ATTACHMENT A: LONG-TERM OPERATING RULES WITH LTOR MONITORING PLAN

Southern California Edison

Big Creek No. 4 Hydroelectric Project (FERC Project No. 2017)

San Joaquin River – Horseshoe Bend Reach
Long-Term Operating Rules

August 2019

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List of Acronyms

AF	acre-feet
AGC	Automated Generation Control
AMP	Adaptive Management Plan
BCS	Big Creek System
CDFW	California Department of Fish and Wildlife
cfs	cubic feet per second
DWR	Department of Water Resources
FERC	Federal Energy Regulatory Commission
ISO	Independent System Operator
LTOR	Long-Term Operating Rules
LWD	Large Woody Debris
MIF	Minimum Instream Flow
MPOC	Mammoth Pool Operating Contract
NASMP	Native Aquatic Species Management Plan
Reclamation	U.S. Bureau of Reclamation
SCE	Southern California Edison
SWRCB	State Water Resources Control Board
TRG	Technical Review Group
USFS	U.S. Forest Service
USGS	U.S. Geological Survey

1.0 Introduction

This document presents the Long-Term Operating Rules (LTOR) for river flows for the Horseshoe Bend Reach of the San Joaquin River, which is the 6.3-mile bypass reach of Southern California Edison's (SCE or Licensee) Big Creek No. 4 Hydroelectric Project (Big Creek No. 4 Project). The Big Creek No. 4 Project is the lower-most project of SCE's Big Creek System (BCS), which includes nine powerhouses with six reservoirs operating under the authority of seven separate Federal Energy Regulatory Commission (FERC) licenses. The BCS has a total storage capacity in all of its reservoirs of about 560,000 acre-feet (AF). The San Joaquin River annual average natural runoff in the watershed is approximately 1.8 million AF. Major features of the Big Creek No. 4 Project consist of Dam 7, which impounds Redinger Lake; a diversion and penstock and tunnel; and the Big Creek No. 4 Powerhouse. Water is diverted from Redinger Lake to the Big Creek No. 4 Powerhouse located approximately 6.3 miles downstream. Redinger Lake has a current estimated storage capacity of 24,751 AF (not including dead storage) and the Big Creek No. 4 Powerhouse has a capacity of about 3,500 cubic feet per second (cfs). The Big Creek No. 4 Project is operated to generate power based on water availability and energy demand of SCE's customers and the California Independent System Operator (ISO). Operations are generally carried-out under ISO automated generation control (AGC) to control the power output of electric generators for grid stability.

The Big Creek No. 4 Project FERC License (issued December 2003) required development of an *Adaptive Management Plan for River Flows* (Adaptive Management Plan or AMP) (SCE 2008a). The AMP established a framework for providing flows for whitewater recreation, while protecting native fish, reptiles, and the aquatic community. The AMP required development of LTOR for the Project upon completion of whitewater, biological, and operational studies. The biological components of the AMP were integrated into the *Native Aquatic Species Management Plan* (NASMP) (SCE 2008b). These plans were implemented on September 30, 2009 with approval by the FERC, U.S. Forest Service (USFS), and State Water Resources Control Board (SWRCB). The data developed from the implementation of the AMP, NASMP, and associated studies (Appendix A) were used to develop the LTOR. The LTOR also considered the following Project constraints:

- Project infrastructure capabilities, including: (1) the minimum flow release provided by the fish water generator flow outlet with current operational constraints of 40-50 cfs (maximum release capacity of approximately 70 cfs); (2) limited Redinger Lake storage available for release from the spill gates of 12,200[1] AF; (3) limited spill gate control of approximately 150-200 cfs increments; and (4) planned and unplanned outages;
- Integrated operations of the Dam 7 spill gates and the Big Creek No. No. 4 Powerhouse;
- Power generation and grid stabilization (automated grid control);
- Minimum instream flow (MIF) or other release requirements;
- Minimum reservoir elevations at certain periods;
- Inflow and inflow forecasting;

[1] Approximately 12,220 AF of storage is available in Redinger Reservoir for providing boating flows and down ramping. However, the available storage decreases to 4,620 AF if functionality of the boat ramp is maintained.

- Public safety; and
- Downstream water rights (Mammoth Pool Operating Contract[2] [MPOC]) (Appendix B).

The LTOR were developed in consultation with SCE and the Big Creek No. 4 Project Technical Review Group[3] (TRG) based on nine years of post-license study and analysis. SCE and the TRG balanced Project constraints with the objective to provide consistent boating opportunities while promoting the native aquatic species assemblage. Based on current available information, SCE and the TRG determined that balance would be best met by the following:

- In wet years (with long duration spills), the LTOR prescribe down ramping of spills to mimic the natural hydrograph (enhance the aquatic community) and increase whitewater boating opportunities (refer to Appendix C for whitewater boating opportunity day definitions);
- In drier years (with short duration spills), the LTOR prescribe management of spills to provide whitewater boating opportunities and prevent fish stranding by down ramping the spill;
- In the driest years (non-spill years), the LTOR prescribe flow releases on a scheduled weekend to enhance whitewater boating opportunities and prevent fish stranding by down ramping the release;
- Flow and water temperature monitoring every year;
- Biological monitoring in the first two years following adoption of the LTOR, with a requirement for monitoring in Year 3, if the first two years do not include both a spill and non-spill year. After which, biological monitoring will occur every five years for the term of the license including license extensions; and
- Ongoing consultation with the TRG over the term of the license including any license extensions[4].

The requirements identified in this document (LTOR), once approved by FERC, will replace all requirements identified in the NASMP and AMP.

2.0 Spill Year and Non-Spill Year Boating Flows and Down Ramping from Dam 7 into the Horseshoe Bend Reach of the San Joaquin River

Spill Years

- The Licensee will provide spill year boating flows and down ramping of spills from May 1 through August 31.
- Spill years are defined as years when (1) average daily flow below Dam 7 at U.S. Geological Survey (USGS) Gage No. 11242000 is projected to exceed 500 cfs based on the Licensee's May 1 average daily flow forecast (May 1 forecast) and a spill actually occurs that exceeds 500 cfs between May 1 and August 31 or (2) a spill that exceeds 500 cfs was not projected based on the Licensee's May 1 forecast, but a spill (average

[2] The Mammoth Pool Operating Contract is a contract between SCE and the U.S. Bureau of Reclamation that constrains SCEs Big Creek System operations to protect downstream water rights (Appendix B).

[3] The Technical Review Group included federal and state resource agencies, Native American tribes, non-governmental organizations, and members of the public.

[4] The consultation may result in recommendations to modify or further evaluate the LTOR (including monitoring requirements), as appropriate based on monitoring results (adaptive management).

daily flow below Dam 7 at USGS Gage No. 11242000 exceeds 500 cfs) occurs prior to implementation of a non-spill year boating flow (see the Non-Spill Years section below)[5]. Other spills are addressed in the Other Spill Events section below.

- A short-term pulse flow release to flush large woody debris (LWD) from the face of the dam downstream into the Horseshoe Bend Reach of the San Joaquin River (Section 3.2) does not constitute a spill.
- In the spill years, boating flows and down ramps will be based on the water year type schedules A-D in the Mammoth Pool Contract (Appendix B):

Schedule	Criteria
A	April Forecast of Friant Natural Runoff during April-July not more than 650,000 AF
B (Low Storage)	April Forecast of Friant Natural Runoff during April-July more than 650,000 AF and Water Year Forecast Runoff not more than 1,200,000 AF with a September aggregate storage requirement <325,000 AF
B (High Storage)	April Forecast of Friant Natural Runoff during April-July more than 650,000 AF and Water Year Forecast Runoff not more than 1,200,000 AF with a September aggregate storage requirement ≥325,000 AF
C	April Forecast of Friant Natural Runoff during water year more than 1,200,000 AF but not more than 1,600,000 AF
D	April Forecast of Friant Natural Runoff during water year more than 1,600,000 AF

Non-Spill Years

- The Licensee will provide non-spill year boating flows and down ramping of boating flows (regardless of water year type) from May 15 through June 15.
- Non-spill years are defined as years when average daily flow below Dam 7 at USGS Gage No. 11242000 is projected to not exceed 500 cfs between May 1 and August 31 based on the Licensee's May 1 forecast and a spill (average daily flow below Dam 7 at USGS Gage No. 11242000 exceeds 500 cfs) does not occur prior to implementation of a non-spill year boating flow.

