

Block of Water Plan

Sacramento Municipal Utility District

Hydro License Implementation • March 2016
Upper American River Project
FERC Project No. 2101



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1.0 Overview and Background

This Block of Water Plan (Plan) implements procedures set forth in the License issuance Order (FERC, 2014) for the Upper American River Project (SMUD et al., 2007), which is owned and operated by the Sacramento Municipal Utility District (SMUD). This Plan defines block of water releases to control water temperature in certain situations, as required in Condition 1.I of Appendix A and Condition 27 of Appendix B of the License issuance Order. Excerpts from these conditions are in Attachment A of this document.

The Project lies within El Dorado and Sacramento counties, primarily within lands of the Eldorado National Forest. The Project is on the American River watershed, and incorporates drainage from the South Fork American River, Rubicon River and Silver Creek sub-basins. The Project consists of three major storage reservoirs—Loon Lake, Union Valley and Ice House (with a combined capacity of 379,622 acre-feet), eight smaller regulating or diversion reservoirs, and eight powerhouses. SMUD began hydroelectric operations of the Project in 1961 and has an authorized generating capacity of 637.3 megawatts (MW).

2.0 Objectives

In “Wet” water type years, SMUD is required to provide temperature control as fish protection measures in two stream reaches of Silver Creek. To accomplish this, based on direction provided in this Plan, as developed in consultation with the State Water Resources Control Board (State Water Board), United States Forest Service (FS), California Department of Fish and Wildlife (CDFW), and United States Fish and Wildlife Service (FWS) (hereafter “Resource Agencies”), SMUD shall release water in addition to minimum instream release if the daily mean water temperatures in the applicable reaches exceed 20° C. This adaptive management measure objective is described in Condition 1.I of Appendix A of the License issuance Order (FERC, 2014, pp. 84-86):

“To assist the Licensee in maintaining required temperature control in the river reaches below Camino and Junction Reservoirs, the Licensee shall release up to two blocks of water per month in Wet years during July, August and/or September, for a potential total of six water blocks annually. The volume of water constituting a water block varies depending on the month of release.”

The temperature target and threshold is defined later in the Condition:

“The Licensee shall release each block of water as directed by the approved plan to maintain mean daily water temperatures of 20° C or below in the Junction Dam and Camino Dam reaches.”

Furthermore, SMUD shall notify applicable resource agencies and may be required to monitor for foothill yellow-legged frog (*Rana boylei*) (FYLF) if a temperature threshold is exceeded:

“The Licensee shall, promptly but not later than within 24 hours, notify the State Water Board, CDFW, USFWS, and USFS if the water temperatures in Silver Creek below Junction Reservoir Dam or below Camino Reservoir Dam exceed the 20° C water temperature objective.

If the water temperature objective is exceeded, the Licensee may be required to monitor for the presence of FYL frogs prior to and after the release of the water block according to the approved plan described above.”

3.0 Management Locations and Temperature Monitoring

The adaptive management conditions for block of water releases include two stream reaches: Silver Creek below Junction Reservoir and Silver Creek below Camino Reservoir. Continuous temperature monitoring stations have been installed at the downstream end of each reach to monitor the warmest waters of each. This data is telemetered and reviewed daily pursuant to the *Water Temperature Monitoring Plan* (SMUD, 2015a). Figure 1 shows monitoring locations in relation to nearby streams and reservoirs.

4.0 Water Release Methodology

Near-future water temperature is highly dependent on antecedent water temperature. In “Wet” water year types, a computer routine will obtain and process the relevant water temperature data each day at noon and notify SMUD License Implementation staff if the daily average of 20° C has been exceeded at the bottom of one of the two relevant reaches, and the utilization of the block of water is required.

Once it has been determined that the block of water is necessary, it will be released using the following schedule:

- Increase the minimum instream flow by 10 cfs for one calendar week.
- If the average water temperature during this period remains above 20° C, release an additional 5 cfs, for a total of 15 cfs above minimum instream flow for one calendar week. If the average water temperature over this time drops below 20° C, return to minimum instream flow.
- If the average water temperature during this period remains above 20° C, continue to release 15 cfs above minimum instream flow for calendar weeks of time until the 7-day average temperature is below 20° C, or the quantity allotted for the block of water has been exhausted.

