Aquatic Macroinvertebrate Monitoring Plan

Sacramento Municipal Utility District

Hydro License Implementation • July 2016

Upper American River Project

FERC Project No. 2101

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Acronyms and Abbreviations

Acronym	Definition
BMI	Benthic macroinvertebrate
CDFW	California Department of Fish and Wildlife
FERC	Federal Energy Regulatory Commission
GPS	Global Positioning System
IBI	Index of Biotic Integrity
PG&E	Pacific Gas and Electric Company
QC	Quality control
SAFIT	Southwestern Association of Freshwater Invertebrate Taxonomists
SFAR	South Fork American River
SMUD	Sacramento Municipal Utility District
SWRCB	State Water Resources Control Board
SWAMP	Surface Water Ambient Monitoring Program
UARP	Upper American River Project
USFS	U.S. Department of Agriculture, Forest Service
USFWS	U.S. Fish and Wildlife Service

1.0 INTRODUCTION AND BACKGROUND

This Aquatic Macroinvertebrate Monitoring Plan (Plan) addresses monitoring requirements set forth in the State Water Resources Control Board (SWRCB) section 401 Water Quality Certification, Condition 8.B of Appendix A of the new license order (FERC 2014), and the U.S. Department of Agriculture and Forest Service (USFS) section 4(e) Condition No. 31 of Appendix B of the new license order (FERC 2014) for the Upper American River Project (UARP; FERC Project 2101), and the USFS section 4(e) Condition No. 14 for the Slab Creek Flow Facility Project License Amendment (USFS 2015). Attachments 1, 2, and 3 contain the language from these documents as applicable to this Plan.

The UARP is owned and operated by the Sacramento Municipal Utility District (SMUD) and is located 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 Reservoir, and Ice House Reservoir), eight smaller regulating or diversion reservoirs, and eight powerhouses. The UARP has an authorized installed capacity of 637.3 megawatts. The UARP also includes recreation facilities containing over 700 campsites, five boat ramps, hiking paths, and bicycle trails at the reservoirs.

2.0 MONITORING PLAN OBJECTIVES

The primary goal of this Plan is to utilize an aquatic ecosystem health index to document changes in character or composition of aquatic or benthic macroinvertebrate (BMI) assemblages in the UARP potentially related to implementation of the 2014 modified stream flow regime.

3.0 MONITORING SITES AND FREQUENCY

3.1 MONITORING SITES

Monitoring under this Plan is focused on sampling at locations previously surveyed during relicensing (SMUD and PG&E 2005) because these sites facilitate comparability to conditions present prior to implementation of the new flow regime. A total of 31 study sites in 13 stream reaches were sampled in the UARP during 2002 and 2003. These sites were identified by relicensing participants to be representative of Project-affected stream reaches based on information from aerial photographs, satellite imagery, area reconnaissance, and historical information (SMUD and PG&E 2005). License Conditions (Attachments 1 and 2) identify a subset of the relicensing study stream reaches and sites for ongoing BMI monitoring.

The following 8 stream reaches with 11 monitoring sites are proposed for sampling:

1. Rubicon River upstream of Rubicon Springs (site RR-I2 [now labeled RRD-I2[1]]).
2. Gerle Creek below Loon Lake Reservoir Dam (site LLD-I3[1]]).
3. Gerle Creek below Gerle Creek Reservoir Dam (site GC-I2 [now labeled GCD-I2]).
4. South Fork Rubicon River below Robbs Peak Reservoir Dam (site RPD-I2).
5. South Fork Silver Creek below Ice House Reservoir Dam (site IH-I2 [now labeled IHD-I2]).
6. Silver Creek below Junction Reservoir Dam (sites JD-I1 and JD-I4[2]).
7. Silver Creek below Camino Reservoir Dam (sites CD-I2 and CD-I3).
8. South Fork American River (SFAR) below Slab Creek Reservoir Dam (site SCD-I1a[3] above Iowa Canyon Creek and site SCD-I1b[1] downstream of Iowa Canyon Creek).

Table 1 lists the name and location of monitoring sites specified in the license conditions and those proposed in this Plan. Proposed monitoring site locations are shown in Figure 1.

