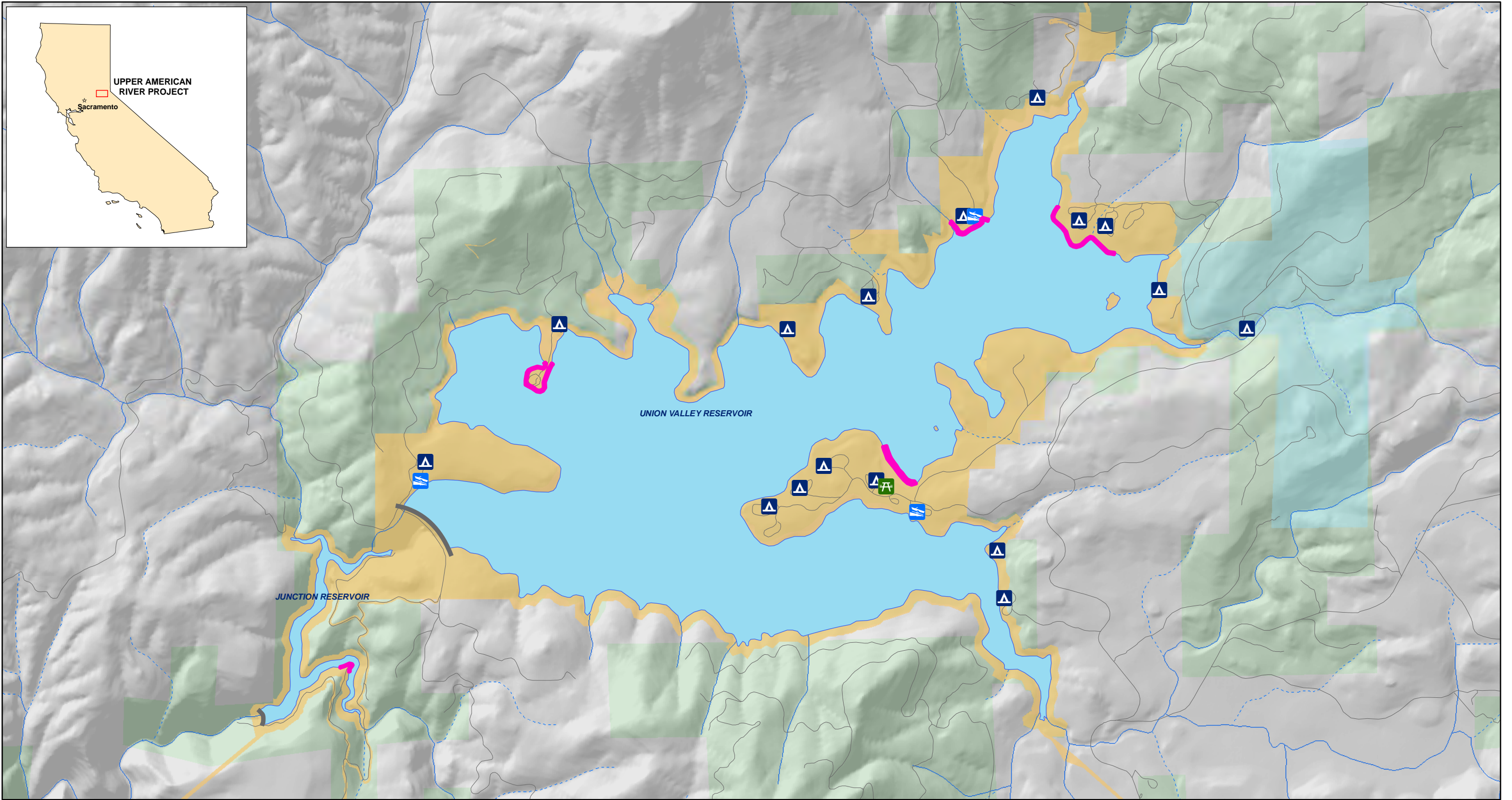


Map Features

- Sampling Locations
- Primary Roads
- Campground
- Day Use Area
- Boat Ramp
- FERC Project No. 2101 Boundary
- National Forest
- Other



1 in = 0.4 miles



Upper American River Project
 Water Quality Monitoring Plan
 Figure 5. Bacterial Sampling Locations
 Loon Lake

