

RECLAMATION

Managing Water in the West

PACIFIC NORTHWEST REGION

DECISION DOCUMENT

**Following the
May 2008 NOAA Fisheries FCRPS Biological Opinion
On
Operation of the Federal Columbia River Power System, 11 Bureau of Reclamation Projects in the
Columbia Basin, and ESA Section 10(a)(1)(A) Permit for Juvenile Fish Transportation Program (Revised
and reissued pursuant to court order, NWF v NMFS, Civ. No. CV 01-0640-RE (D. Oregon))**



**U.S. Department of the Interior
Bureau of Reclamation**

September 3, 2008

Mission Statements

The mission of the Department of the Interior is to protect and provide access to our Nation's natural and cultural heritage and honor our trust responsibilities to Indian Tribes and our commitments to island communities.

The mission of the Bureau of Reclamation is to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public.

**U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
PACIFIC NORTHWEST REGION**

**DECISION DOCUMENT
CONCERNING THE**

NOAA FISHERIES' MAY 5, 2008, BIOLOGICAL OPINION

**CONSULTATION ON REMAND FOR OPERATION OF THE FEDERAL
COLUMBIA RIVER POWER SYSTEM,
11 BUREAU OF RECLAMATION PROJECTS IN THE COLUMBIA
BASIN AND ESA SECTION 10(a)(1)(A) PERMIT FOR JUVENILE FISH
TRANSPORTATION PROGRAM**

**[Revised and reissued pursuant to court order, *NWF v. NMFS*, Civ. No. CV
01-0640-RE (D. Oregon)]**

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Abbreviations, Acronyms, and Definitions

TERM	DEFINITION
Action Agencies	U. S. Department of the Interior Bureau of Reclamation (Reclamation), U.S. Army Corps of Engineers, Bonneville Power Administration, the agencies responsible for management and operation of Federal hydroelectric projects in the Columbia and Upper Snake Rivers.
Adaptive Management	The process of adjusting management actions and/or directions based on new information.
Anadromous Fish	Species that are hatched in freshwater migrate to and mature in salt water and return to freshwater to spawn.
Biological Assessment	The Action Agencies' analysis of impacts of their proposed actions on species listed and proposed to be listed under the ESA. The Action Agencies produced biological assessments on projects in the Federal Columbia River Power System in the Columbia River and on projects in the Upper Snake River. See definition at 50 C.F.R. 402.02.
Biological Opinion	A document expressing NOAA Fisheries' opinion regarding whether and how a proposed action avoids jeopardy to listed species and the destruction or adverse modification of their critical habitat. See 50 C.F.R. § 402.02.
BPA	Bonneville Power Administration.
Columbia Basin Accords (Accords)	Agreements signed by the Action Agencies, four tribes, and two states to support the 2008 FCRPS BiOp and provide additional benefits to fish.
Comprehensive Analysis	The analysis conducted by the Action Agencies to assess impacts of proposed operation of major projects in the Federal Columbia River Power System (FCRPS). The CA provides the basis underlying the biological assessments on the FCRPS and Upper Snake projects.
Corps	U.S. Army Corps of Engineers.
CRITFC	Columbia River Intertribal Fish Commission.
Cumulative Effects	Effects of future state or private activities, not involving Federal activities, that are reasonably certain to occur. See definition at 50 C.F.R. 402.02.

TERM	DEFINITION
EFH	Essential fish habitat under the Magnuson Stevens Fisheries Management Act.
EIS	Environmental impact statement.
Environmental Baseline	Past and present impacts of all Federal, State, or private actions and other human activities in the action area, the anticipated impacts of all proposed Federal projects in the action area that have already undergone formal or early section 7 consultation, and the impact of state or private actions which are contemporaneous with the consultation in process. See definition at 50 C.F.R. 402.02.
ESA	Endangered Species Act, 16 U.S.C. 1531 <u>et seq.</u>
ESA Recovery Plan	A plan to recover a species listed as threatened or endangered under the U.S. Endangered Species Act (ESA). The ESA requires that recovery plans, to the extent practicable, incorporate (1) objective, measurable criteria that, when met, would result in a determination that the species is no longer threatened or endangered; (2) site specific management actions that may be necessary to achieve the plan's goals; and (3) estimates of the time required and costs to implement recovery actions.
Evolutionarily significant unit (ESU)	A group of Pacific salmon or steelhead trout that is (1) substantially reproductively isolated from other specific units and (2) represents an important component of the evolutionary legacy of the species.
FCRPS	Federal Columbia River Power System.
Federal Caucus	Eight agencies operating in the Columbia River Basin that have natural resource responsibilities related to the Endangered Species Act (ESA). Through the Federal Caucus, these agencies coordinate their activities.
ICTRT	Interior Columbia Basin Technical Recovery Team.
Jeopardize	To reduce appreciably the likelihoods of survival and recovery of a species listed as threatened or endangered under the ESA. See 50 C.F.R. § 402.02 (definition of “jeopardize”).
Multipurpose Facilities	The Columbia River and the reservoir system are used for many purposes or uses. Projects that were authorized to serve a variety of purposes are referred to as “multipurpose.”
NEPA	National Environmental Policy Act.

TERM	DEFINITION
NOAA Fisheries	National Marine Fisheries Service, an agency within NOAA (also referred to as NMFS).
NW Power and Conservation Council	Pacific Northwest Electric Power and Conservation Planning Council, created under the Pacific Northwest Electric Power Planning and Conservation Act, which develops which develops power plans and a fish and wildlife programs to guide activities by the Bonneville Power Administration and other Federal and nonfederal entities in the Pacific Northwest.
Reasonable and Prudent Alternative (RPA)	Recommended alternative actions identified during formal consultation that can be implemented in a manner consistent with the purposes of the action, that is consistent with the scope of the Federal agency’s legal authority and jurisdiction, that is economically and technologically feasible, and that NOAA Fisheries believes would avoid the likelihood of jeopardizing the continued existence of listed species or resulting in the destruction or adverse modification of critical habitat. See definition at 50 C.F.R. § 402.02.
Reclamation	Bureau of Reclamation.
Recovery	Improvement in the status of a species to the point at which listing under the ESA is no longer appropriate.
ROD	Record of decision.
RPA	Reasonable and Prudent Alternative.
Spill	Water released from a dam over the spillway instead of being directed through the turbines.
Supplemental Comprehensive Analysis (SCA)	An analysis by NOAA Fisheries of the effects of three actions in the context of the environmental baseline and cumulative effects. The SCA provides the analysis underlying the evaluations in NOAA Fisheries’ Biological Opinions on operation of FCRPS projects, operation of Upper Snake River projects, and harvest activities under <i>U.S. v. Oregon</i> .
<i>U.S. v. Oregon</i>	Litigation under which Federal, State, and Tribal parties resolve differences respecting harvest levels of anadromous fish.

I. Introduction

The Bureau of Reclamation (Reclamation) was authorized by Congress to construct, operate, and maintain multiple use projects in the Columbia River Basin for such purposes as irrigation, municipal and industrial water supply, flood control, hydropower generation, fish and wildlife, and recreation.

Some of these projects (or parts of projects) are operated in a coordinated manner with other Federal projects; the coordinated projects are referred to as the Federal Columbia River Power System (FCRPS). The FCRPS projects also operate in coordination with several public utility hydropower projects located along the mid-Columbia River and certain Canadian reservoir projects pursuant to the Columbia River Treaty between the United States and Canada. The FCRPS projects, located throughout the Pacific Northwest in the states of Idaho, Oregon, Montana, and Washington, provide a wide array of benefits to the citizens of the Northwest.

The operation and maintenance of the FCRPS projects affect species listed for protection under the Endangered Species Act (ESA). The ESA, Section 7(a) 2 requires that:

“[e]ach federal agency shall, in consultation with and with the assistance of the Secretary, insure that any action authorized, funded, or carried out by such agency is not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of habitat of such species. . .”

The FCRPS Action Agencies (the Corps of Engineers (Corps), Bonneville Power Administration (BPA), and Reclamation), have engaged in several ESA consultations since the early 1990s with the National Marine Fisheries Service (NMFS or NOAA Fisheries) on actions concerning the operation and maintenance of the FCRPS projects that may affect listed anadromous species or adversely modify these species’ critical habitat.

After over two years of collaboration among regional sovereigns, on May 5, 2008, NOAA Fisheries issued the current biological opinion “*Consultation on Remand For Operations of the Federal Columbia River Power System, 11 Bureau of Reclamation Projects in the Columbia Basin and ESA Section 10(a)(1)(A) Permit for Juvenile Fish Transportation Program* [Revised and reissued pursuant to court order, *NWF v. NMFS*, Civ No. CV 01-0640-RE (D. Oregon)]” (2008 FCRPS Biological Opinion).

ESA regulations state “following the issuance of a biological opinion, the Federal [action] agency shall determine whether and in what manner to proceed with the [proposed] action in light of its Section 7 obligations and the Service's biological

opinion” [50 CFR Part 402.15 (a)]. This Decision Document sets forth Reclamation’s rationale for the decision to implement those actions for which it is responsible in the 2008 FCRPS Biological Opinion Reasonable and Prudent Alternative (RPA) and the terms and conditions of the Incidental Take Statement.

II. Background

The Snake River sockeye salmon was the first anadromous fish species in the Columbia River Basin to be listed by NMFS (November 20, 1991). Since then, additional anadromous species have been listed. Reclamation and the other FCRPS Action Agencies have initiated numerous ESA Section 7 consultations to address the effects of the operation and maintenance of the FCRPS projects on listed salmon and steelhead and their critical habitat.

The National Wildlife Federation (NWF) and others filed an ESA challenge to the 2000 NOAA Fisheries FCRPS Biological Opinion, which the District Court ruled was arbitrary and capricious because it relied on (1) Federal mitigation actions that had not been subject to Section 7 consultation and (2) non-federal mitigation actions that had not been shown reasonably certain to occur [*NWF v. NMFS*, 254 F. Supp. 2d 1196, 1213 (D. Or. 2003)]. The court remanded to the agencies for a new Biological Opinion to correct these deficiencies, leaving the 2000 Biological Opinion in effect in the meantime.