[1] The site specified in the license condition is located on private land and not reliably accessible. To provide continuity with prior sampling, an alternate monitoring site that was previously surveyed during relicensing surveys is proposed in this Plan.
[2] The site specified in the license condition is located on private land and not reliably accessible. An alternate site (JD-I4) that was not previously surveyed during relicensing is proposed. This site is located on public land and access is expected to be available for the duration of the monitoring.
[3] This site is associated with USFS section 4(e) Condition No. 14 for the Slab Creek Flow Facility Project License Amendment, and is not specified as part of current License Conditions.

Table 1. Upper American River Project Aquatic Macroinvertebrate Monitoring Site Locations

Stream	Reach	Site Name	Previously Sampled Relicensing Site	Site Description	UTM (NAD 27)	
					Easting	Northing
Rubicon River	Rubicon Dam	RRD-I2	Yes	Upstream of Rubicon Springs	739578	4321336
Gerle Creek	Loon Lake Dam	LLD-I3	Yes	Above Rocky Basin Creek Confluence	727256	4318833
Gerle Creek	Gerle Creek Dam	GCD-I2	Yes	Upstream of S.F. Rubicon River	725735	4315013
S.F. Rubicon	Robbs Peak Dam	RPD-I2	Yes	Downstream of Gerle Creek confluence	724343	4314532
S.F. Silver Creek	Ice House Dam	IHD-I2	Yes	Downstream of Ice House Reservoir	727986	4299755
Silver Creek	Junction Dam	JD-I1	Yes	Downstream of Junction Dam	720377	4303377
Silver Creek	Junction Dam	JD-I4	No	At Jaybird Tunnel Adit	--[1]	--[1]
Silver Creek	Camino Dam	CD-I2	Yes	Camino tunnel access	710243	4298661
Silver Creek	Camino Dam	CD-I3	Yes	Above SFAR confluence	709354	4296229
S.F. American	Slab Creek Dam	SCD-I1a	No	Downstream of Slab Creek Dam; above Iowa Canyon Creek	--[1]	--[1]
S.F. American	Slab Creek Dam	SCD-I1b	Yes	Below Iowa Canyon Creek	699367	4293904

[1] Not available as site has not yet been set up.