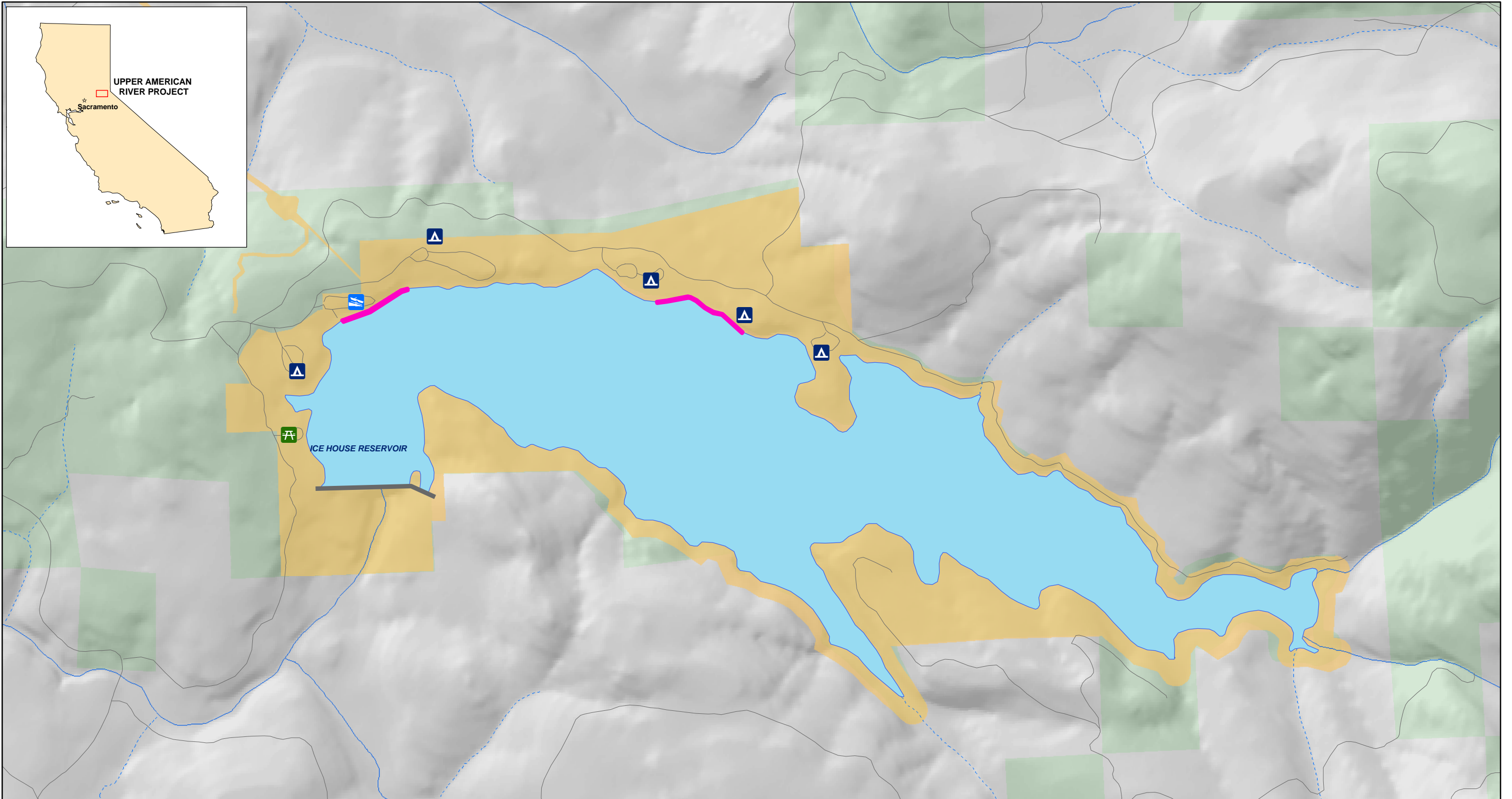


Map Features

- Sampling Locations
- Campground
- ⊕ Day Use Area
- Boat Ramp
- Primary Roads
- FERC Project No. 2101 Boundary
- BLM
- National Forest
- Other



1 in = 1 miles



Upper American River Project
 Water Quality Monitoring Plan
 Figure 6. Bacterial Sampling Locations
 Ice House Reservoir

