GUIDANCE DOCUMENT
Upper Sacramento River Spring Pulse Flow & Upper Sacramento River Scheduling Team LTO Implementation
May 14, 2020

I. PURPOSE

This document provides implementation guidance on the Upper Sacramento Spring Pulse Flow action pursuant to 4.10.4 of the U.S. Bureau of Reclamation's (Reclamation) Proposed Action and NOAA's National Marine Fisheries Service's (NMFS) Biological Opinion and Incidental Take Statement (ITS). The scope of guidance includes the deliverables, schedule, and processes of the Upper Sacramento Scheduling Team (USST), Sacramento River Temperature Task Group (SRTTG), and other teams to implement the Spring Pulse Flow. The primary deliverables are the USST meeting notes and the Pulse Flow Operation Plan and Fish Monitoring Plan related to the Spring Pulse Flow action. A Pulse Flow Operation Plan will describe a set of potential scenarios to be used by the USST and Reclamation to coordinate implementation of the pulse flow.

II. REQUIREMENTS

This section provides the applicable verbatim language for the Spring Pulse Flow action from the Reclamation PA and NMFS 2019 BiOp. No text was identified from the USFWS 2019 BiOp.

PROPOSED ACTION:

4.10.1.2 Spring Pulse Flows

Under the Core Water Operation, Reclamation would release spring pulse flows of up to 150 TAF in coordination with the Upper Sacramento Scheduling Team when the projected total May 1 Shasta Reservoir storage indicates a likelihood of sufficient cold water to support summer cold water pool management, and the pulse does not interfere with the ability to meet performance objectives or other anticipated operations of the reservoir. Total storage provides a surrogate for the likely cold water pool prior to stratification of the reservoir, and would inform the decision, in addition to monthly winter reservoir temperature measurements and climate forecasts. Reclamation would evaluate the projected May 1 Shasta Reservoir storage at the time of the February forecast to determine whether a spring pulse would be allowed in March and would evaluate the projected May 1 Shasta Reservoir storage at the time of the March forecast to determine whether a spring pulse would be allowed in April. Reclamation anticipates that a projected May 1 storage greater than 4 MAF provides sufficient cold water pool management for Tier 1 and may release the spring pulse if it does not impact the ability to meet project objectives. Reclamation could also determine, in coordination with the Upper Sacramento scheduling team, that while the reservoir is less than 4 MAF, there is sufficient water to do a pulse of up to 150 TAF. The Upper Sacramento scheduling team could also determine that the benefits of a spring pulse flow do not outweigh the potential negative impacts on the system, in which case Reclamation would not release one. Reclamation would also not make a spring pulse release if the release would cause Reclamation to drop into a Tier 4 Shasta summer cold water pool management (i.e., the additional flow releases would decrease cold water pool such that summer Shasta temperature management drops in Tier 4), would interfere with meeting performance objectives, or would interfere with the ability to meet other anticipated demands on the reservoir. The Upper Sacramento Scheduling Team would determine the timing, duration,

and frequency of the spring pulse within the 150 TAF volume. Wet hydrology downstream of Keswick Dam may meet the need for pulse flows without increased releases.

NMFS ITS:

RPM 1: Reclamation shall minimize the impact of the amount or extent of incidental take of listed species during operations of the Shasta Division. (NMFS BiOp page 815)
a. [...]
b. Reclamation shall not implement the Spring Pulse Flow if the release would cause Reclamation to drop into a lower Tier of the Shasta summer temperature management.

13.6 Conservation Recommendations (NMFS BiOp page 824)
Science and Monitoring
b. Support science actions such as marking and tagging/survival studies for Battle Creek Reintroduction, spring pulse flow actions and for studying alternative release strategies for Coleman National Fish Hatchery fall-run.
c. Support science, model development and monitoring; experimental design (with validation monitoring) for spring pulse flows

Essential Fish Habitat Conservation Recommendations for the Sacramento River (page 16 of NMFS' EFH response)
NMFS Conservation Recommendation, expected to result in increased survival of juvenile salmonids by mimicking the natural hydrologic cues that trigger salmonid outmigration, affects the Complex Channels and Floodplain Habitats, and Spawning Habitat Habitat Areas of Potential Concern: For Effect SR-2: NMFS considers the effect of the Spring Pulses action component to have a beneficial effect on Chinook salmon EFH. There is, however, some uncertainty ascribed to this benefit and as such, Reclamation should develop a monitoring plan in coordination with the relevant resource agencies [e.g. NMFS, USFWS, California Department of Fish and Wildlife (CDFW), etc.] to assess the effectiveness of a spring pulse in increasing juvenile migration success, when one is implemented. In addition, on an annual basis, Reclamation should disclose the steps taken in consideration of whether or not to implement a spring pulses action component.

