February 2005

APPENDIX E

OPERATIONS RELATED TO PROJECT SPILL FOR FISH PASSAGE

February 2005

Operations related to project spill for fish passage, from the Action Agencies' Final Updated Proposed Action for the FCRPS Biological Opinion Remand (UPA) dated November 2004, Section III.E.1., pages 40–41 and 49–50:

UPA Section III.E.1., pages 40-41:

***Modified initiation of transport*:** The Action Agencies will continue to collect and transport juvenile fish at Lower Granite, Little Goose, Lower Monumental and McNary dams. However, rather than beginning transport in accordance with the 2000 BiOp and the associated NOAA Fisheries Section 10 permit, we would initiate transport based on seasonal flows as follows:

In years when the seasonal average Snake River flow at Lower Granite is expected to be less than 70 kcfs, maximization of transportation will occur from the date the JBSs begin operation. Due to the mixed benefits of early season transport, however, collection for transport will not be initiated until April 20 in all years where average seasonal flows are expected to equal or exceed 70 kcfs. Prior to April 20, all collected fish will be bypassed back to the river. In those years where flows are anticipated to be between 70 and 85 kcfs, spill will be provided at the collector projects until April 20. Further investigations of spill patterns (e.g. large gate openings/bulk spill) that provide optimum spillway survival conditions in these lower flow conditions will be coordinated through the FFDRWG.

	< 70 kcfs	**70-85 kcfs**	**> 85 kcfs**
Transport	Maximize	Initiate Collection April 20	Initiate Collection April 20
Bypass	None	Bypass Through April 19	Bypass Through April 19
Spill	None	Spill Through April 20	Spill (Table 4)

Using the smolt index at Lower Granite as reported for 1994-2003 (Columbia River Dart), a change in the initiation of transport to begin collection on April 20 has the potential to affect on average 9.0% (range 1.2- 15.4%) of the Snake River yearling Chinook run (all stocks combined) and an average 4.6% (range 0.2-11.1%) of the juvenile steelhead run (all stocks combined). A potential change in SARs during this time period of possibly 50% (-40% to +400%) could be realized for spring/summer Chinook but little to no increase would be expected in steelhead survival (-46% to +35%). These estimates are based on weekly SAR data from a NOAA-Fisheries memo (from Paul Wagner to Jim Ruff June 18, 2004).

Anderson et al 2004 reported that the benefits to in river passage versus transport reversed at water temperatures at the Lower Granite Water Quality forebay of about 9°C. As a point of reference, the average daily water temperature met or exceeded 9˚C on April 20 in 7 of the 9 available data years between 1995 and 2004.

Improvements to increase adult salmon returns through the juvenile fish transportation process are being evaluated. These improvements include additional barges, a new juvenile fish facility at Lower Granite and improvements to the juvenile fish facilities at Little Goose, Lower Monumental and McNary Dams.

UPA Section III.E.1., pages 49-50:

Spill Operations. The Action Agencies will continue to consider the following to establish spill priorities.

- ***Spread the Risk –*** Under average or above-average spring runoff conditions, spill at both transport and non-transport projects will "spread the risk" between transportation and in-river migration. Under low-flow conditions and during the summer outmigration, spill will only occur at non-transport projects to enable maximum transportation.
- ***Dissolved gas management –*** We will provide specific spill levels for juvenile fish passage at each project, not to exceed established TDG levels (either the 110 percent TDG standard, or as modified by state water quality waivers, up to 120 percent TDG). Additionally, we will manage spill on a system basis according to a priority list. In high runoff conditions, this distributes spill across the region and prevents dissolved gas supersaturation "hotspots."
- ***Adult salmon fallback and delay –*** We will limit spill for juvenile fish passage to reduce adult fish fallback and delay.
- ***Passage survival research –*** We will continue spill-related research in order to evaluate juvenile passage survival, spill effectiveness in relation to spill levels and duration, effect of spill on juvenile fish retention in forebays and tailraces, tailrace egress, and effect of spill on adult fallback. The results of this research will inform future spill management decisions in the context of achieving biological performance standards and optimizing the biological benefits of current spill volumes at individual dams. In some cases, we may modify normal spill operations to support such research. For instance, we may, as currently planned in the regional forum, evaluate the biological performance of the 12-hour spill volumes now provided at McNary and Little Goose reshaped and allocated over 24hours. To the extent that greater spill duration and/or volumes are required for the purposes of spill evaluation at some projects, efforts will be made to minimize or offset additional effects to the hydropower system.

