

United States Government

Department of Energy
Bonneville Power Administration

memorandum

DATE: July 2, 2004

REPLY TO
ATTN OF: KEC-4

SUBJECT: Supplement Analysis for the System Operation Review EIS (DOE/EIS-0170/SA-2)

TO: Stephen J. Wright - A-7
Administrator

The attached Supplement Analysis for the System Operation Review EIS finds that the proposed 2004 Federal Columbia River Power System Juvenile Bypass Operations is consistent with impacts from the various SOSs identified and evaluated in the System Operations Review EIS and accompanying Record of Decision. A range of spill regimes, which encompasses the proposed action, was analyzed in the EIS, and the implementation of this action is consistent with the adaptive management approach adopted in the SOR Record of Decision. In addition, the proposed action does not constitute a substantial change relevant to environmental concerns; and there are no significant new circumstances or information relevant to environmental concerns bearing on the proposed action or its impacts within the meaning of 10 C.F.R. § 1021.314(c) and 40 C.F.R. § 1502.9(c). Therefore, preparation of a supplemental EIS is not required.

/s/ Katherine S. Pierce for

Michael S. Mayer
Fish and Wildlife Biologist

CONCUR:

/s/ Thomas C. McKinney

Thomas C. McKinney
NEPA Compliance Officer

DATE: July 2, 2004

Attachment:

Supplement Analysis to the System Operation Review EIS

cc: (w/ attachment)

G. Delwiche - KE-4

S. Coe - PG-5

S. Cooper - PG-5

G. Lear - Army Corps of Engineers

**2004 Federal Columbia River Power System
Juvenile Bypass Operations
Supplement Analysis**

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Supplement Analysis for the System Operation Review EIS (DOE/EIS-0170/SA-2)

This document provides for the Bonneville Power Administration's (BPA) National Environmental Policy Act (NEPA) compliance for its proposal to reduce summer spill in 2004. The document is divided into six sections. Section I is the Supplement Analysis, discussing the proposed action for 2004, its location, description, and analysis of impacts in relation to the Columbia River System Operation Review Final Environmental Impact Statement (SOR EIS). Section II outlines the individual mitigation measures that are proposed to offset the impacts of the proposed action. Section III provides a summation of aggregate impacts. The remaining sections provide a discussion of potential future spill proposals, a determination of overall consistency with the SOR EIS, and a notification of the document's availability to the public.

I. Proposed Action

BPA and the United States Army Corps of Engineers (Corps) are proposing a one-year plan, to be implemented in 2004, to operate the federal hydrosystem more cost-effectively by reducing the amount of water spilled over specific dams during certain times of the summer. The proposed reduced spill would take effect after most of the juvenile salmon and steelhead have moved downriver past Bonneville Dam. Specifically, operations would adhere to current Biological Opinion (BiOp)-recommended spill levels with the exceptions of:

1. An evaluation of 45 thousand cubic feet per second (kcfs) and 120% TDG from July 1 to July 15 at Ice Harbor Dam;
2. No summer spill after August 25 at Ice Harbor Dam and John Day Dam;
3. An evaluation of 50 kcfs/24 hrs vs. BiOp-recommended spill at Bonneville Dam during July; and
4. No spill in August for The Dalles Dam and Bonneville Dam.

For a complete discussion of the proposed action see **Description of Proposed Action** below.

Proposing Entity

BPA and Corps

Location

Lower Columbia River to the confluence of the Snake River up to river mile 9.7. Specifically, reduced spill will occur at Bonneville, The Dalles, and John Day dams on the Columbia River, and Ice Harbor Dam on the Snake River.

Introduction

In 1995, the Federal Hydrosystem Action Agencies (BPA, Corps, and the United States Bureau of Reclamation (Bureau)) completed the SOR EIS. This EIS assessed the potential impacts of adopting different System Operation Strategies (SOS) for 14 dams on the Columbia and Lower Snake rivers that are part of the Federal Columbia River Power System (FCRPS). The preferred alternative adopted operations recommended in the 1995 BiOps issued by the United States Fish and Wildlife Service (USFWS) and National Oceanic and Atmospheric Administration (NOAA). The SOS preferred alternative supported the recovery of Endangered Species Act (ESA)-listed fish including storing water in reservoirs during the fall and winter to meet spring and summer flow targets.

In 1997, the Federal Action Agencies released individual SOS Records of Decision (RODs) adopting the SOR's Preferred Alternative. In adopting this particular SOS, the RODs indicated that operations would implement the measures recommended by the BiOps. Specifically the SOS (1) supports recovery of ESA-listed fish by storing water during fall and winter to meet spring and summer flow targets; (2) protects other resources by managing detrimental effects caused by operations for ESA-listed species by establishing minimum summer reservoir levels, providing public safety through flood protection and other actions; and (3) provides for reasonable power generation.

In addition to adopting the SOS preferred alternative in its ROD, BPA stipulated that “[o]perations [would] be reviewed and monitored as often as necessary to determine if actions are performing as expected.” This review was established to allow for operational corrections to be made pursuant to new information generated by monitoring, research, and other sources. In fact the ROD states that “[e]ven though the agencies have decided on a selected strategy that is comprised of specific operating requirements, the agencies embrace the concept of adaptive management.” This adaptive management approach allows operational flexibility in responding to changing conditions and new information.

Also in 1995, BPA, after completing the Business Plan Environmental Impact Statement (BP EIS), adopted a market-driven approach for its overall business practices. Cost-consciousness and results-orientation were pivotal concepts in BPA's decision to adopt a market-driven approach. In fulfilling its responsibilities, including fish and wildlife obligations, BPA stated that it must balance the interest of its ratepayers and its responsibility to the environment. BPA identified broad dimensions of fish and wildlife administration that help define its potential directions. Two of these concepts are (1) the relationship between BPA's responsibility to implement its mandated fish and wildlife responsibilities, and its accountability for results; and (2) BPA's financial position—its ability to predict and stabilize its fish and wildlife costs. Overall, in addressing the administration of its fish and wildlife obligations, BPA must find a way to balance its fish and wildlife and power marketing responsibilities in a business-like manner.

In 2001, BPA issued a decision document regarding its responsibilities under the Endangered Species Act of 1973, as amended (16 U.S.C §§ 1536 et seq.), the Clean

Water Act (33 U.S.C. §§ 1251 et seq.), and other laws as a result of BiOps issued by the USFWS and NOAA Fisheries in December of 2000. These BiOps dealt with the operation of major projects of the FCRPS. The 2000 BiOp presented a long term Reasonable and Prudent Alternative (RPA) for avoiding jeopardy. To avoid jeopardy, the RPA requires the satisfaction of performance standards. The RPA then listed an extensive set of measures including hydro, habitat, harvest, artificial propagation, research, monitoring, and evaluation, designed to achieve applicable performance standards. BPA's 2001 decision document adopted those hydro measures supplementing those adopted in the SOR ROD. However, the BiOp recognizes that because of uncertainties, changing conditions, and new information, any proposed measure may be subject to change. It also acknowledges that additional measures may be proposed to substitute for initial measures not implemented. This approach has been affirmed by NOAA Fisheries Northwest Region's Regional Administrator in a Northwest Power and Conservation Council (Council) Meeting in December 2003. In that meeting, the Regional Administrator stated that when results can be achieved that are biologically equal or greater to those proposed in the BiOp, and there is reasonable measurement in place to assure that the expected results are in fact realized, then the proposal would likely be consistent with the BiOp.