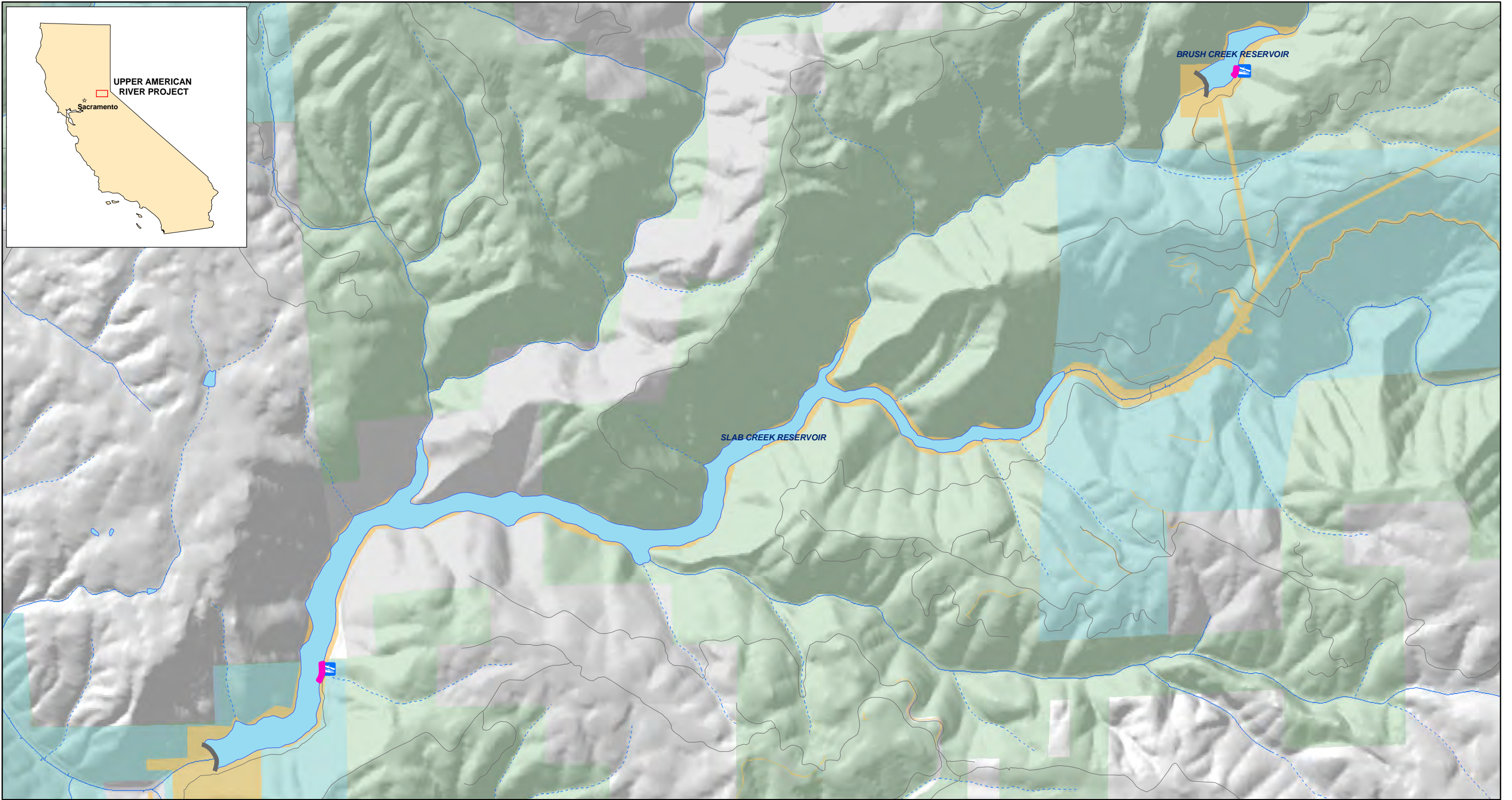
Map Features

- Sampling Locations
- FERC Project No. 2101 Boundary
- Campground
- National Forest
- Other
- Day Use Area
- Boat Ramp
- Primary Roads



1 in = 0 miles





Upper American River Project
 Water Quality Monitoring Plan
 Figure 7. Bacterial Sampling Locations
 Slab Creek & Brush Creek Reservoirs

Map Features

- Sampling Locations
- Boat Ramp
- Primary Roads
- FERC Project No. 2101 Boundary
- BLM
- National Forest
- Other



1 in = 0.4 miles



Attachment 1.

**State Water Resources Control Board 401 Certification for the UARP Condition
8.J**

8.J Other Water Quality Parameters

Within three months of license issuance, the Licensee shall consult with USFS, BLM, USFWS, CDFW, State Water Board and Central Valley Water Board on the development of a draft Water Quality Monitoring Program Plan (WQ Plan). The WQ Plan shall include the water quality monitoring elements listed below, and must: (1) provide detail on field sampling locations, sampling frequency, handling methods and quality assurance/quality control protocols; and (2) define the laboratory methods and associated reporting and detection limits for all constituents and parameters to be monitored in the various elements of the Monitoring Program.

Following consultation, and within six months of license issuance, the Licensee shall submit the WQ Plan to the Deputy Director for review and approval. The Licensee shall provide the Deputy Director with any comments provided by the agencies during the consultation process. The Licensee shall provide the Deputy Director with at least 60 days to review and approve the WQ Plan prior to submittal to the Commission, if applicable. The Deputy Director may require modifications as part of the approval. The Licensee shall file the Deputy Director's approval, together with any required WQ Plan modifications, with the Commission. The approved WQ Plan shall be implemented by the Licensee as described, through the life of the license and any extensions. The WQ Plan may be modified pursuant to adaptive management program needs as recommended by USFS, BLM, USFWS, CDFW, State Water Board, and/or Central Valley Water Board, and the new WQ Plan shall be implemented upon receiving all necessary approvals.