In response to the remand, NOAA Fisheries issued the November 30, 2004 Biological Opinion on the operation of the FCRPS (2004 FCRPS Biological Opinion). On December 30, 2004, NWF filed a Second Supplemental Complaint challenging the 2004 FCRPS Biological Opinion. On May 26, 2005, the District Court held the 2004 Biological Opinion invalid followed by an October 7, 2005 Opinion and Order for NOAA Fisheries to engage in remand proceedings in accordance with the following instructions:

- 1) Correct its improper segregation of the elements of the proposed action NOAA Fisheries deems to be nondiscretionary;
- 2) Correct its improper comparison, rather than aggregation, of the effects of the proposed action on the listed salmon and steelhead;
- 3) Correct its flawed determinations as to whether the proposed action destroys or adversely modifies critical habitat;
- 4) Correct its failure to consider the effects of the proposed action on both recovery and survival of the listed species in determining whether the proposed action is likely to jeopardize the continued existence of listed salmon and steelhead; and,

- 5) Correct its past reliance on mitigation measures that are not reasonably certain to occur and/or have not undergone Section 7 consultation.

Further, the Court ordered NOAA Fisheries and the FCRPS Action Agencies to collaborate with regional sovereign States and Tribes to develop items to be included in the FCRPS proposed action, clarify policy issues, and reach agreement or narrow the areas of disagreement on scientific and technical information. Finally, the Order directed NOAA Fisheries to file periodic status reports with the Court, to provide preliminary information about the legal framework NOAA Fisheries intended to use in its jeopardy analysis, and the nature and scope of the proposed action or the reasonable and prudent alternative for the FCRPS.

On January 3, 2006, the Federal Defendant's First Remand Report was filed in which the Federal agencies committed to the Court that they would "apply the ESA, its implementing regulations and this Court's ruling of May 7, 2003 and May 26, 2005." In accordance with the District Court's remand order, the Federal, State, and Tribal entities outlined a collaborative process and formed a Policy Working Group, made up of one representative from each of the sovereign entities. The Policy Working Group established technical workgroups and policy subgroups to develop information concerning the status of the species, various State, Tribal and Federal actions, and the estimated effects of the various actions. There were more than 270 Policy Working Group and Technical Workgroup meetings involving more than 150 participants from 26 organizations. The Policy Working Group also provided ten briefings and discussions with other parties to the litigation at key milestones to keep them informed and to seek their input.

This collaboration process identified actions for salmon recovery, including an analysis of their effects that the FCRPS Action Agencies' could use in developing a Proposed Reasonable and Prudent Alternative. This process also identified actions to be taken by sovereign parties in coordinating regional salmon recovery efforts. The collaboration assisted the Action Agencies in the development of the FCRPS Biological Assessment and the Comprehensive Analysis.

A significant outcome of the collaboration process relied on in this consultation was the historic signing of the *Columbia Basin Fish Accords* (Accords). Reclamation and other parties signed the Accords on May 2, 2008.

Comprehensive Analysis. The development of the Comprehensive Analysis responded to a ruling in *American Rivers v. NOAA Fisheries* [2006 U.S. Dist. Lexis 69442 (D.OR. Sept 26, 2006)] concerning the 2005 Upper Snake Biological Opinion. The District Court ruled that the analysis of effects in the 2004 FCRPS Biological Opinion remand be integrated with the analysis of effects for the Upper Snake River Biological Opinion remand. This would result in a "comprehensive

analysis" of the effects of the two actions on the listed species and designated critical habitat.

To address the District Court's concerns, the FCRPS Action Agencies and NOAA Fisheries embarked on a thorough lifecycle survival analysis that looks at the status of each of the listed species and the factors that have contributed to their decline, assesses the impact of the Federal agencies' proposed actions, and makes a determination of whether those actions and the actions of others will contribute to the recovery of these fish. The Action Agencies submitted the FCRPS Biological Assessment and Comprehensive Analysis to NOAA Fisheries on August 21, 2007. The analysis concluded that the Federal Agencies proposed actions would not jeopardize listed species or result in the destruction or adverse modification of their critical habitat.

NOAA Fisheries prepared a draft Biological Opinion with a Supplemental Comprehensive Analysis, which was released to the litigation parties and made available to the public on October 31, 2007. NOAA Fisheries received detailed and specific comments on the draft Biological Opinion. Responses to these are reflected in the final 2008 FCRPS Biological Opinion and Supplemental Comprehensive Analysis.

Ninth Circuit Decision. The District Court's decision regarding the 2004 Biological Opinion was appealed to the Ninth Circuit. [*NWF v. NMFS*, 524 F.3d 917 (Ninth Cir. 2008)]. In its analysis, the Ninth Circuit examined what it means to "jeopardize the continued existence" of a listed species.

We have gleaned from the decision the following statements regarding agency action:

- A jeopardy analysis does not "have the effect of preventing any Federal action once background conditions place a species in jeopardy"
- "An agency may still take action that removes a species from jeopardy entirely or that lessens the degree of jeopardy."
- "An agency may not take action that will tip a species from a state of precarious survival into a state of likely extinction."
- "Even where baseline conditions already jeopardize a species, an agency may not take action that deepens the jeopardy by causing additional harm."

The Ninth Circuit also held that the existence of the dams must be included in the environmental baseline while the operation of the dams is within the Federal agencies discretion, and that "[t]he proper baseline analysis is not the proportional share of responsibility the Federal agency bears for the decline in the species, but what jeopardy might result from the agency's proposed actions in the present and

future human and natural contexts” (524 F.3d at 930). The Court upheld the District Court’s conclusion “that the 2004 Biological Opinion impermissibly failed to incorporate degraded baseline conditions into its jeopardy analysis” (524 F.3d at 933). Further, the Ninth Circuit found that the “district court correctly determined that the 2004 Biological Opinion was legally deficient because its jeopardy analysis did not adequately consider the proposed action’s impacts on the listed species’ chances of recovery.”

In May 2008, NOAA Fisheries concurrently issued Biological Opinions on the operations of FCRPS projects, operations of Upper Snake Projects, and the *United States v. Oregon* Harvest Management Agreement (collectively described as the “Prospective Actions”). NOAA Fisheries’ 2008 FCRPS Biological Opinion recommended a Reasonable and Prudent Alternative with changes and additions from the action proposed by the FCRPS Action Agencies. The collective effects of these actions were evaluated in the Supplemental Comprehensive Analysis that was issued simultaneously. NOAA Fisheries concluded that the combination of these Prospective Actions avoids jeopardizing listed species and the destruction or adverse modification of their designated critical habitat.

NOAA Fisheries’ Supplemental Comprehensive Analysis used the same analytical approach and methodology provided in the Federal agencies’ Comprehensive Analysis, with updated information regarding species status as well as new modeling estimates and analysis to inform the 2008 Biological Opinion’s conclusions. The aggregated lifecycle analysis incorporated and considered all sources of salmonid mortality and assessed the effects of the Prospective Actions with the environmental baseline and the anticipated future state and private actions, or cumulative effects, on the listed salmon and steelhead that are reasonably certain to occur; and, analyzed whether, with these aggregate effects, listed species have a sufficiently low risk of extinction and an adequate potential for recovery.

2008 Biological Opinion Consultation Process

The 2008 FCRPS Biological Opinion addressed a total of 15 species, all listed under the ESA between 1991 and 2007 (Table 1). In addition to ESA-listed species, the ESA requires designation and protection of their critical habitat. NOAA Fisheries previously designated critical habitat for 12 of the species and is currently working on the designation process for the Lower Columbia River Coho Salmon Evolutionary Significant Unit. No critical habitat rules have been published for the Southern Distinct Population Segment of the killer whale or Southern Distinct Population Segment of the green sturgeon (Table 1).

Table 1 - Species Considered Under the 2008 FCRPS Biological Opinion

Species/ESU	Scientific Name	Status	Critical Habitat
Snake River Sockeye Salmon	<i>Oncorhynchus nerka</i>	Endangered	Yes – final
Snake River Spring/Summer Chinook Salmon	<i>Oncorhynchus tshawytscha</i>	Threatened	Yes – final
Snake River Fall Chinook Salmon	<i>Oncorhynchus tshawytscha</i>	Threatened	Yes – final
Snake River Steelhead	<i>Oncorhynchus mykiss</i>	Threatened	Yes – final
Upper Columbia River Spring Chinook Salmon	<i>Oncorhynchus tshawytscha</i>	Endangered	Yes – final
Upper Columbia River Steelhead	<i>Oncorhynchus mykiss</i>	Endangered	Yes – final
Middle Columbia River Steelhead	<i>Oncorhynchus mykiss</i>	Threatened	Yes – final
Lower Columbia River Chinook Salmon	<i>Oncorhynchus tshawytscha</i>	Threatened	Yes – final
Lower Columbia River Steelhead	<i>Oncorhynchus mykiss</i>	Threatened	Yes – final
Columbia River Chum Salmon	<i>Oncorhynchus keta</i>	Threatened	Yes – final
Upper Willamette River Chinook Salmon	<i>Oncorhynchus tshawytscha</i>	Threatened	Yes – final
Upper Willamette River Steelhead	<i>Oncorhynchus mykiss</i>	Threatened	Yes – final
Lower Columbia River Coho Salmon	<i>Oncorhynchus kisutch</i>	Threatened	In process
Killer Whale Southern DPS	<i>Orcinus orca</i>	Endangered	No
Green Sturgeon Southern DPS	<i>Acipenser medirostris</i>	Threatened	No

III. 2007 FCRPS Biological Assessment and Comprehensive Analysis

2007 FCRPS Biological Assessment (and addendums) including Proposals to Improve Salmon and Steelhead Survival

The Corps, BPA, and Reclamation jointly submitted the FCRPS Biological Assessment and Comprehensive Analysis to NOAA Fisheries on August 21, 2007. The FCRPS Biological Assessment and Comprehensive Analysis analyzed the effects of the Proposed Reasonable and Prudent Alternative for the operation of the FCRPS and the Proposed Action for the Upper Snake on 13 Evolutionary Significant Units (ESUs). Subsequent addendums to the FCRPS Biological

Assessments were provided to NOAA Fisheries on two more ESA listed species - the Southern Distinct Population Segment of the killer whale (orcas) and the Southern Distinct Population of the green sturgeon (green sturgeon).