Other Spill Events

- Other spill events in the May 1 to October 31 time period that are not captured in the Spill Years or Non-Spill Years definitions above are addressed in Sections 2.1 to 2.5 below as initial, subsequent, or unanticipated spill.

[5] If a spill is projected based on the Licensee's May 1 forecast and subsequent weekly forecasts continue to predict a spill prior to June 15, but the spill does not occur, then whitewater boating days would not be provided in that year. The Licensee will notify FERC, USFS, CDFW, SWRCB, American Whitewater, and the TRG. The parties would have an opportunity to discuss the forecasting methodology and revise the LTOR, as appropriate (see Section 6.0).

Notification

- Notification of whether it is a projected spill or non-spill year based on the Licensee's forecast will be provided to the USFS, California Department of Fish and Wildlife (CDFW), SWRCB, American Whitewater[6], Tribes[7], and the TRG no later than May 1 each year.
- Projected date(s) of boating opportunities will be provided as follows:
  - Spill years: The Licensee will estimate the timing, magnitude (average daily flow), and duration of boating flows. Projections and the Licensee's forecast information will be updated weekly (by 5:00 pm Tuesday) from May 1 through August 31, or until no additional boating flows are projected.
- Non-spill years: Notification will occur a minimum of two weeks prior to the boating flow release. If the Licensee forecasts a potential spill after the boating release occurs, the Licensee will make a good faith effort to provide notification within two weeks of the projected spill or as soon as possible.
- The Licensee will provide notifications by email and posting on the Licensee's webpage (http://kna.kisters.net/scepublic/# or its replacement)[8].

Safety

- When the LTOR result in increasing flows in the San Joaquin River below Dam 7 (e.g., during spill or non-spill years when flows are increased to provide white water boating opportunities), the following safety measures will be implemented:
  - Signage will be posted at least one week prior to the release (if possible) at both ends of the Horseshoe Bend Trail; at the top of the Willow Creek Trail and parking area; and at the intersection of Powerhouse Road (aka County Road 222) and County Road 235 (near Kerckhoff Reservoir).
  - Notification by email at least one day prior to the release (if possible) to the USFS, CDFW, SWRCB, American Whitewater, Tribes, and the TRG.
  - Notification to the public at least one day prior to the release (if possible) by posting on the Licensee's webpage (http://kna.kisters.net/scepublic/# or its replacement).
  - The Licensee will increase flows to 2,000 cfs at the compliance gage (see below) prior to 5:30 am.
  - Activation of the alarm horn at Dam 7 immediately prior to initiating the release.

[6] Or designated whitewater stakeholder on the TRG.
[7] The following Tribes were consulted regarding the LTOR: North Fork Mono Tribe, North Fork Mono Nation, North Fork Rancheria of Mono Indians, and Big Sandy Rancheria Band of Western Mono Indians.
[8] Tribal notification will be provided by email, phone call, or written correspondence, as appropriate.

Compliance Gage and Flow Definitions

- Flow will be measured at the USGS Gage No. 11242000 SAN JOAQUIN R AB WILLOW C NR AUBERRY CA.
  - Average daily flow is defined as the average of the 15-minute flow data for 24 hours (8 am to 8 am).
  - Average hourly flow is defined as the average of the 15-minute flow data within each hour.
  - Average flow during a time step that is shorter than one day, but longer than one hour is defined as the average of the 15-minute flow data within each specified time step.
  - Average flow during a time step that is longer than one day, is defined as 1) the average daily flow for each full day of the time step and 2) average of the 15-min flow data for any remaining time in that time step that is less than a full day.
  - MIF is the flow required downstream of Dam 7 as specified in the Big Creek No. 4 License (4(e) and 401 conditions), as follows:

    During operation of the facilities authorized by the new project license, the Licensee shall maintain the San Joaquin River below Dam No. 7 at a continuous, minimum flow of 20 cubic feet per second (cfs) as measured at gage station 11242000 with the following exceptions:

    - *From October 1 to April 1 of a dry or critical water year for the San Joaquin Basin, as defined in the SWRCB's 1995 Bay-Delta Water Quality Control Plan, with the reduced flow period beginning the following October:*

      15 cubic feet per second (cfs) as measured at gage 11242000 below Dam No. 7, provided the combined flow of the San Joaquin River and Willow Creek (as measured by gage 11246500) is maintained at 20 cfs. For purposes of this condition, the water year type shall be based on the California Department of Water Resources' (DWR) final May San Joaquin Valley Water Year Hydrologic Classification.

    - *With the written consent of the Chief of the Division of Water Rights, the flows in this condition may be temporarily modified during and to the extent required for performance of required maintenance of the dam, the outlet facility, and minimum flow release facilities. The Licensee shall notify the Chief of the Division of Water Rights at least five working days prior to any such departure. The Licensee also may modify the minimum flow requirement temporarily in the event of operating emergencies beyond the control of the Licensee or in the interest of public safety, in which case the Licensee shall notify the SWRCB and the USFS as soon as practicable, but at most 10 days, after making such an emergency flow modification.*

2.1 Spill Year Schedule D – Boating Flows and Down Ramping of Spill Flows

In the months of May through August, the Licensee shall down ramp the declining limb of spill(s) once the average daily flow declines below 3,500 cfs (exceptions are noted below).

The Licensee shall reduce spill flows from Dam 7 according to the following schedule (Schedule D):

- Day 1. Maintain flow within a range of 3,500-3,000 cfs
- Day 2. Reduce the flow within a range of 3,000-2,500 cfs
- Day 3. Reduce the flow within a range of 2,500-2,000 cfs
- Day 8. Reduce the flow within a range of 2,000-1,600 cfs
- Day 10. Reduce the flow within a range of 1,600-1,300 cfs
- Day 12. Reduce the flow within a range of 1,300-1,000 cfs
- Day 14. Reduce the flow within a range of 1,000-750 cfs
- Day 16. Reduce the flow within a range of 750-500 cfs
- Day 18. Reduce the flow within a range of 500-250 cfs
- Day 20. Reduce the flow within a range of 250-100 cfs
- Day 21. Reduce the flow within a range of 100-MIF cfs

Compliance with the down ramp of spill flows requires that the Licensee meet the following conditions:

- Down ramping of spill flows to the appropriate flow range in the schedule will occur by 9 am.
- Down ramp flows must be made on the day and time specified (see exceptions below) in Schedule D unless access to the streamflow release infrastructure is prohibited by hazardous conditions or if there is an equipment/infrastructure malfunction/outage or ISO emergency. If this occurs, the FERC, USFS, CDFW, SWRCB, Tribes, and TRG will be notified of the circumstances, as soon as possible, but no later than 2 business days[9] after such incident and the down ramp of spill flow must be resumed as soon as practicable, if conditions allow. If requested by the FERC, USFS, CDFW, SWRCB, Tribes, and/or TRG, the Licensee will hold a meeting (or conference call) to discuss.
- Down ramp of spill flow must be maintained for at least the number of days or hours (duration) identified in each down ramp step. Each step of the down ramp can have a duration longer than that specified.
- Once the flows are set at the beginning of a down ramp step, average daily flow must at all times be compliant with the flow range specified in the Schedule D. If average daily flow falls below the flow range identified in the schedule, flow shall be returned, as soon as practical, to the original flow range for at least one day[10] and then down ramp will resume according to the schedule. If average daily flow exceeds the flow range

[9] Business day is defined as Monday through Friday, excluding state and federal recognized holidays.