Method: The Licensee shall conduct a water quality sampling program designed to demonstrate seasonal conditions at all reservoir and stream locations affected by operation of the UARP, as described in the UARP Relicensing Water Quality Study Plan (Plenary approval, January 8, 2003) contained in the Water Quality Technical Report (May 2005). Laboratory analyses shall be conducted using USEPA analytical methods and/or standard methods adequately sensitive to detect constituent levels for determination of compliance with recognized state and federal criteria.

In Situ: In situ physical parameters (pH, water temperature, dissolved oxygen, electrical conductivity, and turbidity) shall be measured at representative locations on diverted stream reaches below all UARP reservoirs. In situ physical parameters shall be monitored at reservoir profiles collected at 1-meter depth intervals in Loon Lake, Gerle Reservoir, Ice House Reservoir, Union Valley Reservoir, Junction Reservoir, Camino Reservoir, and Slab Creek Reservoir.

Frequency: Riverine reaches: once seasonally in spring (April-May), summer (August), fall (November) and winter (January-February, as accessible) each year after license issuance through the term of the license and any extensions.

Reservoirs: once in spring (April-May) and once in fall (October-November) each year through the term of the license and any extensions. When possible, in situ water quality and water temperature monitoring may be completed coincident with amphibian, fisheries, and macroinvertebrate monitoring.

General Chemistry Monitoring

The Licensee shall monitor in situ parameters, standard minerals, hardness, nutrients, metals (total and dissolved fractions), oil and grease, and other chemical constituents. Method: Water chemistry samples shall be collected and analyzed for the set of constituents shown in Table 23. Water samples shall be collected from all UARP reservoirs and riverine locations, dam release points from reservoirs, and representative sites along all bypassed stream reaches greater than one mile in length. Reservoir samples shall be collected at the surface and near the bottom at multiple, representative locations within each impoundment. Secchi disk measurements shall be collected at Loon Lake, Ice House Reservoir, Union Valley Reservoir, and Slab Creek Reservoir.

Frequency: Water samples for chemical analysis shall be collected seasonally in spring, summer, fall, and immediately following either the second or third measurable rain event of the fall-winter period, once every five years beginning in Year 3 after license issuance. Secchi disk measurements shall be collected in summer and fall seasons once every five years after license issuance. After a minimum of three data sets are collected, if it is demonstrated that exceedances are not occurring at specific locations, the collection frequency may be reviewed to determine if it can be modified. The Licensee, CDFW, USFS or the Deputy Director may propose modifications to the sampling frequency contained in the WQ Plan. The Deputy Director must approve any revised plan prior to its implementation.

Trace Elements*		Standard Minerals		Nutrients	
Aluminum	Manganese	Calcium	Potassium	Nitrate-Nitrite	Orthophosphate
Arsenic	Lead	Magnesium	Sodium	Ammonia as N	Total Phosphorus
Barium	Nickel	Chloride	Sulfate	TKN as N	
Cadmium	Selenium				
Copper	Silver			Miscellaneous	
Iron	Zinc		Oil and Grease	MTBE	TPH
Mercury	Methyl mercury		Total Organic Carbon	Total Suspended Solids	Total Dissolved Solids
* For metals, the analysis shall include quantification of both total and dissolved constituents.			Hardness	Total Alkalinity	Cyanide

Bacterial Monitoring

Method: The Licensee shall conduct bacterial monitoring for fecal coliform and *E.coli* for protection of the recreational water contact (REC-1) beneficial use²⁸. Five near-shore samples shall be collected at each of the 15 sampling locations during the 30-day period that spans either the Independence Day holiday (June-July) or the Labor Day holiday (August-September), using the five samples in 30-day methodology or any other future protocol in an amended Basin Plan.

Location: Monitoring shall be conducted at a minimum of 15 shoreline recreational locations within the UARP boundary. Sampling locations shall be selected based on criteria that include: (1) where swimming and other water contact recreation activities are known to occur in the area; and (2) the existence of sources for potential introduction of pathogens to the water column in the immediate vicinity. Candidate sites for annual REC-1 bacterial monitoring will include developed recreation sites and frequently used sites at reservoir and riverine locations. The bacterial monitoring program shall include sampling at a minimum of four annually-rotating stations at Union Valley Reservoir swim areas, and a minimum of two beach locations each at Buck Island Reservoir, Loon Lake, Ice House Reservoir, and Gerle Creek Reservoir along with three other selected stations. The Licensee, in consultation with USFS, CDFW, State Water Board, USFWS, and Central Valley Water Board shall determine sampling locations for each upcoming field season. The Licensee shall consult with USFS, State Water Board, USFWS, and other listed parties to determine the locations to be sampled and shall submit the list of sampling locations to the Deputy Director for approval no later than May 31 of each designated sampling year. The Licensee shall provide the Deputy Director with any comments provided by the agencies during the consultation process. The Deputy Director may require modification as part of the approval.