During summer 2003, the Council developed an analysis of the impacts of summer spill. Council biologists used an analytical tool called the Simulated Passage (SIMPAS) model to estimate the effect of eliminating juvenile bypass spill in July and August on the survival of Snake River fall chinook, Hanford fall chinook, and Lower Columbia fall chinook. The Council also used an additional model, Columbia River Integrated System Passage (CRiSP). The models estimated that eliminating spill in July would reduce system survival by 0.01 percent for Snake River fall chinook and 1.1 percent for Hanford fall chinook. (Hanford fall chinook are not listed under the ESA.) Because in years with average water and normal migration timing biologists expect fewer juvenile salmon migrants in the river in August, the actual decrease in the number of adult fish as a result of reduced spill would typically be even less than in July.

The analyses prepared by BPA and presented to the Council in January 2004 looked at impacts to summer migrants over a range of reduced spill scenarios, ranging from the present biological opinion spill regime, to no summer spill at all. The agencies concluded that, on the one hand, a system-wide evaluation was not feasible in 2004. A statistically valid system-wide study would require tagging and tracking millions of fish and collecting data for several decades, perhaps centuries. On the other hand, project-specific studies—looking at survival through one of the eight individual dams on the Lower Snake and Columbia—could provide useful information. As a result of the Council's Mainstem Amendments and 2003 analysis, BPA and the Corps developed an initial proposal for summer spill reductions, which included project specific studies to assess passage survival under different spill levels.

Background

BPA, the Corps, and the Bureau are the action agencies responsible for the Federal Columbia River Power System. The Corps and the Bureau own and operate the federal

dams for multiple purposes, and BPA markets and transmits the power generated at each facility. The hydrosystem is managed for multiple purposes including power generation, irrigation, navigation, flood control, recreation, and fish and wildlife.

BPA helps fund and manage what has been called the largest fish and wildlife mitigation program in the world. Along with harvest, logging, irrigation, and other human activities, hydro projects have impacted fish and wildlife in the Columbia Basin. BPA works with other federal and state agencies and tribes on projects to address problems caused by FCRPS dams. BPA is committed to working toward regional solutions based on sound biology and cost-effectiveness. The agency funds approximately 500 fish and wildlife projects a year, from repairing spawning habitats to studying fish diseases and controlling predators. Projects for BPA funding are identified through the Council's Fish and Wildlife Program or the BiOps and are reviewed by an independent scientific review panel.

One impact that the hydrosystem has on fish is that it reduces the ability for fish to move past dams. This problem can be serious for anadromous fish that must migrate to and from the ocean as part of their natural life-history cycle. In order to address this problem, billions of BPA's ratepayer dollars have been spent researching and developing techniques and facilities to aid in getting fish past the FCRPS dams. These efforts have included collecting and transporting fish, developing juvenile and adult fish passage systems, making modifications to the design and operation of turbines, and spilling water during peak migration periods. In terms of costs to provide flow and spill mitigation for migrating salmon and steelhead, BPA estimates that in an average water year, it loses an estimated \$77 million in potential revenues by spilling water in July and August for juvenile salmon passage.

Regardless of which type of passage—spill, barge, or turbine—is used by the migrating fish, a certain level of mortality occurs. Mortality can be either as a direct or indirect result of the passage utilized. Indirect mortality, also called delayed mortality, includes actual mortality caused by such things as predation, stress, or increased susceptibility to disease. Indirect or delayed mortality is more difficult to measure. Turbine passage mortality results from turbine blades, hydraulic pressure, or shear force. Spillway passage can result in direct mortality caused by abrasion. Indirect mortality from spill can be caused by increased predation, descaling, stress, and reduced viability due to dissolved gas supersaturation. Juvenile bypass systems and transport also result in fish mortality from factors such as stress and increased vulnerability to predation.

Recent analyses by BPA and NOAA Fisheries suggest that there would be very little difference in system passage survival for Snake River fall chinook if the BiOp spill levels are maintained or spill is eliminated. For example, system passage survival under a high impact scenario is estimated at 15.81 percent when BiOp spill is maintained. However, when spill is eliminated, system passage survival is only reduced to 15.54 percent—a difference of 0.27 percent. This difference in system passage survival is even less under a low impact scenario. The analyses assume that fish are also passed using juvenile bypass system and transport, as well as through the turbines.

As discussed in Chapter 2 of BPA's Fish and Wildlife Implementation Plan EIS (DOE/EIS-0312, April 2003), the federal hydrosystem is not the only source of impacts on anadromous fish. Habitat loss and degradation as a result of water withdrawals and land management practices, such as timber harvest, agriculture, and development, have affected all aspects of the freshwater portion of the anadromous fish life cycle. Impacts include dewatered rivers as a result of over appropriation; increased turbidity, temperatures, non-thermal pollution, and other water quality-limiting factors; stream channelizations; and passage impediments.

Anadromous fish harvest is also a large source of direct and indirect salmon and steelhead mortality. Traditionally, harvest was guided by production-focused fisheries management. In fact some runs of anadromous fish were purposefully harvested to extinction. However, recently there has been some shifting away from production-focused management towards more conservation-minded management. This approach is reflected in the Pacific Salmon Treaty between the United States and Canada, which shifted from quota-based harvest to abundance-based harvest. This shift helps to provide more protection to weaker anadromous fish stocks. However regardless of the change in management, anadromous fish are still harvested at relatively high rates. For example, the total proposed 2001 harvest rate for Snake River fall chinook was 31.29 percent (NOAA 2001). It has been suggested that harvest reductions alone could result in the necessary survival improvements needed for this ESU (NOAA 2003a)¹.

Snake River fall chinook salmon migrate up the Columbia River in July and August as returning adults. They typically spawn from October through early December. Historically, spawning areas included sections of the upper mainstem Snake River. However, currently this ESU is limited to the areas from the Lower Granite Reservoir to Hells Canyon Dam, the lower sections of the Imnaha, Grande Ronde, Clearwater, and Tucannon Rivers, as well as small mainstem areas in the tailraces of the Lower Snake hydro projects. Fall chinook emerge as fry in March and April, migrate from June through early fall, rearing as they migrate to the estuary. This differs from Snake River Spring/Summer chinook, which migrate as yearlings (NOAA 2003b). Previous status review by NOAA indicated that limiting factors for Snake River fall chinook included loss of primary spawning and rearing habitat; increase in non-local hatchery contribution to adult escapement; and relatively high aggregate harvest impacts by ocean and inriver fisheries (NOAA 2003b).