The Action Agencies will provide spill and operations of passage facilities at certain FCRPS projects, depending on runoff conditions, to provide better project passage for juvenile fish while avoiding high TDG supersaturation levels or adult fallback problems.

The Action Agencies will provide spill as identified in Table 4 to improve juvenile fish passage while avoiding high TDG supersaturation levels or adult fallback problems. Spill may be modified through the implementation planning process and adaptive management decisions. Future Water Management Plans will contain the annual work plans for these operations and spill programs will be coordinated through the TMT. The Action Agencies will continue to evaluate and optimize spill passage survival to meet the hydrosystem performance standards identified in the 2000 BiOp.

Table 4. Spill at run-of river projects to aid out-migration of juvenile anadromous fish.

Project	Planning Dates	Time	Spring Spill	Summer Spill	Amount	Minimum Generation Requirements kcfs
Lower Granite *	April 3– June 20	1800-0600	Yes	No	120/115 gas cap	11.5[a]
Little Goose	April 3– June 20	1800-0600	Yes	No	120/115 gas cap	11.5[a]
Lower Monumental	April 3– June 20	24 hours a day	Yes	No	45% or 50% of outflow	11.5[a]
Ice Harbor	April 3– August 31	24 hours a day	Yes	Yes	120/115 gas cap 1800-0500 45 Kcfs 0500-1800	7.5 – 9.5[a]
McNary	April 10– June 30[b]	1800-0600	Yes	No	120/115 gas cap	50
John Day	April 10– August 31	1800-0600 1900-0600 May 15– July 20 June 21 24 hours a day	Yes	Yes	60% of outflow until June 20 Min spill 30% Starting June 21 30% of outflow	50
The Dalles	April 10– August 31	24 hours a day	Yes	Yes	40% of outflow	50
Bonneville	April 10– August 31	24 hours a day	Yes	Yes	120/115 gas cap nighttime 75 kcfs daytime [c] 50 min flow	30

a – Minimum generation requirements at the Lower Snake River Projects may not be needed all the time.
b – Collection of subyearling fall chinook for transportation at McNary Dam shall not be initiated until in-river migratory conditions are deteriorating (i.e., no longer spring-like).[5] In general, the switch from spring to summer operation will occur on or about June 20. Spring-like is defined as favorable flow and water temperature conditions; i.e., river flows are at or above the spring flow target (220 to 260 kcfs) at McNary Dam, and ambient water temperatures are below 62°F (17°C). Actual dates shall be set by TMT coordination.
c – Day and nighttime vary during the spill season and are set in the Fish Passage Plan.
Note: Spill for juvenile fish passage may be reduced or turned off for short periods of time because of navigation problems at the projects or to allow for juvenile fish barges to dock and undock. Also research at projects that spill may change the details of spill at the project.

The Action Agencies will continue to provide attraction spill for winter steelhead at Bonneville Dam during the winter months. The details of this action will be coordinated through the Fish Passage Operations and Maintenance Coordination Team (FPOM) and the Fish Passage Plan (FPP), including any need for related studies.

* Lower Granite spring spill for fish passage will be 19 kcfs (Removable Spillway Weir operation with training spill) for 24 hours a day, as defined in the Action Agencies' 2005 Water Management Plan, Section 6.0, Table 4, page 22.

[5] NMFS BiOp at Section 9.6.1.3.4 Page 9-77, Action 43