# **SYSTEM OPERATIONAL REQUEST: #2020-3**

# Walla Walla District

The following State, Federal, and Tribal Salmon Managers have participated in the preparation and support this SOR: Idaho Department of Fish and Game, NOAA Fisheries, Colville Tribes, and Nez Perce Tribe

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**DATE:** June 02, 2020

#### SUBJECT: Little Goose Dam Performance Standard Spill Hours for Adult Passage

**OBJECTIVE:** Increase the number of hours of Performance Standard Spill at Little Goose Dam to reduce travel times of adult spring/summer Chinook salmon.

### **SPECIFICATIONS**

This SOR seeks to:

- (1) have operators maintain Performance Standard spill for a 12 hour block from 0400-1600 hours at Little Goose Dam (LGS). Extended Performance Standard spill hours will be implemented *every other day* from 08 -20 June. On off days, Performance Standard spill will occur as stipulated in the FOP.
- (2) increase the number of hours spilling to the 125% TDG gas cap at Lower Granite Dam (LWG) by three for a total of 19 Gas Cap spill hours at LWG. This operation will only occur on days when 12 hours of Performance Standard spill are implemented at LGS.

### JUSTIFICATION

Tailrace conditions at Little Goose Dam (LGS) during periods of high spill proportions make it difficult for adult Chinook salmon to find and enter the fish ladder. As a result, higher spill proportion at LGS is associated with higher travel times between Ice Harbor Dam (IHR) and Lower Granite Dam (LWG; Siegel and Crozier 2020). Subsequently, higher travel times may decrease survival to the tributary spawning habitats for some threatened populations in the Salmon River basin (Siegel and Crozier 2000), but that the observed effects may be limited to extreme travel times of greater than 20 days (FPC 2020). Additionally, individuals exhibiting slower travel through the hydrosystem arrive at the spawning grounds with lower energy reserves than individuals that travel faster with potential consequences for spawning success (Bowerman et al. 2017). Furthermore, faster travel times support timely tribal harvest opportunities of high quality fish in tributary areas.

Longer travel times occurring with increased proportion and duration of spill in recent years led to the implementation of a contiguous eight hours of Performance Standard spill (30% spill) from 0400-1200 hours at LGS. The goal of this operation is to provide a window within which adult Chinook salmon can locate the fish ladder entrances and pass over the dam. Overall, this block of Performance Standard spill has been effective with approximately 86% of PIT tagged fish first entered the LGS ladder during Performance Standard Spill for the period April 15 - May 27, 2020 (n total = 173; Figure 1). Similarly, approximately 86% of spring/summer Chinook salmon entered the ladder during Performance Standard spill during 2019 (n total = 587). Yet travel times have steadily increased since May 13. At present, the majority of tagged fish have travel times of greater than 8 days from IHR-LWG and greater than 3 days from Lower Monumental Dam (LMN) to LGS (Figure 2; Figure 3).

Extending the Performance Standard Spill period from 8 hours (0400-1200) to 12 hours (0400-1600) may allow more adults to pass Little Goose Dam on a given day and reduce travel times. The DART adult passage tool shows that approximately 70% of PIT tagged fish enter the ladder between 0900-1300 hours (Figure 4) suggesting that fish may require time to adjust to abrupt

changes in tailrace conditions and find the ladder. We will evaluate the response to this operation be comparing the distributions of entry hour during 8 hour vs 12 hour Performance Standard Spill days.

We suggest implementing the 12 hour Performance Standard spill operation every other day from June 08-20, 2020 to evaluate not only whether it allows the fish currently between LMN and LGS to pass, but also whether it results in lower travel times for fish passing ICH from approximately June 05 - 17.

Reducing spill at LGS to facilitate faster adult passage has the potential to negatively impact some juveniles and reduce SARs. NOAA used the COMPASS model in 2019 to evaluate potential effects on juveniles of 8 hour versus 12 hour daytime Performance Standard spill periods and concluded that any impacts on juvenile survival and travel time would be unmeasurably small at a season and hydrosystem wide scale. Yet, reach and time specific impacts to juvenile survival and travel times are important to consider given that this SOR seeks to address time- and reach- specific increased travel times of adults associated with the current operation.

Instantaneous PITPH at LGS as estimated by the NPT Shiny App increases from 0.19 to 0.27 during period described in this SOR, which may reduce SARs for 8% of juvenile Chinook salmon passing Little Goose during the period. The impact of the requested LGS operation on system PITPH for the period can be offset by 3 hours of additional spill at Lower Granite Dam, where spill has lower effects on adult passage. As such, we also request that an additional 3 hours of spill to the 125% TDG gas cap (3 hour reduction in Performance Standard spill) be implemented at Lower Granite Dam.

### References

Bowerman, T. E., A. Pinson-Dumm, C. A. Peery, and C. C. Caudill. 2017. Reproductive energy expenditure and changes in body morphology for a population of Chinook salmon Oncorhynchus tshawytscha with a long distance migration. Journal of Fish Biology 90:1960-1979.

Fish Passage Center. 2020. Review of Siegel and Croizier 2020: Upstream survival of Snake River spring/summer-run Chinook salmon in relation to travel time and conditions at Little Goose Dam. April 24, 2020 Memorandum to Michele Dehart. http://fpc.org/documents/memos/22-20.pdf

Siegel, J. and L. Crozier. 2020. Upstream survival of Snake River spring/summer-run Chinook salmon in relation to travel time and conditions at Little Goose Dam. Report for NOAA Fisheries, West Coast Region.



Figure 1. Frequency of adult entry into the LGS ladder at different spill proportion in from April 15-May 27, 2020. PIT tag data was queried from PTAGIS and depicts the first entry into the ladder for a given fish. Flow data at Little Goose Dam was queried from the USCOE – Northwest Division Data Query 2.0.



Figure 2. Travel time from IHR – LWG from Columbia Basin Research DART adult passage indicator tool.



Figure 3. Figure 2. Travel time from LMN – LGS from Columbia Basin Research DART adult passage indicator tool.



www.cbr.washington.edu/dart 31 May 2020 19:19:08 PDT Figure 4. Timing of adult Chinook salmon into the LGS fish ladder in 2020.