The additions to the FCRPS Biological Assessment and Comprehensive Analysis included the:

- 1) Addendum to the “Comprehensive Analysis of the Federal Columbia River Power System and Mainstem Effects of Upper Snake and other Tributary Actions.” Analysis of Effects on Listed Killer Whale and Green Sturgeon Distinct Population Segments. April 2008.
- 2) Revised Addendum to the “Biological Assessments and Comprehensive Analysis of the Federal Columbia River Power System and Mainstem Effects of Upper Snake and Other Tributary Actions.” Analysis of Effects on Listed Columbia River Basin Salmon and Steelhead Populations from Proposed Memorandum of Agreement Actions. May 2008.

Together these documents assess the status of the 15 ESA-listed species, describe the action the Action Agencies proposed to undertake, identify the extent of the action area, discuss the process the Action Agencies applied in analyzing the effects of the action, and present a package of specific mitigation actions. The action proposed in the Biological Assessment/Comprehensive Analysis spans the 10-year time period from 2007 through 2017; through the consultation, this was later adjusted to 2008 to 2018.

The action proposed by the Action Agencies and analyzed in the FCRPS Biological Assessment consists of multiple, separate actions that include:

- 1) The operation and maintenance of the 14 Federal dams and powerplants that are operated by the Corps and Reclamation as an integrated system for flood control and power generation, two of which are Reclamation projects (Hungry Horse Project and Columbia River Basin Project which includes Grand Coulee Dam)
- 2) The operation of other Reclamation irrigation projects, to the extent they affect flows in the mainstems of the Columbia and Snake rivers.

The Reclamation irrigation projects in the Columbia River Basin whose mainstem effects are addressed under this consultation are listed in Table 2.

Table 2 – Columbia River Mainstem Effects were Considered at the Following Bureau of Reclamation Projects ¹

PROJECT NAME	STATE
<i>Upper Columbia River (upstream from Snake River confluence)</i>	
Hungry Horse	Montana
Columbia Basin	Washington
Chief Joseph*	Washington
Okanogan	Washington
Yakima	Washington
<i>Lower Columbia River (downstream of the Snake River confluence)</i>	
Crooked River	Oregon
Deschutes	Oregon
Wapinitia	Oregon
The Dalles*	Oregon
Umatilla	Oregon
Tualatin	Oregon
* Chief Joseph and The Dalles projects are irrigation works that are owned and operated by Reclamation. They are separate from The Dalles and Chief Joseph Dams owned and operated by the Corps.	

The operation and maintenance of Reclamation’s projects are described in the 2007 FCRPS Biological Assessment, Appendix B.1, including Attachments B.1-4 (Bureau of Reclamation Storage Projects)² and B.1-7 (Bureau of Reclamation Tributary Projects).

While the operation of the FCRPS and each of Reclamation’s projects, which are primarily (though not necessarily exclusively) authorized for irrigation purposes, are separate actions, and while the operation of each project is independent of the

¹ With the exception of the Columbia Basin Project, these Reclamation projects are not located on the mainstem Columbia River.

- (a). The Bitterroot Project, located south of Missoula on the Bitterroot River in western Montana, was erroneously included in the 2008 Biological Opinion.
- (b.) Reclamation is proceeding with Section 7(a)(2) consultations with NOAA Fisheries on the effects from operating and maintaining Reclamation Projects. These consultations, in combination with this FCRPS consultation, will provide coverage of all tributary and mainstem effects of those projects. Those Reclamation projects currently undergoing additional consultation include the Okanogan, Yakima, and Tualatin.
- (c.) The projects that are collectively referred to as the Upper Snake River Projects are Minidoka, Palisades, Michaud Flats, Ririe, Little Wood River, Boise, Lucky Peak, Mann Creek, Owyhee, Vale, Burnt River, and Baker. A separate biological opinion was prepared for these projects; however, the effects of these projects were included in the Comprehensive Analysis and Supplemental Comprehensive Analysis.
- (d) Small Reclamation projects having no measureable effects on the Columbia River mainstem include the Spokane Valley, Big Flat Units of the Missoula Valley, Frenchtown, Dalton Gardens, Avondale, and Rathdrum Prairie projects.

² As clarified by an email sent to NOAA Fisheries on April 15, 2008.

operation of any other project, all of these legally and factually separate actions were the subject of the 2007 FCRPS Biological Assessment and Comprehensive Analysis consultation at Reclamation's request as permitted, but not required, by 50 C.F.R. §402.14(c).

The Proposed Reasonable and Prudent Alternative included a variety of actions to address limiting factors throughout the anadromous species' lifecycles. The Proposed Reasonable and Prudent Alternative was not limited to hydrosystem improvements, but also improvements in habitat, hatcheries, harvest, predation management, and research, monitoring and evaluation actions that are directly interrelated with the operation and maintenance of the FCRPS. Additionally, adaptive management actions that describe commitments, performance standards, planning, reporting, research, monitoring, evaluation, oversight, and contingencies were included.

All proposed actions are within the scope of one or more of the Action Agencies' respective statutory authorities and their expected funding resources. In reaching the determinations set forth in this Decision Document, Reclamation relied on the description of the actions for which Reclamation is responsible as set forth in the 2007 FCRPS Biological Assessment and NOAA Fisheries' Reasonable and Prudent Alternative, unless specifically noted to the contrary.

Comprehensive Analysis

The Action Agencies' Comprehensive Analysis reviews the effects of two actions: 1) the operation and maintenance of the FCRPS projects with actions to mitigate for these effects; and 2) the operation and management of Reclamation projects in the Upper Snake River. This combined analysis responds to direction by the district court to ensure a "comprehensive analysis" of the effects of both actions on listed species and their critical habitat. The following is a summary of the approach the Action Agencies used for the Comprehensive Analysis, with a thorough discussion of the approach located in the Action Agencies' Comprehensive Analysis.

The Comprehensive Analysis uses a life-cycle, aggregate approach, which considers the biological requirements for survival and recovery of the listed species. It evaluates whether the species are likely to survive and be placed on a trend toward recovery after considering the effects of the FCRPS Proposed Reasonable and Prudent Alternative and the Upper Snake River Proposed Actions aggregated with the environmental baseline and cumulative effects. As such, this lifecycle survival analysis necessarily considers all mortality factors affecting the listed species, as well as all actions that have an impact on the species' survival, productivity, and population growth rates. The Comprehensive Analysis takes into consideration the status of, and other information applicable to, each ESU.

Based upon this analysis, the Comprehensive Analysis concludes that the FCRPS action meets or exceeds the objectives of doing no harm and contributing to recovery. The Comprehensive Analysis also concludes that the primary constituent elements of listed species' designated critical habitat are expected to function adequately to serve their conservation role.

Subsequent to the submittal of the FCRPS Biological Assessment/Comprehensive Analysis, NOAA Fisheries received comments on the draft 2007 FCRPS Biological Opinion and draft 2007 Upper Snake River Biological Opinion. After review of these comments, NOAA Fisheries requested that the Action Agencies consider whether their actions may affect either the Southern Resident distinct population segment (DPS) of killer whales (orcas), or the Southern DPS of green sturgeon, in addition to the listed anadromous salmonids.

In response, the Action Agencies submitted an Addendum to the Comprehensive Analysis and determined that the Proposed Actions may affect, but are not likely to adversely affect, the Southern Resident DPS of killer whales, and that the FCRPS and Upper Snake dam operations may affect, but are not likely to adversely affect, the Southern DPS of green sturgeon.

Relationship to the Conceptual Framework

In addition to its aggregated lifecycle analysis, the Comprehensive Analysis also considers the Conceptual Framework developed during the FCRPS Biological Opinion Remand's Collaboration Process among the sovereigns. The Framework approach attempted to estimate the relative magnitude of mortality factors affecting Interior Columbia River Basin salmonid populations for which adequate data was available.³ That assessment was intended to define the "relative expectation of the FCRPS for recovery."⁴ As noted in the Comprehensive Analysis the Conceptual Framework "can be understood to represent the Collaboration parties' view of the appropriate contribution of the FCRPS toward long-term recovery of the listed ESUs in the Interior Columbia River Basin" (Comprehensive Analysis at § 3.1.3.2, p. 3-10).

The Framework approach provides another "metric" for use in considering the impacts of the Proposed Reasonable and Prudent Alternative on a listed species'

³ The Interior Columbia River Basin species addressed by the Conceptual Framework are Snake River fall Chinook salmon, Snake River spring and summer Chinook salmon, Upper Columbia River spring Chinook salmon, Upper Columbia River steelhead, and Middle Columbia River steelhead. The two Interior Columbia River Basin species for which adequate scientific data is not available are Snake River sockeye and Snake River steelhead. The Conceptual Framework did not address Lower Columbia River and Willamette River species.

⁴ "Interim Report: Relative Magnitude of Human-Related Mortality Factors Affecting Listed Salmon and Steelhead in the Interior Columbia River Basin," prepared by Framework Work Group of the *NWF v NMFS* Collaboration Process (May 4, 2006), p. 1, quoted in Comprehensive Analysis, § 3.1.3.2, "Comparison to the Remand Collaboration's Conceptual Framework," pp. 3-9 – 3-10 and corresponding sections for each listed species, e.g. § 4.3.5, p. 4-15, for Snake River fall Chinook.

prospects for recovery. In the Comprehensive Analysis, the Action Agencies compare the expected effects of the Proposed Reasonable and Prudent Alternative to the level of effort needed to achieve the goals set by the Policy Working Group in the Conceptual Framework. This comparison provides one means of assessing the degree to which the Proposed Reasonable and Prudent Alternative will advance a species' prospects for recovery. The Comprehensive Analysis concludes that the Proposed Reasonable and Prudent Alternative reaches or exceeds the Conceptual Framework's goals for the FCRPS for all Interior Columbia species for which adequate data are available to support the analysis.

