

Hardhead Monitoring Plan

Sacramento Municipal Utility District

Hydro License Implementation • May 2016

Upper American River Project

FERC Project No. 2101



TABLE OF CONTENTS

1.0 INTRODUCTION AND BACKGROUND	3
2.0 MONITORING PLAN OBJECTIVES	3
3.0 MONITORING SITES AND FREQUENCY	4
3.1 Monitoring Sites	4
3.2 Monitoring Frequency	6
4.0 METHODS	6
4.1 Field Surveys	6
4.1.1 Snorkel Surveys	6
4.2 Analysis.....	7
5.0 REPORTING	7
6.0 LITERATURE CITED.....	8

LIST OF TABLES

Table 1. Slab Creek Dam Reach Hardhead Monitoring Sites	4
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LIST OF FIGURES

Figure 1. Hardhead monitoring locations for the Slab Creek Dam Reach of the South Fork American River	5
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LIST OF APPENDICES

Attachment 1 State Water Resources Control Board section 401 Water Quality Certification for the UARP.....	9
Attachment 2 U.S. Department of Agriculture, Forest Service section 4 (e) Condition for the UARP.....	11

Acronyms and Abbreviations

Acronym	Definition
BLM	U.S. Bureau of Land Management
CDFW	California Department of Fish and Wildlife
FERC	Federal Energy Regulatory Commission
GPS	Global Positioning System
mm	millimeters
PG&E	Pacific Gas and Electric Company
RWQCB	Regional Water Quality Control Board
SFAR	South Fork American River
SMUD	Sacramento Municipal Utility District
SWRCB	State Water Resources Control Board
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 Hardhead Monitoring Plan (Plan) addresses monitoring set forth in the State Water Resources Control Board (SWRCB) section 401 Water Quality Certification, Condition 8.A of Appendix A of the new license order (FERC 2014), and the U.S. Department of Agriculture, 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). Attachments 1 and 2 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 objective of this Plan is to evaluate the longitudinal distribution of hardhead (*Mylopharodon conocephalus*) following implementation of the 2014 modified flow regime in the South Fork American River (SFAR) downstream of Slab Creek Dam. Specifically, this Plan will provide information on the spatial distribution, abundance, and size distribution of hardhead. Results of the Plan will be compared to data collected during previously conducted relicensing and post-application studies.

This Plan is being prepared in advance of, and separately from, the Fish Population Monitoring Plan described in the aforementioned Conditions. This is due to an inconsistency in the License Condition schedules that specify hardhead surveys are to begin in late summer/early fall of Year 2 (i.e., 2016), yet the Fish Population Monitoring Plan is not due to the Federal Energy Regulatory Commission (FERC) until November 28, 2016. Given the remaining details to develop the Fish Population Monitoring Plan, this Plan was developed and provided to the Resource Agencies (i.e., CDFW, USFS, U.S. Fish and Wildlife Service [USFWS], and SWRCB) for review and comment in advance of hardhead sampling planned for late summer/early fall 2016. Following USFS and SWRCB approval, this Plan will be filed with FERC. Accordingly, the Fish Population Monitoring Plan will address trout specifically, and will be developed in consultation with the Resource Agencies, submitted for USFS and SWRCB approval, and filed with FERC within 28 months (i.e., November 2016) of License issuance.

3.0 MONITORING SITES AND FREQUENCY

3.1 MONITORING SITES

Hardhead monitoring under this Plan is focused on sampling at locations previously surveyed during relicensing because these sites facilitate comparability to conditions present prior to implementation of the new flow regime. Relicensing electrofishing surveys conducted in 2002 and 2003 established the presence of numerous species in the Slab Creek Reach, including rainbow trout (*Oncorhynchus mykiss*), brown trout (*Salmo trutta*), riffle sculpin (*Cottus gulosus*), prickly sculpin (*Cottus asper*), Sacramento sucker (*Catostomus occidentalis*), hardhead, Sacramento pikeminnow (*Ptychocheilus grandis*), California roach (*Lavinia symmetricus*), speckled dace (*Rhinichthys osculus*), green sunfish (*Lepomis cyanellus*), and smallmouth bass (*Micropterus dolomieu*) (DTA and Stillwater Sciences 2005). More spatially comprehensive snorkel studies for hardhead were subsequently conducted during 2004 (DTA and Stillwater Sciences 2005) and 2007 (Stillwater Sciences 2008) to determine their longitudinal distribution in this reach. These hardhead surveys included 14 snorkeling sites that extended upstream from above White Rock Creek to above Mosquito Bridge.