[10] The total number of days within each step and flow range will be maintained such that each day that is out of the flow range will be repeated.

identified in the schedule, flow shall be returned, as soon as practical, to the original flow range for at least one day[9] and then down ramp will resume according to the schedule.

- During down ramping within the boatable flow range (3,500-1,600 cfs), average hourly flow between 9 am – 6 pm cannot drop below the minimum flow within each flow step. If average hourly flow drops below the minimum flow in a down ramping flow step, then the Licensee shall increase flows to within the down ramping step as soon as possible and maintain flow for that day and repeat that down ramping step according to Schedule D for the following day.
- If a spill event occurs in the months of May through August that does not exceed 3,500 cfs average daily flow, then the spill shall be down ramped according to Schedule D beginning at the day/step that includes the largest observed average daily flow. If the spill down ramp does not provide a minimum of two boating days ≥2,000 cfs, then the Licensee will increase flows to provide two days of boating flows (i.e., ≥2,000 cfs) and down ramp according to Schedule D. The Licensee will make a good faith effort to provide the boating flow at the beginning of the spill down ramp. Spills that do not exceed 500 cfs (average daily flow) will not be down ramped.
- If the Licensee's weekly forecast indicates that an initial spill will be followed by a larger magnitude spill, the Licensee will down ramp the initial spill according to the Stranding Protection Down Ramp schedule (Section 2.5). The larger magnitude spill will be down ramped according to Schedule D.
- If a spill(s) occurs after the Licensee has completed the down ramp in Schedule D, the subsequent spill(s) will be down ramped according to the Stranding Protection Down Ramp schedule (Section 2.5).

2.2 Spill Year Schedule C or B (High Storage) Boating Flows and Down Ramping of Spill Flows

In the months of May through August, the Licensee shall down ramp the declining limb of spill(s) once the average daily flow declines below 3,500 cfs (exceptions are noted below).

The Licensee shall reduce spill flows from Dam 7 according to the following schedule (Schedule C/B):

- Day 1. Maintain flow within a range of 3,500-3,000 cfs
- Day 2. Reduce the flow within a range of 3,000-2,500 cfs
- Day 3. Reduce the flow within a range of 2,500-2,000 cfs
- Day 5. Reduce the flow within a range of 2,000-1,600 cfs
- Day 6. At 6 pm, reduce the flow within a range of 1,600-1,200 cfs
- Day 7. At 2 am, reduce the flow within a range of 1,200-800 cfs
- Day 7. At 12 pm, reduce the flow within a range of 800-600 cfs
- Day 7. At 5 pm, reduce the flow within a range of 600-400 cfs
- Day 7. At 10 pm, reduce the flow within a range of 400-200 cfs
- Day 8. At 3 am, reduce the flow within a range of 200-MIF cfs

Compliance with the down ramp of spill flows requires that the Licensee meet the following conditions:

- Down ramping of spill flows to the appropriate flow range in the schedule will occur by 9 am unless otherwise specified in Schedule C/B.
- Down ramp flows must be made on the day and time specified in the Schedule C/B unless access to the streamflow release infrastructure is prohibited by hazardous conditions or if there is an equipment/infrastructure malfunction/outage or ISO emergency. If this occurs, the FERC, USFS, CDFW, SWRCB, Tribes, and TRG will be notified of the circumstances, as soon as possible, but no later than 2 business day after such incident and the down ramp of spill flow must be continued as soon as practicable, if conditions allow. If requested by the FERC, USFS, CDFW, SWRCB, Tribes, and/or TRG, the Licensee will hold a meeting (or conference call) to discuss.
- Down ramp of spill flow must be maintained for at least the number of days or hours (duration) identified in each down ramp step. Each step of the down ramp can have a duration longer than that specified.
- Once the flows are set at the beginning of a down ramp step, average flow during each time step must at all times be compliant with the flow range specified in the Schedule C/B. If average flow falls below the flow range identified in the schedule, flow shall be returned, as soon as practical, to the original flow range for at least the time step[11] in the schedule and then down ramp will resume according to the schedule. If average flow exceeds the flow range identified in the schedule, flow shall be returned, as soon as practical, to the original flow range for at least the step duration[10] specified in the schedule, then the down ramp will resume according to the schedule.
- During down ramping within the boatable flow range (3,500-1,600 cfs), average hourly flow between 9 am – 6 pm cannot drop below the minimum flow within each flow step. If average hourly flow drops below the minimum flow in a down ramping flow step, then the Licensee shall increase flows to within the down ramping step as soon as possible and maintain flow for that day and repeat that down ramping step according to Schedule C/B for the following day.
- If a spill event occurs in the months of May through August that does not exceed 3,500 cfs average daily flow, then the spill shall be down ramped according to Schedule C/B beginning at the day/step that includes the largest observed average daily flow. If the spill down ramp does not provide a minimum of two boating days ≥2,000 cfs, then the Licensee will increase flows to provide two days of boating flows (i.e., ≥2,000 cfs) and down ramp according to Schedule C/B. The Licensee will make a good faith effort to provide the boating flow at the beginning of the spill down ramp. Spills that do not exceed 500 cfs (average daily flow) will not be down ramped.

[11] The total number of hours/days within each step and flow range will be maintained such that each time step that is out of the flow range will be repeated. If the time step is a multiple day time step, only the day that is out of compliance must be repeated.

- If the Licensee's weekly forecast indicates that an initial spill will be followed by a larger magnitude spill, the Licensee will down ramp the initial spill according to the Stranding Protection Down Ramp schedule (Section 2.5). The larger magnitude spill will be down ramped according to Schedule C/B.
- If a spill(s) occurs after the Licensee has completed the down ramp in Schedule C/B, the subsequent spill(s) will be down ramped according to the Stranding Protection Down Ramp schedule (Section 2.5).

2.3 Spill Year Schedule A or B (Low Storage) Boating Flows and Down Ramping of Spill Flows

In the months of May through August, the Licensee shall down ramp the declining limb of spill(s) once the average daily flow declines below 2,500 cfs (exceptions are noted below).

The Licensee shall reduce flows from Dam 7 according to the following schedule (Schedule A/B):

- Day 1. Maintain the flow within a range of 2,500-2,000 cfs
- Day 3. At 6 pm, reduce the flow within a range of 2,000-1,600 cfs
- Day 4. At 2 am, reduce the flow within a range of 1,600-1,200 cfs
- Day 4. At 12 pm, reduce the flow within a range of 1,200-800 cfs
- Day 4. At 5 pm, reduce the flow within a range of 800-600 cfs
- Day 4. At 10 pm, reduce the flow within a range of 600-400 cfs
- Day 5. At 3 am, reduce the flow within a range of 400-200 cfs
- Day 5. At 8 am, reduce the flow within a range of 200 - MIF cfs

Compliance with the down ramp of spill flows requires that the Licensee meet the following conditions:

- Down ramping of spill flows to the appropriate flow range in the schedule will occur by 9 am unless otherwise specified.
- Down ramp flows must be made on the day and time specified in Schedule A/B unless access to the streamflow release infrastructure is prohibited by hazardous conditions or if there is an equipment/infrastructure malfunction/outage or ISO emergency. If this occurs, the FERC, USFS, CDFW, SWRCB, Tribes, and TRG will be notified of the circumstances, as soon as possible, but no later than 2 business days after such incident and the down ramp of spill flow must be continued as soon as practicable, if conditions allow. If requested by the FERC, USFS, CDFW, SWRCB, Tribes, and/or TRG, the Licensee will hold a meeting (or conference call) to discuss.
- Down ramp of spill flow must be maintained for at least the number of days or hours (duration) identified in each down ramp step. Each step of the down ramp can have a duration longer than that specified.
- Once the flows are set at the beginning of a down ramp step, average flow during each time step must at all times be compliant with the flow range specified in Schedule A/B. If average flow falls below the flow range identified in the schedule, flow shall be returned,

as soon as practical, to the original flow range for at least the duration of the step[12] identified in the schedule and then down ramp will resume according to the schedule. If average flow exceeds the flow range identified in the schedule, flow shall be returned, as soon as practical, to the original flow range for at least the step duration[11] specified in the schedule, then the down ramp will resume according to the schedule.