The Conceptual Framework was intended to provide a link to recovery efforts and “can be understood to represent the Collaboration parties’ view of the appropriate contribution of the FCRPS toward long-term recovery of the listed ESUs in the Interior Columbia River Basin” (Action Agencies’ Comprehensive Analysis, § 3.1.3.2, p. 3-10).

IV. The Columbia Basin Fish Accords

The District Court directed the Federal agencies to collaborate with regional sovereign States and Tribes to reach agreement or narrow areas of disagreement on scientific and technical information in the formulation of a Reasonable and Prudent Alternative that complies with the ESA. After many months of concerted efforts to accomplish this objective for the ESA consultation, the Action Agencies entered into agreements with four Tribes and two States to improve fish survival and habitat, and to advance fish recovery in the Columbia River Basin. The *Columbia Basin Fish Accords* address fish affected by the operation of the FCRPS projects, with a focus on salmon and steelhead fish listed under the ESA.

The Accords are specific and binding plans that contain a clear, definite commitment of current and future resources that will result in hundreds of new projects and dedicated funding for certain on-going projects throughout the Columbia River Basin for the next 10 years. These Accords also signal to the region the recognition by the signatories that a collaborative partnership is necessary to successfully meet the needs of the region’s fish.

Specifically, the Columbia Basin Fish Accords are:

- An agreement between the Action Agencies and the Confederated Tribes of the Umatilla Indian Reservation, the Confederated Tribes of the Warm Springs Reservation, the Confederated Tribes and Bands of the Yakama Nation, and the Columbia River Inter-Tribal Fish Commission. These Tribes and the Columbia River Inter-Tribal Fish Commission are collectively referred to as the “Three Treaty Tribes.”
- An agreement between the Action Agencies and the Confederated Tribes of the Colville Indian Reservation (Colville Tribe)

- An agreement between the State of Idaho and the Action Agencies
- An agreement between the State of Montana and the Action Agencies

Under the terms of the Accords, the Action Agencies committed to implementation of hydrosystem actions, both structural and operational improvements to the FCRPS projects. Additionally, the Action Agencies and the signatory Tribes and States are committing to implementing non-hydro projects, funded primarily by BPA, for the benefit of fish affected by the FCRPS.

The Columbia Basin Fish Accords also provide for actions to help other fish, including non-ocean-going (resident) stocks in Montana such as bull trout, as well as for non-listed anadromous and resident species in the Basin, including Pacific lamprey. The actions committed to in the Accords were developed to work in concert with the 2008 FCRPS Biological Opinion and the Upper Snake Biological Opinion.

Reclamation Commitments in the Columbia Basin Fish Accords

In the 2008 FCRPS Biological Opinion, the Action Agencies have committed to holding annual forecast performance reviews looking at in-place tools for seasonal volume forecasts and reporting on the effectiveness of experimental or emerging technologies and procedures. In the Three Treaty Tribes-Action Agency agreement, the parties negotiated additional actions to improve forecasting methods such as convening a forecast and data committee to include technical representatives from these Tribes.

Pacific lamprey, though not a listed species, are of considerable importance to the Three Treaty Tribes, who use the fish for food and medicine. The parties agreed upon a suite of actions to address concerns about the decline in lamprey populations, both to address the tribal interests and to help avoid a listing of the species in the future. The parties agreed to study lamprey impacts associated with Reclamation projects in the Columbia River Basin. Following this study, the parties have agreed to work together to develop a Pacific lamprey implementation plan to help address the study findings.

In the Three Treaty Tribes agreement, the parties seek to improve spawning and rearing habitat in order to increase productivity of specific population groups of salmon and steelhead. Projects will be focused in the upper Columbia tributaries, as well as the Grande Ronde, Umatilla, and Walla Walla Rivers. Reclamation will continue to provide technical assistance at 2007 levels for habitat improvements in both the Grand Ronde and the John Day basins.

The Confederated Tribes of the Colville Reservation have a particular concern about how dry year (low water) operations of the FCRPS will be conducted; dry

year operations affect Lake Roosevelt, which inundates a portion of the Colville's reservation. In the Colville agreement, the parties provided additional details as to how summer drafting and other dry year operations studies will be carried out, and provided expressly for the inclusion of the Colville Tribes in those analyses.

Under the Colville-Action Agency agreement, Reclamation will annually fund the purchase of up to 500 acre-feet of water from willing sellers in the Okanogan Project in Washington to provide instream flow for listed steelhead in Salmon Creek.

V. 2008 FCRPS Biological Opinion

NOAA Fisheries released the 2008 FCRPS Biological Opinion simultaneously with the Upper Snake Biological Opinion and the *United States v. Oregon* Harvest Management Agreement Biological Opinion. The Supplemental Comprehensive Analysis serves as the scientific foundation for all three biological opinions.

In the preparation of the final 2008 FCRPS Biological Opinion, NOAA Fisheries analyzed the information submitted in the Action Agencies' Biological Assessment/Comprehensive Analysis, the Addendums noted above, as well as other scientific information and comments received on the draft Biological Opinion. In so doing, notable changes to the draft Reasonable and Prudent Alternative were made, including the following:

- Actions to improve survival of Snake River B-run steelhead populations.
- The Snake River Steelhead Kelt Management Plan was added to improve the productivity of interior basin B-run steelhead populations.
- More conservative summer spill cessation triggers
- Forecasting improvements for flow augmentation and climate change
- Transport operations to increase survival benefits for Snake River steelhead as compared to the Biological Assessment and as modified by the Biological Opinion, subject to continued performance review.
- Chum spawning flows.

In the final Biological Opinion, NOAA Fisheries addressed the Court's remand instructions directly:

- "NOAA Fisheries' analysis aggregates the effects of the FCRPS Proposed Actions, which are incorporated in the Reasonable and Prudent Alternative, the Upper Snake basin proposed actions, the transportation permit and the *United States v. Oregon* Harvest Management Agreement (all together referred to as "Prospective Actions"), with the continuing

effects in the environmental baseline and anticipated future state and private actions (termed Cumulative Effects) on the listed salmon and steelhead, as reported in Chapter 8 of the Supplemental Comprehensive Analysis for each species.

- NOAA Fisheries revised the 2004 analytical treatment and effects of the Proposed Action on critical habitat, as reported in Chapter 8 of the Supplemental Comprehensive Analysis for each species.
- NOAA Fisheries addressed the prospects for both recovery and survival for each species in evaluating the effects of the Proposed Action.
- NOAA Fisheries' determination relies on measures included in the Reasonable and Prudent Alternative, which is the subject of the Section 7 consultation. Actions outside of this Reasonable and Prudent Alternative, such as Federal, State, and Tribal measures that are already taking place or are reasonably certain to occur, are considered as part of the Environmental Baseline or on a qualitative basis, as part of a cumulative effects analysis (2008 FCRPS Biological Opinion).

Supplemental Comprehensive Analysis

The 2008 FCRPS Biological Opinion Reasonable and Prudent Alternative (as modified from the draft Biological Opinion) is supported by the analysis in NOAA Fisheries' Supplemental Comprehensive Analysis (Supplemental Comprehensive Analysis). While the Supplemental Comprehensive Analysis is consistent with the Action Agencies' Comprehensive Analysis, it includes updated biological information and modeling, using new and revised estimates of impacts on salmonid survival, thus providing additional assurance that NOAA Fisheries' recommended Reasonable and Prudent Alternative avoids jeopardizing listed species and the destruction or adverse modification of critical habitat.

The Supplemental Comprehensive Analysis aggregated lifecycle analysis incorporates and considers all sources of salmonid mortality, and assesses the effects of the Prospective Actions with the environmental baseline and anticipated future state and private actions that are reasonably certain to occur (cumulative effects), on listed salmon and steelhead. It also analyzes whether, with these aggregate effects, listed species have a sufficiently low risk of extinction and an adequate potential for recovery.

NOAA Fisheries analytic methodology considered not only survival, but also the listed species' potential for recovery. The analytic approach used in the Supplemental Comprehensive Analysis is conceptually similar to that employed in the 2000 Biological Opinion, but has been refined to reflect the continuing accumulation of new data and scientific analysis. For example, the Biological Opinion and Supplemental Comprehensive Analysis benefit from a much

expanded set of data compared to the 2000 Biological Opinion's analysis. The more recent analyses avail themselves of a variety of metrics, taking advantage of the relative strengths and weaknesses of each to form a more complete picture of the present and future status particularly for the interior-listed ESU and Distinct Population Segments where adequate information is available. In this manner, NOAA Fisheries developed its methodology using the best science available, and also addressed the court rulings interpreting the ESA, including *NWF v. NMFS* [524 F.3d 917 (Ninth Cir. 2008)].

The Supplemental Comprehensive Analysis concludes that the Prospective Actions provide sufficient benefits in that they will improve, not degrade, the current status of listed species. The aggregate analysis indicates the listed salmon and steelhead are expected to survive with an adequate potential for recovery. The Supplemental Comprehensive Analysis also concludes that the Prospective Actions will improve habitat so that critical habitat which is presently functional will remain functional; other critical habitat will retain its current ability for Primary Constituent Elements to become functionally established and serve its conservation role for the species. Consequently, the Prospective Actions avoid jeopardizing the listed species, and the destruction or adverse modification of designated critical habitat.

