SYSTEM OPERATIONAL REQUEST: NPT #2006-1 DRAFT

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FROM: Nez Perce Tribe

DATE: June 9, 2006

SUBJECT: 2006 Dworshak Summer Operations

General Framework

Operate Dworshak during summer for temperature control and flow augmentation, shaping augmented flows to avoid exceeding the Lower Granite tailrace temperature standard of 68F. Limit cold water releases during the first half of July for rearing fall chinook juveniles in the lower Clearwater River. After July 15, maintain continuous, evenly distributed discharges of 10 kcfs (full powerhouse capacity) to cool the Lower Snake. Provide discharges in excess of 10 kcfs, up to a maximum of 14 kcfs, as necessary to avoid exceeding the Lower Granite temperature standard, pursuant to actual in-season conditions. Achieve a target elevation of 1535 msl or higher by August 31 to preserve 200,000 acre-feet for September temperature/flow augmentation control as per the SRBA agreement. The management of 200,000 acre-feet (elevation 1535 to 1520 msl) will be determined by the Dworshak Board.[1] Achieve a target elevation of 1520 msl during September.

Monthly Criteria

June Operation

- Refill Dworshak Reservoir to full pool (Elevation 1600 msl) as soon as possible (June 30 or earlier)

[1] Dworshak Board created pursuant to Nez Perce SRBA Settlement Agreement ("Mediator's Term Sheet" dated April 20, 2004) consisting of the Nez Perce Tribe (Chair), NOAA Fisheries, U.S. Army Corps of Engineers, Bonneville Power Administration and the State of Idaho.

July Operation

- Maintain at full pool (pass inflows) through July 4 (45F).
- From July 5 –July 15th: increase discharge to 7 kcfs (45F). If temperatures at Lower Granite exceed 67F (19.4C), as measured in the tailrace, on a 24-hr rolling average, increase discharge to 10kcfs (powerhouse capacity) for as long as necessary so as not to exceed the Lower Granite temperature standard. (note Contingencies, below)
- July 16th –July 31: Increase flows to 10kcfs (43F) for temperature control/flow augmentation. If temperatures at Lower Granite exceed 67F (19.4C) on a 24-hr rolling average during this period, increase flows to 12kcfs for as long as necessary so as not to exceed the Lower Granite temperature standard. (note Contingencies, below)

August Operation

- Continue to operate at 10kcfs (powerhouse capacity) for temperature control/flow augmentation. If temperatures at Lower Granite exceed 67F (19.4C) on a 24-hr rolling average during this period, increase flows to 12kcfs for as long as necessary so as not to exceed the Lower Granite temperature standard. (note Contingencies, below)
- Achieve target elevation of 1535 msl or higher by August 31 to preserve 200,000 acre-feet for September temperature/flow augmentation control as per the SRBA agreement.

September Operation

- Shaping of the 200 kaf of September temperature control/flow augmentation water will be determined by the Dworshak Board. If the end of August elevation is higher than 1535, the amount of water between that elevation and elevation 1535 will be discharged based on in-season recommendations made by the Technical Management Team.