Frequency: Bacterial monitoring shall be conducted annually for the first five years after license issuance, after which it may be decreased in frequency to every other year at reservoir or riverine locations where no exceedances of Basin Plan objectives for protection of REC-1 designated waters have been identified during Years 1-5. The Licensee shall notify the Central Valley Water Board if monitoring data demonstrate bacterial concentrations that present risks to human health at specific reservoir(s) or riverine sites. The Licensee shall also continue annual monitoring at those sites until the Licensee consults with the State Water Board and USFS (and any other interested parties) and agreement is reached that the monitoring frequency can be reduced. The Deputy Director must approve any change in monitoring frequency prior to implementation.

Metals Bioaccumulation Monitoring

Method: The Licensee shall monitor for potential uptake of mercury, copper, lead, and silver through the aquatic food chain in UARP-affected impoundments. Resident fish species shall be collected and analyzed to determine tissue residue levels of mercury, copper, lead, and silver. Target species, numbers of individuals, sampling strategy, and

analytical methods used shall be consistent with current State Water Board, Surface Water Ambient Monitoring Program (or any future water quality monitoring program) requirements, and shall be defined prior to each sampling event through Licensee consultation with USFS, CDFW, State Water Board, Central Valley Water Board, USFWS, and the Office of Environmental Health Hazard Assessment (OEHHA). Deputy Director approval is required prior to implementation of the metals bioaccumulation monitoring plan. The Licensee shall submit the metals bioaccumulation monitoring plan to the Deputy Director for approval, including any comments provided by the agencies during the consultation process. The Deputy Director may require modifications as part of the approval.

Location: Loon Lake Reservoir, Gerle Reservoir, Ice House Reservoir, Union Valley Reservoir, Camino Reservoir, and Slab Creek Reservoir.

Frequency: Metals bioaccumulation monitoring shall begin in Year 2 following license issuance and be performed once every five years through the term of the license and any extensions.

Attachment 2.

Settlement Agreement Article 1-5.10 Water Quality Monitoring

Within 3 months of license issuance, the licensee shall consult with FS, BLM, FWS, CDFG, SWRCB, and Regional Water Quality Control Board, Central Valley Region (RWQCB) on the development of a draft Water Quality Monitoring Program Plan (Plan). The Plan shall include the water quality monitoring elements listed below, and must (1) provide detail on field sampling locations, sampling frequency, handling methods and QA/QC; and (2) define the laboratory analyses and associated method detection limits for all constituents and parameters to be monitored in the various elements of the monitoring program. Following consultation, and within 6 months of license issuance, the licensee shall submit the draft Plan for review and approval by the Chief, Division of Water Rights, SWRCB. The final Plan shall be filed with FERC for approval. The approved Plan shall be implemented by the licensee as described, through the life of the license. The Plan may be modified pursuant to adaptive management program needs as recommended by FS, BLM, FWS, CDFG, RWQCB, and approved by the Chief, Division of Water Rights, SWRCB.

Water Chemistry Monitoring

Method: The licensee shall conduct a water chemistry sampling program designed to demonstrate seasonal conditions at all reservoir and stream locations affected by operation of the UARP, as described in the Project No. 2101 relicensing Water Quality Study Plan (Plenary approval, January 8, 2003). Laboratory analyses shall be conducted using USEPA Standard Methods adequately sensitive to detect constituent levels for determination of compliance with recognized state and federal criteria.

a. In situ physical parameters (pH, water temperature, dissolved oxygen, specific conductance, and turbidity) shall be sampled at representative locations on diverted stream reaches below all Project No. 2101 reservoirs. In situ physical parameters shall be monitored at reservoir profiles collected at 1-meter intervals in Loon Lake, Gerle Reservoir, Ice House Reservoir, Union Valley Reservoir, Junction Reservoir, Camino Reservoir, and Slab Creek Reservoir.

Frequency: In stream reaches, once seasonally in spring (April-May), summer (August), fall (November) and winter (January-February, as accessible) each year after license issuance. In reservoirs, in spring (April-May) and fall (October-November) each year. When possible, water quality and water temperature monitoring may be completed coincident with amphibian, fisheries, and macroinvertebrate monitoring.

Rationale: To monitor compliance with state and federal water quality standards and track potential changes in surface waters associated with Project No. 2101.

b. General chemistry monitoring. In situ parameters, minerals, nutrients, metals (total and dissolved fractions), measured hardness, and petroleum products shall be

conducted. General chemistry samples shall be collected from all Project reservoirs and in stream locations, dam release points from reservoirs, and representative sites along all diverted stream reaches greater than 1 mile in length. Reservoir samples shall be collected at the surface and near the bottom at multiple, representative locations within each impoundment. Secchi disc measurements shall be collected at Loon Lake, Ice House Reservoir, Union Valley Reservoir, and Slab Creek Reservoir.