NOAA Fisheries' completed the biological opinion after extensive collaboration with Pacific Northwest States and Tribes, meetings with all interested entities, and thorough consideration of comments received on the draft Biological Opinion including those submitted by parties to the *NWF v. NMFS* litigation. NOAA Fisheries addressed comments in its May 2, 2008, memorandum entitled, "Comments on the 2007 Draft FCRPS Biological Opinion." Contemporaneous with the 2008 Biological Opinions, NOAA Fisheries produced "Issue Summaries of the FCRPS 2008 Biological Opinion," presenting a reasoned consideration of diverse views and explains the approach taken in the Biological Opinions.

Responses to Comments. Some commentators have criticized the methodology used by NOAA Fisheries in its Supplemental Comprehensive Analysis, and contrast it to the approach used in the 2000 Biological Opinion. For instance, in both the 2000 and 2008 Biological Opinions, NOAA Fisheries considered the listed species' risk for extinction with estimates for 24-year and 100-year timeframes. The 2000 Biological Opinion placed its primary emphasis on extinction risk estimates over a 100-year timeframe, whereas, the 2008 FCRPS Biological Opinion's Supplemental Comprehensive Analysis and the Comprehensive Analysis placed emphasis on risks over a 24-year timeframe. This was done in part because the precision of the risk estimate decreases over a longer time horizon. This is especially true in the case of Columbia River Basin salmon populations, since the available data only supports reliable risk estimates 5

to 10 years into the future. (See discussion in the Supplemental Comprehensive Analysis, Aggregate Analysis Appendix at page 9.)

Use of ICTRT Data. Contrary to some commentators' assertions that the Interior Columbia River Basin Technical Recovery Team (ICTRT) information was not used in the 2008 Biological Opinion's Supplemental Comprehensive Analysis, NOAA Fisheries relied heavily upon the ICTRT's work. Both analyses used the ICTRT spawner-recruit datasets. Both analyses used the ICTRT metrics, such as average recruit-per-spawner productivity that were derived from the underlying datasets. Both analyses carefully considered the ICTRT's status assessments and assessments of Viable Salmonid Population factors other than abundance and productivity. Both analyses relied upon the ICTRT's recommendations for ESU-level viability in determining whether an ESU as a whole avoided jeopardy based upon a consideration of status of individual populations within that ESU. Again, the Supplemental Comprehensive Analysis and the Comprehensive Analysis relied upon the best available scientific information in reaching their respective conclusions.

Quantitative Analysis. Some commentators suggest that the 2008 BiOp's potential for recovery analysis bears no logical or analytical connection to any scientifically based recovery criteria. They suggest that NOAA fails to first determine the point at which survival and recovery are placed at risk and therefore cannot demonstrate that the likelihood of achieving both will not be appreciably reduced.

With regard to recovery, the Federal agencies' CA uses widely accepted measures of population growth and productivity to inform its conclusions. For example: "A population with an average long-term population growth rate >1.0 is, by definition, a population whose size is increasing, not decreasing. A population that persists with an average growth rate >1.0 over an extended period of time will eventually recover. It is, in short, on a trend towards recovery." CA at 3.1.2.4. Of course, this statement is true only if recovery criteria are not set at an unrealistically high level. If the level of abundance deemed to be needed for recovery is beyond the maximum capacity of the available habitat, for instance, the population is unlikely to ever maintain itself at those levels. But that is more a function of analytic error in the setting of recovery levels than one of basic population dynamics.

For populations at historically low levels of abundance, the CA's conclusion holds. The point at which a population's growth rate changes from one of decline (mean $R/S^5 < 1.0$, for instance) to increase (mean $R/S \geq 1.0$) is a significant threshold when considering both the likelihood of survival and the potential for recovery of that population. NOAA's BiOps and Supplemental Comprehensive Analysis, too, consider impacts on recovery. For each listed species, the SCA

⁵ Replacement rate from one generation to the next.

considers the species' potential for recovery. (Page 26 of 38 Bonneville Power Administration Record of Decision on 2008 FCRPS Biological Opinion.)

Second, some commentators incorrectly contend that NOAA does not rely upon its quantitative analysis in determining whether the RPA jeopardizes listed species. A jeopardy determination must ultimately rely both upon quantitative analysis and a host of considerations that are largely qualitative. This is the case for many reasons, including uncertainty in the quantitative estimates used in the analysis. Other reasons include, but are not limited to, the fact that for many listed ESUs, insufficient information exists to support a quantitative analysis, so conclusions are almost entirely based upon qualitative considerations. Also, even for those ESUs for which sufficient information is available, the quantitative portion of the analysis is done at the level of individual populations within an ESU. Evaluating the status of an ESU based upon estimates of the status of individual populations within that ESU requires the exercise of qualitative judgment. Finally, the use of multiple metrics, while providing a more complete basis for reaching conclusions respecting survival and potential for recovery, necessitates a qualitative consideration of the metrics themselves, since each metric has its own particular strengths and weaknesses (see Chapter 3 of the CA). The 2000 BiOp used only one metric (λ) so the quantitative analysis here is more complete and extensive. Past biological opinions have necessarily taken a qualitative approach to section 7(a)(2) determinations. The 2000 FCRPS BiOp had this to say: "...NMFS relies on this [quantitative] analysis primarily to provide a standardized measure of risk against which to judge the significance of the action to the continued existence of the ESU. In the end, however, NMFS' determination of consistency with ESA Section 7(a)(2) is qualitative, informed to the extent possible by standardized quantitative analysis." 2000 BiOp at 1.3.1.1. Likewise, the 2008 BiOp clearly describes a qualitative approach to a jeopardy determination. FCRPS BiOp at 1-10 et seq. The Action Agencies conclude that NMFS has appropriately relied upon both quantitative analysis and qualitative (i.e., best professional) judgment in reaching its conclusions.

Snake River Sockeye. Commentators raised contrary views concerning the conclusions in the 2008 Biological Opinion on Snake River sockeye. The Action Agencies believe that NOAA Fisheries' Reasonable and Prudent Alternative proposes appropriate and timely steps to continue the process of bringing these fish back from the brink of extinction.

In addition to effects associated with hydroelectric development, Snake River sockeye have suffered from a variety of influences, including a state-sponsored program in the 1950s and 1960s aimed at eradicating sockeye from lakes in the Stanley Lakes basin (Biological Opinion at 8.4-3 and Comprehensive Analysis at 6.1). By the time of listing, the ESU had been reduced to a small remnant population that some considered functionally extirpated. An experimental captive

brood stock program was initiated in an attempt to save the species from extinction. In contrast, sockeye runs in the Upper Columbia, which are also above multiple Federal and non-federal dams, are relatively healthy and remain unlisted under the ESA.

The sockeye captive brood stock program is coordinated through the Stanley Basin Sockeye Technical Oversight Committee (SBSTOC). Members of the SBSTOC have concluded that the program has succeeded in its original goal of preventing extinction and "[t]he SBTOC has determined that the next step toward meeting the goal of re-establishing and amplifying the wild population is to increase the number of smolts released" (2008 FCRPS Biological Opinion at 8.4-9).

Reclamation concludes that the 2008 FCRPS Biological Opinion's Reasonable and Prudent Alternative is likely to increase the numbers of returning adult sockeye by significantly expanding the number of smolts produced and released from the captive broodstock program, improving in-river survival for Snake River juvenile and (potentially) adult sockeye, and by improving long-term understanding of the factors negatively affecting survival of these fish.

Killer Whales. Commentators also suggested that NOAA Fisheries did not consider certain FCRPS operations effects on Southern Resident Killer Whales such as reduced numbers of adult salmon, compressed adult run timing of hatchery fish, and the potential lower nutrient value of hatchery Chinook compared to wild fish.

The Action Agencies' April 2008 *Analysis of Effects on Listed Killer Whale and Green Sturgeon Distinct Population Segments* showed a trend of increasing abundance since 1980 of Chinook salmon (believed to be a preferred food source for killer whales) returning to the mouth of the Columbia River. This analysis looked at the total number of fish produced from the Columbia, both listed and non-listed, and both natural and wild. Chinook salmon returns to Bonneville Dam, while showing significant variation between years, have overall remained remarkably constant since 1938, when most of the FCRPS did not exist. This analysis shows that neither the existence nor the operation of the FCRPS has had a significant effect on that portion of the killer whales' prey base that originates in the Columbia River Basin. NOAA Fisheries also presented an analysis showing that FCRPS-funded hatchery production in the Columbia River Basin more than compensates for the estimated effects of the FCRPS on salmon abundance.

Concerning the compressed run timing of hatchery-origin adult salmon, an additional statistical analysis conducted by Hinrichsen, *Detecting a Shift in the Arrival Distribution of Adult Chinook Salmon at Bonneville Dam Fish Ladders*, evaluated whether the distribution of arrival times for Chinook salmon has changed since adult salmon counts began at Bonneville Dam in 1938. This

analysis shows that there have been only slight changes in the distribution of arrival times since adult counts began. The fall Chinook run has actually become slightly more extended (by 4 days) during the recent period than was the case from 1939 to 1955, thus increasing the period of time during which these fish are hypothetically available to killer whales feeding off of the mouth of the Columbia River. These changes are likely not biologically significant from the standpoint of killer whales.

Concerning the potential nutritional value differences between hatchery and wild fish, commentators cite a report *State of Washington Status Report for the Killer Whale* (2004), which notes that overall salmon size has decreased “during the past few decades.” The report notes several factors that may play a role in this reduction, such as the major and prolonged shift in North Pacific Ocean and climate conditions that occurred in the mid-1970s, reduced ocean productivity, intense harvest pressures, genetic changes and even hatchery practices. Finally, a plain analysis of killer whale population trend data shows that this population has trended upwards since 1971 when the species reached a low of 67 animals (due to extensive live capture for marine parks that ended around 1973). The latest population estimate was 88 as of November 2007 (Center for Whale Research).

Having reviewed this information and the best available scientific information contained in the 2008 FCRPS Biological Opinion, Reclamation, together with the other Action Agencies, considers NOAA Fisheries’ conclusions concerning the effects of the operation of the FCRPS on orcas reasonable.