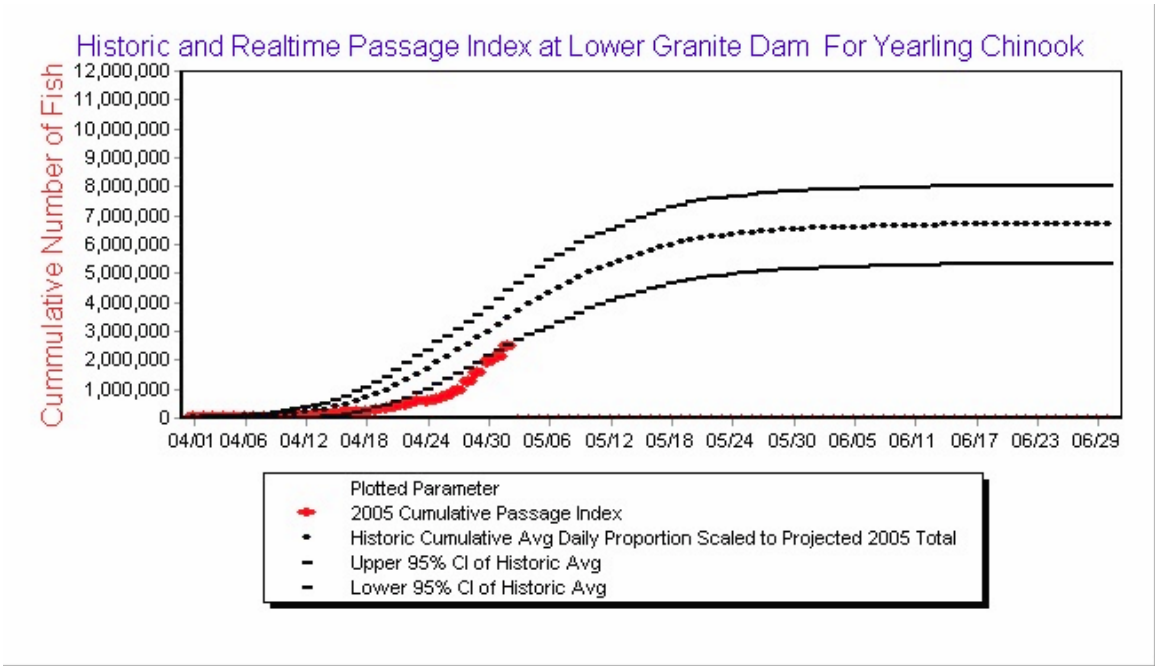
Contingencies

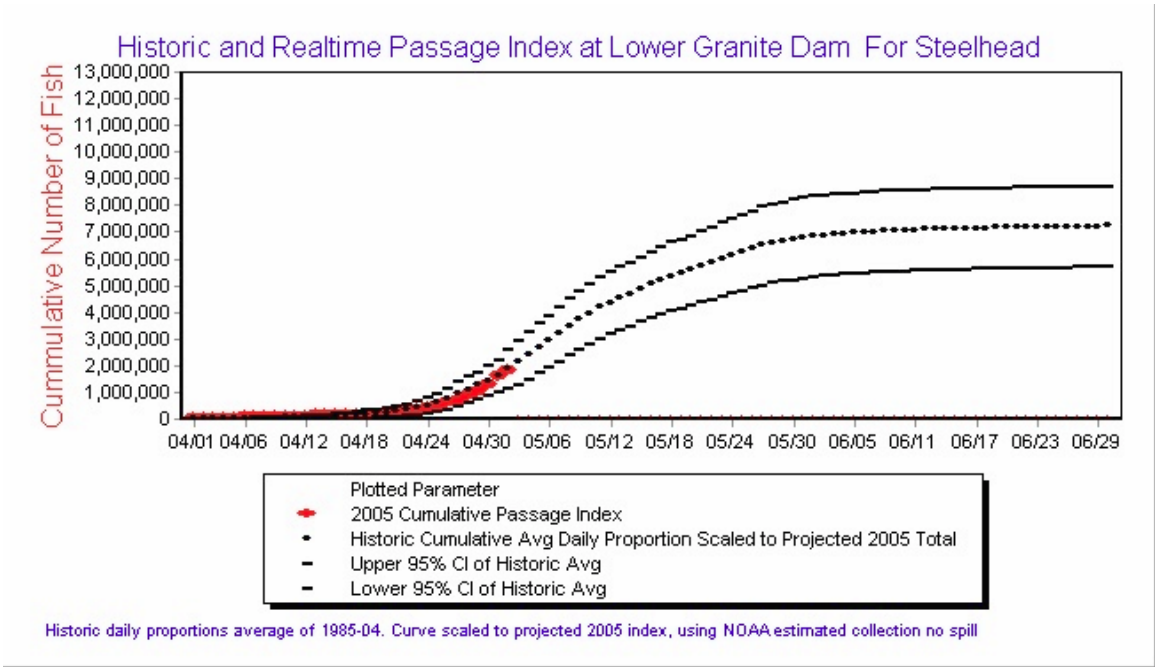
- If water temperatures at Lower Granite, as measured in the tailrace, exceed 67 deg. F on a 24 hour rolling average and appear likely to exceed the temperature standard (68 deg. F) based on weather and flow forecasts, Dworshak will provide additional flow above powerhouse capacity but not to exceed the total dissolved gas standard (approximately 14 kcfs)