- During Day 1 through Day 3, average hourly flow between 9 am – 6 pm cannot drop below the minimum flow within each flow step. If average hourly flow drops below the minimum flow in a down ramping flow step, then the Licensee shall increase flows to within the down ramping step as soon as possible and maintain the flow for that day and repeat that down ramping step according to Schedule A/B for the following day.
- If a spill event occurs in the months of May through August that does not exceed 2,000 cfs average daily flow, then the spill shall be down ramped according to Schedule A/B and begin at the day/step that includes the largest observed average daily flow. If the spill down ramp does not provide a minimum of two boating days ≥2,000 cfs, then the Licensee will increase flow to provide two days of boating flows (i.e., ≥2,000 cfs) and down ramp according to Schedule A/B. The Licensee will make a good faith effort to provide the boating flow at the beginning of the spill. Spills that do not exceed 500 cfs (average daily flow) will not be down ramped.
- If the Licensee's weekly forecast indicates that an initial spill will be followed by a larger magnitude spill, the Licensee will down ramp the initial spill according to the Stranding Protection Down Ramp schedule (Section 2.5). The larger magnitude spill will be down ramped according to Schedule A/B.
- If a spill(s) occurs after the Licensee has completed the down ramp in Schedule A/B, the subsequent spill(s) will be down ramped according to the Stranding Protection Down Ramp schedule (Section 2.5).

2.4 Non-Spill Year Boating Flows and Down Ramping from Dam 7 into the Horseshoe Bend Reach of the San Joaquin River

Between May 15 and June 15 of a non-spill year beginning on a Saturday, the Licensee shall provide a boating flow and down ramp of the boating flow.

The Licensee shall provide the boating flow and down ramp from Dam 7 according to the following schedule (Non-Spill Year Boating Flow Schedule):

- Day 1. At 9 am, provide flow within a range of 2,500-2,000 cfs
- Day 2. At 6 pm, reduce the flow within a range of 2,000-1,600 cfs
- Day 3. At 2 am, reduce the flow within a range of 1,600-1,200 cfs
- Day 3. At 12 pm, reduce the flow within a range of 1,200-800 cfs
- Day 3. At 5 pm, reduce the flow within a range of 800-600 cfs
- Day 3. At 10 pm, reduce the flow within a range of 600-400 cfs

[12] The total number of hours/days within each step and flow range will be maintained such that each time step that is out of the flow range will be repeated. If the time step is a multiple day time step, only the day that is out of compliance must be repeated.

- Day 4. At 3 am, reduce the flow within a range of 400-200 cfs
- Day 4. At 8 am, reduce the flow within a range of 200-MIF cfs

Compliance with the non-spill year boating flow and down ramp requires that the Licensee meet the following conditions:

- Boating flow and down ramp must be made on the day and time specified in the Non-Spill Year Boating Flow Schedule unless access to the streamflow release infrastructure is prohibited by hazardous conditions or if there is an equipment/infrastructure malfunction/outage or ISO emergency. If this occurs, the FERC, USFS, CDFW, SWRCB, Tribes, and TRG will be notified of the circumstances, as soon as possible, but no later than 2 business days after such incident and the boating flow and down ramp must be continued as soon as practicable, if conditions allow. If requested by the FERC, USFS, CDFW, SWRCB, Tribes, and/or TRG, the Licensee will hold a meeting (or conference call) to discuss.
- The boating flow and down ramp must be maintained for at least the number of days / hours (duration) identified in the schedule. Each step of the boating flow and down ramp can have a duration longer than that specified.
- Once the flows are set at the beginning of a down ramp step, average flow during each time step must at all times be compliant with the flow range specified in the Non-Spill Year Boating Flow Schedule. If average flow falls below the flow range identified in the schedule, flow shall be returned, as soon as practical, to the original flow range for at least the duration of the step[13] identified in the schedule and then down ramp will resume according to the schedule. If average flow exceeds the flow range identified in the schedule, flow shall be returned, as soon as practical, to the original flow range for at least the step duration[12] specified in the schedule, then the down ramp will resume according to the schedule.
- During Day 1 and Day 2, average hourly flow between 9 am – 6 pm cannot drop below the minimum flow within each flow step. If average hourly flow drops below the minimum flow in a down ramping flow step, then the Licensee shall increase flows to within the down ramping step as soon as possible and maintain the flow for that day and repeat that down ramping step according to the Non-Spill Year Boating Flow Schedule for the following day.
- If an unanticipated spill(s) occurs after the Licensee has completed the boating flow and down ramping release, the unanticipated spill(s) will be down ramped according to the Stranding Protection Down Ramp schedule (Section 2.5).

[13] The total number of hours/days within each step and flow range will be maintained such that each time step that is out of the flow range will be repeated.

2.5 Stranding Protection Down Ramping

In the months of May through August, the Licensee shall down ramp the declining limb of an initial or subsequent spill(s) as described in Sections 2.1 through 2.4 once the average daily flow declines below 1,600 cfs (exceptions are noted below). The Licensee will make a good faith effort to initiate the down ramp prior to average hourly flow declining below 1,200 cfs.

The Licensee shall down ramp spill flows from Dam 7 according to the following schedule (Stranding Protection Schedule):

- Step 1. Maintain flow within a range of 1,600-1,200 cfs for 10 hours
- Step 2. Reduce the flow within a range of 1,200-800 cfs for 10 hours
- Step 3. Reduce the flow within a range of 800-600 cfs for 5 hours
- Step 4. Reduce the flow within a range of 600-400 cfs for 5 hours
- Step 5. Reduce the flow within a range of 400-200 cfs for 5 hours
- Step 6. Reduce the flow within a range of 200-MIF cfs

Compliance with the Stranding Protection Down Ramp requires that the Licensee meet the following conditions:

- Down ramp must be made on the step and time specified in the Stranding Protection Schedule unless access to the streamflow release infrastructure is prohibited by hazardous conditions or if there is an equipment/infrastructure malfunction/outage or ISO emergency. If this occurs, the FERC, USFS, CDFW, SWRCB, Tribes, and TRG will be notified of the circumstances, as soon as possible, but no later than 2 business days after such incident and the boating flow and down ramp must be continued as soon as practicable, if conditions allow. If requested by the FERC, USFS, CDFW, SWRCB, Tribes, and/or TRG, the Licensee will hold a meeting (or conference call) to discuss.
- Down ramp must be maintained for at least the number of hours (duration) identified in the schedule. Each step of the down ramp can have a duration longer than that specified.
- Once the flows are set at the beginning of a down ramp step, average flow during each time step must be compliant with the flow range specified in the Stranding Protection Schedule. If average flow falls below the flow range identified in the schedule, flow shall be returned, as soon as practical, to the original flow range for at least the time step identified in the schedule and then down ramp will resume according to the schedule. If average flow exceeds the flow range identified the schedule, flow shall be returned, as soon as practical, to the original flow range for at least the step duration specified in the schedule, then the down ramp will resume according to the schedule.
- If a subsequent spill event occurs in the months of May through August that does not exceed 1,200 cfs average daily flow, then the spill shall be down ramped according to the Standing Protection Schedule beginning at the step that includes the largest flow observed (e.g., if the spill flow equals 700 cfs average daily flow, the down ramping begins at Step 4). Spills that do not exceed 500 cfs (average daily flow) will not be down ramped.

