

probability for increased spring flows in the Snake River. These shifts may be implemented after coordination with the TMT.

6.10 Lower Snake River Dams (Lower Granite, Little Goose, Lower Monumental, Ice Harbor)

6.10.1 Reservoir Operations

The four lower Snake River CRS projects (Lower Granite, Little Goose, Lower Monumental, and Ice Harbor) are operated for multiple purposes including fish and wildlife conservation, irrigation, navigation, hydropower generation, recreation, and limited FRM. As described in the Joint Motion to Extend the Litigation Stay and subsequent extensions of the stay, the Corps shall operate Lower Granite, Little Goose, Lower Monumental, and Ice Harbor Dams at minimum operating pool (MOP) with a 1.5 foot forebay operating range and a 1.0 foot range to the extent possible (referred to operationally as a “soft constraint”) from April 3 until August 14, 2024 (August 31 for Lower Granite), unless adjusted on occasion to meet authorized project purposes, primarily navigation, as specified in the FOP (e.g., 2023 FOP Section 4.6).

The Corps conducts a bathymetric survey of the federal navigation channel annually to assure a 14 foot depth is maintained in the federal navigation channel. Bathymetric surveys performed from 2017-2022 showed impairment of the federal navigation channel in the Lower Granite pool. As a result, the Corps implemented a variable MOP operation at Lower Granite from 2018-2022 to help maintain a minimum depth of 14 feet in the federal navigation channel. Dredging of the federal navigation channel was completed in February 2023 to remove the sediment and allow Lower Granite to operate throughout its normal forebay range. In 2023, with the federal navigation channel restored, Lower Granite operated in the normal MOP range (733.0-734.5 feet) from April 3 until August 31. Lower Granite will operate in the normal MOP range from April 3 through August 31, 2024, unless adjusted on occasion to meet authorized project purposes, primarily navigation, as specified in the FOP.

6.10.2 Snake River Zero Generation

Zero Generation Operations as described in the 2020 CRSO EIS ROD will no longer commence as early as October 15, and will instead commence once the previously defined implementation trigger of “few, if any” actively migrating anadromous fish (as described in SOR 2005-22) has been met. This trigger will be implemented in relation to both date (implementation will be limited to periods between December 1 and through February 28) and abundance.

Salmon Managers submitted System Operations Request (SOR) 2005-22 Snake River Zero Nighttime and Weekend Flow, to the Action Agencies (AA) on December 6, 2005. The SOR may be found on the following website:

<http://pweb.crohms.org/tmt/sor/2005/2005-22.pdf>

In the SOR, the Salmon Managers provided the AAs with the following table to define the criteria of “... few, if any ...” prior to the implementation of the Zero Generation Operation. The few migrating adult criterion trigger will be defined on a sliding scale outlined in the following table. The table applies to both “wild” and “total” categories of returning adult steelhead.

Table 12: The Few Migrating Adult Criterion Trigger (SOR 2005-22)

Run to date>#	Run to date< #	Few criteria< #
0	30,000	10
30,000	60,000	20
60,000	100,000	35
100,000	150,000	50
150,000	200,000	65
200,000	250,000	80
250,000		100

System Operations Request 2005-22 defined “few” migrating adults; this SOR has guided operations through 2019. Over time, these criteria have been slightly modified to include:

1. The number of adults migrating per day is defined as the number of upstream counts minus the number of downstream counts, as reported on the Fish Passage Center’s website (https://www.fpc.org/currentdaily/HistFishTwo_7day-ytd_Adults.htm).
2. A three-day moving average will be used to determine if the few migrating adult criterion has been met.
3. The criteria apply to both “Unclipped” and “total” categories of returning adult steelhead. “Unclipped” and “total” returns will be calculated separately. Only one of the categories is necessary to show that more than a few adults are migrating.
4. The run to date is defined as the cumulative number of adult steelhead in the “Unclipped” and “total” categories passing Lower Granite Dam since July 1st of the return year.

During the period between the date the criteria above is met and end of February discharge at the four lower Snake River CRS projects may be reduced discharge to the project minimum discharge. The reduction in discharge is limited to the nighttime hours identified below. The utilization of this flexibility will be consistent with the historical use of the operation during the months of December through February.

The timing of “*nighttime*” and “*dawn*” changes throughout the year. Based on the hours of actual Civil Twilight at Lower Granite Dam, the following hour ranges were coordinated during the October 21, 2020, TMT meeting to be consistent with the criteria identified in the 2020 CRS BA:

DATES	“NIGHTTIME” HOURS FOR ZERO GEN
December 1-14	1800-0600
December 15 - January 31	1800-0600 + up to 3 daytime hours
February 1-28	1900-0600 + up to 3 daytime hours

Sources for definitions and computation of nighttime hours:

<https://www.esrl.noaa.gov/gmd/grad/solcalc/glossary.html>

<https://www.esrl.noaa.gov/gmd/grad/solcalc/calcdetails.html>

6.10.3 Lower Granite Dam Flow Objectives

6.10.3.1 Spring Flow Objectives

The April final runoff volume forecast at Lower Granite Dam for April to July determines the spring flow objective at Lower Granite Dam. When the forecast is less than 16 million acre-feet (MAF), the flow objective will be 85 kcfs. If the forecast is between 16 and 20 MAF, the flow objective will be linearly interpolated between 85 and 100 kcfs. If the forecast is greater than 20 MAF, the flow objective will be 100 kcfs. The flow objective is measured as the season average of the discharge at Lower Granite between the planning dates of April 3 to June 20. These flow objectives are provided as a biological guideline and will likely not be met throughout the entire migration season in all years because the flow in the Snake River primarily depends on the volume and shape of the natural runoff, while the augmentation volumes available are small in comparison to the overall objective. Flow in the Snake River during this period is supported by drafting Dworshak Dam and flow augmentation water from the upper Snake River.

6.10.3.2 Summer Flow Objectives

The June final runoff volume forecast at Lower Granite Dam for April to July determines the summer flow objective at Lower Granite Dam. When the forecast is less than 16 MAF, the flow objective will be 50 kcfs. If the forecast is between 16 and 28 MAF, the flow objective will be linearly interpolated between 50 and 55 kcfs. If the forecast is greater than 28 MAF, the flow objective will be 55 kcfs. The summer flow objective is measured as the season average of the discharge at Lower Granite between the planning dates of June 21 to August 31. The summer flow in the Snake River is augmented by the release of stored water upstream of Lower Granite Dam. The summer flow objectives are provided as a biological guideline and will likely not be met throughout the entire migration season in all years because there is a limited amount of stored water available for flow augmentation and the natural shape of the runoff generally produces decreasing streamflow from July to the end of August.

6.11 Lower Columbia River Dams (McNary, John Day, The Dalles, Bonneville)

6.11.1 Reservoir Operations

The four lower Columbia River CRS projects (McNary, John Day, The Dalles, and Bonneville) are operated for multiple purposes including fish and wildlife, irrigation, navigation, hydropower generation, recreation, and limited FRM. The AAs will operate the lower Columbia River reservoirs within their normal operating ranges. Additional information regarding turbine operations ($\pm 1\%$ from peak efficiency), and spill operations, may be found in the most current Fish Operations Plan and Fish Passage Plan.