License Conditions (Attachments 1 and 2) specify that snorkeling surveys for hardhead shall be conducted from immediately downstream of Mosquito Road Bridge down to and including site SCD-F2. Therefore, hardhead monitoring for this Plan will be conducted at six of the previously surveyed sites mentioned above between Mosquito Road Bridge and Rock Creek. Hardhead monitoring site names and locations are listed in Table 1 and shown in Figure 1.

Table 1. Slab Creek Dam Reach Hardhead Monitoring Sites

Site Name	UTM Coordinates Easting/Northing ¹	Number of Habitat Units Previously Sampled	Habitat Unit Types Previously Sampled	River Mile ²	Notes
Slab 5 ³	0693056/ 4295078	2	Run, Pool	2.25	Above Rock Creek
Slab 6	0693533/ 4295058	2	Pool, Run	2.50	Below Mosquito Creek
Slab 7	0694018/ 4294468	3	Run, Run, Pool	3.00	
Slab 8	0694462/ 4294766	3	Run, Run, Pool	3.40	
Slab 9	0694723/ 4294477	2	Run, Pool	3.70	Below Mosquito Bridge
Slab 10	0695478/ 4294159	3	Pool, Run, Pool	4.20	

¹ Universal Transverse Mercator (UTM) coordinates, North American Datum 1983 (NAD 83)