2.6 Testing of Spill and Non-Spill Year Operations

During the first two years when boating flows and down ramping of spill is implemented at Dam 7 (Sections 2.1-2.3, 2.5) and during the first two years when non-spill boating flows and down ramp is implemented at Dam 7 (Section 2.4), the Licensee will test their ability to manage flows to provide the specified flow schedules. Any deviations from the specified schedules during this period will not be considered a compliance violation; however, any deviation will be reported to the FERC, USFS, CDFW, and the SWRCB within 30 days of the occurrence. At the conclusion of each of the first two spill years and at the conclusion of each of the first two non-spill years, the Licensee will submit a testing report to the FERC, USFS, CDFW, SWRCB, American Whitewater, Tribes, and TRG by January 15 of the following year. The testing report shall include Redinger Reservoir inflow, outflow, and storage; river gaging data; and a description of the Licensee's attempt/ability to meet the flow schedules. After the second year of testing, the Licensee may recommend modifications to the down ramp of spill or non-spill year schedules (or the Section 3.0 schedules), as needed, based on infrastructure / operational limitations while attempting to maintain the original intent of the flow schedules provided herein (Section 1.0). The Licensee shall consult with USFS, CDFW, SWRCB, American Whitewater, Tribes, and TRG to discuss potential recommended modifications to the LTOR. Any modifications will require approval from the USFS, CDFW, and SWRCB. Following approval by the USFS, CDFW, and SWRCB, the Licensee will submit the modified flow schedules to FERC for approval. The Licensee shall implement the modified flow schedules as approved by FERC.

3.0 Other Spill Considerations

3.1 Spills September 1 to October 31

From September 1 through October 31 in all water year types, the Licensee shall down ramp the declining limb of spills once the average daily flow declines below 1,600 cfs. The Licensee will make a good faith effort to initiate the down ramp prior to average hourly flow declining below 1,200 cfs.

The Licensee shall down ramp spill flows from Dam 7 according to the following schedule (Sep/Oct Schedule):

- Step 1. Maintain flow within a range of 1,600-1,200 cfs for 2 hours
- Step 2. Reduce the flow within a range of 1,200-800 cfs for 2 hours
- Step 3. Reduce the flow within a range of 800-600 cfs for 2 hours
- Step 4. Reduce the flow within a range of 600-400 cfs for 2 hours
- Step 5. Reduce the flow within a range of 400-200 cfs for 2 hours
- Step 6. Reduce the flow within a range of 200-MIF cfs

Compliance with the down ramping of spills from September 1 through October 31 requires that the Licensee meet the following conditions:

- Down ramp must be made on the step and time specified in the Sep/Oct Schedule unless access to the streamflow release infrastructure is prohibited by hazardous conditions or if there is an equipment/infrastructure malfunction/outage or ISO emergency. If this occurs, the FERC, USFS, CDFW, SWRCB, Tribes, and TRG will be notified of the circumstances, as soon as possible, but no later than 2 business days after such incident and the boating flow and down ramp must be continued as soon as

practicable, if conditions allow. If requested by the FERC, USFS, CDFW, SWRCB, Tribes, and/or TRG, the Licensee will hold a meeting (or conference call) to discuss.

- Down ramp must be maintained for at least the number of hours (duration) identified in the schedule. Each step of the down ramp can have a duration longer than that specified.
- Once the flows are set at the beginning of a down ramp step, average flow during each time step in the schedule must at all times be compliant with the flow range specified in the Sep/Oct Schedule. If average flow falls below the flow range identified in the schedule, flow shall be returned, as soon as practical, to the original flow range for at least the time step identified in the schedule and then continued according to the schedule. If average flow exceeds the flow range identified the schedule, flow shall be returned, as soon as practical, to the original flow range for at least the step duration specified in the schedule, then the down ramp will resume according to the schedule.
- If a spill event occurs from September 1 to October 31 that does not exceed 1,200 cfs average daily flow, then the spill shall be down ramped according to the Sep/Oct Schedule beginning at the step that includes the largest flow observed (e.g., if the spill flow equals 700 cfs average daily flow, the down ramping begins at Step 4). Spills that do not exceed 500 cfs (average daily flow) will not be down ramped.

3.2 Short-term Large Woody Debris Management Spills

If the Licensee initiates a gate opening at Dam 7 for the purpose of providing a short-term pulse flow (i.e., spill) to flush large woody debris (LWD) (LWD flow) from the face of the dam downstream into the Horseshoe Bend Reach of the San Joaquin River in the months of May through October, then the Licensee will notify the USFS, CDFW, SWRCB, American Whitewater, Tribes, and TRG via email a minimum of two business days prior to the gate opening. In an emergency situation, notification will occur within two business days after the event. The Licensee will implement appropriate public safety measures during any LWD flows.

The Licensee will release LWD flows according to the following requirements:

- Prior to a LWD flow the following safety measures will be implemented:
  - Signage will be posted at least one day prior to the LWD flow (if possible) at both ends of the Horseshoe Bend Trail; at the top of the Willow Creek Trail and parking area; and at the intersection of Powerhouse Road (aka County Road 222) and County Road 235 (near Kerckhoff Reservoir).
  - Notification by email at least one day prior to the LWD flow (if possible) to the USFS, CDFW, SWRCB, American Whitewater, Tribes, and the TRG.
  - Notification to the public at least one day prior to the LWD flow (if possible) by posting on the Licensee's webpage (http://kna.kisters.net/scepublic/# or its replacement).
  - If flow below Dam 7 (USGS Gage No. 11242000) is less than 2,000 cfs prior to the LWD flow release, the Licensee will increase flows to 2,000 cfs prior to 5:30 am before initiation of the LWD flow release.
  - Activation of the alarm horn at Dam 7 immediately prior to initiating the LWD flow.

- For LWD flows in the months of May through August:
  - The Licensee will make a good faith effort to implement LWD flows prior to a scheduled spill year or non-spill year down ramping event.
  - LWD flows that occur prior to or after a down ramping event will be down ramped according to the Stranding Protection Down Ramp schedule (Section 2.5).
  - If a LWD flow must occur during a down ramping event, the LWD flow will be down ramped as follows:
    - If the flow step at the initiation of the LWD flow is above 1,600 cfs, the scheduled down ramp will be resumed once the flow returns to the original flow step.
    - If the flow step at the initiation of the LWD flow is below 1,600 cfs, the LWD flow will be down ramped according to the Stranding Protection Down Ramp Schedule (Section 2.5) until the flow returns to the original flow step. After which, down ramping will resume according to the original down ramping schedule.
- For LWD flows in the months of September through October:
  - LWD flows will be down ramped according to the schedule in Section 3.1.

4.0 Monitoring

The goal of long-term monitoring is to determine whether implementation of the LTOR support native aquatic species and their habitats. The monitoring approach is to obtain, for comparative purposes, periodic information on water temperature, flow, fish populations, mussels, western pond turtles, and foothill yellow-legged frogs (presence/absence based on sampling for eDNA) within the Horseshoe Bend Reach of the San Joaquin River. This information will be compared to historic data and data collected as part of the Adaptive Management Plan and Native Aquatic Species Management Plan (SCE 2008b) to evaluate native aquatic species and habitat trends.

Monitoring will be conducted at each of the monitoring sites (Appendix D) in Year 1 and Year 2 following adoption of the LTOR, with a requirement for monitoring in Year 3 if the first two years do not include both a spill and non-spill year. After which, monitoring will occur every five years for the term of the license including license extensions. The Licensee will file monitoring reports to the FERC, USFS, CDFW, SWRCB, Tribes, and TRG. Details of the long-term monitoring are provided in Appendix D.

5.0 Minimum Instream Flow

In the Project license and associated 4(e) and 401 conditions, development of the LTORs include an evaluation and potential modification of the MIF requirement.

However, flow release infrastructure issues at Dam 7 have resulted and continue to result in the Licensee over-releasing MIFs in the Horseshoe Bend Reach of the San Joaquin River by 15 to 20 cfs (minimum flow releases in recent history have been in the 30 to 40 cfs range). Monitoring data collected as part of the NASMP and used in TRG evaluations have been made at the higher instream flow releases. The Licensee plans to repair the infrastructure issues at Dam 7 such that future instream flow releases may be lower and more consistent with the license requirements. Therefore, the USFS, CDFW, SWRCB, Tribes, and TRG reserve the right to evaluate and recommend modifications to the MIF requirements in the future should an infrastructure repair be implemented at Dam 7.