Frequency: General chemistry samples shall be collected seasonally in spring, summer, fall, and immediately following either the second or third measurable rain event of the fall-winter period, once every 5 years beginning in Year 3 after license issuance. Secchi disk measurements shall be collected in summer and fall seasons, once every 5 years after license issuance. After a minimum of three data sets have been collected, if it is demonstrated that exceedances are not occurring at specific locations, the collection frequency may be reviewed to determine if it can be modified.

Rationale: To monitor for compliance with state and federal water quality standards and track potential changes in surface waters associated with the UARP. Monitoring at 5-year intervals will provide an index of changes in water quality conditions. Data collected will allow for the development of a long-term trend analysis in waters regulated by Project features and operations.

Bacterial Monitoring

Method: The licensee shall conduct bacterial monitoring consistent with Basin Plan objectives for protection of the REC-1 beneficial uses annually, at a minimum of 15 shoreline recreational locations within the Project boundary. Sampling locations shall be selected based on criteria that include: (1) swimming and other water contact recreation activities are known to occur in the area, and (2) there are sources for potential introduction of pathogens to the water column in the immediate vicinity. Candidate sites for annual REC-1 pathogen monitoring will include developed recreation sites and frequently used dispersed sites at reservoir and riverine locations. The bacterial monitoring program shall include sampling at a minimum of four annually rotating stations at Union Valley Reservoir swim areas, and a minimum of two beach locations each at Buck Island Reservoir, Loon Lake, Ice House Reservoir, and Gerle Creek Reservoir along with three other selected stations. Five near-shore samples shall be collected at each of the 15 sampling locations during the 30-day period that spans either the Independence Day Holiday (June-July) or the Labor Day Holiday (August-September), using the five samples in 30-day methodology or other protocol as amended in the Basin Plan. The licensee, in consultation with FS, CDFG, SWRCB, FWS, and RWQCB shall determine sampling locations for each upcoming field season. Licensee shall consult with FS, SWRCB, FWS, and other listed parties for final determination of the locations to be sampled no later than May 31 of each designated sampling year.

Frequency: Bacterial monitoring shall be conducted annually for the first 5 years after license issuance, then may be decreased in frequency to every other year at reservoirs

where no exceedances of Basin Plan objectives for protection of REC-1 designated waters have been identified during Years 1-5. If data demonstrates bacterial concentrations that present risks to human health at specific reservoir(s) or riverine sites, the program shall continue annually in the water body, through the life of the license.

Rationale: The UARP provides water contact recreational opportunities that include swimming, angling, and water skiing. Monitoring will be conducted to demonstrate summer bacterial concentrations at swim beaches affected by Project operations, to ensure that pathogen levels are recognized and do not exceed the thresholds acceptable for protection of human health.

Metals Bioaccumulation Monitoring

Method: The licensee shall monitor for potential uptake of mercury, copper, lead, and silver through the aquatic food chain resident in Project-affected impoundments. Resident fish species from Loon Lake Reservoir, Gerle Reservoir, Ice House Reservoir, Union Valley Reservoir, Camino Reservoir, and Slab Creek Reservoir shall be collected and analyzed to determine tissue residue levels of mercury, copper, lead, and silver. Target species, numbers of individuals, sampling strategy, and analytical methods used shall be consistent with current Surface Water Ambient Monitoring Program needs (SWRCB), and shall be defined prior to each sampling event through licensee consultation with FS, CDFG, SWRCB, RWQCB, FWS, and the state Office of Environmental Health Hazard Assessment. Fish tissue samples shall be collected and analyzed for rates of bioaccumulation, and monitoring shall continue through the term of the new Project License.

Frequency: Once every 5 years beginning in year 2 following license issuance.

Rationale: Reservoirs operated by the licensee have the potential to impound sediments and organic materials that may transport bound metals. Impounded metals have the potential to concentrate and become bioavailable to aquatic organisms. Metals that are bioaccumulated in the aquatic prey-base may bioconcentrate up through the food chain where elevated levels could become health risks to human and wildlife consumers.

Monitoring at 5-year intervals will provide an index of changes in fish body burdens of silver, mercury, copper and lead.

Overall Water Quality Program Rationale

Through the water quality monitoring program the licensee will monitor compliance with state and federal water quality standards and track potential changes in surface waters associated with the UARP and Chili Bar Hydroelectric Project operations. The monitoring program will provide data necessary to develop a long-term water quality trend assessment through the life of the FERC licenses. Data collected will provide water quality regulators the opportunity to identify trends of risk to human health and wildlife, and to design possible measures to intervene in this degradation. Water quality monitoring will focus on the identification of inorganic constituent levels and physical

parameters, along with bacterial concentrations that may impair beneficial uses designated for waters impounded by the project and releases to diverted reaches downstream of Projects' reservoirs.