² Number of miles above Chili Bar Reservoir

³ Includes the area covered in Site SCD-F2

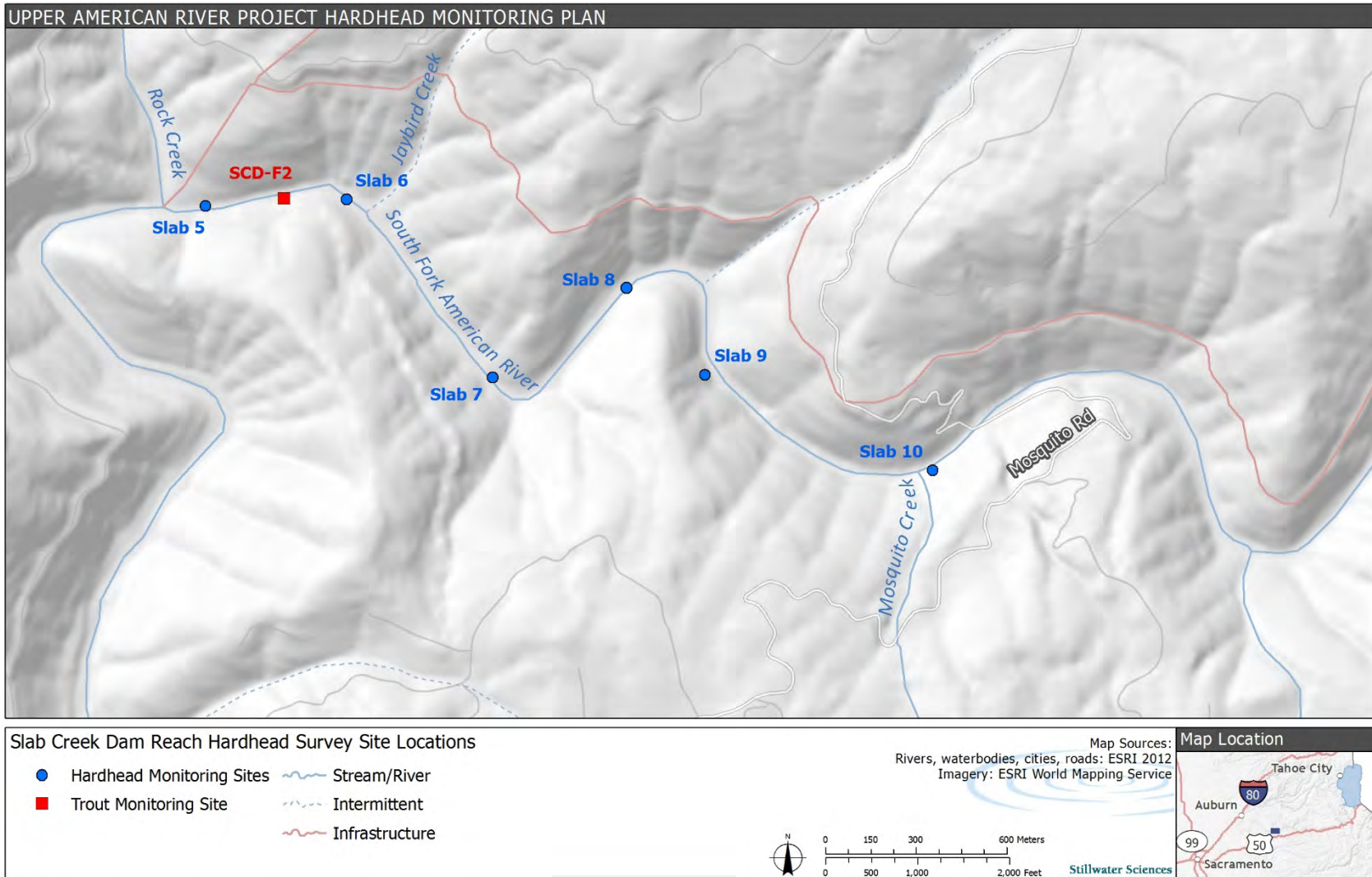


Figure 1. Hardhead monitoring locations for the Slab Creek Dam Reach of the South Fork American River

3.2 MONITORING FREQUENCY

Hardhead surveys will be conducted in years 2, 3, 5, 6, 10, 11, 15, 16 (i.e., 2016, 2017, 2019, 2020, 2024, 2025, 2029, 2030), and thereafter for 2 consecutive years during every 10 years for the term of the license and any extensions.

4.0 METHODS

Hardhead monitoring methods described herein are intended to be consistent with those used during relicensing studies wherever possible (DTA and Stillwater Sciences 2005, Stillwater Sciences 2008). All sites will be surveyed during late summer/early fall (targeting August, to maximize comparability to 2007 survey timing) using snorkeling methods.

4.1 FIELD SURVEYS

4.1.1 Snorkel Surveys

Daytime single-pass snorkel surveys will be consistent with procedures described in Thurow (1994) and Dolloff et al. (1996). Each site will include several habitat types considered representative of the local channel conditions (e.g., riffle, run, glide, pool). The extent of each site will be determined in the field using a handheld global positioning system (GPS) device, coordinates from the relicensing surveys (Table 1), and photographs (where available) of the sites taken during previous sampling efforts. Habitat units within the site will be sampled in their entirety; for example, surveys will begin at the downstream end of the habitat unit and terminate at the upstream end of the habitat unit.

The field crew will consist of three to five snorkelers, depending on stream width. Each person snorkeling will be positioned in lanes parallel to one another across the width of the stream. Lane width will be determined on-site, depending on visibility and habitat complexity. Prior to sampling, observers will calibrate estimated fish lengths by viewing variably sized objects of known lengths underwater. Stream visibility will be determined using a Secchi disk and estimated by the average of horizontal measurements obtained looking into and away from the sun. Divers will enter the stream downstream from the area to be sampled and briefly rest to acclimate and allow any fish in the area to resume normal behavior. Snorkeling will typically be conducted in the upstream direction, with divers moving in a zig-zag pattern within their lane in an effort to enumerate all fish present. In shallow-water habitats with fast velocities, divers will proceed upstream by pulling themselves along the substrate. If stream flow does not permit snorkeling upstream, surveyors will move as slowly as possible in the downstream direction, taking care not to startle fish.

Snorkelers will identify and count fish observed in their lane while moving upstream at a slow, even, and uniform pace. Fish will be counted as they pass below or to the side of

each observer. Fish total length will be visually estimated by each observer, and each fish assigned to a particular size class (e.g., 25–50 millimeters [mm], 50–75 mm, 75–100 mm, ... 250–300 mm, 300–350 mm). Fish will be identified to species, estimated to size class, and the data recorded on a dive slate. Snorkelers will communicate as best as possible in an effort to avoid potential double-counting.

Directly following each survey, start and end times will be noted, data on the dive slates will be transcribed to a data sheet, and site information will be recorded. General site information will include: stream name, reach, site name, unit number, habitat type, site length, average site width, substrate composition, percent cover, crew member names, time of day, environmental (weather) conditions, underwater visibility, water chemistry (i.e., average water temperature, dissolved oxygen, and conductivity), and GPS location. Photographs will also be taken to document the specific location and condition of the site.