Description of Proposed Action

BPA and the Corps propose to implement an operation of the FCRPS that reduces the level of summer spill at Ice Harbor, John Day, The Dalles, and Bonneville dams. This proposal incorporates BiOp identified spill levels, experimental spill levels, and the complete curtailment of spill at different facilities during July and August 2004. Specifically, the proposal calls for BiOp spill levels during the month of July at all of the dams with the following exceptions. From July 1 through July 15 a test will be

¹ These harvest increases are not accompanied by harvest mitigation that leaves the affected ESA populations in an equal or better position. The equal or better standard is applied only to FCRPS operations.

conducted at the Ice Harbor Dam that alternates spill levels in 2, 24-hour blocks at a time between 45 kcfs and 120 percent TDG. There will also be a test at Bonneville Dam during the entire month of July in which BiOp spill levels will be evaluated against spill at 50 kcfs. This test will evaluate survival benefits of new spill passage technology under two different spill conditions. Spill levels in August will be completely curtailed at The Dalles and Bonneville dams. August spill levels at Ice harbor and John Day dams will be set at BiOp levels until August 25, when they will be completely curtailed until August 31. The following table compares the proposed spill operation to the BiOp spill operation.

TABLE 1: Specific Spill Proposal

	Ice Harbor		John Day		The Dalles		Bonneville	
	BiOp	Proposal	BiOp	Proposal	BiOp	Proposal	BiOp	Proposal
July	120% TDG, 24-hrs	Test * to 7/15; BiOp 7/16-31	30% of river flow, 24 hrs	BiOp	40% of river flow, 24 hrs	BiOp	75 kcfs day, 120% TDG night	Test BiOp vs. 50 kcfs/ 24 hrs
August	120% TDG, 24 hrs	BiOp through 8/21; no spill 8/ 25-31	30% of river flow, 24 hrs	BiOp through 8/21; no spill 8/25-31	40% of river flow, 24 hrs	No spill	75 kcfs day, 120% TDG night	No spill

*Alternate 45kcfs and 120% TDG to 7/15

The reduction or complete curtailment of spill in August is based on the premise that in most years a relatively small percentage of fish outmigrate in August and most of them are transported. (There have been some late migration years in which about 50 percent of some fall chinook stocks migrated in August, but our proposed offsets are intended to mitigate the potential impacts even in a late migration year.) In fact, about 75 percent of the ESA-listed fall chinook are collected and transported at Lower Granite, Lower Monumental, Little Goose, and McNary dams. Therefore there are relatively few fish migrating in river past Ice Harbor Dam on the lower Snake River and the mainstem dams on the lower Columbia River. This is not to say that the remaining 25 percent migrate in-river, because there is mortality to in-river migrants even with full BiOp spill. Of the estimated 16 percent system survival for Snake River fall chinook, less than 1 percent of the fish are in-river migrants and over 15 percent are transported.

In addition, the mainstem dams in the lower Columbia River have fish passage technology in place to aid migration. This technology, coupled with implementation of offsetting mitigation measures aimed at providing direct benefits to summer migrants, is estimated to result in the same or better biological benefit as continuing the current spill regime unaltered. Mitigation measures are discussed below. See section II.

Public Involvement and Discussion of Comments

There has been a concerted effort to coordinate with the public during the development of the summer spill proposal. Opportunities for public input were offered and comments

were received from tribes, states, interest groups and the general public. In mid-January of 2004, federal agencies released the results of the alternative spill evaluation and the offset approaches for public review and comment. The analyses of biological impacts and offsets were presented at meetings of the Technical Management Team and the Implementation Team in early February, with oral comments from meeting participants reflected in the official meeting notes.

By February 20, the comment closure date for the results of the spill evaluation, the agencies had received a total of 236 comments. Of these, 95 comments plus about 65 identical form letters were in response to the spill evaluation. Of the 95 individual comments, the majority supported a reduction in summer spill. Most of these were from utilities and ratepayers wanting cost-effective salmon recovery efforts. The remaining letters expressed support for continuing the current summer spill program, cited policy issues, or challenged technical aspects of the federal analysis. These included a detailed set of comments submitted jointly by state, tribal, and federal fisheries managers. Critics of the analyses primarily claimed that the agencies underestimated impacts of reducing summer spill and overestimated or miscalculated mitigation benefits. The federal agencies considered these comments in developing many aspects of this proposal, particularly the mitigation measures. As a result of the comments, a number of potential mitigation measures, such as piling removal, small mouth bass control, and drafting Dworshak Dam, were dropped from consideration, while other measures received renewed consideration.

After considering the first round of comments, the federal agencies proposed a modified three-year summer spill regime that included offsets to mitigate potential effects and a plan to evaluate the effectiveness of the spill reduction at individual projects. This preliminary proposal was released on March 30 and the comment period extended through April 7, 2004. The agencies specifically requested input on a reasonable package of mitigation actions that could achieve the objective of providing similar or better biological benefits for salmon. During that comment period 264 comments were received.

The federal executives (including BPA, Corps, and NOAA) consulted with the states and tribes on April 16. Later that same day the Regional Executive Committee, consisting of federal, state, and tribal executives, met to review the input received. On April 14 and April 21, BPA and the Corps announced they intended to take more time to make a decision on summer spill. Based on comments received on the preliminary proposal, BPA and the Corps, in consultation with NOAA Fisheries, developed an amended modified summer spill proposal for a one-year period and mitigation for potential effects. This amended proposal was released on June 8, 2004 and was followed by another one-week comment period. On June 14, the federal agencies met with Columbia Basin tribes and, later that same day, they met with states, other federal agencies, and the interested public. Through the end of June 2004, 459 additional comment letters had been received.

BPA and the Corps have considered all the comments and identified more than 1000 issues. Responses have been prepared. Comments and responses will be posted on

<http://www.salmonrecovery.gov/implementation.shtml> and are part of the administrative record. To the greatest extent possible the comments and responses to them have been utilized in the development of this Supplement Analysis.

Analysis and Findings

BPA analyzed the proposed action and evaluated its consistency with the impacts discussed in the SOR EIS and SOS decision documented in the SOR ROD. This analysis was performed to determine whether the proposed action constitutes a substantial change relevant to environmental concerns, or if there are significant new circumstances or information relevant to environmental concerns bearing on the proposed action or its impacts as required under 10 C.F.R. § 1021.314(c) and 40 C.F.R. § 1502.9(c). BPA analyzed all of the relevant factors in evaluating the impacts of a reduced spill program and their relationship to the impacts previously considered in the SOR EIS, based on the best science currently available. In order to fully evaluate any potential impacts, new circumstances, or new information, the following analysis discusses the human environment (as defined by 40 C.F.R. § 1508.14) in terms of the natural, economic, and social environments.