See Figure 2 for a flowchart further demonstrating this release methodology. This schedule creates a cap of 15 cfs above minimum instream flow. This value was chosen after extensive consultation with Resource Agencies, as a compromise between mitigating water temperature and protecting the larval stage of FYLF, a USFS Sensitive species. Water temperature modeling as described in the *Water Temperature Technical Report* (SMUD, 2005a) and physical habitat modeling as described in the *Physical Habitat Simulation Technical Report* (SMUD, 2005b) guided the development of this schedule and 15 cfs cap.

SMUD will release this block of water accordingly until the monthly cap of water has been released. These caps are explicitly described in Appendix A of the License issuance Order, and are included in (Table 1) for convenience. Any additional water released above minimum streamflows to mitigate water temperature during a particular month will be included in the monthly cap.

Table 1: Adaptive Management Water Block Release Volumes for Water Temperature Management	
Month	Maximum Quantity (acre-feet)
July	1044
August	491
September	475

SMUD acknowledges that changes to the release schedule may be needed based on empirical evidence collected after measures in this Plan have been triggered and executed. The schedule included in this Plan will guide releases for the first few implementation events. After each year in which these measures have been implemented, SMUD will assess the effectiveness of this Plan and provide this assessment and suggested updates of the schedule to the Resource Agencies at the Annual Review of Ecological Conditions. The Plan may then be revised pursuant to Section 7 (below).

5.0 Notification Protocols

If the mean daily water temperature in either reach exceeds 20°C, notifications will be issued in two ways: an e-mailed notification to the Resource Agencies, and a follow-up formal letter to these resource agencies. The e-mail notification will occur within 1 business day of the exceedance day, and will include a short summary of the observed conditions and actions to follow.

If feasible, a courtesy e-mail will be issued to the above agencies in advance if SMUD expects the threshold to be reached. This notification will have a targeted issuance of one week before the anticipated date of the temperature threshold passage.

6.0 Ecological Monitoring

If a block of water release is anticipated to be triggered as described in Section 4, SMUD may be required to initiate FYLF monitoring pursuant to methodologies and appurtenant sites described in the *Amphibian and Aquatic Reptile Monitoring Plan* (SMUD, 2016). The schedule and frequency of monitoring that will occur will depend on the year:

- If the Block of Water Plan is utilized during a year in which surveys under the *Amphibian and Aquatic Reptile Monitoring Plan* are already on-going in these reaches and at least two surveys for FYLF have occurred with no evidence of FYLF breeding activity, SMUD is not required to conduct additional monitoring before and after block of water releases.
- In the event that FYLF breeding activity has been observed during earlier surveys in a given year (under the *Amphibian and Aquatic Reptile Monitoring Plan*), there will be two monitoring efforts associated with each flow event – one within five days prior to each predicted block of water release, and one within five days following each block of water release. SMUD may use information from surveys conducted under *Amphibian and Aquatic Reptile Monitoring Plan* to meet these requirements if the surveys occurred within the five day window prior to and following each block of water release and the surveys included tadpole counts (see below).
- If the particular year does not correspond with survey activities under the *Amphibian and Aquatic Reptile Monitoring Plan*, there may be two monitoring efforts associated with each flow event – one within five days prior to each predicted block of water release, and one within five days following each block of water release. If no evidence of FYLF breeding activity was observed during the pre-release surveys, SMUD is not required to conduct additional monitoring following the release. FYLF monitoring for this Plan will include counts (or estimates) of tadpoles at each breeding site and documentation of the spatial location (e.g., GPS point) of each group of tadpoles. Counts may be done using categories (e.g., 0-10, 10-50, 50-100, 100-200, 200-500, etc.). Surveys that follow block of water releases will also include areas of nearby habitat downstream of breeding sites, adjacent streambanks, and isolated side pools, to document tadpoles that may have been displaced or stranded.

- FYLF monitoring results for this Plan will be included in the Annual Review of Ecological Conditions. After three years in which block of water releases and FYLF monitoring have occurred, the need for continued FYLF monitoring related to the block of water releases will be discussed with the Resource Agencies.

7.0 Plan Revisions

If SMUD and the Resource Agencies collaboratively determine that revisions should be made to the Plan, SMUD will make any revisions to the Plan in coordination and consultation with the listed resource agencies. Any revisions to the Plan must be approved by the Resource Agencies. Any revisions shall be filed with FERC for approval prior to implementing.

8.0 Works Cited

FERC. (2014). *Order Issuing New License, FERC Project No. 2101-084*. Washington, D.C.: Federal Energy Regulatory Commission.