152 FERC ¶ 62,021
UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

Sacramento Municipal Utility District

Project No. 2101-104

ORDER MODIFYING AND APPROVING WATER QUALITY MONITORING PLAN
PURSUANT TO ARTICLE 401(A)

(Issued July 9, 2015)

1. On May 18, 2015, Sacramento Municipal Utility District (licensee) filed its Water Quality Monitoring Plan with the Federal Energy Regulatory Commission (Commission) pursuant to Article 401(a) of the Upper American River Project license.¹ The project is located on the Rubicon River, Silver Creek, and South Fork American River in El Dorado and Sacramento counties, California and occupies lands within the Eldorado National Forest.

REQUIREMENTS

2. Article 401(a), in part, requires the licensee to file, for Commission approval, a Water Quality Monitoring Plan (Plan) within 10 months of license issuance, or May 23, 2015. The Plan is also required by the project's Water Quality Certification (WQC), Condition No. 8(j).² These requirements specify that the Plan should include a comprehensive water quality monitoring program designed to document seasonal conditions at project reservoirs and streams. The Plan is to be implemented for the duration of the license term and include the monitoring of four general constituents of water quality at the project: (1) basic *in-situ* parameters; (2) general water chemistry; (3) bacteria; and, (4) metals bioaccumulation. The monitoring must be conducted in accordance with the schedule provided in Condition No. 8(j) of the WQC. The Plan must take an adaptive management approach so that modifications to the Plan can be made as the program needs dictate. The licensee must develop the Plan in consultation with the State Water Resource Control Board (SWRCB), Central Valley Water Board (CVWB),

¹ Order Issuing New License. 148 FERC ¶ 62,070 (issued July 23, 2014).

² The water quality certification was incorporated into the project license via Appendix A.

U.S. Forest Service (FS), U.S. Fish and Wildlife Service (FWS), U.S. Bureau of Land Management (BLM), and the California Department of Fish and Wildlife (DFW).

LICENSEE'S PLAN

3. The licensee's proposed Plan consists of four main parameters, which are summarized below. In accordance with WQC Condition No. 8(j), monitoring would take place within the project reservoirs and diverted stream and river reaches downstream of the project reservoirs. While the Plan is required to be implemented for the duration of the license term, the licensee's Plan focuses on the first five years of the water quality monitoring program. According to the implementation schedule in its Plan, the licensee would begin monitoring in 2015; hence, 2015 would represent Year One of the Plan. At the end of the five year period, the licensee would meet with the agencies and review the monitoring results from the five year period. Then, together, the licensee and the agencies would determine whether the results of the monitoring period warrant modification to the Plan under the adaptive management provision.

In-situ Monitoring

4. *In-situ* water quality monitoring, which includes dissolved oxygen, conductivity, water temperature, turbidity, and pH, would take place on an annual basis for the duration of the license. Measurements in the reservoirs would occur at one-meter increments through the water column. Stream measurements would occur at a single location as close to the thalweg as possible, where there is adequate lateral and vertical mixing. Reservoir sampling would occur once in the spring (April or May) and again in the fall (October or November). Stream sampling would occur once in the winter (January or February), spring (April or May), summer (August) and fall (November). The licensee notes that winter sampling is subject to weather conditions, which, given the high elevation of the project, has the potential to prevent safe access to the sampling locations. The licensee's Plan provides the exact location of sampling locations, which includes 15 reservoir locations and 19 stream locations. The licensee would follow standard Environmental Protection Agency (EPA) sampling protocols and calibrate the monitoring equipment per the manufacturer's specifications.

General Water Chemistry Monitoring

5. General water chemistry monitoring would take place during Year Three of the Plan, or 2017, and every five years thereafter. Specifically, the licensee would collect samples once during the spring, summer and fall, and immediately following the second or third measurable rain event³ during the fall-winter period. The constituents monitored

³ The licensee defines a "measurable" rain event as an event resulting in 0.50 inches of precipitation over a 24-hour period.

under this component include the *in-situ* parameters described above, plus nutrients, trace elements, and standard minerals. A complete list of constituents is presented in the licensee's Plan. The licensee's Plan provides the exact location of sampling locations, which includes 18 reservoir locations and 19 stream locations. Reservoir sampling methods would depend on whether the reservoir is stratified at the time of sampling. During periods of stratification, the licensee would collect samples in the upper epilimnion layer and the hypolimnion layer, one meter from the reservoir bottom. During periods of non-stratification, the samples would be collected at a point equivalent to one-third of the water depth. Stream measurements would occur at a single location as close to the thalweg as possible, where there is adequate lateral and vertical mixing. The licensee would follow standard EPA sampling protocols and calibrate the monitoring equipment per the manufacturer's specifications.