If infrastructure repairs at Dam 7 occur and instream flows drop below 30 cfs (average daily flow; USGS Gage No. 11242000) for more than 7 days, the Licensee will collect water temperature data in the Horseshoe Bend Reach of the San Joaquin River to evaluate the effect of instream flow on water temperature. The Licensee will install five temperature probes in the Horseshoe Bend Reach of the San Joaquin River at the following monitoring locations: USGS Gage No. 11242000, Willow Creek, Below Willow Creek, San Joaquin River Horseshoe Bend East, Fish Population Site 4, and Upstream of Big Creek No. 4 Powerhouse (Appendix D, Table 1). Water temperature will be monitored annually for a minimum of three years encompassing at least one spill year and one non-spill year. A meteorological station will also be maintained at Dam 7 during this monitoring period. The Licensee will compare this monitoring data (instream temperature, meteorological, and flow information) to historical data collected as part of the NASMP and LTOR monitoring, and prepare a report for review by the USFS, CDFW, SWRCB, Tribes, and TRG. The Licensee will convene a meeting with the USFS, CDFW, SWRCB, Tribes, and TRG to discuss the monitoring results and identify any additional steps necessary to evaluate MIF license requirements. If revisions to the MIF license requirements are deemed necessary to meet the objectives of the LTORs, the Licensee, USFS, CDFW, SWRCB, Tribes, and/or TRG can recommend modifications to the MIF requirement. Approval of any modification to the MIF requirements will require approval of USFS, SWRCB, and FERC consistent with the approval process for the LTORs.

6.0 Consultation

The LTOR includes the following consultation activities:

Annual Reporting

Annually, by January 15th, the Licensee will provide a report to USFS, CDFW, SWRCB, American Whitewater, Tribes, and TRG (Participants) documenting: (1) compliance with the LTOR (notifications, safety, down ramps, boating days, annual flow and temperature monitoring data, forecasting, testing results, LWD management); (2) any new listings of aquatic species currently occurring in or proposed for reintroduction in the Horseshoe Bend Reach of the San Joaquin River; and (3) recommendations to modify or further evaluate the LTOR, as appropriate. The report will also include the monitoring results in the years following biological data collection (see Section 4.0), including trends in the native aquatic community based on long-term monitoring results and identification of potential threats to the native aquatic community. Peer review or consultation with additional technical specialists may be included as part of the consultation.

Consultation

The Licensee will convene an annual meeting with Participants in February for the first five years following implementation of the LTOR and in all years following completion of biological monitoring. The purpose of the meetings will be to discuss the report described above. In other years, the Licensee will convene a meeting if requested by USFS, CDFW, SWRCB, Tribes, and/or TRG.

A draft summary of each annual consultation meeting will be provided by the Licensee to the Participants for review and comment within 15 days of the meeting. The Participants will be given 30 days to provide any comments on the draft summary. The Licensee will address Participants comments in a final meeting summary filed with USFS, SWRCB, and FERC, within 30 days after Participant comments are due. Any disagreements/unresolved issues between the Participants will be incorporated into the final meeting summary.

Testing of Spill and Non-Spill Operations Consultation

At the conclusion of each of the first two spill years and at the conclusion of each of the first two non-spill years, the Licensee will consult with the Participants regarding any proposed modification to the down ramp of spill flow or non-spill year schedules, as needed, based on infrastructure/operational limitations (Section 2.6). This consultation can occur at an annual meeting, described above.

Following completion of the testing of spill and non-spill operations consultation, the Licensee will consult with the Participants regarding any flow spikes that occurred during down ramping events, including the rate of attenuation of the flow spikes and the ability of the Licensee to implement Stranding Protection Down Ramp (Section 2.5) for future flow spikes, if applicable.

Infrastructure Malfunction, Hazardous Condition, or ISO Emergency Consultation

If requested by the FERC, USFS, CDFW, SWRCB, Tribes, and/or TRG, the Licensee will schedule a meeting or conference call to discuss compliance with the boating flow and down ramping requirements if access to the streamflow release infrastructure is prohibited by hazardous conditions or if there is an equipment/infrastructure malfunction affecting inflows or outflow to/from Redinger Lake or an ISO emergency (Section 2.1 – 2.5, 3.1).

Forecasting Consultation

If requested by the FERC, USFS, CDFW, SWRCB, Tribes, and/or TRG, the Licensee will schedule a meeting or conference call to discuss SCE's forecasting methods and potential improvements to the methods if forecasting is affecting implementation of the LTOR. This consultation may occur at an annual meeting, described above.

7.0 References

SCE (Southern California Edison). 2008a. Final Adaptive Management Plan (AMP). Big Creek, California. July 2008.

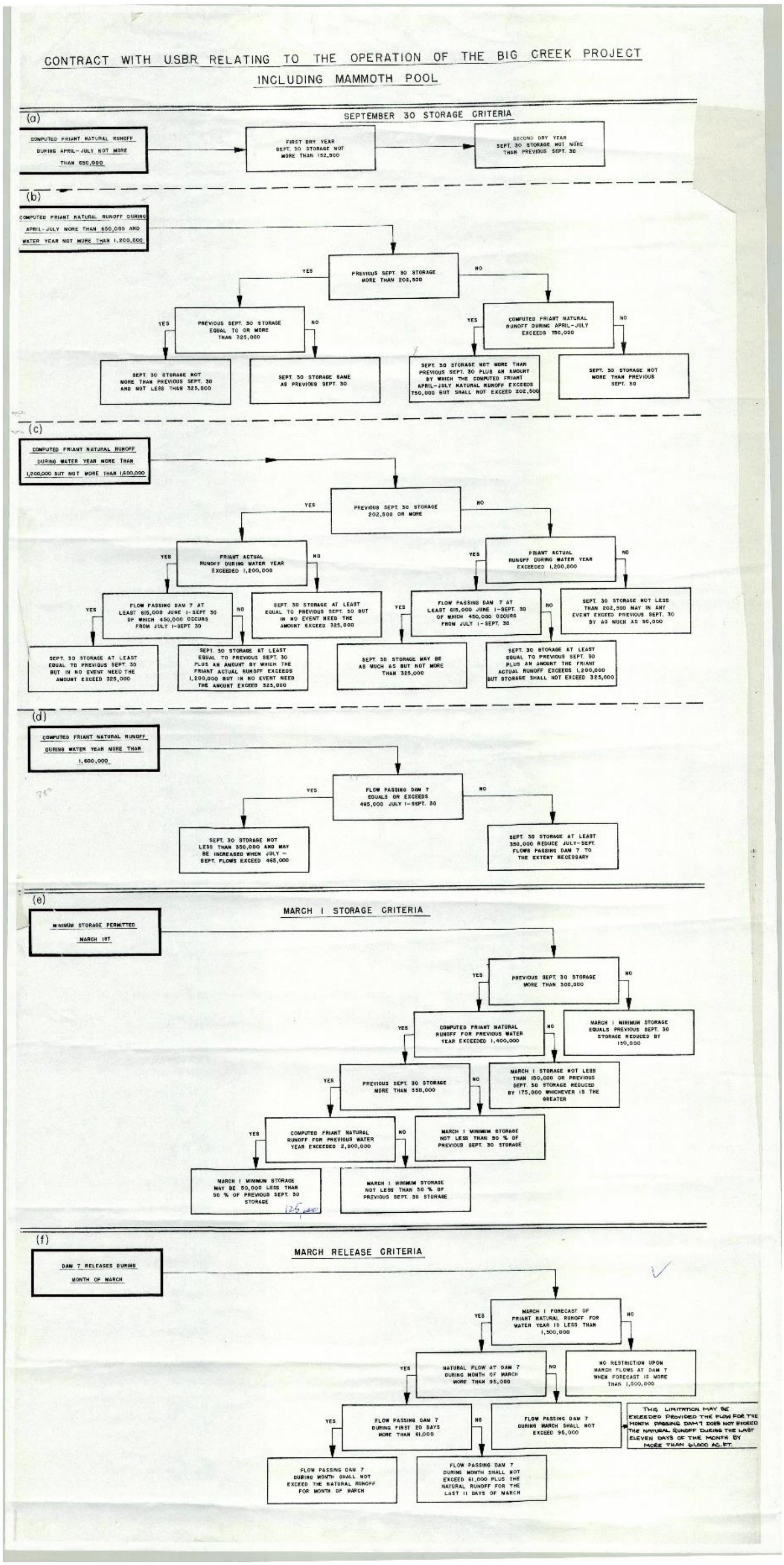
SCE. 2008b. Final Native Aquatic Species Management Plan (NASMP). Big Creek, California. July 2008.