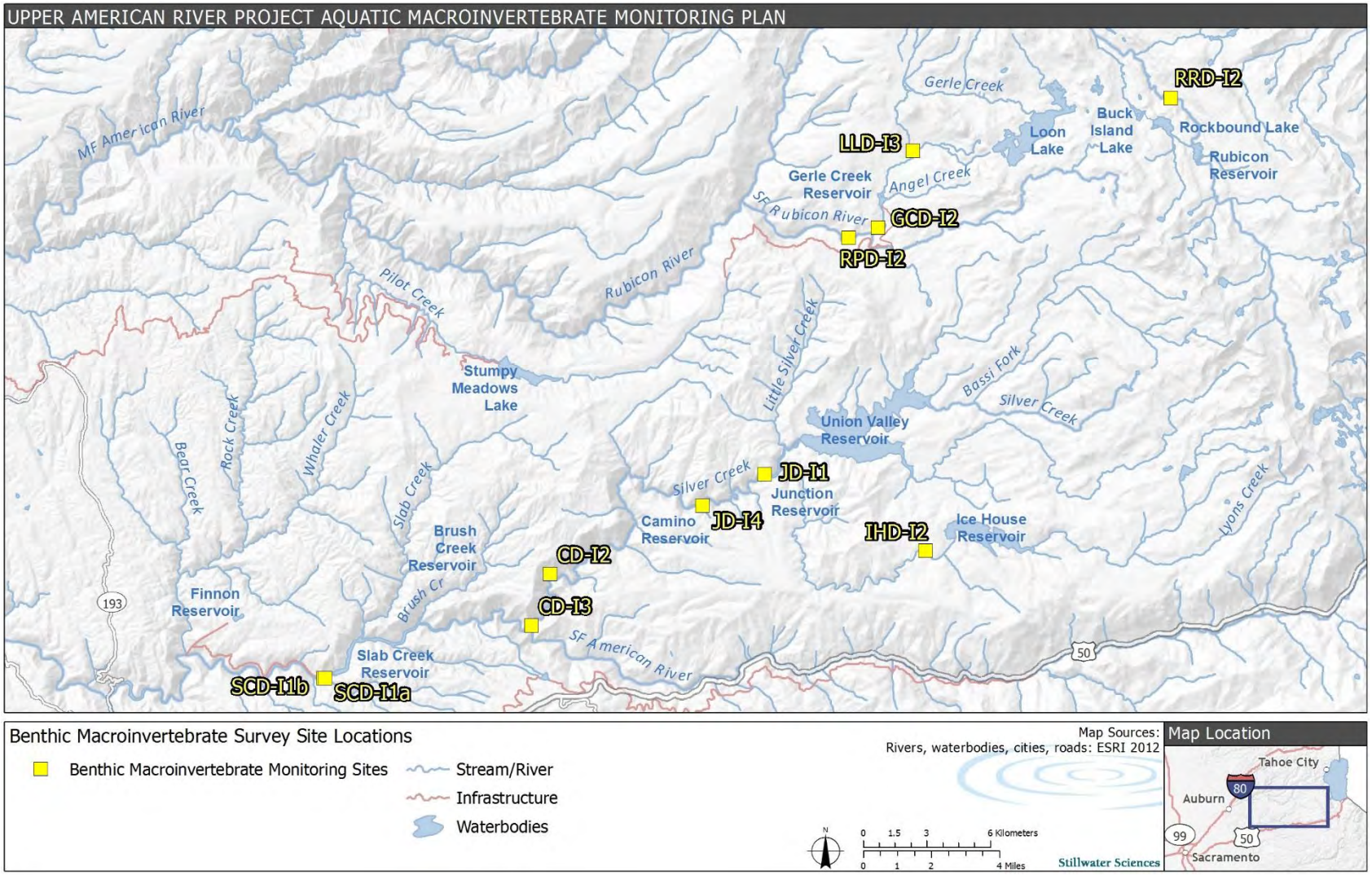

Figure 1. Aquatic macroinvertebrate monitoring locations

3.2 MONITORING FREQUENCY

Surveys will be conducted in years 5, 6, 10, 11, 15, 16 (i.e., 2019, 2020, 2024, 2025, 2029, 2030) and thereafter for two consecutive years every 10 years for the term of the license and any extensions, or until the new License is issued.

4.0 METHODS

The BMI study conducted in support of relicensing for the UARP included samples collected in 2003 and 2004 (SMUD and PG&E 2005). These samples were collected using the targeted-riffle California Stream Bioassessment Procedure (CSBP) (Harrington 2003). Since this time, the standard collection procedure has been revised by the Surface Water Ambient Monitoring Program (SWAMP) (Ode 2007), which emphasizes a multi-habitat approach. Although samples collected using the multi-habitat approach are derived from a wider variety of aquatic habitat, the biological signals from the two collection methods have been shown to be similar (Rehn et al. 2007). Although this Plan specifies use of SWAMP protocol, additional information regarding standardization measures that will be taken to ensure comparability with historical (CSBP) data is included in the analytical methods section below. This Plan includes BMI sampling methods for sites that are safely wadeable and that allow for effective sampling using the SWAMP protocol.

4.1 FIELD SURVEYS

4.1.1 Aquatic Macroinvertebrate Sample Collection

Sampling will be conducted using the reach-wide benthos (RWB) method (full version) for documenting and describing BMI assemblages and physical habitat described by the SWAMP (Ode 2007). In accordance with the SWAMP protocol, the length of each sample site will be determined based on the average wetted width (if the average width is less than 10 m, the sample site will be 150 m; if the average width is greater than 10 m, the sample site will be 250 m in length). Other factors that may affect the length of the sample site include contiguity of wadeable (i.e., sampleable) aquatic habitat, influence of tributary streams, and/or accessibility. Sample sites will be placed as close as possible to those stream sections sampled for the relicensing study; however, the start and/or end points of the site may need to be adjusted to comply with the contiguity requirements of the SWAMP protocol. This contiguity requirement could also make some sites previously sampled with the CSBP targeted riffle method unsuitable for sampling using the SWAMP protocol, in which case alternate sites will be proposed.