Natural Environment

BPA evaluated the potential impacts to the natural environment from the proposed action. As analyzed in the SOR EIS, the natural environment was divided in the following categories: earth resources, water and air resources, aquatic life, and terrestrial life. The categories are individually discussed below.

Earth Resources

A change in operation that substitutes water typically spilled through the spillway for water run through the turbines will have no new or additional impact on earth resources. The SOR EIS analyzed earth resource impacts related to erosion and mass wasting, sedimentation, and groundwater processes. Because the proposal would result in operations within normal operational limits, there will be no new impacts to earth resources other than those analyzed in the SOR EIS.

Air and Water Resources

The SOR EIS assessed air impacts primarily in terms of fugitive dust generated from exposed reservoir sediment. The proposed spill reduction would not result in any increased fugitive dust from exposed reservoir sediment than that currently experienced. The EIS also discussed indirect air quality impacts in terms of increased air pollution if hydropower generation is curtailed and replacement power is generated by thermal power plants. Since the proposed action calls for increased hydropower generation, it may result in decreased air pollution, as hydropower is potentially sold in place of power from thermal generation. BPA's Resource Programs EIS and Business Plan EIS included analyses, on a per megawatt basis, of the environmental impacts of various generating resources. These analyses were updated in BPA's recently published Fish and Wildlife Implementation Plan EIS.

Water resources evaluated in the SOR EIS were categorized into the following impact areas: water temperature, dissolved gas, and sediment transport. The SOR EIS modeled a range of water temperature relationships. The potential temperatures expected from the proposed action were assessed in the EIS and are within state water quality standards. Dissolved gas is often created by spill and increases cumulatively for each dam. States regulate the dissolved gas levels pursuant to their Clean Water Act authority. These same standards are incorporated into the BiOps. High levels of dissolved gas can cause gas bubble trauma resulting in increased fish mortality. The reduction in spill, by increasing power generation, will result in a decrease in dissolved gas levels. Increases and decreases in sediment transport can be caused by fluctuations in flow velocity, depth, and reservoir fluctuations, among others. The SOR EIS assessed these potential impacts over a range of system operating strategies. The proposed action will not result in any sediment transport outside the levels considered in the SOR EIS.

Aquatic Life

Aquatic life was assessed in the SOR EIS in terms of resident and anadromous fish, and the potential impacts associated with a range of system operation strategies. Impacts to resident fish were evaluated based on spawning success, juvenile survival, and food availability. The potential impacts of the proposed action on resident fish are consistent with the analysis in the SOR EIS for the range of system operation strategies. The SOR EIS evaluated anadromous fish in terms of juvenile salmonids, adult salmonids, other anadromous stocks, and hatcheries. The Snake River fall chinook evolutionarily significant unit (ESU) was listed as threatened in 1992, pursuant to the Endangered Species Act. As such, impacts to this particular listed ESU were contemplated in the SOR EIS.

Recently, additional analyses were performed regarding the potential impacts of the proposed action on ESA-listed and non-listed anadromous fish. Spill is one way in which juvenile anadromous fish pass downstream of dams. Therefore a reduction in spill results in additional fish passing through the turbines. However, some fish are also collected and transported around the dams while others use existing juvenile passage.

The result of modeling the perceived impact of the proposed action concluded that the potential mortality of ESA-listed Snake River fall chinook ranged from approximately 143 – 943 smolts. The total estimated run size of this stock is approximately 1 million smolts. Both BPA and NOAA Fisheries scientists conducted the analyses. Non-listed fish were also assessed in the aggregate. The estimated impact for non-listed fish was between 130,000 – 742,000 smolts. One stock that was included in this analysis was the non-listed fall chinook salmon, which has an estimated run size of 50 million smolts. These mortality estimates are within the range evaluated in the SOR EIS.

NOAA Fisheries has further analyzed the potential impact of the proposed action on ESA-listed Snake River fall chinook as part of its review of the action agencies' June 22, 2004 "Amendment to the 2004/2004-2008 Implementation Plan for the FCRPS Biological Opinion Remand" (Amended 2004 IP), which includes the proposed action. As documented in NOAA Fisheries' July 1, 2004 "Findings Regarding Adequacy of the Federal Columbia River Power System Action Agencies' 2004 Annual Implementation

Plan” (NOAA Fisheries 2004 IP Findings), estimates of differences in juvenile fish survival between alternative spill scenarios were determined using the SIMPAS model. Potential effects were estimated under a range of migration patterns (from early to late) and a range of potential impacts from low to high. Based on this analysis, NOAA Fisheries determined that the range of adverse effects on ESA-listed Snake River fall chinook was estimated to be between approximately 100 and 900 juvenile fish. These impact estimates are within the range evaluated in the SOR EIS.

Terrestrial Life

Impacts to terrestrial life, including plants and animals, can result from reservoir fluctuations, including exposing habitat to adverse conditions, inundating habitat, or increased predation. These impacts were fully evaluated in the SOR EIS. Because the proposal would result in operations within normal operational limits, there will be no additional impacts to terrestrial life other than those analyzed in the SOR EIS.

Economic Environment

The SOR EIS evaluated impacts on the economic environment as a result of the various System Operations Strategies. Categories of impact areas assessed included the following: recreation, flood control, navigation, power, irrigation, and municipal and industrial water supply. It addressed these categories in economic terms and, although the estimated costs may have changed, the relationships of the actions to the impacts remain the same. Based on an evaluation of the proposed action, there would be no impacts outside those currently affecting flood control, navigation, irrigation, and municipal and industrial water supplies.

Power

There would be beneficial effects to power as more hydropower is generated. Recent analyses suggest that the proposed action will result in the ability to generate between \$31 and \$41 million in additional power in 2004. This additional generation could help to keep regional energy costs lower than originally projected. This could provide modest but far-reaching benefits to the Pacific Northwest’s economy during the recent economic downturn and slow recovery, decreasing BPA’s wholesale power rates up to 2 percent. Potential impacts to power from the proposed action fall within those considered in the SOR EIS. One commenter suggested that BPA should instead pursue conservation or “other less harmful alternatives” to offset increasing rates. The potential impacts of both conservation and generating resources were analyzed in BPA’s Resource Programs EIS. These analyses were subsequently updated in BPA’s Business Plan and Fish and Wildlife Implementation Plan EISs.

Recreation

There may also be benefits to recreation, as mitigation measures are implemented that encourage fishing opportunities for salmonid predators and increase harvestable hatchery stocks. See the discussion of mitigation measures below. Potential impacts to recreation from the proposed action fall within those considered in the SOR EIS.