Related to effect SR-2, NMFS also recommends the inclusion, by reference, of Term and Condition (T&C) 1.b from the Biological Opinion as a conservation recommendation that Reclamation shall not implement the spring pulse releases if they would cause Reclamation to drop into a lower tier of the Shasta summer temperature management.

Reclamation's response: Reclamation will continue to coordinate with the NMFS Southwest Fisheries Science Center and other agencies on their development of the monitoring activities to undertake in a spring pulse flow.

Reclamation will coordinate with the SRTTG in development of a spring pulse flow and the criteria needed to be met, including Shasta Dam storage, weather and climate forecasts, and upcoming water operations requirements, for a pulse to occur.

III. DELIVERABLES

Deliverables resulting from this effort follow the coordination described in Appendix C of the Proposed Action and a Pulse Flow Study Plan.

By the end of June of each year, Reclamation shall provide information, including spring pulse action, if taken. (Appendix C, G.b and G.c). This will include preliminary survival results.

The Pulse Flow Study Plan, developed by the USST, includes the necessary operational scenarios to select from annually and the fish monitoring plan. This Pulse Flow Study Plan should encompass the information necessary to consider the seasonal pulse flows for at least through 2025 to support consistency among the implementation of this action (see description below).

A Pulse Flow Operation Plan, drafted and finalized by the USST, will be developed each year using the Pulse Flow Study Plan scenarios and its Fish Monitoring Plan. The Operation Plan will include an estimate of improved outmigration survival.

IV. PROCESS

A. Upper Sacramento Scheduling Team (USST)

The Upper Sacramento Scheduling Team will include agency (CDFW, DWR, NMFS, Reclamation, USFWS) and stakeholder (Sacramento Central Valley Project Contractors and Sacramento River Settlement Contractors) technical staff with direct interest in the Pulse Flow Operation Plan and its Fish Monitoring Plan. Technical staff may include members with expertise in operations and/or fish science.

B. Timeline

2020

The USST will include members from the WY 2020 interagency and stakeholder Pulse Flow study team to draft and finalize the Pulse Flow Study Plan.

The USST will develop the Pulse Flow Study Plan that identifies multiple possible scenarios differing in their daily schedules (duration, rate of change, frequency of pulses, timing, and magnitude) for the pulse flow(s). The scenarios do not need to be calendar-based, but situational based on conditions such as: potential May hydrology and meteorology and anticipated Temperature Management Tier. These scenarios should include potential options for what pulse actions may occur if May 1 Shasta storage is projected to be above 4 MAF, which may be indicative of a tier 1 or 2 temperature management year. The Pulse Flow Study Plan should identify the criteria to consider these actions, including language from the LTO PA and NMFS RPM, such as avoiding increasing temperature-dependent mortality, the prohibition of causing a reduction in storage/cold water pool that would otherwise result in a Tier 4 year, avoiding changing temperature tiers, and any possible “rule of thumb” relationships related to late summer operations and temperature management. The Pulse Flow Study Plan will include information about the potential quantity of water necessary to be released for each scenario up to fully implementing the Spring Pulse Flow action using up to 150 TAF. The Pulse Flow Study Plan

will include a Fish Monitoring Plan to assess the effectiveness of a spring pulse in increasing juvenile migration success and alternative study plans for if a pulse does not occur.

2021+

February through May

Concurrently, and as early as practicable, Reclamation will notify and coordinate with stakeholders on the Upper Sacramento River of potential impacts of a spring pulse flow and report their findings to the USST. For example, Reclamation will need to coordinate with the Anderson-Cottonwood Irrigation District (ACID) to determine how the flashboards and related diversion dam infrastructure may potentially limit Keswick releases as operations develop through the spring. Reclamation may also facilitate USST discussions with the relevant parties regarding potential opportunities to reduce downstream diversions during spring pulse flows.

The USST will develop a Pulse Flow Operation Plan from the scenarios described in the Pulse Flow Study Plan considering potential pulses in April and May. This effort requires that a set of information be iteratively reviewed for developing and implementing a Pulse Flow Operation Plan. In February through April, the USST will review Reclamation's monthly operations forecasts, and use the 90% forecast to evaluate the May 1 Shasta Reservoir storage. Starting in March, monthly reservoir temperature measurements and climate forecasts will be shared with the USST (and SRTTG), and used to evaluate which potential pulse flow operation may occur.

In March and April, the USST will use the Pulse Flow Study Plan to identify the pulse flow scenarios most likely to be achievable based on current conditions described by the monthly reservoir temperature measurements and modeling. A suite of potential pulse flow scenarios or single scenario will be reported out at the monthly SRTTG meeting where the SRTTG will reserve time for discussion. The USST may indicate that the benefits of a spring pulse flow does not outweigh the potential negative impacts on the system, which would be identified in the Pulse Flow Operation Plan to ensure the Fish Monitoring Plan still is implemented.