Action Area. In the 2008 FCRPS Biological Opinion, NOAA Fisheries addressed the action area in this consultation as defined in the joint implementing regulations, “all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action” (50 CFR Section 402.02). The Biological Opinion states that “[t]he action area is not delineated by the migratory range of the species affected by the project unless that area is also directly or indirectly affected by the proposed action” (2008 FCRPS Biological Opinion at p. 4-3). In a May 2003 decision, Judge Redden ruled that the action area should include not only the area impacted by FCRPS operations but locations where the Action Agencies would conduct off-site mitigation habitat, harvest, and hatchery actions.

The FCRPS Action Agencies and NOAA Fisheries defined the action area to include “[a]ll additional spawning areas above Bonneville Dam that are accessible to listed adult salmon or steelhead that are affected by the FCRPS Reasonable and Prudent Alternative,” as “[t]he hydrosystem could have an indirect effect on the amount of marine derived nutrients returning to spawning and rearing areas due to a reduction in the number of adult fish returning to spawn and die” (2008 FCRPS Biological Opinion at p. 4-4).

The Reasonable and Prudent Alternative

The Reasonable and Prudent Alternative can be described as the operation and maintenance of the FCRPS and 11 Reclamation Projects as described in the 2007 FCRPS Biological Assessment and as modified by NOAA Fisheries Reasonable and Prudent Alternative Table as described in the 2008 FCRPS Biological Opinion.

Specific mitigation actions are completely described in the Reasonable and Prudent Alternative Actions Table (Appendix in the 2008 FCRPS Biological Opinion) which itemizes the specific actions and reporting obligations that will be implemented and met over the term of the 2008 FCRPS Biological Opinion. The Reasonable and Prudent Alternative Action Table organizes actions according to overall objectives and strategies in the areas of adaptive management, hydropower, habitat, hatcheries, predation, research, monitoring, and evaluation.

Reclamation will work with the Corps and BPA to implement our actions consistent with the adaptive management process and regional coordination. Table 3 lists the specific ongoing and new mitigation actions undertaken by Reclamation in consideration of the 2007 FCRPS Biological Assessment and the 2008 FCRPS Biological Opinion.

Table 3 - On-Going and New Mitigation Actions by Reclamation

Reasonable and Prudent Alternative Number	Reclamation Role in Reasonable and Prudent Alternative implementation	Comments
1 - 3	Work with other Action Agencies	Reporting requirements; Adaptive Management
4 (Hydro)	Grand Coulee; Hungry Horse; Banks Lake	On-going and new operations to benefit salmon and steelhead while considering resident fish; Columbia River Water Management Plan
6 (Hydro)	Grand Coulee; Hungry Horse; Banks Lake	In-season water management
7 (Hydro)	Work with other Action Agencies	Improve forecasting
8 (Hydro)	Work with other Action Agencies	Emergency operations
14 (Hydro)	Grand Coulee; Hungry Horse; Banks Lake	Explore opportunities to improve conditions for listed fish in dry years
15 (Hydro)	Grand Coulee	Water temperature modeling at Grand Coulee as it relates to EPA's Total Maximum Daily Load
16 (Hydro)	Entire Reasonable and Prudent Alternative	Complete tributary consultations
17 (Hydro)	Possible Grand Coulee	On-going action for chum
34 & 35 (Habitat)	Specific actions identified in the 2007 FCRPS Biological Assessment for 11 Interior Columbia River Basin tributary subbasins as modified in the 2007 FCRPS Biological Assessment	Added Grand Ronde and Pahsimeroi basins because Snake River steelhead and spring Chinook gaps were large and habitat actions address limiting factors that improve tributary habitat spawning and rearing conditions
39 (Hatchery)	At Leavenworth National Fish Hatchery complex – develop funding criteria	Ensure hatcheries do not impede recovery of ESA-listed fish.

Reasonable and Prudent Alternative Number	Reclamation Role in Reasonable and Prudent Alternative implementation	Comments
40 (Hatchery)	At Leavenworth, work with operators to implement certain hatchery reforms as described in the FCRPS BA	Requested by NOAA Fisheries (after 2007 FCRPS Biological Assessment) to improve conditions for Upper Columbia steelhead
56 (RME)	Methow pilot study	Evaluate whether habitat actions have intended effect
57 (RME)	Work with other Action Agencies	Ensure habitat action effectiveness
71 (RME)	Work with other Action Agencies	Regional research, monitoring, and evaluation coordination
72 (RME)	Work with other Action Agencies	Research, monitoring, and evaluation database management
73 (RME)	Work with other Action Agencies	Implementation and compliance monitoring

VI. Other Considerations

Operating and maintaining Reclamation’s FCRPS and other projects is a complex undertaking and Reclamation is responsible for ensuring consistency with a number of statutes, regulations, and treaties, as well as consideration of other factors in its decision-making. The decision to implement the actions in the 2008 BiOp RPA includes an examination of these other responsibilities.

Authority

Reclamation has sufficient authority to operate the 11 Reclamation projects in the manner described in the 2007 FCRPS Biological Assessment and to carry out those habitat and hatchery actions for which it is responsible.

Appropriations

Reclamation prepares an annual budget request approximately 2 years before actually receiving an appropriation from the Congress. Interim program modifications may require funds that were not listed in the annual request; further, Congress may appropriate less than the amount requested by the Administration.

Funding shortfalls are possible. If this happens, Reclamation will work with NOAA Fisheries, other Federal and State agencies, and Tribes to prioritize the work using available funding. Congress occasionally adds funding to the Administration's budget request. Reclamation will also work with NOAA Fisheries to prioritize use of these ESA implementation funds.

Litigation

In view of the contentious history of these issues in the region, litigation will likely occur during the implementation phase of this 2008 FCRPS Biological Opinion. Reclamation will work with NOAA Fisheries to address and coordinate any delays in scheduling resulting from litigation.

Emergencies

Power emergencies, safety considerations, emergency/critical maintenance, drought, and other natural disasters can occur and may require modifications in operations at Reclamation projects. Reclamation will coordinate to the extent feasible any deviations in operations with NOAA Fisheries and other parties affected by the actions.

Development of Implementation Plans

It is impractical to detail all implementation and schedule requirements for the Reasonable and Prudent Alternative action items in this Decision Document. Therefore, Reclamation will use the Reasonable and Prudent Alternative implementation plans process to coordinate actions and identify work with the other Action Agencies. These plans will serve as blueprints for anticipated actions for respective periods of time; the plans will be updated periodically and coordinated with NOAA Fisheries, other appropriate Federal agencies, State agencies, and Tribes. These plans are not decision documents but will be used as planning tools. Prioritization of work and any changes in schedule will be addressed in the plans. These plans will also be used to identify and coordinate actions from the Incidental Take Statement (2008 FCRPS Biological Opinion Section 14).

Compliance with Other Laws and Regulations

Additional Endangered Species Act Compliance

There may be individual actions in the Reasonable and Prudent Alternative that require additional consultation. For instance, the effects of individual habitat actions will be assessed, and if there are short-term, site-specific, or other effects to listed species which were not addressed in the 2008 Biological Opinion,

Reclamation will consult with NOAA Fisheries to supplement the 2008 Biological Opinion.

Recovery. Section 4(f) of the ESA directs NOAA Fisheries to develop and implement recovery plans for the ESUs addressed in this Opinion. Reclamation agrees with NOAA Fisheries that recovery plans will have a greater likelihood of success if developed in partnership with other stakeholders, including those that have the responsibility and authority to implement recovery actions. Many of the habitat actions in the Reasonable and Prudent Alternative were developed with input from regional parties involved in recovery planning through the collaborative process. Current efforts that will provide a strong foundation for ESA recovery plans in the Columbia River Basin include the Accords signed between the Action Agencies and several Tribes and States; the Northwest Power and Conservation Council's subbasin plans; and the State of Washington's regional recovery plans. Reclamation intends to work with NOAA Fisheries and the other Action Agencies to assist in furthering these efforts as they develop assessments, strategies, and actions.

USFWS FCRPS Consultation. Reclamation and the other agencies also engaged in ESA consultation with the U.S. Fish and Wildlife Service (USFWS) during 1999-2000 on the effects of the FCRPS project on listed bull trout and Kootenai River white Sturgeon.⁶ Reclamation and the other action agencies have determined that the FCRPS operations called for in the 2008 FCRPS Biological Opinion will not affect bull trout, Kootenai River white sturgeon, or other USFWS-listed species or critical habitat in a manner or to an extent not previously considered; therefore, reconsultation with the USFWS on operations of the FCRPS is not required. Reclamation will continue to implement actions identified in the USFWS 2000 FCRPS Biological Opinion. As individual actions in the 2008 Reasonable and Prudent Alternative and committed to in this decision document are prepared for implementation, site-specific consultation with the USFWS may be necessary to address localized effects. Reclamation will continue to coordinate with the USFWS on annual and 5-year implementation plans as required by the USFWS 2000 FCRPS Biological Opinion.

Tribal Treaty and Trust Responsibility

The United States Government recognizes the sovereign status of Native American Tribes. Treaties between the United States and some Columbia Basin Tribes document agreements reached between the Federal Government and the Tribes. In exchange for ceding most of their ancestral land, the Government established reservation lands and guaranteed that the Government would respect the treaty rights including fishing and hunting rights. The treaties provide, in part,

⁶ The Corp reinitiated consultation with USFWS on the Kootenai River white Sturgeon and have a 2006 Biological Opinion for Kootenai River white Sturgeon.

the exclusive right of taking fish in the streams running through and bordering the reservations and at all other usual and accustomed stations in common with citizens of the United States. The Federal Government has a trust responsibility to protect the tribal rights under these treaties.

Reclamation will comply with the Executive Order on Consultation and Coordination with Indian Tribal Governments. In formulating and implementing activities that have Tribal implications, Reclamation will consult with the affected Tribes.