Social Environment

The SOR EIS evaluated impacts on the social environment as a result of System Operations Strategies. Categories of impact areas assessed included the following: cultural resources, traditional cultural properties, Native American resources, and aesthetics. These are the same areas that could potentially be impacted by the proposed action.

Cultural Resources

The SOR EIS characterized cultural resources as areas that are historic or cultural properties. Typically, these resources can be impacted by fluctuating reservoir levels, wave action, inundation, vandalism, and exposure to the elements. The proposed action will not result in any impacts to cultural resources, other than those already identified in the SOR EIS.

Traditional Cultural Properties

The SOR EIS described traditional cultural properties, important to Native Americans, as aquatic and terrestrial resources associate with a free-flowing river. These properties also included ceremonial grounds, sacred sites, important plants and life forms, fishing sites, social and political gathering areas, unique landforms, and other features important to the traditional way of life for Indian peoples. Primary impacts would be to aquatic resources, such as fish, and resources that are benefited or harmed by changes in water levels. As discussed above, the system will not experience fluctuations in water levels more extreme than those evaluated in the SOR EIS. In fact, it is unlikely there would be any impact from the proposed action on water levels and those resources impacted by changes in water levels. The proposed action will result in impacts to fish, as spill is reduced and no longer becomes a passage option for late season migrants. These impacts are discussed above in the *Aquatic Life* section. These impacts will also be fully mitigated as discussed in Section II, below. These types of impacts fall within the range considered in the SOR EIS analyses.

Native American Resources

The SOR EIS describes Native American resources as including cultural resources, traditional cultural properties, treaty rights and trust responsibilities, and fishing impacts. The EIS's analysis considered a range of impacts to tribal resources, including fishing treaty rights and trust obligations. The impacts of the proposed action fall within those impacts considered. During the completion of the SOR EIS, a number of tribes submitted comments expressing their concern for what they perceived would result in a continued decline of resources and diminished fish harvests. The proposed action drew similar comments.

BPA believes there will be no adverse impacts to tribal fishing as a result of the proposed action because we expect no reduction in the number of non-listed returning adults—the focus of tribal fisheries. Even if there were a small reduction, whether in relation to the overall run or an individual tributary, the small reductions documented in the final proposal would not in and of themselves be large enough to warrant either an increase or decrease in tribal harvest allocations. Generally, tribal fishing allocations are limited by

the extent to which they incidentally take ESA-listed species. Because the spill reduction proposal will allow for equal or better returns of listed fish, the proposed action would not affect tribal harvest opportunities.

Aesthetics

Hydrosystem operations can result in impacts to aesthetics. An impact to aesthetics is a value judgment, since an attribute that one person finds aesthetically pleasing may be displeasing to someone else. The SOR EIS assessed the impacts to aesthetics in terms of shoreline contrast, erosion, facility impacts, seep lakes and embayments, water characteristics, and dust and odors. The proposed action would not result in additional impacts to aesthetics other than those previously considered in the EIS.

Information Reviewed

BPA. 1993. Resource Programs Final Environmental Impact Statement (DOE/EIS-0162).

BPA. 1995. Columbia River System Operation Review Final Environmental Impact Statement (DOE/EIS-0170).

BPA. 1995. Business Plan Environmental Impact Statement (DOE/EIS-0183).

BPA. 1995. Columbia River System Operation Review on Selecting an Operating Strategy for the Federal Columbia River Power System Record of Decision.

BPA. 2001. Decision Document Regarding Responsibilities under the Endangered Species Act, Clean Water Act, and Additional Laws.

BPA. 2003. Fish and Wildlife Implementation Plan Final Environmental Impact Statement (DOE/EIS-0312).

BPA. 2004. Impact Assessment for Proposal for FRCPS Summer Juvenile Bypass Operations.

NOAA. 2001. Biological Opinion: Impacts of treaty Indian and non-Indian fall season fisheries in the Columbia River Basin in year 2001 on salmon and steelhead listed under the Endangered Species Act. (August).

NOAA. 2003a. Pacific Salmon Fisheries Management Final Programmatic Environmental Impact Statement.

NOAA. 2003b. Updated status of federally listed ESUs of west coast salmon and steelhead. (July).

NOAA. 2004. Analysis of Impacts and Offsets. *Available at* <http://www.salmonrecovery.gov/implementation.shtml>. (June 2004).

NOAA. 2004. Findings Regarding Adequacy of the Federal Columbia River Power System Action Agencies' 2004 Implementation Plan. July 1, 2004.

Northwest Power and Conservation Council. 2000. Columbia River Basin Fish and Wildlife Program (2000-19).

Northwest Power and Conservation Council. 2003. Mainstem Amendments to the Columbia River Basin Fish and Wildlife Program (2003-11).

Northwest Power and Conservation Council. 2002. Third Annual Report to the Northwest Governors on Expenditures of the Bonneville Power Administration to Implement the Columbia River Basin Fish and Wildlife Program (2004-3).

Determination for Consistency

The potential impacts of the proposed 1-year spill reduction plan are consistent with impacts from the various SOSs identified and evaluated in the System Operations Review EIS and accompanying Record of Decision. A range of spill regimes, which encompasses the proposed action, was analyzed in the EIS, and the implementation of this action is consistent with the adaptive management approach adopted in the SOR Record of Decision. In addition, the proposed action does not constitute a substantial change relevant to environmental concerns; and there are no significant new circumstances or information relevant to environmental concerns bearing on the proposed action or its impacts within the meaning of 10 C.F.R. § 1021.314(c) and 40 C.F.R. §1502.9(c). Therefore, preparation of a supplemental EIS is not required.

II. Proposed Mitigation Measures (Offset Actions)

An offset action is simply a mitigation measure that is likely to produce similar or greater biological benefits for fish compared to BiOp summer spill levels. These measures are also designed to be much less costly than the current summer spill program. As discussed above, costs associated with the summer spill program are primarily foregone revenues as water is spilled over dams instead of being used to generate power.

Mitigation measures are separated primarily into two categories based on their perceived benefit, though there is some overlap. These two categories consist of mitigation for ESA-listed Snake River fall chinook and mitigation for non-listed fish (non-listed fall chinook are included in this category). Among the proposed mitigation measures are flow augmentations, programs to control predation on juvenile anadromous fish, habitat enhancement, and hatchery improvements. As stated above, the intent of the mitigation measures is to result in equal or better benefits to anadromous fish compared to the current BiOp spill regime. However, BPA foresees that some of the proposed mitigation measures may result in much higher returns. These proposed mitigation measures are designed to offset impacts to fish as a result of altering the current spill regime. All proposed mitigation measures are discussed below.