Each sample site will be divided into 11 equidistant transects arranged perpendicular to the direction of flow. A single inter-transect will be located between main transects at sites greater than 100 m in length in total (i.e., where main transects are at least 10 m apart).

Main transects will be designated A through K, while any inter-transects will be identified by their adjacent upstream and downstream transects (e.g., AB, BC, etc.). A total of 11 subsamples will be taken (1 per main transect) to form a single RWB composite sample for each site (only physical habitat data is collected at inter-transects). The subsample position will alternate between the left, center, and right positions along each main transect (25%, 50% and 75% of wetted width, respectively). If a subsample cannot be collected at the designated point along the transect due to deep water or unsafe conditions, the point will be relocated as close as possible to the designated position.

Subsamples will be taken moving upstream from the downstream end of the sample site in order to minimize instream disturbance. Subsamples will be collected by rubbing cobble and boulder substrates and disturbing finer sediments for a minimum of 30 seconds upstream of a D-frame kicknet fitted with a 0.02-in. diameter (0.5 mm) mesh net at each subsample point. Subsamples will be taken from one square foot of the stream bottom with a one square foot frame used for calibration as necessary.

Once all BMI subsamples (11 as described above) have been collected, the composited sample will be transferred to one or more 500-mL wide-mouth plastic jars. A single jar will not be filled more than halfway with sampled material. The transfer will be performed over a tray to facilitate recovery of any spilled organisms. Larger twigs and rocks will be removed by hand and inspected for BMI. Forceps will be used to transfer any BMI clinging to the net to the sample jar. Each sample jar will be filled with ethanol as a preserving agent and identified with both internal and external labels.

4.1.2 Measurements of Chemical and Physical Habitat

Physical habitat and water quality parameters will be recorded at each BMI sampling site utilizing methods described in the SWAMP protocol (Ode 2007). These parameters include GPS coordinates, total sample site length, elevation, gradient, discharge, water temperature, specific conductance, alkalinity, pH, and dissolved oxygen.

Additional physical habitat data will be collected from transects and inter-transects at each site. These data will include: wetted width; depth (averaged from five points at each transect); estimated bankfull width and depth; an evaluation of bank stability; percent aquatic habitat type (e.g., riffle, run, etc.); canopy cover using the Strickler (1959) modification for a convex spherical densiometer; substrate measurements using a modified Wolman (1954) pebble count; percent cobble embeddedness (for a minimum of 25 cobbles); presence or absence of algae, macrophytes, and coarse particulate organic matter (CPOM); a characterization of riparian vegetation; an evaluation of instream habitat complexity; and photographs facing upstream and downstream at three of eleven main transects (A, F, and K).

4.2 LABORATORY METHODS

Laboratory methods will follow procedures outlined in the Standard Operating Procedures for Laboratory Processing and Identification of Benthic Macroinvertebrates in California (Woodard, Slusark, and Ode 2012). Each composite sample will be rinsed in a standard No. 35 sieve (0.5 mm) and transferred to a tray with twenty 25-cm^2 grids for subsampling. Subsampling will be performed using a stereomicroscope with magnifications of 6.5x to 20x. Subsamples will be transferred from randomly selected grids to Petri dishes where BMI will be removed indiscriminately with the aid of a stereomicroscope and placed in vials containing a solution of 70% ethanol and 30% water. In cases where BMI abundance exceeds 100 organisms per grid, half grids will be delineated to ensure that a minimum of three discrete areas within the tray of benthic material is subsampled. At least 600 BMIs will be subsampled from a minimum of three discrete areas of the subsampling tray. The debris from the processed grids will be placed in a remnant jar and preserved in 70% ethanol for later quality control (QC) testing. Subsampled BMIs will be identified using standard aquatic BMI identification keys (e.g., Merritt et al. 2008, Stewart and Stark 1993, Thorp and Covich 2001, and Wiggins 1996) and other appropriate references. All organisms from the subsample will be identified to a level 1 taxonomic effort as specified in the Southwestern Association of Freshwater Invertebrate Taxonomists (SAFIT) except chironomids, which will be identified to subfamily/tribe instead of family. Finally, the California Department of Fish & Wildlife (CDFW) Aquatic Bioassessment Laboratory (ABL) will be contracted to perform an external QC review of the sample identification. In accordance with the SWAMP external QC procedures, 10% of the samples collected will be randomly selected for QC by the taxonomist and sent to the CDFW ABL (Rehn et al. 2015).