Clean Water Act

In developing the Proposed Reasonable and Prudent Alternative, the Action Agencies considered the respective ecological objectives and requirements of the ESA and the Clean Water Act. In many instances, actions implemented to attain water quality standards (e.g., reducing Total Dissolved Gas and improving water temperature) will also benefit ESA-listed species. Reclamation operates its dams to comply with both the ESA requirements, determined by NOAA Fisheries and USFWS, and the State and Tribal water quality standards. Below is specific information about compliance with these standards:

Hungry Horse

The Hungry Horse Dam and Reservoir are located on the South Fork of the Flathead River in Montana. Two Montana water quality standards are at issue with Hungry Horse operations:

- **Total Dissolved Gas (TDG):** The Montana TDG standard is 110 percent (the total concentration of dissolved gas cannot exceed 110 percent of saturation at atmospheric pressure). Water spilled through the hollow jet valves at Hungry Horse Dam can cause an increase in TDG. Hungry Horse Dam is operated to the extent possible to limit spill through the hollow jet valves to 15 percent of total outflow (the rest of the outflow is through the turbines) to avoid exceeding the standard. A TDG/spill correlation developed by Reclamation using 1996 winter/spring and 2002 summer data shows that if spill as a percent of total flow remains below 21 percent, the TDG level will remain below 110 percent (VARQ EIS 2006).
- **Temperature:** Montana has established water quality standards for temperature. In 1995, with input and recommendations from the State of Montana, Reclamation installed a selective withdrawal system at Hungry Horse Dam to improve temperature condition for aquatic life below the dam (Reclamation 1994; Cavigli et al. 1998; Christenson et al. 1996; Marotz et al. 1994). Water stored in the reservoir stratifies at different temperatures, with colder water near the bottom. The selective withdrawal system consists of a series of outlets on all four unit penstock intakes to

allow releases of water at varying temperatures. From June 1 to the end of October, the system is used to increase the water temperature in the South Fork to correlate with temperatures in the North and Middle Forks of the Flathead River. Operators use thermometers located on the face of the dam to determine reservoir temperatures and the correct elevation for the control gates to capture the desired discharge temperature. The selective withdrawal system allows the temperature of released water to mimic the temperature of nearby natural flows (Reclamation 2006).

Grand Coulee

Grand Coulee Dam is located in north central Washington State on the mainstem of the Columbia River. This dam is also operated to address TDG and temperature issues:

- **TDG:** To reduce TDG below Grand Coulee Dam releases in excess of the powerplant capacity are performed in the following order:
 1. If the water surface elevation is above 1260 feet, Reclamation releases the water evenly across the 11 spillway gates. Flows over the spillway can strip gas from the water up to a certain point.
 2. Below elevation 1260 feet water must be released through the low-level outlets. If the water surface elevation is below 1260 feet, Reclamation seeks a generation swap with Chief Joseph Dam, the next dam downstream from Grand Coulee. Spilling at Chief Joseph Dam generates much less TDG than spilling through the low-level outlets at Grand Coulee Dam (GCL/CHJ Joint Operation Subcommittee 2001). The Corps is installing flow deflectors at Chief Joseph Dam that will further reduce the generation of gas at the dam; when this work is completed, Reclamation will transfer as much spill as possible to Chief Joseph Dam when Lake Roosevelt falls below elevation 1260 feet.
 3. If water must be released through the outlets, it is released evenly through the upper and lower gates. If only two gates are required, then an upper gate and the lower gate immediately below it will be used.
- **Temperature:** In 2008, EPA reinitiated development of the Lower Snake Columbia River Temperature TMDL (Total Maximum Daily Load). Reclamation is participating in this process and has committed to further evaluation of the opportunities for managing water temperature below Grand Coulee Dam. In 2003, as part of the initial TMDL effort, Reclamation performed a preliminary evaluation of three strategies for managing water temperature at Grand Coulee Dam (Reclamation 2003).

Reclamation will continue to provide information on water temperature at Grand Coulee to assist the four Northwest States, Tribes, and EPA in this TMDL process.

Reclamation's obligation to comply with the Clean Water Act is also directly implicated when we implement our habitat improvement actions. These projects are all covered on a case-by-case basis with individual permits in place prior to implementation.

Magnuson Fishery Conservation and Management Act (MSA)

The Magnuson-Stevens Fishery Conservation and Management Act, as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-267), established procedures designed to identify, conserve, and enhance Essential Fish Habitat (EFH) for those species regulated under a Federal fisheries management plan. The 2007 FCRPS BA includes a section on the MSA.

National Environmental Policy Act (NEPA)

Reclamation previously evaluated the environmental effects from FCRPS operations in three NEPA documents. Three environmental impact statements were prepared in the 1990s that analyzed operation of Federal projects, primarily to benefit salmon species listed under the ESA. The NEPA documents relevant to this decision include the *1992 Columbia River Salmon Flow Improvement Measures Options Analysis Environmental Impact Statement (EIS)* and its 1993 supplement, which analyzed alternatives to benefit salmon species listed under the ESA; and the *System Operation Review EIS* completed in 1997. Reclamation also prepared the *Upper Columbia Alternative Flood Control and Fish Operations EIS (VARQ EIS)* and the *Banks Lake Drawdown EIS (Banks Lake EIS 2004)*.

In addition to the NEPA documents addressed above, Reclamation reviewed and considered the Bonneville Power Administrator's Record of Decision 2008 Columbia Basin Fish Accords, dated May 2, 2008.

Reclamation reviewed the biological requirements of the listed species and the operations described in this Decision Document. Reclamation believes that the effects are within the range of the analyses conducted in the NEPA documents noted above. These effects include improved survival of listed salmonids, bull trout, and Kootenai River white sturgeon; reduction in hydropower generation; mixed effects on recreational opportunities; mixed resident fish and wildlife impacts; effects on water quality including TDG levels and water temperatures; and additional exposure of cultural resources at certain projects. As individual actions in the 2008 Reasonable and Prudent Alternative and committed to in this Decision Document are programmed for implementation, site-specific NEPA analyses may be necessary to assure full compliance.

National Historic Preservation Act (NHPA)

The Corps, BPA, and Reclamation are developing a final draft of a “*Systemwide Programmatic Agreement for the Management of Historic Properties Affect by the Multi-Purpose Operations of Fourteen Projects of the Federal Columbia River Power System for Compliance with Section 106 of the National Historic Preservation Act*” (PA). This draft PA will satisfy the three lead agencies responsibilities under Section 106 of NHPA for the effects caused by all authorized purposes of the Projects, as well as operation and maintenance activities required for current and future operations of the FCRPS.

Ten regional Tribes, four State Historic Preservation Offices, the Advisory Council on Historic Preservation, and other affected Federal land managing agencies have been provided the opportunity to consult during the development of this draft PA. The terms of the draft PA have been considered in implementation of the action items stipulated in this Decision Document.

Pacific Northwest Electric Power Planning and Conservation Act

Under the Pacific Northwest Electric Power Planning and Conservation Act (Northwest Power Act), Reclamation is to exercise its responsibilities for operating the FCRPS in a manner that provides equitable treatment for fish and wildlife with other purposes for which Reclamation facilities are operated and managed, and to take into consideration in its decisionmaking the Northwest Power and Conservation Council’s Fish and Wildlife Program to the fullest extent practicable.

Reclamation considered the Council’s Amendments to the Fish and Wildlife Program in the preparation of the Reclamations’ operations and mitigation actions included in the FCRPS Biological Assessment’s Proposed Reasonable and Prudent Alternative. The 2008 FCRPS Biological Opinion’s Reasonable and Prudent Alternative includes these operations and Reclamation plans to move forward with implementation as provided for in this Decision Document. These operations include actions that not only provide benefits to listed anadromous species, but also assist in meeting the needs of other fish species including ESA-listed resident fish species, such as bull trout and Kootenai River white sturgeon; and, non-listed resident and anadromous species.

VII. Conclusions

Reclamation evaluated the 2007 FCRPS Biological Assessment, addendums, and clarifications; the Comprehensive Analysis; the FCRPS Biological Opinion and Supplemental Comprehensive Analysis; the Columbia Basin Fish Accords; and

other documents (e.g., Attachment A). Based on the full body of information available to us, I conclude that:

- 1) The Action Agencies' 2007 FCRPS Biological Assessment and Comprehensive Analysis are a reasoned assessment of the effects of proposed actions on each ESA-listed species and their critical habitat.
- 2) NOAA Fisheries' analysis appropriately concludes that the FCRPS action does not jeopardize the continued existence of any species or adversely modify or destroy critical habitat.
- 3) The analyses used by the 2007 FCRPS Biological Assessment and 2008 Biological Opinions follow the decisions of the *NWF v. NMFS* District and Appellate Courts.
- 4) The Columbia Basin Accords among the Action Agencies, Tribes, and States result from collaboration encouraged by the District Court and provide additional benefits to fish that the Action Agencies' and NOAA Fisheries' ESA analyses take into account.
- 5) The FCRPS Action and 2008 FCRPS Biological Opinion result from, and offer opportunities for, continued dialogue and collaboration.
- 6) The FCRPS Action is consistent with other Federal laws and responsibilities.

I conclude that the FCRPS proposed actions meet the regulatory requirements of Sec. 7(a)(2) of the ESA and the implementing regulations in that the proposed action is not likely to "jeopardize the continued existence of any species" or "result in the destruction or adverse modification of critical habitat proposed to be designated" for the listed species. In addition, the proposed actions are consistent with other laws and regulations.

VIII. Decision

Reasonable and Prudent Alternative. In light of the above conclusions, it is my decision that Reclamation will implement each component of the Reasonable and Prudent Alternative that pertains to Reclamation, recognizing that the adaptive management framework may require adjustments to the actions to meet survival improvements identified in the 2008 FCRPS Biological Opinion. The Reasonable and Prudent Alternative will be implemented in accordance with applicable laws.