Brownlee Dam Flow Augmentation

Proposing Entity

BPA

Location

Brownlee Dam, Cambridge, Washington County, Idaho

Description of Proposed Action

On June 9, 2004, BPA entered into an option agreement with the Idaho Power Company to release 100 thousand acre feet (kaf) from Brownlee Reservoir between July 7 and July 28, 2004. On June 23, 2004, BPA exercised its option. Weekly release volumes will be approximately 33 kaf. The purpose is to increase flows and provide cooler water temperatures during the Snake River fall chinook outmigration. This additional water would not otherwise be available to BPA during this period without the agreement with the Idaho Power Company. This mitigation measure is designed to completely offset the impacts to ESA-listed Snake River fall chinook.

Analysis and Findings

BPA determined that this action is consistent with two categorical exclusions (CXs) pursuant to Section 1021.410 and Appendix B of Subpart D of the Department of Energy's (DOE) National Environmental Policy Act (NEPA) Regulations (57 FR 15144, Apr. 24, 1992, as amended at 61 FR 36221-36243, July 9, 1996; 61 FR 64608, Dec. 6, 1996). The applicable CXs include the following: B4.4 Power marketing services, including storage, load shaping, seasonal exchanges, or other similar activities if the operations of generating projects would remain within normal operating limits; and B4.5 Temporary adjustments to river operations to accommodate day- to-day river fluctuations, power demand changes, fish and wildlife conservation program requirements, and other external events if the adjustments would occur within the existing operating constraints of the particular hydrosystem operation.

This mitigation measure has support based on the comments received by BPA. Fish managers, such as Washington Department of Fish and Wildlife and the Columbia River Inter-Tribal Fish Commission, commented that the measure was "credible and viable" and "supported by fish passage data." This measure provides benefits to both listed and non-listed fish potentially impacted by the proposed spill reduction.

NOAA Fisheries has performed an impact analysis related to flow augmentation from Brownlee Reservoir. As documented in the NOAA Fisheries 2004 IP Findings, the survival benefit of the flow augmentation, by itself, is estimated to range between 700 and 1,100 additional juvenile fish surviving to below Bonneville Dam. The magnitude of this benefit is largest during an early migration year and lowest during a late migration year. However, regardless of the migration timing, the proposed mitigation measure results in increased benefits to Snake River fall chinook compared to the current BiOp spill regime. In addition, under each scenario analyzed by NOAA Fisheries, the survival benefit from flow augmentation was greater than the projected survival reduction due to

curtailed spill. Furthermore, there is expected to be no effect on adult salmon passage due to flow augmentation.

NOAA Fisheries thus determined that there would be an overall net benefit for listed Snake River fall chinook from increased flows from Brownlee Reservoir between July 8 and July 29, 2004, even with curtailment of spill; and that the flow augmentation measure by itself would be sufficient to offset the adverse effects of the proposed spill curtailment. As such, this offset is all that is needed to meet the equal or better standard for ESA-listed stocks.²

Information Reviewed

NOAA Analysis of Impacts and Offsets. *Available at*
<http://www.salmonrecovery.gov/implementation.shtml>. (June 30, 2004).

NOAA. 2004. Findings Regarding Adequacy of the Federal Columbia River Power System Action Agencies' 2004 Annual Implementation Plan (July 1, 2004).

Northern Pikeminnow Management Program (NPMP) Augmentation

Proposing Entity

BPA. BPA funds the NPMP. The Pacific States Marine Fisheries Commission and the Washington Department of Fish and Wildlife together have the responsibility for administration and record keeping for the Sport-Reward fishery. The Sport-Reward fishery is open to all appropriately licensed anglers and encourage through a reward for each northern pikeminnow (*Ptychocheilus oregonensis*) caught. The Oregon Department of Fish and Wildlife has responsibility for biological evaluation of program accomplishments in terms of the annual exploitation rate on northern pikeminnow, responses of northern pikeminnow and other resident fishes to northern pikeminnow management (e.g., inter- or intra-specific compensation), and estimated benefit to juvenile salmonid survival.

Location

The NPMP is a system-wide predator control program in the Columbia Basin. Open waters include the mainstem lower Columbia River up to Priest Rapids Dam in Washington and the Snake River up to Hells Canyon Dam in Idaho. Areas also open within this reach include backwaters, sloughs, and up to 400 feet into tributaries on the Columbia and Snake rivers.

Background

One of the primary non-operational actions available to improve in-river survival juvenile salmonids is the management of predatory fishes. The Northern Pikeminnow Management Program is a multi-year effort to reduce piscivorous predation on juvenile

² BPA customer representatives have implicitly argued that no more offsets are necessary because while summer spill was first enshrined in an FCRPS BiOp it did not address an ESA need. Instead, summer spill was for non-listed Hanford Reach fall chinook, the heart of the tribal fishery. Clearing Up, "Politics Played a Big Role in Adding Summer Spill to 1995 BiOp," p. 12-13 (June 21, 2004).

salmon primarily through public angler-driven system-wide removals of predator-sized northern pikeminnow.

The program is designed to reduce the number of pikeminnow that feed on juvenile salmonids. The NPMP is now a turnkey operation with demonstrated success in adaptively managing to changed conditions and responding to special circumstances. The NPMP performance in 2001 is a case-in-point. The highest observed annual harvest rate of 16 percent harvest was achieved in 2001, and was due at least in part to the “heavy-up” that was implemented during the drought/power emergency. More aggressive and focused removals could provide substantial survival benefit to reduce the impact of the conditions that in-river outmigrants face in 2004 and beyond.

While the benefit of annual removals accrue over time, removals within a year can also have significant immediate benefits to fish survival within the same year. An increase in the annual harvest rate can also have the effect of increasing the average annual harvest rate in the longer-term. Since program inception, over two million northern pikeminnow have been removed throughout the system with an estimated benefit of reducing predation mortality by 25 percent (Friesen and Ward 1999). This equates to over four million juvenile fish not eaten by pikeminnow each year. Currently, multi-year annual average harvest is approximately 12 percent, with the annual harvest rate ranging between approximately 8 and 16 percent.

Description of Proposed Action

In spring 2004, BPA initiated augmentations to the 2003 NPMP in order to provide potential mitigation if a decision was made to reduce spill levels. The 2004 program included increases in the basic reward structure and focused removals at Bonneville, The Dalles, and John Day dams’ forebay and tailrace boat restricted zones. Specifically, an additional reward of \$500 per specifically tagged northern pikeminnow caught would be provided and there would be modifications across all three reward tiers. The increases include the following: tier 1 (<100 northern pikeminnow caught) from \$4 to \$5 per fish; tier 2 (>100 northern pikeminnow caught) from \$5 to \$6 per fish; and tier 3 (>400 northern pikeminnow caught) from \$6 to \$8 per fish.