4.3 ANALYTICAL METHODS

Prior to data analysis, historical datasets (i.e., the 2003/2004 samples) that were identified using a different method, such as CAMLnet (CDFG 2003), or to a different taxonomic level will be standardized to the SAFIT level one before calculating metrics or running statistical analyses. In addition, historical datasets (i.e., the 2003/2004 samples) that used laboratory procedures outlined by the CSBP, which specified a 900-organism subsample, will be standardized using re-sampling software to the 600-organism subsample size. This step will ensure comparability of metric values and Index of Biological Integrity (IBI) scores between the 2003/2004 sampling events and subsequent monitoring efforts described in this plan. All data collected from this plan will be stored in a SWAMP-compatible database (Microsoft SQL Server).

A set of standard metrics that characterize BMI assemblages and have been found to be reliable responders to disturbance (Karr and Chu 1999) will be calculated for each sample (Table 2). In addition, a suite of metrics used to evaluate effects of hydropower projects in California will be formulated as described by Rehn (2009, 2010) and applied to each

sample, including those in the 2003/2004 dataset. Rehn's Sierra IBI utilizes seven metrics (Table 2) in a weighted scoring system that produces total scores ranging from 0 to 100, depending on the response of the BMI assemblages to hydropower project facilities and operations. The application of the IBI to the BMI data will facilitate identification of longitudinal and/or temporal trends using a composite biological response variable.

Table 2. Metrics Used to Characterize Aquatic Macroinvertebrate Assemblages

Metric	Description	Response to Increasing Stream Quality[a]
Taxonomic Richness	Total number of distinct taxa identified to a standardized taxonomic level	Increase
Number of EPT Taxa	Number of taxa in the orders Ephemeroptera (mayfly), Plecoptera (stonefly) and Trichoptera (caddisfly)	Increase
ET Taxa Richness[b]	Number of taxa in the orders Ephemeroptera and Trichoptera	Increase
Number of Ephemeroptera Taxa	Number of taxa in the Ephemeroptera insect order	Increase
Number of Plecoptera Taxa	Number of taxa in the Plecoptera insect order	Increase
Number of Trichoptera Taxa	Number of taxa in the Trichoptera insect order	Increase
Number of Coleoptera Taxa	Number of taxa within the Coleoptera (beetle) insect order	Increase
Shannon Diversity Index[b]	General measure of sample diversity that incorporates richness and evenness	Increase
% Scrapers[b]	Percentage of BMIs within the scraper functional feeding group[c]	Increase
% Predator Individuals[b]	Percentage of BMIs within the predator functional feeding group[c]	Increase
% Tolerant Individuals[b]	Percentage of BMIs that are highly tolerant to water and/or habitat quality impairment as indicated by TVs[c]	Decrease
% Intolerant Individuals[b]	Percentage of BMIs that are intolerant to water and/or habitat quality impairment as indicated by TVs[c]	Increase
% Non-insect Taxa[b]	Percentage of taxa not included in the class Insecta[c]	Decrease

[a] The responses indicated are generalized and can vary with natural gradients associated with elevation, water temperature and substrate composition as well as impairment to the aquatic environment.

[b] Metrics used for Sierra Index of Biotic Integrity (Rehn 2009, 2010).

[c] SAFIT used as source for functional feeding group and tolerance value (TV) designations.

5.0 REPORTING

Each calendar year, by April 1, SMUD will schedule and facilitate an Annual Review of Ecological Conditions meeting with the Resource Agencies (i.e., CDFW, USFS, U.S. Fish and Wildlife Service, and SWRCB) to review and discuss the results of implementing this Plan. The report will be provided at least two weeks prior to the Annual Review of Ecological Conditions.

