UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Northwest Region
7600 Sand Point Way N.E., Bldg. 1
BIN C15700
Seattle, WA 98115-0070

NMFS Tracking No.:
2003/00627

August 29, 2003

Mr. Stephen J. Wright, Administrator
ATTN: Ms. Shannon C. Stewart
Bonneville Power Administration
P.O. Box 3621
KEC-4
Portland, OR 97208-3621

Re: Endangered Species Act Section 7 Formal Consultation and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Consultation for East Fork of the Salmon River Diversions - SEF 10 and 11, East Fork Salmon River, 5th HUC #1706020109, Custer County, Idaho (One Project)

Dear Ms. Stewart:

Enclosed is a document containing a biological opinion (Opinion) prepared by NOAA's National Marine Fisheries Service (NOAA Fisheries) pursuant to section 7 of the Endangered Species Act (ESA) on the effects of the proposed East Fork of the Salmon River Diversions - SEF 10 and 11, East Fork Salmon River, 5th HUC #1706020109, Custer County, Idaho. In this Opinion, NOAA Fisheries concludes that the proposed action is not likely to jeopardize the continued existence of ESA-listed Snake River spring/summer chinook salmon and Snake River steelhead and designated critical habitat. As required by section 7 of the ESA, NOAA Fisheries includes reasonable and prudent measures with nondiscretionary terms and conditions that NOAA Fisheries believes are necessary to minimize incidental take associated with this action.

This document contains a consultation on essential fish habitat (EFH) pursuant to section 305(b) of the Magnuson-Stevens Fishery Conservation and Management Act (MSA) and its implementing regulations (50 CFR Part 600). NOAA Fisheries concludes that the proposed action may adversely affect designated EFH for Snake River spring/summer chinook salmon. As required by section 305(b)(4)(A) of the MSA, conservation recommendations and provisions are included in the biological assessment and the Opinion that NOAA Fisheries believes will avoid, minimize, mitigate, or otherwise offset adverse effects on EFH. Therefore, no further action is required under the MSA at this time.

If you have any questions regarding this letter, please contact Jim Huinker at (208) 756-6483 or Larry Zuckerman at (208) 756-6496 of my staff in the Idaho Habitat Branch, Salmon Field Office.

Sincerely,

D. Robert Lohn
Regional Administrator

Enclosure

cc: A. Simpson - BOR
N. Murillo - Shoshone-Bannock Tribes
C. Colter - Shoshone-Bannock Tribes
A. Johnson - Nez Perce Tribe
D. Johnson - Nez Perce Tribe
A. Miles - Nez Perce Tribe
M. Olson - NRCS
K. Bragg - CSWCD
D. Mignogno - USFWS
T. Curet - IDFG

Endangered Species Act Section 7 Consultation Biological Opinion
and
Magnuson-Stevens Fishery Conservation and Management Act
Essential Fish Habitat Consultation

East Fork of the Salmon River Diversions - SEF 10 and 11
Snake River Spring/Summer Chinook Salmon and Snake River Basin Steelhead
East Fork Salmon River
1706020109
Custer County, Idaho

Lead Action Agency: Bonneville Power Administration

Consultation Conducted By: NOAA's National Marine Fisheries Service, Northwest Region

Date Issued: August 29, 2003

Issued by: for Michael R Crouse

D. Robert Lohn
Regional Administrator

NMFS Tracking No.: 2003/00627

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1. INTRODUCTION

The Endangered Species Act (ESA) of 1973 (16 USC 1531-1544), as amended, establishes a national program for conserving threatened and endangered species of fish, wildlife, plants, and the habitat on which they depend. Section 7(a)(2) of the ESA requires Federal agencies to consult with NOAA's National Marine Fisheries Service (NOAA Fisheries) and U.S. Fish and Wildlife Service (USFWS) (together "Services"), as appropriate, to ensure that their actions are not likely to jeopardize the continued existence of endangered or threatened species or adversely modify or destroy their designated critical habitats. This biological opinion (Opinion) is the product of an interagency consultation pursuant to section 7(a)(2) of the ESA and implementing regulations 50 CFR 402.

The analysis also fulfills the Essential Fish Habitat (EFH) requirements under the Magnuson-Stevens Fishery Conservation and Management Act (MSA). The MSA, as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-267), established procedures designed to identify, conserve, and enhance EFH for those species regulated under a Federal fisheries management plan. Federal agencies must consult with NOAA Fisheries on all actions, or proposed actions, authorized, funded, or undertaken by the agency, that may adversely affect EFH (section 305(b)(2)).

The Bonneville Power Administration (BPA) proposes to consolidate points of diversion, and replace the existing push-up berm at the East Fork Salmon River Diversion 11 (SEF 11 Diversion) on the East Fork Salmon River (EFSR) with a permanent structure. Funding is provided as part of BPA's program to protect, mitigate and enhance fish and wildlife affected by the development and operation of hydroelectric facilities on the Columbia River and its tributaries. The purpose of the proposed East Fork of the Salmon River Diversions - SEF 10 and 11 (SEF 10 and 11 Project) is to improve fish passage and habitat, reduce migration hazards, and to eliminate the need for annual in-stream maintenance of the diversion structure. The BPA is proposing the action according to its authority under the Pacific Northwest Electric Power Planning and Conservation Act of 1980 (Regional Act). The U.S. Department of Interior Bureau of Reclamation (BOR) is the designated technical representative administering this SEF 10 and 11 Project. The administrative record for this consultation is on file at the Idaho Habitat Branch office.