Appendix A: List of Technical Studies Used in Development of the Long-Term Operating Rules

Report / Study	Reference
A technical report on riverine fishery studies conducted in support of the Big Creek Expansion Project.	BioSystems Analysis, Inc. 1987
Big Creek No. 4 Water Power Project (FERC No. 2017). Application for New License for Major Project Existing Dam.	SCE 1997
CAWG 2 Geomorphology, Technical Study Report.	SCE 2003
Adaptive Management Plan for River Flows and Native Aquatic Species Management Plan. Big Creek No. 4 Hydroelectric Project, FERC Project No. 2017.	SCE 2008
Whitewater Navigability Flow Survey First Rapid, Horseshoe Bend Run San Joaquin River.	SCE 2008
Native Aquatic Species Management Plan. Draft 2007 Data Collection Report. Big Creek No. 4 Hydroelectric Project, FERC Project No. 2017.	SCE 2009
Native Aquatic Species Management Plan. Draft 2008 Data Collection Report. Big Creek No. 4 Hydroelectric Project, FERC Project No. 2017.	SCE 2009
Native Aquatic Species Management Plan. Draft 2009 Data Collection Report. Big Creek No. 4 Hydroelectric Project, FERC Project No. 2017.	SCE 2010
Native Aquatic Species Management Plan. 2010 Data Collection Report. Big Creek No. 4 Hydroelectric Project, FERC Project No. 2017.	SCE 2011
Dam 7 Spill Management Feasibility Study Report, San Joaquin River. Big Creek No. 4, FERC Project No. 2017.	SCE 2012
Native Aquatic Species Management Plan. 2011 Data Collection Report. Big Creek No. 4 Hydroelectric Project, FERC Project No. 2017.	SCE 2012
Native Aquatic Species Management Plan. 2012 Data Collection and Baseline Report. Final. Big Creek No. 4 Hydroelectric Project, FERC Project No. 2017.	SCE 2013
Native Aquatic Species Management Plan and Adaptive Management Plan. 2013 Data Collection Report. Big Creek No. 4, Hydroelectric Project, FERC Project No. 2017.	SCE 2014
Native Aquatic Species Management Plan and Adaptive Management Plan. 2014 Data Collection Report. Big Creek No. 4, Hydroelectric Project, FERC Project No. 2017.	SCE 2015
Native Aquatic Species Management Plan. 2015 Data Collection Report. Big Creek No. 4 Hydroelectric Project, FERC Project No. 2017.	SCE 2016
Hydrographic Analysis of Spills below Dam 7. Technical Memorandum.	SCE 2016
Native Aquatic Species Management Plan. Draft 2016 Data Collection Report. Big Creek No. 4, Hydroelectric Project, FERC Project No. 2017.	SCE 2017
Big Creek 4 Potential Whitewater Boating Opportunity Days Summary Analysis. Technical Memorandum.	SCE 2017
Native Aquatic Species Management Plan. 2017 Data Collection Report. Big Creek No. 4, Hydroelectric Project, FERC Project No. 2017.	SCE 2018
Experimental Flow Management. Technical Memorandum.	SCE 2018
Stage-Discharge Analysis. Technical Memorandum.	SCE 2018
Ramp-Down and Stranding Study in the Horseshoe Bend Reach below Dam 7. Technical Memorandum.	SCE 2018

Appendix B: Mammoth Pool Operating Contract Flow Diagram

Southern California Edison (SCE) operates its Big Creek System (BCS) reservoirs consistent with the Mammoth Pool Operating Contract (MPOC), which specifies cumulative reservoir storage constraints based on the computed natural runoff for the water year at Friant Dam. The MPOC specifies water storage and release requirements for the BCS reservoirs, which are upstream of Friant Dam (Millerton Lake) and the associated Central Valley Project water distribution system operated by U.S. Bureau of Reclamation (Reclamation) on behalf of the downstream irrigators. Millerton Lake is a major irrigation storage facility serving the central San Joaquin Valley agricultural community. Meetings between SCE, Reclamation, and the downstream irrigators are held following the March 1 runoff forecast each year, and periodically as needed, to coordinate and optimize hydropower production consistent with irrigation needs of the downstream agricultural users holding senior water rights and emergency flood control operations of Millerton Lake. The MPOC includes constraints on the annual and seasonal timing and volume of releases from SCE's BCS reservoirs, maximum year-end storage allowed, and minimum seasonal flow to the river downstream. The requirements contained in the MPOC are distinct from the requirements in the BCS FERC licenses.