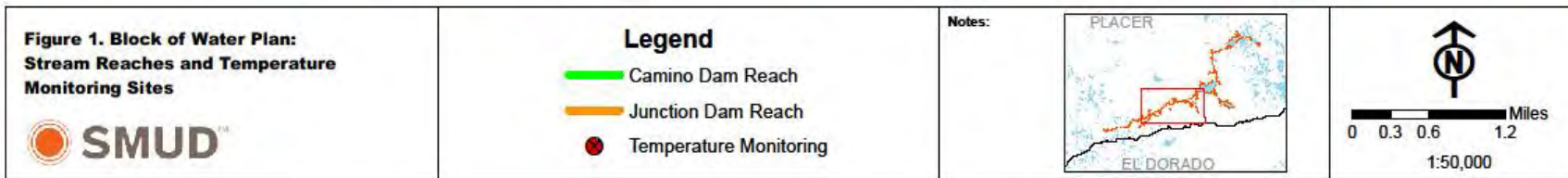
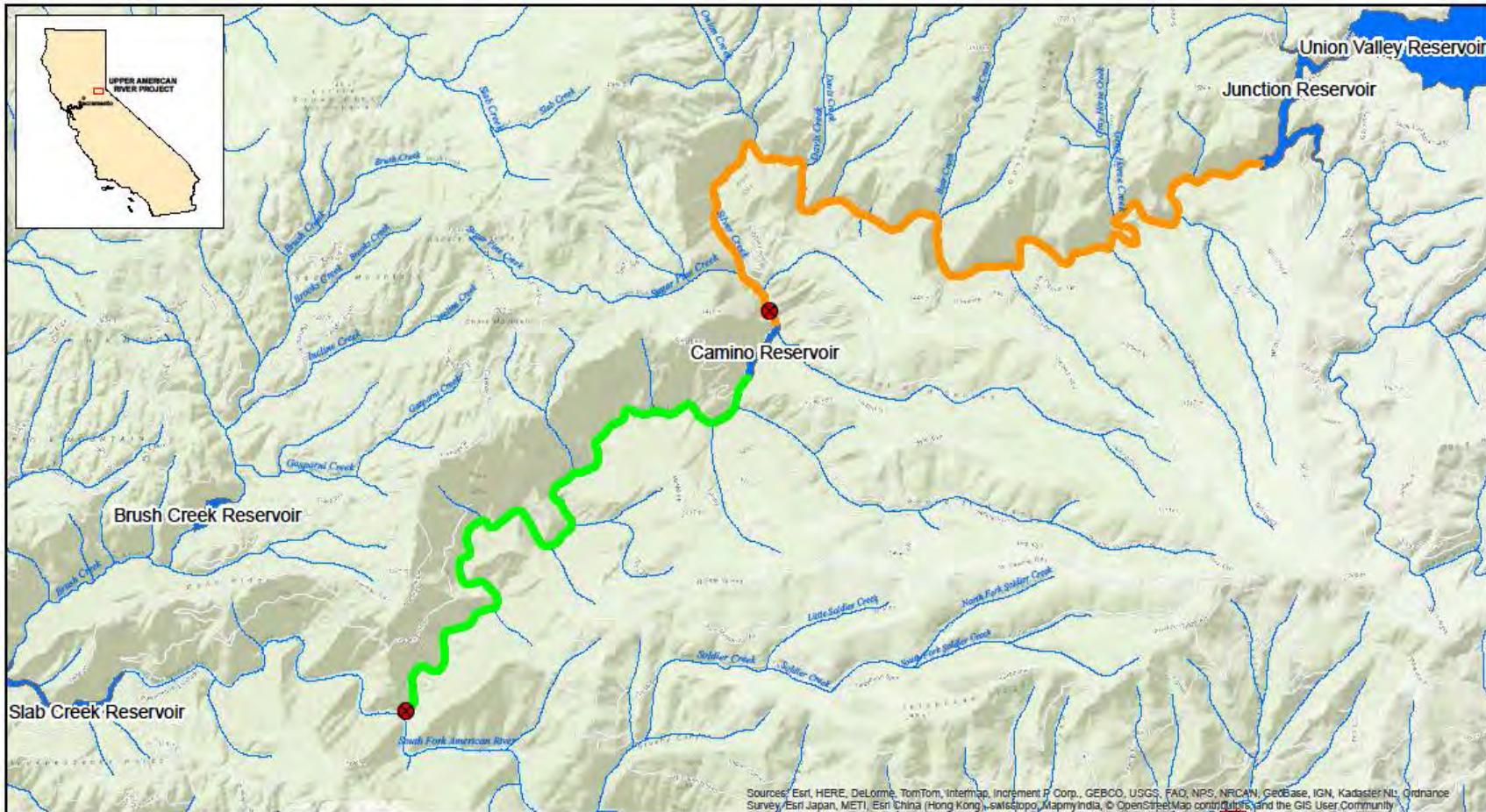
SMUD. (2005a). *Water Temperature Technical Report*. Sacramento: Sacramento Municipal Utility District.