SMUD will file with FERC by June 30 of each year an annual report fully describing the monitoring efforts of the previous calendar year. Results of the BMI monitoring, including a discussion of current BMI assemblages and identification of any trends with possible relationships to the modified flow regime, will be included in this report. SMUD will provide copies of the annual report to the Resource Agencies. The Resource Agencies will have at least 30 days to review and comment on the draft report prior to filing with FERC.

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Attachment 1
State Water Resources Control Board section 401 Water Quality Certification for the UARP

Condition 8.B Aquatic Macroinvertebrates

Within two years of license issuance, the Licensee shall develop an aquatic macroinvertebrate monitoring plan in consultation with USFS, CDFW, USFWS, and the State Water Board. The Licensee shall provide the Deputy Director with any comments provided by the agencies during the consultation process. The Licensee shall submit the plan to the Deputy Director for review and approval after agency consultation. The Licensee shall provide the Deputy Director with at least 90 days to review and approve the 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 plan modifications, with the Commission.

Method: The Licensee shall use a method developed in consultation with USFS, CDFW, USFWS, and the State Water Board. The results shall be compared to an aquatic health index approved by the Deputy Director.

Locations: At a minimum, the following sites shall be included:

8.B.1. Rubicon River below Rubicon Reservoir Dam (RR-I3).

8.B.2. Gerle Creek below Loon Lake Reservoir Dam (LL-I2).

8.B.3. Gerle Creek below Gerle Reservoir Dam (impaired reach) (GC-I2).

8.B.4. SF Rubicon River below Robbs Peak Reservoir Dam (RPD-I2).

8.B.5. SF Silver Creek below Ice House Reservoir Dam (impaired reach) (IH-I2).

8.B.6. Silver Creek below Junction Reservoir Dam (JD-I1 and JD-I2).

8.B.7. Silver Creek below Camino Reservoir Dam (CD-I2 and CD-I3).

8.B.8. SF American River below Slab Creek Reservoir Dam (SC-I2).

Reference streams that were sampled as part of the macroinvertebrate monitoring program during the relicensing shall be incorporated into the Monitoring Program if the Deputy Director so determines. Reference sites may be substituted upon approval by the Deputy Director.

Timing: Years 5, 6, 10, 11, 15, 16, and thereafter for two consecutive years every 10 years for the term of the license and extensions.

Attachment 2
U.S. Department of Agriculture, Forest Service section 4 (e)
Condition for the UARP

Condition No. 31 Aquatic Macroinvertebrates

Within 2 years of license issuance, the licensee shall develop an aquatic macroinvertebrate monitoring plan in consultation with FS, CDFG, FWS, and SWRCB. The licensee shall provide FS, CDFG, FWS, and SWRCB a 90-day review and approval period for the monitoring plan prior to implementation. The licensee shall implement the plan upon approval.

Method: A method accepted by FS, CDFG, FWS, and SWRCB. The results shall be compared to an aquatic health index approved by FS, CDFG, FWS, and SWRCB. The following sites shall be included:

Rubicon River below Rubicon Reservoir Dam (RR-I3).

Gerle Creek below Loon Lake Reservoir Dam (LL-I2).

Gerle Creek below Gerle Reservoir Dam (impaired reach) (GC-I2).

South Fork Rubicon River below Robbs Peak Reservoir Dam (RPD-I2).

South Fork Silver Creek below Ice House Reservoir Dam (impaired reach) (IHI2).

Silver Creek below Junction Reservoir Dam (JD-I1 and JD-I2).

Silver Creek below Camino Reservoir Dam (CD-I2 and CD-I3).

SFAR below Slab Creek Reservoir Dam (SC-I2).

Reference streams that were sampled as part of the macroinvertebrate monitoring program during the relicensing shall be incorporated into the monitoring program if FS, CDFG, FWS, and SWRCB determine they are necessary. Reference sites may be substituted upon approval by FS, CDFG, FWS, and SWRCB.

Frequency: Years 5, 6, 10, 11, 15, 16, and thereafter for 2 consecutive years during every 10 years for the term of the license.

