

SYSTEM OPERATIONAL REQUEST: #2004-17

The following State, Federal, and Tribal Salmon Managers have participated in the preparation and support this SOR: U.S. Fish & Wildlife Service, Idaho Department of Fish and Game, Oregon Department of Fish and Wildlife, the Washington Department of Fish and Wildlife, NOAA Fisheries, Nez Perce Tribe, Shoshone-Bannock Tribes, and the Columbia River Inter-Tribal Fish Commission.

TO:	B. G. Grisoli	COE-NWD
	William Branch	COE-Water Management
	Cindy Henriksen	COE-RCC
	Witt Anderson	COE-P
	LTC Charles S. Markham	COE-Portland District
	LTC Kertis, Jr.	COE-Walla Walla District
	J. William McDonald	USBR-Boise Regional Director
	Stephen J. Wright	BPA-Administrator
	Greg Delwiche	BPA-PG-5



FROM: David A. Wills, Chairperson, Salmon Managers

DATE: July 6, 2004

SUBJECT: Summer Dworshak Operations

SPECIFICATIONS:

- Maintain outflows at Dworshak of 10 Kcfs (or near powerhouse flows) through July 11th, 2004. On July 12th, 2004 increase outflows to 12 Kcfs and maintain through August 8th, 2004. On August 9th, 2004 decrease flows to 10 Kcfs and maintain through August 31st, 2004. Draft to elevation 1535 feet by August 31st, 2004 and maintain approximately 200 Kaf of Dworshak storage water for early September flow and temperature augmentation¹. All recommended outflows should target 45°F and are contingent upon maintaining temperature below 68 °F in the Lower Granite tailwater.

¹ The 200 Kaf in September would be to support a recently documented life history pattern of yearling fall chinook. Particularly, scale analysis indicates that 40% - 50% of adult fall chinook returning to Lower Granite Dam were yearling migrants. This suggests that value exists in assuring environmental conditions be maintained into September for the benefit of this life history pattern.

JUSTIFICATION:

Juvenile Fall Chinook Passage Timing

The passage of juvenile fall chinook is progressing at Snake River dams. For the run-at-large subyearling chinook population entering the hydrosystem at Lower Granite Dam, the passage index over the 7-day period of June 30 to July 6 averaged 15,800 fish/day. The Clearwater River releases of PIT tagged hatchery subyearling fall chinook from the Nez Perce Hatchery and Big Canyon Creek acclimation facilities are more prevalent now in detections at Lower Granite Dam compared to the mainstem Snake River releases of PIT tagged hatchery fall chinook from Captain John Rapids and Pittsburg Landing acclimation ponds. PIT tagged wild fall chinook from the mainstem Snake River peaked on June 27 with 121 detections that day, and have dropped to an average of 37 fish/day from July 1 to 5. As of July 5, the cumulative detection at Lower Granite Dam of PIT tagged wild fall chinook of mainstem Snake River origin is 29.5% of the release number, a level already 3 percentage points higher than what was detected over the entire 2003 season. Of the 1,633 wild fall chinook of Clearwater River origin PIT tagged between June 15 and July 1, there have been no detections at Lower Granite Dam. These fall chinook appear to be currently rearing in the lower Clearwater River below Dworshak Dam. Water temperature affects growth rate. Cold water releases from Dworshak Dam may slow juvenile growth and delay out-migration timing. The aim of the Dworshak coldwater release strategy is to address the full spectrum of Snake and Clearwater River basin fall chinook life history strategies and needs. This SOR is also consistent with the intent of the State of Idaho-Nez Perce Tribe Dworshak Operations Plan—approved by the Idaho legislature in 2000 (<http://www.nwd-wc.usace.army.mil/tmt/agendas/2003/0709DOP.pdf>).

Travel Time Survival of Juvenile Fall Chinook

In the compilation of travel time and survival data by NOAA Fisheries "Travel Time/Survival White Paper" (March 2000), NOAA Fisheries concludes that "Estimated survival probability from release points in the Snake River Basin to Lower Granite Dam was significantly correlated with flow, water temperature and turbidity". NOAA Fisheries also concludes that the high correlation among variables precludes the determination of effects of these variables individually. A flow travel time relationship has been established for sub-yearling chinook migrants. The flow travel time relationship has been confirmed consistently in various studies and monitoring programs. Recent information (Connor, 2003) has shown statistically significant relations between flow, temperature and survival for sub-yearling fall chinook.

Historical passage timing and distribution of fall chinook data shows that 90% of the wild chinook passage at Lower Granite occurs prior to August 31 and 97% of hatchery sub-yearling fall chinook of Clearwater and Snake River origin pass Lower Granite Dam prior to August 31. This data set is primarily comprised of Snake River origin fish. The limited data available for the Clearwater population indicates they pass Lower Granite Dam at a later date.

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. Washington State water quality standards for temperatures in the mainstem Snake is 20°C. The maximum recommended water temperature in the NMFS BIOP at Lower Granite Dam is 20°C. Also refer to Dr. Dale McCullough's work (from CRITFC) on the benefits of cooler water on returning salmon adults during late summer: <http://www.critfc.org/tech/EPAreport.htm>.

The tailrace temperature at Lower Granite Dam has been decreasing slightly over the last several days after reaching 19.9°C (67.8°F) on July 2nd, 2004. Temperatures in the Lower Granite Tailwater were 19.4°C (66.9°F) on July 5th, 2004. The outlined Dworshak release plan will help to further moderate temperatures at Lower Granite Dam throughout the summer.

Flows

The BIOP summer flow objective for Lower Granite Dam in 2004 is 50 Kcfs. Flows at Lower Granite from June 21 through July 5 have averaged 44.2 Kcfs, slightly below the NOAA Biological Opinion target. Wild sub-yearling fall chinook salmon spend from 20 to 42 days in Lower Granite Reservoir primarily during the months of July and August. Survival of wild subyearling Snake River fall chinook is influenced simultaneously by flow and temperature. Meeting summer flow targets increases flow and decreases temperature. Meeting summer flow targets in July and August increases survival of sub-yearling fall chinook migrants.