

# **SYSTEM OPERATIONAL REQUEST: #2021-3**

## **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, National Oceanographic and Atmospheric Administration, Nez Perce Tribe*

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**FROM:** Jonathan Ebel, Idaho Department of Fish and Game

**DATE:** July 01, 2021

**SUBJECT:** Requested operations to mitigate for and reduce high water temperatures in the lower Snake River reservoirs

**SPECIFICATIONS:** We request that two actions be initiated to reduce reservoir water temperatures in the Lower Snake River reservoirs and mitigate the impacts on adult and juvenile anadromous salmonids:

- (1) reduce spill to spillway weirs only at Lower Granite (LWG) and Little Goose (LGS) Dams from 0900-2300 h and return to summer spill volumes defined in the 2020 FCRPS Biological Assessment (2020 BA) from 2300-0900. Operation would begin July 03, 2021 and continue through July until coordinated otherwise;

- (2) initiate truck transport of juvenile migrants at Lower Granite and Little Goose Dams and transport until period of reduced spill ceases or continued through summer transport period previously scheduled to begin 01 August 2021 FPP Appendix E;

#### **JUSTIFICATION:**

An extended heat wave combined with low flows in the Lower Snake River and its major tributaries, and the heat-trapping characteristics of reservoirs, are resulting in water temperatures at the Lower Snake projects that may exceed the physiological limits of juvenile and adult anadromous salmonids. The requested action may lessen the impacts of high water temperatures in the Lower Snake River reservoirs by decreasing temperatures by a small, but not physiologically insignificant amount. Because salmonids are poikilothermic, small changes in temperatures can have disproportionately large physiological effects. Additionally, this action will provide for increased efficiency in the use of cold water flow augmentation from Dworshak Dam and can extend the use of that limited water volume later into August than currently projected with benefits for adult fall Chinook salmon and A-run steelhead.

**Action 1:** Reducing spill to spillway weirs only and increasing generation flow at LWG and LGS may decrease temperatures by increasing the proportion of water in the tailrace drawn from deeper levels of the respective forebays. In 2015, an experimental spill reduction was conducted to test whether reducing spill at LGS positively influenced sockeye passage and decreased temperatures (Haeseker 2015). Spill was eliminated between 0400-2000 h on two blocks of two consecutive days each during late July 2015. Sockeye passage and Lower Monumental (LMN) forebay temperatures during these blocks were compared to control blocks adjacent to the treatments in time. Haeseker (2015) found no significant effect of reducing spill on sockeye passage or LMN water temperatures.

While some deemed the action ineffective in 2015, modifications to the timing and spatial extent of a spill reduction action may increase its efficacy. In 2015, spill reduction only occurred for a short period of time (2 day blocks) and only at LGS. Reducing spill at Lower Granite Dam may produce a stronger and more persistent thermocline at the LGS forebay and decrease the temperature of generation flow more than if spill remains at current levels at LWG. Furthermore, spill resumed between 2000 – 0400 h during treatment blocks in 2015 such that spill resumption occurred when LGS forebay temperatures were highest on a given day and ended before forebay temperatures reached their daily minimum (see 2015 forebay string data). Maintaining spill at the spillways weirs at LWG and LGS throughout the day and shifting 2020 BA spill volumes to 2300-0900 can allow forebay water to pass when it is coolest, provide regular surface passage for juveniles during night and early morning hours, and potentially alleviate issues with forming extensive warm water lenses in the forebays of LGS and LWG.

**Action 2:** High water temperatures throughout the lower Snake and lower Columbia reservoirs increases thermal stress and predation on subyearling fall Chinook salmon migrants with consequences for survival. Truck transportation, as described in the 2020 Fish Operations Plan (FPP Appendix E), is scheduled to begin August 1<sup>st</sup> and is an action meant to increase survival of subyearling Chinook salmon migrating during the period when these fish typically experience high water temperatures. Given the known negative effects of current in-river conditions and the unknown costs and benefits of truck transportation of subyearlings, we think it is prudent to

spread the risk by beginning truck transport as soon as possible. Truck transport rates would increase with spill reductions at LGS and LWG (see Action 1).

**References:**

Haeseker, S. (2015). Assessment of Experimental Spill Operations at Little Goose Dam. Presentation at 2015 TMT Annual Review. December 02, 2015.

[http://pweb.crohms.org/tmt/agendas/2015/1202\\_Haeseker\\_TMT\\_YER\\_Haeseker.pdf](http://pweb.crohms.org/tmt/agendas/2015/1202_Haeseker_TMT_YER_Haeseker.pdf)