Justification

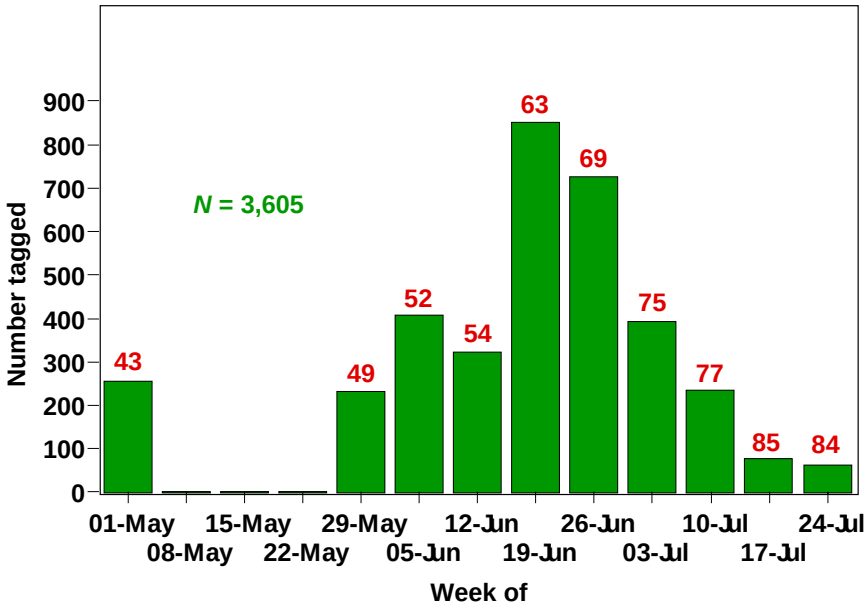
Fish Passage Timing

Based on historic timing, migrations of yearling chinook salmon and steelhead through the Lower Snake system are essentially completed by July 1, and water management for temperature and flow focuses on subyearling fall chinook. (See below figures for cumulative passage timing of yearling chinook and steelhead).