4.2 ANALYSIS

Data collected during hardhead studies will be entered into a database for data reduction, tabulation, and summary. Abundance, size distribution, and spatial distribution for all species observed will be evaluated at each site. Data collected in this study will be compared with data collected during relicensing studies to determine changes in longitudinal distribution and other parameters (where possible) over time (e.g., DTA and Stillwater Sciences [2004] and Stillwater Sciences [2008]).

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, FWS, and SWRCB) to review and discuss the results of implementing this Plan (FERC 2014).

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 hardhead monitoring will be provided in the Project reports and will include a discussion of the current hardhead populations. Trends observed and possible relationships to the modified flow regime will be discussed, as applicable. 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.

6.0 LITERATURE CITED

Dolloff, A., J. Kershner, and R. Thurow. 1996. Underwater observation. Pages 533–554 in B. R. Murphy and D. W. Willis, editors. Fisheries techniques, 2nd edition. American Fisheries Society, Bethesda Maryland.

DTA (Devine Tarbell & Associates) and Stillwater Sciences. 2005. Stream Fisheries Technical Report. Prepared for SMUD (Sacramento Municipal Utility District) and PG&E (Pacific Gas and Electric Company) by Stillwater Sciences, Berkeley, California.

FERC (Federal Energy Regulatory Commission). 2014. Federal Energy Regulatory Commission Order 148 FERC ¶ 62,070 Issuing New License for the Sacramento Municipal Utility District Upper American River Hydroelectric Project No. 2101. Issued July 23, 2014.

Stillwater Sciences. 2008. Technical Report of the 2007 Slab Creek Dam Reach Fish Distribution Study. December 2008.

Thurow, R. F. 1994. Underwater Methods for Study of Salmonids in the Intermountain West. USFS Intermountain Research Station, United States Forest Service.

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

Condition 8.A Fish Populations

Within two years of license issuance, the Licensee shall develop a fish population monitoring plan in consultation with USFS, CDFW, USFWS, and the State Water Board that incorporates, at a minimum, the elements detailed below. 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 any comments provided by the agencies during the consultation process. 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 conduct electro-fishing and/or snorkeling surveys (in the same manner as the studies conducted in 2002-2003 by the Licensee) during late summer/fall for: 1) brown trout in Gerle Creek below Loon Lake Reservoir Dam Reach only; 2) hardhead sampling in SF American River below Slab Creek Reservoir Dam Reach only; and 3) rainbow trout at all stations listed below.

Locations: The sampling locations are as follows:

- 8.A.1. Rubicon River below Rubicon Reservoir Dam (upper and lower sample section of sites RRD-F1 and RRD-F2).
- 8.A.2. Little Rubicon River below Buck Island Reservoir Dam (upper sample section of site BID-F1).
- 8.A.3. Gerle Creek below Loon Lake Reservoir Dam (upper and lower sample section of sites LLD-F1 and LLD-F2).
- 8.A.4. Gerle Creek below Gerle Creek Reservoir Dam (upper and lower sample section of site GCD-F1).
- 8.A.5. SF Rubicon River below Robbs Peak Reservoir Dam (upper and lower sample section of site RPD-F1).
- 8.A.6. SF Silver Creek below Ice House Reservoir Dam (upper and lower sample section of sites IHD-F1 and IHD-F2).
- 8.A.7. Silver Creek below Junction Reservoir Dam (upper and lower sample section of site JD-F1).
- 8.A.8. Silver Creek below Camino Reservoir Dam (upper and lower sample section of site CD-F1). Surveyed once every 10 years after license issuance.)
- 8.A.9. Brush Creek below Brush Creek Reservoir Dam (site BCD-F1). (This site shall be surveyed once every 10 years after license issuance.)
- 8.A.10. SF American River below Slab Creek Reservoir Dam (electro-fishing at upper and lower sample section of site SCD-F2). Hardhead

snorkeling shall be conducted from immediately downstream of Mosquito Road Bridge up to and including site SCD-F2.

Timing: Rainbow trout and brown trout: Years 5, 6, 10, 11, 15, 16, and thereafter for two consecutive years every 10 years for the term of the license and any extensions.
Hardhead: Years 2, 3, 5, 6, 10, 11, 15, 16 and thereafter for two consecutive years every 10 years for the term of the license and any extensions.