Rationale: Compare sites to reference reaches to ensure they have improvement if impaired or maintenance if not (California Energy Commission IBI).

Attachment 3
U.S. Department of Agriculture, Forest Service section 4 (e)
Condition No. 14 for the Slab Creek Flow Facility Project License Amendment

Condition No. 14 – South Fork American River Gravel Augmentation Plan

Prior to undertaking any activities on National Forest System lands, licensee shall complete a South Fork American River Gravel Augmentation Plan that is approved by FS. Licensee shall submit the plan to FS at least 180 days prior to undertaking activities on National Forest System lands. The plan shall be developed in consultation with FS, CDFW, FWS, and SWRCB. The plan shall include measures to enhance trout spawning habitat in the ¼-mile reach between Slab Creek Reservoir Dam and the new Slab Creek Flow Facility. The plan shall focus on increasing the amount of spawning gravel in the 600-foot segment between the large pool and new powerhouse. The size of the gravel pile is expected to be 200-300 cubic yards; its replenishment frequency will be determined by the results of annual monitoring of the pile size and gravel distribution in the 600-foot section of the SFAR. The plan shall also include a proposal for introducing gravel and monitoring of gravel entrainment and distribution, water quality (in-situ and chemistry), benthic macroinvertebrate (BMI), algae, and fish population monitoring sites within the ¼-mile reach, thereby augmenting the monitoring sites already established for the same resources throughout the UARP. Once the plan is approved by FS, it shall be filed with FERC.

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157 FERC ¶ 62,190

UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

Sacramento Municipal Utility District Project No. 2101-135

ORDER MODIFYING AND APPROVING AQUATIC MACROINVERTEBRATE MONITORING PLAN

(Issued December 13, 2016)

1. On November 1, 2016, Sacramento Municipal Utility District, licensee for the Upper American River Hydroelectric Project No. 2101, filed an Aquatic Macroinvertebrate Monitoring Plan with the Federal Energy Regulatory Commission (Commission), pursuant to Article 401(a) of the 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. The project occupies, in part, federal lands administered by the U.S. Forest Service (Forest Service).

Background

2. Article 401(a), in part, requires the licensee to file, for Commission approval, an Aquatic Macroinvertebrate Monitoring Plan (Plan) within 28 months of license issuance, or November 23, 2016. The Plan is also required by condition no. 8(b) of the project's Water Quality Certification (WQC) and condition no. 31.2 of the Forest Service's 4(e) conditions.[2] Further, condition no. 14 of the project's revised Forest Service's conditions incorporated into the license by the Commission's November 9, 2016 Order Amending License, Revising Project Description and Approving Exhibit F Drawings,[3] requires aquatic macroinvertebrate monitoring as part of a required South Fork Gravel Augmentation Plan.[4] Therefore, the licensee's Plan is not only intended to satisfy the

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

[2] The WQC and the Forest Service 4(e) conditions were incorporated into the project license via appendices A and B, respectively.

[3] 157 FERC ¶ 62,106.

[4] The South Fork Gravel Augmentation Plan was approved by the Commission in *(continued ...)*

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aforementioned requirements, but also the aquatic macroinvertebrate monitoring component of revised 4(e) condition no. 14 and approved South Fork Gravel Augmentation Plan. The intent of the Plan is to document changes in character or composition of aquatic or benthic macroinvertebrate assemblages following the implementation of the new stream flow regimes, as licensed. The primary means of doing this would involve monitoring established sites and then utilizing an aquatic ecosystem health index to evaluate changes over time.

3. The licensee must develop the Plan in consultation with the California State Water Resources Control Board (California WRCB), Forest Service, U.S. Fish and Wildlife Service (FWS), and the California Department of Fish and Wildlife (California DFW) and receive approval of the Plan from the California WRCB and Forest Service.