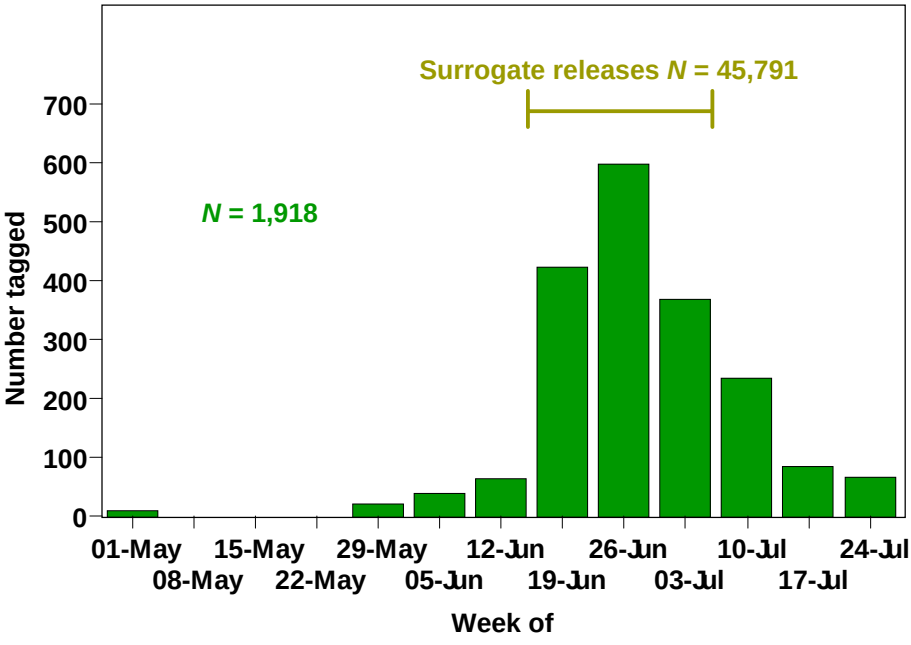




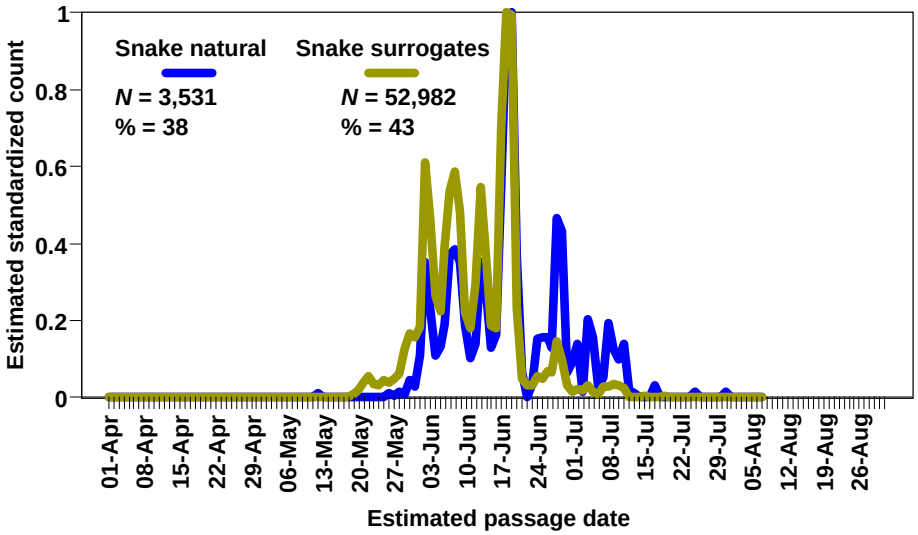
Clearwater River Catch and Fork Length



Clearwater River Tagging and Surrogate Releases



Estimated Passage of Snake River Subyearlings at Lower Granite Dam



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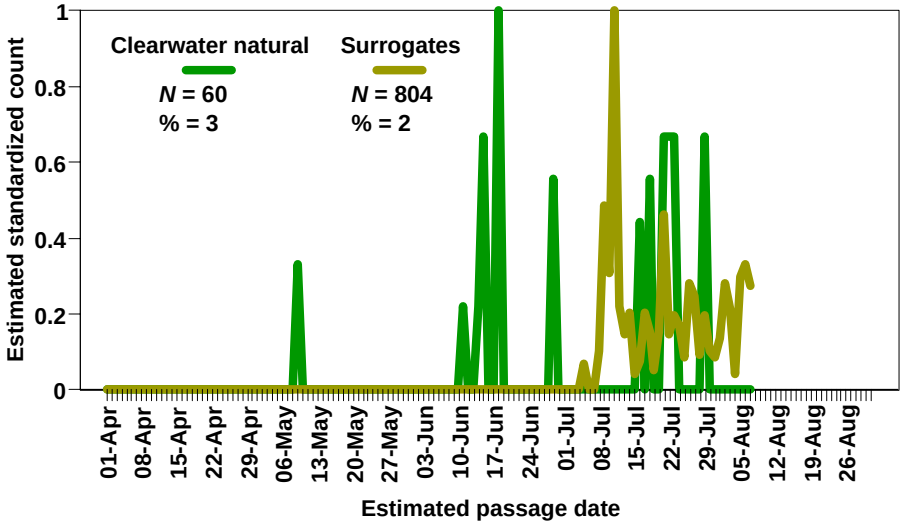

A presentation to the TMT in August 2005 reported that the Clearwater River sub-aggregate population of juvenile fall chinook population moved 1-1.5 months later than those of Snake River origin (Hesse 2005). Numbers and length of subyearling fall chinook samples in the lower Clearwater River in 2005 showed a decreases number of fish collected by mid-July. The mean length of fish collected after mid-July was greater

than 80mm, or active migration size. Collections and size data for Clearwater fall chinook juveniles in 2005 were influenced by hatchery surrogate releases. Mean length data following the surrogate releases likely overestimated the size of natural fish collected. Based on 1,918 were pit-tagged fish, the Clearwater component was about in the middle of their migration on August 10. Hesse indicated that passage of natural fall chinook salmon of Clearwater River origin would likely continue from August through next spring. In contrast the Snake stock migration appeared to be finished or nearly finished on August 10, 2005 (See above figures on Clearwater subyearling fall chinook sampling by number, size and date, Clearwater subyearling fall chinook PIT tagged by date, Snake River fall chinook subyearling passage at Lower Granite Dam, and Clearwater River fall chinook passage at Lower Granite Dam.)

Historical passage timing and distribution data of Snake River origin fall chinook data show that 90% of the wild subyearling chinook pass Lower Granite dam by August 30 and 97% of hatchery sub-yearlings pass Lower Granite Dam by August 30. Historical data indicates that the Clearwater segment passes Lower Granite Dam later and has a more prolonged migration period, into September and later.

