State, Federal and Tribal Fishery Agencies Joint Technical Staff Memorandum

Columbia River Inter-Tribal Fish Commission
Idaho Department of Fish and Game
NOAA National Marine Fisheries Service
Washington Department of Fish and Wildlife
Colville Tribes
Nez Perce Tribe
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SUBJECT: Early Juvenile Bypass System Operation Implementation Recommendation

DATE: August 2, 2017

In conjunction with the March 27, 2017 court ruling to provide PIT-tag monitoring at FCRPS projects beginning March 1, 2018, the Nez Perce Tribe, with input and support from the Fish Passage Advisory Committee (FPAC), has developed the following recommendation for the early operation of the juvenile bypass systems at FCRPS projects for 2018. Data from 2018 will be reviewed to inform operations in 2019-2021.

Background/Purpose:

The timing of juvenile bypass system start-up (late March) and hydro-system operations to aid juvenile passage (i.e. spill) have been structured around historical juvenile emigration patterns, which may not fully represent potential emigration timing shifts associated with climate change and/or other flow management practices. Evidence exists that the current system operation does not fully consider the entire emigration period. The early and late tails of a run are important for diversity and there is some evidence that fish are migrating earlier. With a question concerning the magnitude of earlier juvenile emigration, to and through the FCRPS hydro-system, estimates (or indices) of daily juvenile fish passage between March 1st and June 15 and 20th will provide data to inform decisions on hydro-system operations in the future.

Implementation Guidelines:

The following bullets are provided to address technical questions on how to effectively implement early "PIT tag monitoring" specific to 1) how many and which juvenile bypass systems should be operated, 2) should turbine intake screens be operated, and 3) need for concurrent smolt monitoring program juvenile fish sampling.

- Assessing juvenile emigration timing requires estimating or indexing daily juvenile passage at individual projects over the entire emigration (assessment) period.
- Monitoring juvenile emigration timing over variable conditions (multiple years) and through the entire FCRPS is preferred. However, acceptable alternatives for staggering early juvenile bypass operations are proposed below in Table 1. These alternatives were designed to:
    - Maintenance of Juvenile Bypass Systems (JBS),
    - Funding requirements of extended JBS operations, and
    - Robust estimates of juvenile emigration timing.
- Migration timing metrics include:
    - Juvenile Passage Index – Requires concurrent juvenile sampling by Smolt Monitoring Program (SMP) to expand sample counts by sample rate (i.e., proportion of hour actively sampling) and daily proportion of water passing through the powerhouse. This is currently conducted daily at Lower Granite Dam beginning March 26th and Bonneville Dam beginning approximately March 3rd. It is conducted every-other-day at Little Goose during April until transportation begins, then daily. At Lower Monumental, the SMP sampling schedule is every-third-day from April 1 to April 15, every-other-day from April 16 until transportation begins, and daily thereafter. SMP sampling is also conducted every-other-day at McNary and John Day dams, beginning April 1st. Ice Harbor Dam is not an SMP site and can't support a passage index estimate, as sampling here is only two days per week, for a limited period (few hours to get enough fish for condition). Estimates are generated by project specific (standalone) sampling.
    - PIT Tag Detection Index – Assumes representative tagging and consistent PIT tag detection efficiency over migration period. Standalone estimate per project.
    - Juvenile Population Index - This is an estimate of daily passage based on integrated SMP sampling and predicted PIT-tag detection probabilities (as a

function of daily flow and spill data). It is believed to be more accurate than the passage index for estimating the magnitude of passage because it does not assume a 1:1 fish to water ratio that is inherent in the passage index expansion. Currently, the population index is generated for yearling Chinook, steelhead, and subyearling Chinook at Lower Granite and Little Goose dams.

  - Priority monitoring focused on natural-origin juvenile emigration timing in response to environmental covariates; however hatchery-origin emigration timing also important.

- Standard operations (FCPRS BiOp requirement) of juvenile bypass systems utilize SMP fish condition sampling to monitor/detect bypass system operations and identify maintenance issues/needs.
- Juvenile bypass system operations typically include concurrent operation of turbine intake guidance screens. Delayed installation of screens at McNary Dam until mid-April, with intent to minimize juvenile lamprey mortality, can be continued, but may bias migration timing indices.

Table 1. Alternative Juvenile Bypass System implementation schedule for injunctive early (March) operations.[1]

Project	2018	2019	2020	2021
BONN[2]	X	X	X	X
TDA	NA	NA	NA	NA
JDA	X[3]	X	X[3]	X
MCN	X[4]		X[4]	
ICH		X		X
LMN	X		X	
LGO		X		X
LGR	X[5]	altX[5]	X	

[1] The FCRPS injunction court order provides that "[i]n light of the importance of the tails of a run for diversity and species adaptation, the Court orders PIT tag monitoring begin on March 1 of each year of the remand period, beginning in 2018." This implementation schedule covers a time frame that is designed to provide data on early migration and account for maintenance and funding needs.

[2] Juvenile bypass system operation at Bonneville Dam currently starts in early March; no change required for injunctive early migration monitoring.

[3] Early operation of John Day JBS on even years desirable (optional) to support Umatilla juvenile lamprey monitoring and Umatilla and John Day basin salmonid migration timing monitoring.

[4] Delay installation of turbine intake screens until mid-April to be maintained.

[5] Assumes that Lower Granite Juvenile Bypass rebuild is completed as scheduled (prior to March 2018); if delayed, Little Goose Juvenile Bypass System to be operated.

<u>Recommendations:</u>

1) Early operation (March 1st start up) of a subset of juvenile bypass systems (JBS) will provide additional data on juvenile emigration timing to and through the Federal Columbia River Power System. Priority projects for early operation in 2018 are: Lower Granite, Lower Monumental, McNary, and Bonneville dams. In addition, early operation of John Day Dam JBS would be beneficial to support Umatilla juvenile lamprey

monitoring and Umatilla and John Day basin salmonid migration timing monitoring. Out-year implementation should rotate across projects.

2) Turbine intake screens should be installed and operated concurrent with JBS operations, with the exception of McNary Dam, where intake screen installation/operation should be delayed until mid-April.
3) Early JBS operations should include concurrent Smolt Monitoring Program (SMP) juvenile fish sampling, applying existing sampling patterns (frequency) during early season operations.