Licensee's Plan

4. The licensee's Plan includes provisions to monitor benthic macroinvertebrate assemblages and water quality, as well as assess benthic macroinvertebrate habitat at 11 sites within the project area. In order to effectively compare pre- and post-license conditions, the licensee proposes to conduct monitoring at some of the same sites that it completed its pre-licensing benthic macroinvertebrate studies at in 2002 and 2003. Sampling would occur in 2019, 2020, 2024, 2025, 2029 and 2030 and thereafter for two consecutive years every 10 years for the term of the license. The licensee would employ the Surface Water Ambient Monitoring Program (SWAMP) protocol when monitoring, as recommend by the consulting agencies, described below.

5. At each site, the licensee would establish a series of transects (11 total) and alternate sampling between the left, center, and right positions of the transect. Once the samples are collected and preserved, the licensee would have the samples analyzed in a laboratory and identified to family level. For quality control purposes, the licensee would send 10 percent of its samples to the California DFW for analysis. Using the lab results, the licensee would then calculate the index of biotic integrity for each site using metrics previously agreed upon by the licensee and consulting agencies.

6. At each monitoring site, the licensee would take in-situ water quality measurements per the SWAMP protocol including water temperature, pH, specific conductance, alkalinity, and dissolved oxygen. Additionally, the licensee would georeference the sampling sites and record elevation, gradient and stream discharge.

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ordering paragraph (H) of its November 9, 2016 order.

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7. With regard to habitat assessment, the licensee would collect the following data at each transect within the monitoring sites: wetted width; depth; estimated bankfull width and depth; percent habitat type; canopy cover; pebble count; percent cobble embeddedness; presence or absence of algae, macrophytes, and coarse particulate organic matter; characterize riparian vegetation; evaluate instream complexity and bank stability; and photograph from upstream and downstream points within the transects.

8. The licensee would present its monitoring results at the Annual Review of Ecological Conditions meeting with the FWS, Forest Service, California DFW and California WRCB, which is held by April 1. At least 2 weeks prior to the meeting, the licensee would provide its monitoring report to the agencies to review. The report would include a description of monitoring efforts undertaken during the previous calendar year. The results of all monitoring efforts would be also included, as well as a discussion of current benthic macroinvertebrate assemblages and any trends as they relate to potential project impacts. The licensee would discuss the report with the agencies at the meeting. Following the meeting, the licensee would give the agencies 30 days to provide additional comments on the draft report before finalizing it and filing it, along with any agency comments, with the Commission by June 1 of the year following monitoring. Under this schedule, the first report would be filed with the Commission by June 1, 2020.

Agency Consultation

9. The licensee provided the Plan to the resource agencies for review on July 23, 2016. The California DFW provided comments and the licensee revised its Plan to address them. By letters dated October 17, 2016, the Forest Service and California WRCB approved the Plan.

Discussion and Conclusions

10. The activities described in the licensee's Plan should provide valuable information regarding the composition and health of the benthic macroinvertebrate community in the project area, as well as the quality of habitat available to these organisms. By collecting this data at sites that were monitored prior to the implementation of the new flow regime, the licensee should be able to assess the response of the benthic macroinvertebrate community to the new flow regime and determine whether any changes to the flow regime are necessary over the course of the license. The reporting component of the Plan should ensure that the licensee is in regular contact with the resource agencies regarding the implementation and findings of the Plan, which should provide a solid foundation for any flow management discussions that could arise in the future resulting from this Plan. Further, the reports that the licensee proposes to file with the Commission should keep the Commission apprised of activities taking place under the Plan as well as the effect that the new flow regime is having on the benthic macroinvertebrate community in the project area. The Plan was developed in consultation with the necessary resource

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agencies and meets the agencies' needs. Inasmuch, the Plan meets the requirements of the aforementioned requirements and should be approved. We note, however, that the Commission should reserve the right to require additional monitoring based on the monitoring results.

The Director orders:

(A) Sacramento Municipal Utility District's Aquatic Macroinvertebrate Monitoring Plan (Plan), filed November 1, 2016, pursuant to Article 401(a) of the license for the Upper American River Hydroelectric Project No. 2101, as modified in ordering paragraph B, is approved.

(B) The Commission reserves the right to require additional monitoring based on the results of monitoring conducted under the Plan.

(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. § 825*l* (2012), and the Commission's regulations at 18 C.F.R. § 385.713 (2016). 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.

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

Document Content(s)