As stated above and in response to the comments received, BPA has included the addition of focused removals in the 2004 program. The purpose of this action would be to take advantage of any potential vulnerability of northern pikeminnow to catch based on redistribution under no-spill conditions. The NPMP employed contracted removals at dams and other site-specific locations from 1992 through 2001. Contributions toward total catch in those fisheries were significant in the early years of the NPMP but decreased considerably after 1995. Accordingly, these fisheries were terminated in 2001. An increase in spill at FCRPS projects resulting from the 1995 Biological Opinion may have dispersed predators below dams; partially explaining the decline in catches observed from 1995 forward. If northern pikeminnow re-disperse to locations nearer the dams under the proposed action, then implementation of a new site-specific fishery at these projects should provide opportunity to achieve catches similar to early years and thereby reduce the risk of potential increases in predation mortality at the projects.

This mitigation measure is designed to offset the impacts to non-listed fish, including non-listed fall chinook. It will also result in some benefit to listed Snake River fall chinook; however, BPA is not claiming credit at this time for those benefits.

Analysis and Findings

Juvenile salmonids are the major dietary component of northern pikeminnow (greater than 250 mm fork length). The importance of salmonids in the diet of northern pikeminnow varies seasonally. Research conducted between 1982 and 88 in the John Day reservoir indicates that juvenile salmonids were of greatest importance in the diet during July (82 percent by weight) when the run of subyearling chinook salmon peaked (Poe 1993). Overall, approximately 80 percent of northern pikeminnow predation occurs in July and August when water temperatures are warmer and predators most active; this coincides with the peak migration of subyearling fall chinook and other species affected by summer spill.

BPA received many comments regarding increasing catch and resultant pikeminnow exploitation rate utilizing the existing infrastructure of the NPMP. Comments from the regional salmon biologists suggest that while there may be benefit from increased removal of northern pikeminnow, those effects would not be discernable. In response, BPA proposed to more aggressively implement the NPMP to achieve exploitation rates that are in the higher end of the target range, and which in the long-term may be more significant relative to measurements. BPA also proposed that the mark-recapture effort, which is the basis for the NPMP evaluation, receive additional statistical review, as recommended by Hankin and Richards (2000). But even lacking such precision, BPA reiterates that unless there is either inter- or intra-specific compensation, increased removal has the effect of reduced consumption on smolts—a positive outcome that can be assessed analytically.

In the NOAA Fisheries 2004 IP Findings, NOAA Fisheries acknowledges that this mitigation would likely increase survival of juvenile Snake River fall chinook above current levels, and would cushion the potential risks associated with the proposed action. However, because this mitigation is arguably within one of the existing RPA Actions, and in order to provide a conservative analysis in its Findings, NOAA Fisheries has decided not to credit this mitigation as an offset for the purposes of its Findings. This is consistent with BPA's decision not to claim credit for potential benefits to listed Snake River fall chinook from this mitigation, and does not undermine the validity of this mitigation as an offset for potential impacts to non-listed fish, including non-listed fall chinook, from the proposed action.

Coordination of activities associated with a NPMP augmentation would occur utilizing existing program coordination and review processes. The NPMP has a separate Biological Opinion and NEPA documentation to cover program activities. A program augmentation is consistent with the existing BiOp for NPMP.

The potential impacts from the proposed changes to the NPMP are consistent with those described in the 1992 EA and FONSI. The proposed changes would not raise the level of

the environmental impacts to a significant level. In addition, the proposed mitigation action does not constitute a substantial change relevant to environmental concerns; and there are no significant new circumstances or information relevant to environmental concerns bearing on the proposed action or its impacts within the meaning of 10 C.F.R. § 1021.314(c) and 40 C.F.R. §1502.9(c). Therefore, a supplemental EA is not required. A letter of consistency was issued on May 24, 2004.

Information Reviewed

BPA. 1992. Squawfish Management Program Environmental Assessment. (DOE/EA-0512).

Poe, Tom et al. 1993: System-Wide Significance of Predation of Juvenile Salmonids in Columbia and Snake River Reservoirs, BPA project 1982-003-00.

Beamesderfer, Raymond, David Ward, and Anthony Nigro, 1996. Evaluation of the Biological Basis for a Predator Control Program on Northern Squawfish (*Ptychocheilus oregonensis*) in the Columbia and Snake Rivers, Volume 53, Number 12, pp 2898-2908.

Friesen T. and David Ward, 1999: Management of Northern Pikeminnow and Implications for Juvenile Salmonid Survival in the Lower Columbia and Snake Rivers, North American Journal of Fisheries Management 19:406-420.

Hanken D. and J. Richards, 2000 The Northern Pikeminnow Management Program: An Independent Review of Program Justification, Performance, and Cost-Effectiveness, 38pp.

NOAA. 2004. Findings Regarding Adequacy of the Federal Columbia River Power System Action Agencies' 2004 Annual Implementation Plan. (July 1, 2004).

Hanford Reach Rearing Protection (anti-stranding operation)

Proposing Entity

BPA

Location

Hanford Reach of the Columbia River, an approximately 50 mile long section of the Columbia River extending from downstream of Priest Rapids Dam to just north of Richland, Washington.

Background

Large populations of non-ESA-listed Hanford Reach fall chinook spawn naturally in the free-flowing section of the Columbia River below Priest Rapids Dam. Historically, these fish have been susceptible to being stranded by river fluctuations as they emerge. In the past BPA has voluntarily adjusted its operations to assist in providing adequate flows for the area.

Description of Proposed Action

In early 2004, BPA entered into the Hanford Reach Fall Chinook Protection Program agreement with the parties identified above, in effect replacing the previous Vernita Bar agreement. This agreement developed a 10-year set of protocols to limit flow fluctuations that encourages and requires specific river operations in order to protect Hanford Reach fall chinook. Generally, this agreement calls for hydrosystem operators to cooperate in providing certain minimum flows below Priest Rapids Dam to encourage the establishment of fall chinook redds at certain flow levels. Flows would be maintained into spring during hatching, emergence, and rearing. Specifically, BPA would be required to provide some of the spring flows (for four consecutive weekends in the spring). These temporary adjustments in river operations will be within the existing hydrosystem operating constraints.

Analysis and Findings

On December 15, 2003, BPA determined that the proposed action complied with Section 1021.410 and Appendix B of Subpart D of the Department of Energy (DOE) National Environmental Policy Act (NEPA) Regulations (57 Fed. Reg. 1512.2, April 24, 1992). The applicable CX was B4.5 “Temporary adjustments to river operations to accommodate day-to-day river fluctuations, power demand changes, fish and wildlife conservation program requirements, and other external events if the adjustments would occur within the existing operating constraints of the particular hydrosystem operation.”

Therefore the proposed action met the requirements of a categorical exclusion. This agreement is also consistent with BPA’s Fish and Wildlife Implementation Plan Environmental Impact Statement and subsequent Record of Decision. BPA, therefore, determined that the proposed action may be categorically excluded from further NEPA review and documentation.