CONTRACT WITH U.S.B.R. RELATING TO THE OPERATION OF THE BIG CREEK PROJECT
INCLUDING MAMMOTH POOL
(a)
SEPTEMBER 30 STORAGE CRITERIA
COMPUTED FRIANT NATURAL RUNOFF DURING APRIL-JULY NOT MORE THAN 650,000
FIRST DRY YEAR SEPT. 30 STORAGE NOT MORE THAN 152,500
SECOND DRY YEAR SEPT. 30 STORAGE NOT MORE THAN PREVIOUS SEPT. 30
(b)
COMPUTED FRIANT NATURAL RUNOFF DURING APRIL-JULY MORE THAN 650,000 AND WATER YEAR NOT MORE THAN 1,200,000
PREVIOUS SEPT. 30 STORAGE MORE THAN 202,500
PREVIOUS SEPT. 30 STORAGE EQUAL TO OR MORE THAN 325,000
SEPT. 30 STORAGE NOT MORE THAN PREVIOUS SEPT. 30 AND NOT LESS THAN 325,000
SEPT. 30 STORAGE SAME AS PREVIOUS SEPT. 30
COMPUTED FRIANT NATURAL RUNOFF DURING APRIL-JULY EXCEEDS 750,000
SEPT. 30 STORAGE NOT MORE THAN PREVIOUS SEPT. 30 PLUS AN AMOUNT BY WHICH THE COMPUTED FRIANT APRIL-JULY NATURAL RUNOFF EXCEEDS 750,000 BUT SHALL NOT EXCEED 202,500
SEPT. 30 STORAGE NOT MORE THAN PREVIOUS SEPT. 30
(c)
COMPUTED FRIANT NATURAL RUNOFF DURING WATER YEAR MORE THAN 1,200,000 BUT NOT MORE THAN 1,600,000
PREVIOUS SEPT. 30 STORAGE 202,500 OR MORE
FRIANT ACTUAL RUNOFF DURING WATER YEAR EXCEEDED 1,200,000
FLOW PASSING DAM 7 AT LEAST 815,000 JUNE 1-SEPT. 30 OF WHICH 450,000 OCCURS FROM JULY 1-SEPT. 30
SEPT. 30 STORAGE AT LEAST EQUAL TO PREVIOUS SEPT. 30 BUT IN NO EVENT NEED THE AMOUNT EXCEED 325,000
SEPT. 30 STORAGE AT LEAST EQUAL TO PREVIOUS SEPT. 30 BUT IN NO EVENT NEED THE AMOUNT EXCEED 325,000
SEPT. 30 STORAGE AT LEAST EQUAL TO PREVIOUS SEPT. 30 PLUS AN AMOUNT BY WHICH THE FRIANT ACTUAL RUNOFF EXCEEDS 1,200,000 BUT IN NO EVENT NEED THE AMOUNT EXCEED 325,000
FRIANT ACTUAL RUNOFF DURING WATER YEAR EXCEEDED 1,200,000
FLOW PASSING DAM 7 AT LEAST 815,000 JUNE 1-SEPT. 30 OF WHICH 450,000 OCCURS FROM JULY 1-SEPT. 30
SEPT. 30 STORAGE MAY BE AS MUCH AS BUT NOT MORE THAN 325,000
SEPT. 30 STORAGE NOT LESS THAN 202,500 MAY IN ANY EVENT EXCEED PREVIOUS SEPT. 30 BY AS MUCH AS 50,000
SEPT. 30 STORAGE AT LEAST EQUAL TO PREVIOUS SEPT. 30 PLUS AN AMOUNT THE FRIANT ACTUAL RUNOFF EXCEEDS 1,200,000 BUT STORAGE SHALL NOT EXCEED 325,000
(d)
COMPUTED FRIANT NATURAL RUNOFF DURING WATER YEAR MORE THAN 1,600,000
FLOW PASSING DAM 7 EQUALS OR EXCEEDS 485,000 JULY 1-SEPT. 30
SEPT. 30 STORAGE NOT LESS THAN 350,000 AND MAY BE INCREASED WHEN JULY-SEPT. FLOWS EXCEED 485,000
SEPT. 30 STORAGE AT LEAST 350,000 REDUCE JULY-SEPT. FLOWS PASSING DAM 7 TO THE EXTENT NECESSARY
(e)
MARCH 1 STORAGE CRITERIA
MINIMUM STORAGE PERMITTED MARCH 1ST
PREVIOUS SEPT. 30 STORAGE MORE THAN 300,000
COMPUTED FRIANT NATURAL RUNOFF FOR PREVIOUS WATER YEAR EXCEEDED 1,400,000
MARCH 1 MINIMUM STORAGE EQUALS PREVIOUS SEPT. 30 STORAGE REDUCED BY 150,000
PREVIOUS SEPT. 30 STORAGE MORE THAN 350,000
MARCH 1 STORAGE NOT LESS THAN 150,000 OR PREVIOUS SEPT. 30 STORAGE REDUCED BY 175,000 WHICHEVER IS THE GREATER
COMPUTED FRIANT NATURAL RUNOFF FOR PREVIOUS WATER YEAR EXCEEDED 2,000,000
MARCH 1 MINIMUM STORAGE NOT LESS THAN 50 % OF PREVIOUS SEPT. 30 STORAGE
MARCH 1 MINIMUM STORAGE MAY BE 30,000 LESS THAN 50 % OF PREVIOUS SEPT. 30 STORAGE
MARCH 1 MINIMUM STORAGE NOT LESS THAN 50 % OF PREVIOUS SEPT. 30 STORAGE
(f)
MARCH RELEASE CRITERIA
DAM 7 RELEASES DURING MONTH OF MARCH
MARCH 1 FORECAST OF FRIANT NATURAL RUNOFF FOR WATER YEAR IS LESS THAN 1,500,000
NATURAL FLOW AT DAM 7 DURING MONTH OF MARCH MORE THAN 95,000
NO RESTRICTION UPON MARCH FLOWS AT DAM 7 WHEN FORECAST IS MORE THAN 1,500,000
FLOW PASSING DAM 7 DURING FIRST 20 DAYS MORE THAN 61,000
FLOW PASSING DAM 7 DURING MARCH SHALL NOT EXCEED 95,000
THIS LIMITATION MAY BE EXCEEDED PROVIDED THE FLOW FOR THE MONTH PASSING DAM 7 DOES NOT EXCEED THE NATURAL RUNOFF DURING THE LAST ELEVEN DAYS OF THE MONTH BY MORE THAN 61,000 AC.FT.
FLOW PASSING DAM 7 DURING MONTH SHALL NOT EXCEED THE NATURAL RUNOFF FOR MONTH OF MARCH
FLOW PASSING DAM 7 DURING MONTH SHALL NOT EXCEED 61,000 PLUS THE NATURAL RUNOFF FOR THE LAST 11 DAYS OF MARCH
YES
NO

Appendix C: Whitewater Boating Opportunity Day Definitions

Provided below are definitions for whitewater boating terms that will be used by the Big Creek No. 4 Project Technical Review Group (TRG) to support development of Long-Term Operating Rules (LTOR) to provide boating opportunities in the Horseshoe Bend Reach of the San Joaquin River.

Whitewater Boating User Group:

- Intermediate to advanced whitewater boaters (Class III to Class IV skill levels), for all types of whitewater craft (kayaks, inflatable kayaks, canoes, rafts, inflatable mats, river-boards, etc.).

Whitewater Boating Flow Range:

- The flow range for existing whitewater boating opportunities, or the provision of a whitewater boating opportunity through the management of instream flow is 1,600 cubic feet per second (cfs) to 4,000 cfs as measured at the U.S. Geological Survey (USGS) Gage No. 11242000 (SAN JOAQUIN R AB WILLOW C NR AUBERRY CA). The lower limit of this flow range (1,600 cfs) is the minimum acceptable flow for the target user group. The upper limit of the range (4,000 cfs) is the flow threshold at which the difficulty of the whitewater is above the upper end of the target skill level (Class IV). The target flow range for scheduled whitewater boating release in a non-spill year is 2,000-2,500 cfs.

Flow Timing and Variation:

- For a day to be counted as a boating day, average hourly flow between 9 am and 6 pm must be between 1,600 cfs and 4,000 cfs with a flow variation no greater than 500 cfs.

Boating Season:

- *Existing Whitewater Boating Opportunities*

  For the identification of existing whitewater boating opportunities, any day meeting the flow range, flow timing, and flow variability criteria will constitute an existing whitewater boating opportunity day.

- *Flow-managed Whitewater Boating Opportunities*

  For whitewater boating opportunities provided though the management of flow, any day meeting the flow range, flow timing, and flow variability criteria from May 1 to August 31 will constitute a whitewater boating opportunity day.

Flow Continuity:

- *Boating Opportunity Day*

  A single day meeting the whitewater flow range, flow timing, flow variability, and boating season criteria will constitute a boating opportunity day.

- *Contiguous Opportunity Days*

  Consecutively occurring days meeting the whitewater flow range, flow timing, flow variability, and boating season criteria will constitute contiguous opportunity days.

- *2-Day Weekend Opportunity Days*

  Contiguous Saturday and Sunday dates meeting the whitewater flow range, flow timing, flow variability, and boating season criteria will constitute weekend opportunity days.

- *3-Day Weekend Opportunity Days*

  Contiguous Saturday and Sunday dates, with one additional contiguous day (Friday or Monday), meeting the whitewater flow range, flow timing, flow variability, and boating season criteria will constitute 3-day weekend opportunity days.

Boating Notification:

- Notification of whether it is a projected spill or non-spill year based on the Licensee's forecast will be provided to the U.S. Forest Service (USFS), California Department of Fish and Wildlife (CDFW), State Water Resources Control Board (SWRCB), American Whitewater, Tribes[1] and the TRG no later than May 1 each year. The Licensee will provide forecast information and notification by email and posting on the Licensee's webpage (http://kna.kisters.net/scepublic/#). Projected date(s) of boating opportunities will be provided as follows:
  - Spill years: The Licensee will make a good faith effort to estimate the timing, magnitude, and duration of boating flows. Projections and the Licensee's forecast information will be updated weekly from May 1 through August 31, or until no additional boating flows are projected.
  - Non-spill years: Notification will occur a minimum of two weeks prior to the boating flow release. If the Licensee forecasts a potential spill after the boating release occurs, the Licensee will provide notification within two weeks of the projected spill or as soon as possible.

[1] The following Tribes were consulted regarding the LTOR: North Fork Mono Tribe, North Fork Mono Nation, North Fork Rancheria of Mono Indians, and Big Sandy Rancheria Band of Western Mono Indians.