SMUD. (2005b). *Physical Habitat Simulation Technical Report, Volume 1*. Sacramento: Sacramento Municipal Utility District.

SMUD. (2015a). *Water Temperature Monitoring Plan*. Sacramento: Sacramento Municipal Utility District.

SMUD. (2016). *Amphibian and Aquatic Reptile Monitoring Plan*. Sacramento: Sacramento Municipal Utility District.

SMUD et al. (2007, January). *Relicensing Settlement Agreement for the Upper American River Project and Chili Bar Hydroelectric Project*. Sacramento, Calif.



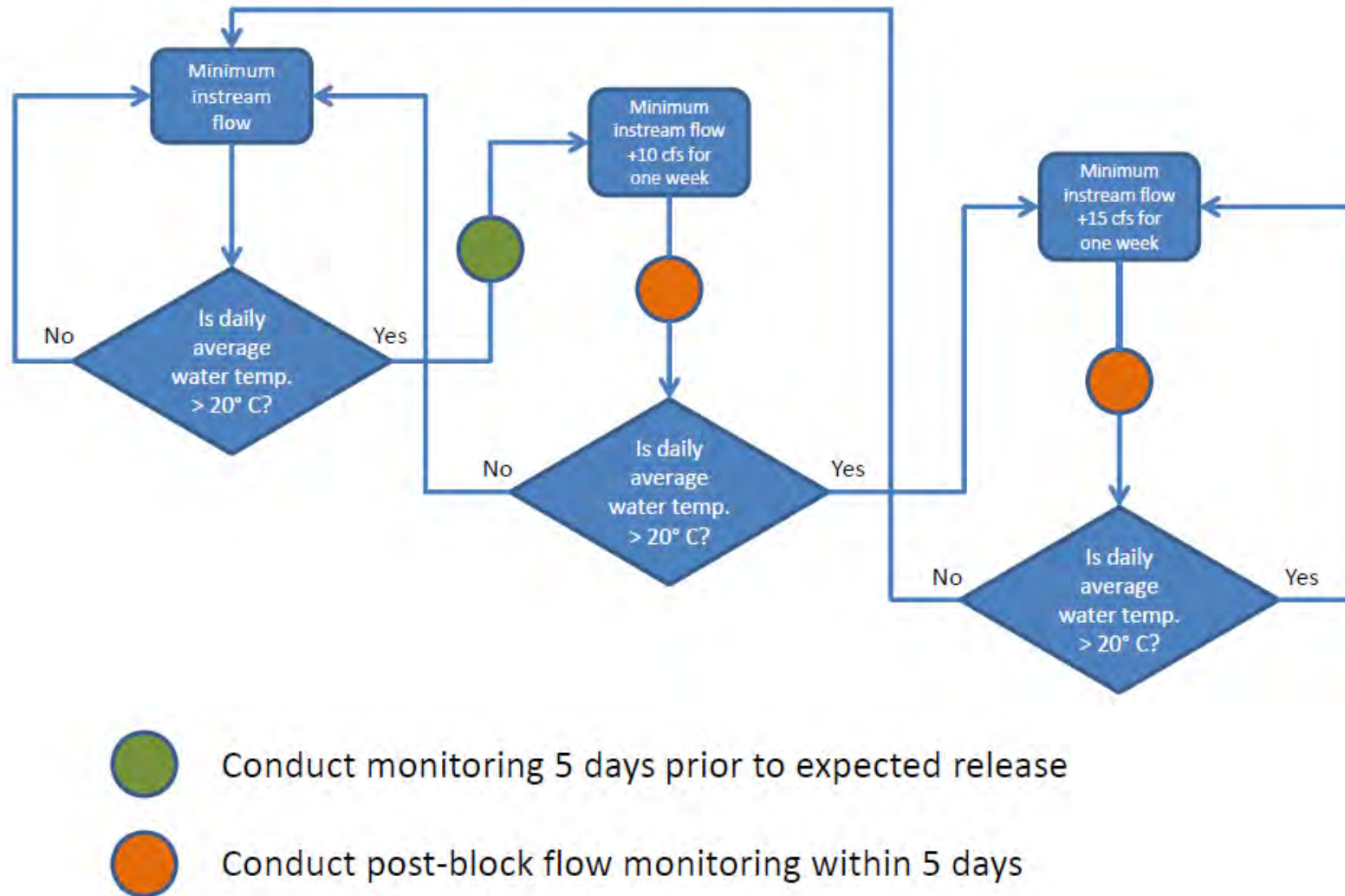


Figure 2: Flow chart for flow releases and post-release monitoring.

Attachment A. License Conditions

Adaptive Water Temperature Management in Silver Creek below Junction and Camino Reservoir Dams

To assist the Licensee in maintaining required temperature control in the river reaches below Camino and Junction Reservoirs, the Licensee shall release up to two blocks of water per month in Wet years during July, August and/or September, for a potential total of six water blocks annually. The volume of water constituting a water block varies depending on the month of release. Upon approval of the Deputy Director, in accordance with the plan described below, one block of water per month shall be released into Silver Creek below Junction Reservoir Dam (Table 11.A.), or one block of water per month shall be released into Silver Creek below Camino Reservoir Dam (Table 11.B.), or both, as needed for temperature control. No block of water shall exceed the monthly quantity described in Tables 11.A. and 11.B.

Table 11.A. Adaptive Management Water Block Release Volumes for Water Temperature Management in Silver Creek below Junction Reservoir Dam (Wet Years Only)

Month	Maximum Water Quantity Released (acre-feet)
July	1044
August	491
September	475

Table 11.B. Adaptive Management Water Block Release Volumes for Water Temperature Management in Silver Creek below Camino Reservoir Dam (Wet Years Only)

Month	Maximum Water Quantity Released (acre-feet)
July	1044
August	491
September	475

Within one year of License issuance, the Licensee shall, in consultation with CDFW, USFWS, USFS, and State Water Board staff, develop a plan for each block of water that addresses, at a minimum: notification protocols for temperature exceedances, emergency temperature operation contingencies, and ecological monitoring associated with the use of each block of water. The Licensee shall submit the plan to the Deputy Director for review and approval after agency consultation but prior to submission to the Commission, if applicable. 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.