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

Condition No. 31 Fish Populations

Within 2 years of license issuance, the licensee shall develop a fish population 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: Electrofishing and/or snorkeling (as conducted in 2002-2003 by the licensee) during late summer/fall for rainbow trout at all stations listed below, brown trout in the Gerle Creek below Loon Lake Reservoir Dam Reach only, and hardhead sampling in SFAR below Slab Creek Reservoir Dam Reach only:

- Rubicon River below Rubicon Reservoir Dam (upper and lower sample section of sites RRD-F1 and RRD-F2).
- Little Rubicon River below Buck Island Reservoir Dam (upper sample section of site BID-F1).
- Gerle Creek below Loon Lake Reservoir Dam (upper and lower sample section of sites LLD-F1 and LLD-F2).
- Gerle Creek below Gerle Creek Reservoir Dam (upper and lower sample section of site GCD-F1).
- South Fork Rubicon River below Robbs Peak Reservoir Dam (upper and lower sample section of site RPD-F1).
- South Fork Silver Creek below Ice House Reservoir Dam (upper and lower sample section of sites IHD-F1 and IHD-F2).
- Silver Creek below Junction Reservoir Dam (upper and lower sample section of site JDF1).
- Silver Creek below Camino Reservoir Dam (upper and lower sample section of site CDF1).
- Brush Creek below Brush Creek Reservoir Dam (site BCD-F1). This site shall be surveyed once every 10 years after license issuance.
- SFAR below Slab Creek Reservoir Dam (electrofishing at upper and lower sample section of site SCD-F2). Hardhead snorkeling shall be conducted from immediately downstream of Mosquito Road Bridge to and including site SCD-F2.

Frequency: Rainbow trout and brown trout: Years 5, 6, 10, 11, 15, 16, and thereafter for 2 consecutive years during every 10 years for the term of the license. Hardhead: Years 2, 3, 5, 6, 10, 11, 15, 16 and thereafter for 2 consecutive years during every 10 years for the term of the license.

Rationale: Sampling for 2 years in the beginning of each 5-year period provides a mean of 2 years for comparison to the ecological resource biomass objectives and reduces electroshocking effects to individuals, with sufficient response time to the new streamflow regimes. Hardhead sampling in years 2 and 3 will provide evaluation of initial response to the new flow regime.

156 FERC ¶ 62,118
UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

Sacramento Municipal Utility District

Project No. 2101-132

ORDER APPROVING HARDHEAD MONITORING PLAN AS PART OF THE FISH
POPULATION MONITORING PLAN UNDER LICENSE ARTICLE 401(a)

(Issued August 12, 2016)

1. On July 23, 2016, Sacramento Municipal Utility District, licensee for the Upper American River Hydroelectric Project No. 2101, filed a Hardhead Monitoring Plan (Plan) pursuant to Article 401(a) of the project license. 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.

License Requirement

2. Article 401(a), in part, requires the licensee to file, for Commission approval, a Fish Population Monitoring Plan within 28 months of license issuance (by November 23, 2016).¹ The Plan is also required by the project's Water Quality Certification (WQC), condition 8.A issued by the California State Water Resources Control Board (SWRCB); U.S. Forest Service's (Forest Service) 4(e) condition 31.1; and section 4.12.1 of the Upper American River Project Relicensing Settlement Agreement.² These requirements specify that the plan must be developed in consultation with the Forest Service, California Department of Fish and Wildlife (California DFW), U.S. Fish and Wildlife Service (FWS), and the SWCB and must include specific elements described in the WQC and 4(e) conditions. One of the specified components to be included in the Fish Population Monitoring Plan is sampling of hardhead (*Mylopharodon conocephalus*) in the South Fork American River below Slab Creek Reservoir Dam.

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

² The SWRCB's water quality certification was incorporated into the project license by ordering paragraph (D) and attached to the license as Appendix A. The Forest Service 4(e) conditions are incorporated into the license by ordering paragraph (E) and are attached to the license as Appendix B.

3. In addition, the WQC and the 4(e) conditions require that hardhead sampling occur during years 2, 3, 5, 6, 10, 11, 15, 16 and thereafter for two consecutive years every 10 years for the term of the license and any extensions.