Water Temperature

An extensive literature review was compiled for the Environmental Protection Agency entitled, "A Review and Synthesis of Effects of Alterations to the Water Temperature Regime on Freshwater Life Stages of Salmonids with Special Reference to Chinook Salmon". This review establishes water temperature as an important factor in all life stages of salmon. The review documents the detrimental effects of elevated water temperatures on all life stages of salmon, both juvenile and adult. The literature review has identified a water temperature of 21°C as the incipient lethal temperature for adult salmon. The Washington State water quality standard for temperature in the mainstem Snake is 20°C. The maximum recommended water temperature in the NMFS BIOP at Lower Granite Dam is 20°C.

Additional temperature considerations include growth of wild fall chinook in the Lower Clearwater River and needs of the Dworshak National Fish Hatchery. Water temperature affects growth rate. Cold water releases from Dworshak Dam can slow juvenile growth and alter out migration timing. Arnsberg and Statler (1995) summarized temperature and growth/maturation relationships from various studies, including:

- Water temperature is more than likely the single most important factor affecting fish growth (Piper et al. 1989).

- Unusual and unstable stream temperatures can lead to disease outbreaks in migrating fish, altered timing of migration, and accelerated or retarded maturation (Bjomn and Reiser, unpublished manuscript).

- Water temperature of 15.6 C appeared closest to the optimum for propagation of fall chinook fingerlings averaging between 1.38 and 8.94 grams. Weight gains

were consistently greater at this temperature than at 10 or 12.7 C. Performance of fall chinook fingerlings at 18.3 OC was variable; however, some test groups had slightly better gains than fish reared in 15.6 C water. Chinook salmon may gain more even at temperatures around 20 C, if food resources are not a limiting factor. (Banks et al. 1971). Notably, Arnsberg et al. (1992) reported very low anadromous fish densities with an apparent abundance of food resources in the lower Clearwater River.

Clabough et al. (2006) concluded that management of Dworshak releases should account for the effects of the releases on adult salmonids as well as juveniles. Clabough et al. (2006) found that comparison of fish depth between Dworshak Dam release and non-release periods supported the hypothesis that individual fish used cool-water masses found at depth during release periods. Chinook salmon and steelhead modified their behavior, mainly depth of migration, to selectively swim through cooler water to ascend Lower Granite reservoir. Overall, these data support the hypothesis that upstream migrating adults use the cool water released from Dworshak Reservoir and that these releases reduce thermal stress during warm summer months. Adequately cool water conditions are key components during the upstream migration of adult salmonids. There is evidence in the literature that adult salmonids will slow or halt their migrations because of warm water conditions. Adult salmon encountering high water temperatures during migration can have reduced egg viability (CDWR 1988; Van der Kraak and Pankhurst 1996), and high temperatures have been associated with pre-spawn mortality in sockeye (Gilhousen 1990) and chinook salmon (Schreck et al.1994; Pinson 2005). Continuous, uninterrupted passage up the Lower Snake River into the Clearwater River and near its mouth is beneficial to the early fall steelhead fishery in Idaho. Importantly, there are few potential thermal refuges in the lower Snake River (e.g. cold-water tributaries), highlighting the potential benefit of the Dworshak releases to summer- and fall-run adult salmon and steelhead.

Assuring adequate Dworshak cooling benefits distributed throughout the summer and into September is beneficial to spectrum of the downstream migrating fall chinook juveniles, adult summer chinook, adult fall chinook and adult steelhead.

Flows

The BIOP summer seasonal flow objective for Lower Granite Dam in 2006 is 54 kcfs. Migration conditions for wild subyearling Snake River fall chinook are improved by both flow and temperature. Higher summer flows generally decrease temperature, depending on the proportion of cool Dworshak water to warmer Upper Snake water.

Other

Additional potential benefits would be protection to adult anadromous salmonids provided by conservation enforcement. Through a Memorandum of Agreement among the Nez Perce Tribe and the Bonneville Power Administration, any power savings accrued through implementation of the plan would be shared among the Nez Perce Tribe,

the Umatilla Tribe and the Columbia River Inter-Tribal Fish Commission. This proposal has been shared with policy representatives in the Policy Working Group of the FCRPS Biological Opinion Remand Process.

Summary

The general framework and approach of the proposed operation is similar to that applied during 2005, with more explicit guidance for operations not to exceed full powerhouse capacity at Dworshak Dam (approximately 10 kcfs). The 2005 trigger mechanism approach to increase Dworshak discharges and/or decrease Dworshak outflow temperatures to avoid exceeding the Lower Granite tailrace temperature standard of 68F is again applied in 2006.