Each block of water released shall be equivalent to the total amount of water available for release in the month specified for that reach. The amount of water for each monthly block shall be released as needed to achieve the desired mean daily water temperature described below. The Licensee is not required to release the block of water in its entirety in one release event. Each block of water shall be made available during the first Wet year that occurs once the initial minimum streamflows are implemented and for all subsequent Wet years.

The Licensee shall release each block of water as directed by the approved plan to maintain mean daily water temperatures of 20°C or below in the Junction Dam and Camino Dam Reaches. One block of water shall be made available to the Junction Dam Reach if water temperature exceeds a daily mean water temperature of 20°C in Silver Creek below Junction Reservoir Dam, as measured in Silver Creek immediately upstream of Camino Reservoir. A second block of water shall be made available to the Camino Dam Reach if water temperature exceeds a daily mean water temperature of 20°C in Silver Creek below Camino Reservoir Dam, as measured in Silver Creek immediately upstream of the confluence with the SF American River (at or near discontinued USGS gage 11442000, Licensee station SC1).

The Licensee shall install and maintain a temperature gage on Silver Creek immediately upstream of Camino Reservoir to measure water temperature in Silver Creek below Junction Reservoir Dam. The Licensee shall also install and maintain a temperature gage on Silver Creek upstream of the SF American River at or near the site of discontinued USGS gage 11442000 (Licensee station SC111). Within two years of License issuance, the Licensee shall develop and install a telemetry system on Silver Creek upstream of the confluence with the SF American River that provides daily access to hourly temperature monitoring data. The Licensee shall, promptly but not later than within 24 hours, notify the State Water Board, CDFW, USFWS, and USFS if the water temperatures in Silver Creek below Junction Reservoir Dam or below Camino Reservoir Dam exceed the 20°C water temperature objective.

If the water temperature objective is exceeded, the Licensee may be required to monitor for the presence of FYL frogs prior to and after the release of the water block according to the approved plan described above.