Licensee's Plan

4. The licensee's plan only addresses the hardhead monitoring component that is required to be included in the Fish Population Monitoring Plan. The licensee states that the requirement to file the Fish Population Monitoring Plan by November 23, 2016 would occur too late to conduct hardhead sampling during the second year of license issuance as required by the conditions. As such, the licensee filed a subset of the plan that is specific to hardhead sampling so that it can conduct the study during August/September of 2016 to fill that requirement.³

5. The licensee states that the objective of the plan is to evaluate the longitudinal distribution of hardhead following the implementation of the license directed modified flow regime below the Slab Creek dam. This flow regime was implemented in 2014.⁴

6. The licensee proposes to sample at locations previously surveyed during the project relicensing so that comparisons can be made regarding hardhead distribution prior to and after the implementation of the new flow regime below the Slab Creek dam. The licensee would survey six previously surveyed locations between the Mosquito Road Bridge and Rock Creek. Sampling would occur in August /September time frame to maximize comparability to previous studies.

7. The license proposes to conduct snorkeling surveys at each of the six locations using two to three snorkelers running parallel lanes across the width of the river. The extent of each survey would be documented using a handheld global positioning system. Observations would occur in various habitats represented in each survey reach. Snorkelers will identify fish species, estimate predetermined size class, and communicate with each other to reduce double counting. Data consisting of substrate type, percent

³ The licensee's filing states that it will file the remainder of the plan related to the monitoring of trout species as described in the conditions, by the November 23, 2016 due date.

⁴ Proposed Article 1-1 of the settlement agreement, condition 1K of the WQC and condition 27 of the Forest Service 4(e) conditions, require the licensee to release specified minimum flows based on month and water year type for each project development.

cover, environmental conditions, visibility, and water quality, among others, will be collected at each location. Comparison to data collected through this monitoring plan would be compared to the data collected in the relicensing studies to determine if any changes in hardhead distribution or abundance had occurred.

8. The licensee proposes to schedule an Annual Review of Ecological Conditions Meeting with the SWRCB, California DFW, Forest Service and FWS by April 1 to review and discuss the results of its implementation of this and other plans. The licensee would then file an annual report with the Commission by June 30 after the resource agencies have had 30 days to review the report.

Agency Consultation

9. As required by the mandatory conditions, the licensee provided its draft Plan to the settlement signatories on February 10, 2016 for review and comment.⁵ The group was allowed 30 days to review and comment on the Plan prior to its distribution to the resource agencies for a 90 day review period. Article 401(a) of the project license requires that the licensee include approval of its Plan from the SWRCB and/or Forest Service, as appropriate. By letter dated June 13, 2016, the Forest Service approved the licensee's Plan. By letter dated July 19, 2016, the SWRCB also approved the Plan.⁶

Discussion and Conclusion

10. The licensee's Plan was filed as a part of the Fish Population Monitoring Plan required by Article 401(a), WQC condition 8.A, and 4(e) condition 31.1. In order for the licensee to conduct hardhead sampling beginning in the second year after license issuance, the licensee has filed a Hardhead Monitoring Plan prior to filing its Fish Population Monitoring Plan. The licensee's Plan describes the monitoring effort it plans to conduct during August/September 2016 to evaluate the longitudinal distribution of hardhead in the South Fork American River below Slab Creek Reservoir Dam.

⁵ Signators of the Settlement Agreement are: the licensee, American Whitewater, American River Recreation Association, U.S. Bureau of Land Management, California Parks and Recreation, California DFW, California Outdoors, California Sportfishing Protection Alliance, Camp Lotus, Foothill Conservancy, Forest Service, Friends of the River, FWS, Interior, U.S. National Park Service, Pacific Gas and Electric, Rich Platt, Hilde Schweitzer, Theresa Simsiman.

⁶ The SWRCB also filed its approval letter with the Commission on July 25, 2016.

Project No. 2101-132

- 4 -

Comparison of this data to data collected prior to the new flow regime required by the license will assist in determining if the new flow regime is having an impact on hardhead and other fishes in that river reach. The licensee's Plan fulfills the hardhead monitoring component of the Fish Population Monitoring Plan required by Article 401 (a), WQC condition 8A of Appendix A., and 4(e) condition 31.1, Appendix B of the project license; therefore, the licensee's Plan should be approved.

The Director orders:

(A) Sacramento Municipal Utility District's Hardhead Monitoring Plan, filed on July 23, 2016 as a component of the Fish Population Monitoring Plan under Article 401 (a), WQC condition 8A of Appendix A, and 4(e) condition 31.1, Appendix B of the license for the Upper American River Hydroelectric Project No. 2101, is approved.

(B) 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. § 825l (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-2101-132.DOC.....1-4