Bacterial Monitoring

6. Bacterial monitoring for fecal coliform and *E. coli* would take place annually in the summer, prior to May 31, during the first five years of the Plan at 15 locations within the project reservoirs, and every other year thereafter pending SWRCB and FS approval. The monitoring stations are described in the licensee's Plan and target public use swimming areas. Additionally, five of 15 sites would undergo monitoring for 30 consecutive days, with the mid-point of the 30-day period falling on a holiday when recreational use in the reservoir(s) is high. This would allow the licensee to identify any locations that have bacterial concentrations that are potentially dangerous to human health. The licensee would collect the samples near-shore in shallow water following EPA sampling protocols.

Metals Bioaccumulation Monitoring

7. Metals bioaccumulation monitoring would take place during the fall of Year Two of the Plan, or 2016, and every five years thereafter. Monitoring would involve fish tissue sampling to assess the potential for bioaccumulation of metals in resident fish within various locations at eight project reservoirs, as well as Gerle and Angel Creeks. The licensee would collect fish using various techniques, targeting brown trout, smallmouth bass, rainbow trout, Sacramento pikeminnow, and hardhead, when present. The licensee would collect three of each species at each sampling location. Fish tissue would be analyzed for copper, lead, methyl mercury, and silver, using EPA-approved protocols.

Data Management and Reporting

8. The licensee would store all data in a database that is compatible with other SWRCB-regulated monitoring programs. Each year, the licensee would compile that year's data and develop a report that includes a list and descriptions of sampling locations, methods, laboratory reports, analysis and results. The report would also

include graphs depicting seasonal trends in dissolved oxygen, pH and water temperature at the sampling locations. The licensee would also place emphasis on identifying changes in water quality over time, depth, or sampling location. Finally, the licensee would compare all water quality data collected that year to the state water quality standards in order to determine its compliance with the standards. The licensee would provide the report to the FS, BLM, SWRCB, CVWB, and DFW by March 1 of the following year and then review the report in person with the agencies at its annual Review of Ecological Conditions meeting held by April 1 of each year. Following this, the licensee would provide the agencies a 30-day review and comment period before filing the report, including any agency comments, with the Commission by June 30.

AGENCY CONSULTATION

9. The licensee provided its Plan to the agencies for review and comment on October 7, 2014. The agencies provided comments on the Plan, which the licensee incorporated before filing the final Plan with the SWRCB for approval on January 23, 2015. On March 24, 2015, the SWRCB approved the Plan.

DISCUSSION AND CONCLUSIONS

10. The licensee's Plan should provide a comprehensive water quality monitoring program that evaluates the effect of project operations on water quality in project reservoirs and streams. The data collected under the Plan should allow the licensee to determine its ability to comply with state water quality standards, identify long-term trends in water quality, and evaluate potential health risks to humans and wildlife.

11. As proposed, the Plan includes a provision to provide the agencies and the Commission with annual reports. Given the Plan's adaptive management approach, and the fact that the licensee anticipates a change in the frequency of monitoring after the initial five year monitoring period, the licensee's fifth annual monitoring report should include a clear discussion as to whether or not changes to the Plan are anticipated. If the licensee, in consultation with the resource agencies, determines that the Plan should be amended, it should file a request to amend its Plan with the Commission for approval. If the licensee determines that an amendment to the Plan is not necessary, it should include a monitoring schedule for the remainder of the license term in its fifth annual report.

12. Sacramento Municipal Utility District's proposed Water Quality Monitoring Plan fulfills the requirements of the 401 (a) in part and Water Quality Certification Condition No. 8(j), and as modified, should be approved.

The Director orders:

(A) Sacramento Municipal Utility District's (licensee) Water Quality Monitoring Plan (Plan), filed on May 18, 2015, pursuant in part to Article 401 (a) and

Water Quality Certification Condition No. 8(j) for the Upper American River Project (FERC No. 2101), as modified in paragraph (B), is approved.

(B) The licensee's fifth annual monitoring report, due June 30, 2020, must include a monitoring schedule for the duration of the license term. If the licensee elects to modify the Plan based on the results of the first five-year period, it should file an amendment request with the Commission accordingly.

(C) This order constitutes final agency action. Any party may file a request for rehearing of this order within 30 days from the date of its issuance, as provided in section 313(a) of the Federal Power Act, 16 U.S.C. § 8251 (2012), and the Commission's regulations at 18 C.F.R. § 385.713 (2015). The filing of a request for rehearing does not operate as a stay of the effective date of this order, or of any other date specified in this order. The licensee's failure to file a request for rehearing shall constitute acceptance of this order.

(for) Thomas J. LoVullo
Chief, Aquatic Resources Branch
Division of Hydropower Administration
and Compliance

Document Content(s)

P-2101-104.DOC.....1-5