155 FERC ¶ 62,192
UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

Sacramento Municipal Utility District

Project No. 2101-124

ORDER APPROVING BLOCK OF WATER PLAN PURSUANT TO ARTICLE 401(a)

(Issued June 8, 2016)

1. On March 1, 2016 and supplemented on May 11, 2016, Sacramento Municipal Utility District, licensee for the Upper American River Hydroelectric Project No. 2101, filed a Block of Water Plan (Plan) for Federal Energy Regulatory Commission (Commission) approval, pursuant to Article 401(a) of the project license.¹ The project is located on the Rubicon River, Silver Creek, and the South Fork American River in El Dorado and Sacramento counties, California. The project occupies federal lands managed by the U.S. Forest Service (Forest Service) and the Bureau of Land Management (BLM).

License Requirements

2. Article 401(a) of the project license requires the licensee to develop and implement various plans pursuant to the California Water Resources Control Board's (California WRCB) Water Quality Certification (WQC) and the Forest Service's final section 4(e) conditions.² WQC condition 1.I and Forest Service condition 27 requires the licensee to implement a plan for water block releases into Silver Creek, below Junction reservoir and Camino reservoir dam, in order to assist in maintaining water temperatures for the protection of fish populations during warm summer months.

3. WQC condition 1.I and Forest Service condition 27 establish that, during wet years, the licensee may release up to two blocks of water per month in July, August, and/or September. The conditions also set limits for the maximum amount of water to be released each month from each development and provide guidance on monitoring and reporting the need for and impact of block water releases.

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

² See Appendices A and B of the Commission's Order Issuing New License.

4. The licensee must develop its Plan in consultation with the California Department of Fish and Wildlife (California DFW), U.S. Fish and Wildlife Service (FWS), Forest Service, and California WRCB. Prior to filing its Plan for Commission approval, the California WRCB and Forest Service must approve the Plan.

License's Plan

5. The licensee's proposed Plan describes a program the licensee has developed to process water temperature data and to report whether the daily average water temperatures have exceeded 20 degrees Celcius (°C) in either reach. If water temperatures exceed 20°C, the licensee would initiate a block of water release. For the first calendar week, the licensee would release 10 cubic feet per second (cfs) above the minimum instream flow requirement. If the average daily water temperature remains above 20°C after the first week, the licensee would release a total of 15 cfs above the minimum flow for an additional calendar week. Otherwise, the licensee would return to the established minimum flow. If temperatures remain above 20°C after two weeks of block water releases, the licensee would continue to release 15 cfs above the minimum flow until the seven-day average water temperature is below 20°C or until the quantity of water permitted for the release has been exhausted.

6. Upon becoming aware of any need for a block of water release, the licensee would notify the California WRCB, Forest Service, California DFW, and FWS within one business day. The licensee would also initiate foothill yellow-legged frog monitoring pursuant to its Amphibian and Aquatic Reptile Monitoring Plan,³ which addresses frog monitoring during block of water releases.

Consultation

7. The licensee provided its most recent draft Plan to the California WRCB, Forest Service, California DFW, and FWS on March 22, 2016. On April 6, 2016, the Forest Service approved the Plan. The California WRCB also approved the Plan by letter dated May 6, 2016. No other comments were provided.

Discussion and Conclusion

8. The licensee's proposed Block of Water Plan provides methods for releasing blocks of water to decrease water temperatures to protect fish populations, as required by Article 401(a), the WQC, and the Forest Service 4(e) conditions. The licensee's proposed Plan includes measures to notify the appropriate entities when initiating a block

³ Order Modifying and Approving Amphibian and Aquatic Reptile Monitoring Plan (155 FERC ¶ 62,128), issued May 19, 2016.

of water release. The Plan is consistent with the licensee's Amphibian and Aquatic Reptile Monitoring Plan and should adequately protect aquatic resources in the pertinent river reaches. As such, the licensee's Block of Water Plan should be approved.

9. The Commission should reserve the right to require changes to the plan, based upon information provided by the licensee or any resource agency.

The Director orders:

(A) Sacramento Municipal Utility District's Block of Water Plan, filed with the Federal Energy Regulatory Commission on March 1, 2016 and supplemented on May 11, 2016, pursuant to Article 401(a) of the license for the Upper American River Hydroelectric Project No. 2101, is approved.

(B) The Federal Energy Regulatory Commission reserves the right to require changes to the plan, based upon information provided by the licensee or resource agency.

(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 Federal Energy Regulatory Commission's regulations at 18 CFR § 385.713 (2015). The filing of a request for hearing 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