In mid-March, Reclamation will provide draft Operational Outlooks suggesting end of April storage conditions (for an associated probability of hydrology) that can be used to estimate the relationship between future temperature performance and total Shasta reservoir storage (Figure 4-2 from the PA). If May 1 Shasta reservoir storage is forecast to be less than 4.0 MAF, Reclamation will determine, in coordination with the USST if there is sufficient water to do a pulse flow up to 150TAF. If May 1 Shasta reservoir storage is forecast to be greater than 4.0 MAF on May 1, the USST may recommend scenario(s) to Reclamation up to 150 TAF released for the pulse flow.

For the SRTTG March meeting, the USST shall present the possible pulse flow scenarios being considered from the Pulse Flow Operation Plan. If the USST identifies a pulse flow for April, it will be based on modifications to the March temperature modeling information presented at the SRTTG March meeting. Reclamation will provide updated temperature modeling by the end of March to the USST which includes likely temperature operations and the proposed pulse flow scenarios to consider any final refinement and for WOMT to consider how the selected scenario is forecast to affect juvenile Chinook migration success and Shasta summer temperature performance (i.e. winter-run Chinook salmon TDM). Based on the USST's recommended Pulse

Flow Operation Plan and potential discussion at WOMT, Reclamation will make a final determination as to whether or not to implement the Pulse Flow Operation Plan that includes a pulse flow in April.

If the USST develops an April pulse flow, it will provide a final Operation Plan to Reclamation at least two week (ideal: three weeks) prior to implementation. This affords the Public Affairs offices time for public notification.

In mid-April, Reclamation produces a draft Temperature Management Plan for the SRRTG. If May 1 Shasta reservoir storage is forecast to be less than 4.0 MAF, Reclamation will determine, in coordination with the USST if there is sufficient water to do a pulse flow up to 150TAF. If May 1 Shasta reservoir storage is forecast to be greater than 4.0 MAF on May 1, the USST may recommend to Reclamation a Pulse Flow Operation Plan scenario up to 150 TAF released for the pulse flow.

For the SRTTG April meeting, the USST shall present the possible pulse flow scenarios being considered from the Pulse Flow Operation Plan. If the USST identifies a pulse flow for May, it will be based on modifications to the April draft temperature management plan information presented at the SRTTG April meeting. Reclamation will provide temperature modeling to the USST as the earliest practicable date to consider any final refinement and for WOMT to consider how the selected scenario is forecast to affect juvenile Chinook migration success and Shasta summer temperature performance (i.e. winter-run Chinook salmon TDM). Based on the USST's recommended Pulse Flow Operation Plan and potential discussion at WOMT, Reclamation will make a final determination as to whether or not to implement the Pulse Flow Operation Plan that includes a pulse flow in May.

May

Reclamation produces a final Temperature Management Plan in mid-May. The Pulse Flow Operation Plan information should be reflected in the final temperature modeling presented in the final Temperature Management Plan. The modeling of temperature management plan targets (e.g. TDM, EOS CWP, and side gate operation) should be reported with and without the Pulse Flow Operation Plan.

Through weekly meetings in May, or more frequent communication, Reclamation will coordinate with the USST, as necessary, to implement the Fish Monitoring Plan of the Pulse Flow Operation Plan. Reclamation will operationalize the recommended scenario and the ability to meet performance objectives and other anticipated operations of Shasta Reservoir. USST will provide to Reclamation a finalized Pulse Flow Operation Plan at least two week (ideal: three weeks) prior to implementation. This affords the Public Affairs offices time for public notification.

Post-Pulse Flow (June of current water year-June of next water year)

The Fish Monitoring Plan results will be reported by its study team to the USST. The USST will review any preliminary survival results and share with SRTTG.

Reclamation will provide information regarding the Spring Pulse Action, if taken, in the report for the Shasta Storage Rebuilding and Spring Pulse (described in Appendix C, Exhibit G.b) and Annual Summary of Water Supply and Fish Operations (described in Appendix C, Exhibit G.c).

C. Change Orders

Changes to Keswick releases for the Spring Pulse Flow action require at least 48 hours prior notice to any desired releases. Change orders pursuant to the Spring Pulse Flow action will be e-mailed to the USST.

D. Water Operations Management Team

In April and May, as the USST provides their input on the potential pulse flow scenarios being considered for the Pulse Flow Operation Plan, Reclamation will communicate this information to WOMT.

E. Updates to Guidance Document

In addition, it is expected that as this guidance is being implemented there will be necessary revisions to the document to provide further clarification and refinement. Reclamation and DWR, with technical assistance from the USFWS, NMFS, and CDFW, commit to reviewing this implementation guidance following each water year, at a minimum, to identify and incorporate any necessary revisions.