Incidental Take Statement. Reclamation interprets the Incidental Take Statement as follows:

"Incidental take from the FCRPS operations and hydropower actions as they pertain to Reclamation will be considered authorized if flow

operations are implemented as described in Reasonable and Prudent Alternative Hydro Strategy 1” (FCRPS Biological Assessment Section 2.2.1 at p. 2-17).

Reclamation intends to operate Grand Coulee and Hungry Horse dams consistent with the Incidental Take Statement.

Reclamation similarly concurs with NOAA Fisheries that implementing the terms and conditions and reasonable and prudent measures identified in Section 14.5 of the 2008 FCRPS Biological Opinion will reduce and minimize the level of take associated with implementing the Reasonable and Prudent Alternative.

Reclamation will implement those terms and conditions that are relevant to Reclamation; these relate largely to annual reports, comprehensive evaluations, items 1 and 2 under improving juvenile and adult passage; research, monitoring and evaluation actions; and habitat actions.

Conservation Recommendations. In its 2008 FCRPS Biological Opinion, NOAA provided a conservation recommendation that “Reclamation, on its own and in coordination with State and Tribal water management entities, identify opportunities and implement actions to conserve water and to ensure that a substantial portion of such conserved water accrues to streamflow to benefit listed species.” Reclamation cannot fully implement this recommendation because state law and other considerations often limit the amount of conserved water that can remain instream. However, increased instream flows are often realized in our water conservation projects. Reclamation will continue to pursue water conservation projects that may result in improved instream flows for listed fish through our two water conservation programs:

- 1) The Water for America - Water Conservation Field Services Program provides cost-share and technical assistance to Reclamation irrigation districts for relatively small scale improvements, which in some cases benefit ESA-listed species.
- 2) The Challenge Grant Program provides cost-share assistance on larger scale water conservation projects, system optimization review studies to identify potential operational improvements, advanced water treatment demonstration projects, and projects that improve conditions for ESA candidate species.

In general, both are West-wide cost-share programs that provide funds to implement water conservation improvements to stretch limited water supplies.

Columbia Basin Fish Accords. Reclamation will implement those actions agreed to by Reclamation in the Columbia Basin Fish Accords.

Magnuson Fishery Conservation and Management Act. NOAA Fisheries concluded that the Reasonable and Prudent Alternative as originally identified in the Biological Assessment would adversely affect Essential Fish Habitat (EFH)

for Columbia Basin Chinook and coho salmon, and effects to designated EFH for coastal pelagic and groundfish (English sole, starry flounder, the northern anchovy, and the Pacific sardine) may also be adverse. Pursuant to the §305(b)(4)(A) of the MSA, NOAA Fisheries is required to provide EFH conservation recommendations to Federal agencies, including itself, regarding actions that would adversely affect EFH. NOAA Fisheries recommends the Action Agencies implement the final Reasonable and Prudent Alternative actions to avoid, minimize, mitigate, or otherwise offset potential adverse effects of operating the FCRPS. Pursuant to the MSA [§ 305(b)(4)(B)] and 50 C.F.R. § 600.920(j), in issuing this Decision Document, Reclamation is informing NOAA Fisheries of the intent to implement the EFH conservation recommendations.

IX. Reinitiation of Consultation

Reinitiation of consultation is governed by regulations set forth at 50 CFR §402.16 and is required: “(a) If the amount or extent of taking specified in the incidental take statement is exceeded; (b) If new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered; (c) If the identified action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in the biological opinion; or (d) If a new species is listed or critical habitat designated that may be affected by the identified action.” Reclamation will, in cooperation with the other Action Agencies and NOAA Fisheries, apply these criteria to determine whether and when reinitiation of consultation is necessary.

Signed: J. William McDonald Date: Sept. 3, 2008

J. William McDonald
Regional Director
Bureau of Reclamation

X. Literature Cited

Parenthetical Reference	Bibliographic Citation
Cavigli et al. 1996	Cavigli, J., L. Knotek, and B. Marotz. 1998. Hungry Horse Dam Fisheries Mitigation: Minimizing zooplankton entrainment at Hungry Horse Dam: Implications for operation of selective withdrawal. Prepared for the U.S. Bureau of Reclamation, Agreement No. 1425-5-FG-10-01760 and Bonneville Power Administration, Contract No. 91-19-03. Montana Department of Fish, Wildlife and Parks. Kalispell, Montana.
Christenson et al. 1996	Christenson, D.J., R.L. Sund, and B.L. Marotz. 1996. Hungry Horse Dam's successful selective withdrawal system. <i>Hydro Review</i> 15(3):10-15.
GCL/CHJ Joint Operation Subcommittee 2001	Grand Coulee Dam/Chief Joseph Dam Joint Operation Subcommittee. 2001. Grand Coulee Dam and Chief Joseph Dam Joint Operation Gas Abatement Analysis. Prepared for the System Configuration Team, May 2001.
Hinrichsen 2008	Hinrichsen, R.A. 2008. Detecting a Shift in the Arrival Distribution of Adult Chinook Salmon. Hinrichsen Environmental Services, Seattle, Washington.
Marotz et al. 1994	Marotz, B.L., C.L. Althen, and D. Gustafson. 1994. Hungry Horse Mitigation: Aquatic modeling of the selective withdrawal system - Hungry Horse Dam, Montana. Prepared for Bonneville Power Administration. 36 pp. Montana Department of Fish, Wildlife and Parks. Kalispell, Montana.
Reclamation 2006	Bureau of Reclamation. 2006. Hungry Horse Selective Withdrawal System Evaluation 2000-2003. U.S. Department of Interior, Technical Services Center, Hydraulic Laboratory Report HL-2006-06.
Banks Lake EIS 2004	Bureau of Reclamation. 2004. Banks Lake Drawdown Final Environmental Impact statement. U.S. Department of Interior, Bureau of Reclamation, Upper Columbia Area Office, Ephrata, Washington and Pacific Northwest Region, Boise Idaho.
Reclamation 2003	Bureau of Reclamation. 2003. Initial Review of Three Strategies to Manage Water Temperature at Grand Coulee Dam. Technical Services Center, Draft Discussion Paper.

Reclamation 1994 Bureau of Reclamation. 1994. Finding of no significant impact and final environmental assessment. Hungry Horse Dam selective withdrawal. U.S. Department of Interior, Pacific Northwest Region Bureau of Reclamation, Boise, Idaho. PN FONSI 94-02.

VARQ EIS 2006 U.S. Army Corps of Engineers. 2006. Upper Columbia Alternative Flood Control and Fish Operations Final Environmental Impact Statement. U.S. Corps of Engineers, Seattle District, Seattle Washington.

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Attachment A

Chronology of Principal Documents Relevant to Decision

For easy reference, a chronological list of principal documents leading to this decision follows. The descriptions are those appearing on the Federal Caucus' Salmon Recovery website at <http://www.salmonrecovery.gov/index.cfm>. The Federal Caucus is a group of eight agencies operating in the Columbia River Basin that have natural resource responsibilities related to the Endangered Species Act (ESA).

2005, 2006, 2007, and 2008: Collaboration. Meetings and Collaboration among Federal Agencies, States, and Tribes.

September 6, 2007: Biological Assessments. The Action Agencies made available 2007 FCRPS Biological Assessments of proposed reasonable and prudent alternatives for operation and configuration of the Federal Columbia River Power System and the Upper Snake projects, including a comprehensive analysis of the impacts of these actions proposed for listed Columbia River Basin salmon and steelhead. They are available at http://www.salmonrecovery.gov/biological_opinions/fcrps/ba-ca/index.cfm and http://www.salmonrecovery.gov/Biological_Opinions/FCRPS/2008_biop/action.cfm.

October 31, 2007: Draft Biological Opinions. NOAA Fisheries today released draft Biological opinions for the Federal Columbia River Power System and the Upper Snake projects. In the *NWF v. NMFS* litigation, the Court set January 4, 2008, as the deadline for close of comment to NOAA Fisheries on these draft Biological opinions.

April 2008: Federal Action Agencies Submit Addenda to their Comprehensive Analysis. The Action Agencies submitted two supplements to their comprehensive analysis of the effects of FCRPS and Upper Snake Project actions. To address possible effects on additional listed species, one Addendum is an "Analysis of Effects on Listed Killer Whale and Green Sturgeon Distinct Population Segments." To address prospective conclusion of agreements with Pacific Columbia River Tribes and States, the other Addendum is an "Analysis of Effects on Listed Columbia River Basin Salmon and Steelhead Populations from Proposed Memorandum of Agreement Actions."

May 2, 2008: Columbia Basin Fish Accords. A tribal ceremony today celebrated the signing of the Columbia Basin Fish Accords, ending years of divisiveness on fish issues. The action agencies, four Northwest Tribes and two States signed agreements for 10 years of projects that will deliver specific biological results for

fish, recognizing the Tribes' proven scientific and resource management expertise. The Accords are available at http://www.salmonrecovery.gov/Biological_Opinions/FCRPS/2008_biop/ColumbiaBasinFishAccords.cfm. See also the May 2, 2008, BPA Administrator's Record of Decision on these Accords.

May 5, 2008: Final Biological Opinions. NOAA Fisheries has issued final biological opinions and a Supplemental Comprehensive Analysis for the Federal Columbia River Power System and the Upper Snake projects and Columbia River harvest under *United States v. Oregon*. NOAA Fisheries finds that, with the actions in the FCRPS Reasonable and Prudent Alternative, salmon and steelhead are on a trend to recovery. The agency noted that these new Biological opinions have broader support among tribes and states than ever before. These Biological opinions are available at <http://www.nwr.noaa.gov/Salmon-Hydropower/Columbia-Snake-Basin/final-BOs.cfm>. The documents at this site include an Executive Summary, an Issues Summary, and a May 2, 2008 Response to Comments on the Draft FCRPS Biological Opinion. The Issues Summary and Response to Comments describe how the 2008 FCRPS Biological Opinion took into account the comments filed by litigants on the draft Biological Opinions.