Other Proposed Mitigation Measures

After issuing the amended proposal, BPA and other agencies continued to evaluate the proposed offsets. Based on these ongoing reviews, BPA believes that the Brownlee Dam Flow Augmentation, NPMP Augmentation, and Hanford Reach Rearing Protection fully offset impacts to both ESA-listed and non-listed fish. Furthermore, for listed Snake River fall chinook, NOAA Fisheries has found that the Brownlee Dam Flow Augmentation, by itself, is sufficient to fully offset impacts. Nevertheless, BPA continues to consider additional mitigation measures that would further contribute to offsetting the potential impacts of the proposed spill reduction. These measures are primarily funding mechanisms to address hatchery and habitat improvements. These proposed measures are listed below.

Hatchery Production and Improvement Fund

In response to public comments, BPA proposes to create a fund in the amount of \$2 million in 2004 for increasing hatchery production of specific stocks and improving hatchery facilities. This would further address those stocks most impacted by the proposed spill reduction.

Habitat Enhancement Fund

BPA also proposes to establish a fund in the amount of \$2 million in 2004 to facilitate habitat enhancement projects targeting naturally spawning fish impacted by the proposed spill reduction. These habitat enhancement projects would be funded starting in 2005. Funding would first be allocated to subbasins benefited but not specifically targeted by other mitigation measures. Projects selected for funding would be coordinated with the Northwest Power and Conservation Council.

Northwest Power and Conservation Council Fish and Wildlife Program Enhancement

BPA proposes to augment funding for the Council's Fish and Wildlife Program with a portion of the additional revenues resulting from the proposed spill reduction. This additional funding of \$3.3 million would be provided for fiscal year 2005 and would enable implementation of mitigation actions that have long-term benefits, such as habitat improvements. Additional funding not to exceed a total of \$10 million dollars may be available for subsequent years if reduced spill proposal are developed and implemented. See discussion in Section III below.

Analysis and Findings

Any site-specific actions proposed under the mitigation funding measures discussed above would be reviewed in a separate NEPA process. It is likely that the NEPA documents prepared would be Supplement Analyses or tiered RODs to existing EISs, specifically the Fish and Wildlife Implementation Plan Final EIS, Watershed Management Program Final EIS, or the Wildlife Mitigation Program Final EIS.

III. Aggregate Impacts and Cumulative Effects

BPA has considered the combined effect of the potential impacts of the proposed action with the potential impacts of the proposed mitigation measures to determine whether there are any synergistic or aggregate impacts. As acknowledged above, the proposed action will likely result in the mortality of a number of fish. Recent analyses estimate that expected mortality of ESA-listed fish would range between 109 to 927 juvenile fish. The Brownlee Dam Flow Augmentation mitigation measure is estimated to result in increased system passage survival of approximately 715 to 1075 juvenile listed fish. This equates to a net benefit ranging from 148 to 606 juvenile Snake River fall chinook. NOAA Fisheries' most recent impact estimates, described in the NOAA Fisheries 2004 IP Findings, confirm this expected net benefit. Furthermore, NOAA Fisheries has found that the Brownlee Dam Flow Augmentation, by itself, is sufficient to fully offset impacts to listed Snake River fall chinook. Therefore, the need to develop mitigation that results in better or equal benefits as the current BiOp spill regime is met.

BPA has also estimated the potential impact of the proposed action on non-listed fish. Based on our analysis there would be increased mortality of approximately 93,000 to 309,000 non-listed fish. The analysis did not differentiate by stock or place of origin. However, in order to provide a frame of reference, one group of fish included in the analysis is non-listed fall chinook, which has an estimated total run size of 50 million

juveniles. The quantifiable mitigation measures (i.e. Hanford Reach Rearing Protection, Northern Pikeminnow Management Program Augmentation, and Brownlee Dam Flow Augmentation) would result in increased system passage survival of approximately 1,131,033 to 1,365,181 non-listed fish. Non-listed fish would also benefit from other mitigation measures, including habitat and hatchery improvements, being considered.

The proposed mitigation measures more than offset the impacts from the proposed action. In fact, it results in net benefits ranging between 148 to 606 ESA-listed Snake River fall chinook and between 1,038,033 to 1,056,181 non-listed fish. The mitigation when taken in its entirety should result in positive, long-lasting synergistic effects that result in increased populations of fish. There are no negative synergistic effects that would result in additional impacts or additional aggregate impacts.

Other reasonably foreseeable actions that may affect the same resources may include harvest guidelines being negotiated in the closed *U.S. v. Oregon* process. These changes are likely to allow for increased incidental take of ESA-listed fish. Unlike the proposed action, however, these changes are not likely to have mitigation offsets. In addition, the Federal Energy Regulatory Commission (FERC) has asked for investigation into whether the temperature of water leaving the reservoir behind the non-federal Brownlee Dam affects salmon spawning and growth. In its relicensing process, FERC has said it wants to consider technology that would provide cooler water in the summer and fall for the chinook spawning season and accelerate the warming of the Snake River in the spring to promote growth and earlier outmigration (which could reduce the need for summer spill). A court has also ordered FERC to respond within 45 days to a 1997 petition from conservation groups requesting that the agency consult with NOAA Fisheries on the adverse impacts the Hells Canyon Complex might have on endangered salmon and steelhead. These FERC actions have no immediate impact for 2004 but may eventually result in additional non-federal mitigation for the Snake River fall chinook.

IV. Potential Spill Proposals for 2005-2006 and Mitigation Offset Measures

The proposed action only addresses spill reductions for the summer of 2004. The proposal states that the feasibility of additional years of reduced summer spill may be analyzed based on the results of 2004. If a future summer spill reduction proposal is developed, then a new NEPA analysis will be conducted to evaluate the potential impacts for those specific time frames. This new analysis will also consider any new information that may be generated by the 2004 proposed action.

In addition, new mitigation measures that may be part of future proposals could include commercial harvest reductions, the installation of fish passage improvements, and increased funding for the Council's Fish and Wildlife Program. If and when these additional mitigation measures become finalized, a separate NEPA review will be initiated and any required permits will be obtained as appropriate.

V. Overall Determination

This Supplement Analysis finds that the proposed action and mitigation measures do not constitute a substantial change relevant to environmental concerns; and that there are no significant new circumstances or information relevant to environmental concerns bearing on the proposed action or its impacts within the meaning of 10 C.F.R. § 1021.314(c) and 40 C.F.R. §1502.9(c). Therefore, preparation of a supplemental EIS is not required.

VI. Public Availability

The availability of this Supplement Analysis will be noticed in the *BPA Journal*. For additional copies of the document, please call 1-800-622-4520 and ask for the document by name. The document is available on the BPA website at www.bpa.gov and at the BPA Public Information Room at 905 NE 11th, Portland, OR. Copies may also be viewed at the U.S. Department of Energy Reading Room, 1000 Independence Avenue, SW, Room 1E-090, Washington, DC 20585.