1.1 Background and Consultation History

The Upper Salmon Basin Watershed Project (USBWP), (ISCC 1995) developed by the Idaho Soil Conservation Commission for the Lemhi River, Pahsimeroi River, and EFSR, outlined goals and objectives, specifically designed to protect and restore important salmon habitat, as part of a regional effort to rebuild Columbia Basin salmon runs. The first goal is to "provide for the safe and timely passage of migrating fish through critical reaches of the watershed" (ISCC 1995). The highest priority goals for the EFSR include reducing the number of physical barriers in the system, specifically unscreened diversion structures on the mainstem and tributaries of the EFSR.

The SEF 10 and 11 Project was proposed under BPA's Power Emergency Action Plan and was approved for funding in February 2003, as part of an existing 2000 contract between BPA and the Custer Soil and Water Conservation District (District). The BOR is with a water management agency that controls a number of hydropower and irrigation projects in the Columbia River Basin. Acting in concert with the District, BOR is assisting BPA with National Environmental Policy Act (NEPA) compliance and ESA consultation for the SEF 10 and 11 Project. The BOR is providing the planning and design work for the proposed SEF 10 and 11 Project, as well as designing the contract documents and specifications.

In December 2000, NOAA Fisheries issued a biological opinion on the "Reinitiation of Consultation on Operation of the Federal Columbia River Power System (FCRPS), including the Juvenile Fish Transportation Program, and 19 Bureau of Reclamation Projects in the Columbia Basin (FCRPS Opinion) (NMFS 2000). The FCRPS Opinion included 199 Reasonable and Prudent Alternatives (RPA) actions. One of these RPAs, Action 149, states that the BOR

> "shall initiate programs in three priority subbasins (identified in the Basinwide Recovery Strategy) per year over 5 years, in coordination with NMFS, FWS (U.S. Fish and Wildlife Service), the states, and others, to address all flow, passage, and screening problems in each subbasin over 10 years... This action initiates immediate work in three such subbasins per year, beginning in the first year with the Lemhi, Upper John Day, and Methow subbasins."

In keeping with the intent of the entire FCRPS Opinion, BOR followed up the work in the initial subbasins by drafting "Evaluations of Six Priority Subbasins for the Implementation of 1-Year Plans in Fiscal Year 2002" (BOR 2001). Included under this plan, the Upper Salmon River subbasin was identified, and included the EFSR and Herd Creek (HC). Under the "All-H" approach outlined by the Federal Caucus (2000), the improvement of irrigation diversions and removal of impediments to anadromous fishes passage in the Snake River Basin (including the EFSR) fits into the habitat strategies that help meet the requirements of the FCRPS Opinion and RPA Action 149. As active participants in the Model Watershed Plan (Plan) (ISSC 1995) that addresses the EFSR subbasin as well as the Lemhi River and Pahsimeroi River subbasins, the BOR and BPA help set the annual project and funding priorities for the Model Watershed (now known as the USBWP). The priority goal of the Plan is to provide "...for the safe and timely passage of migrating fish through critical reaches of the watershed" (ISCC 1995), while protecting and enhancing water quality, and minimizing the loss of migrating fish caused by irrigation diversions. An action plan for the EFSR was developed and the highest priority goals for this watershed include reducing the number of fish passage obstructions and decreasing the number of unscreened water diversion structures on the mainstem and tributaries of the EFSR.

The BPA provided a biological assessment (BA) for the proposed action dated May 1, 2003. On June 12, 2003, NOAA Fisheries requested additional information on the proposed Project. NOAA Fisheries received the requested additional information for the SEF 10 and 11 Project on June 19, 2003, and consultation was initiated at that time. The BOR provided a draft copy of contract documents and specifications in June 2003 (BOR 2003a). An interagency government-to-government meeting was held in the Salmon Field Office of NOAA Fisheries on June 19, 2003, to discuss the SEF 10 and 11 Project and related EFSR and HC diversion removal, replacement, and modification projects. Attending in person or via conference call were representatives of the BPA, BOR, NOAA Fisheries, USFWS, Natural Resource Conservation Service (NRCS), the District, and the Shoshone-Bannock Tribes. The meeting agenda was divided into two major parts: administrative, (including funding options), and technical review of engineering designs and plans. Modifications to a proposed structure for returning water to the EFSR from the SEF 11 Diversion were agreed to by the engineers representing the BOR, NRCS, and NOAA Fisheries, and were adopted by consensus by the meeting participants. The modifications would create a larger pool for adult chinook salmon and steelhead staging, and would prevent juvenile anadromous salmonids and other fishes from being harmed or killed by spilling from the diversion structure back to the river onto exposed rocks. The BPA will submit to NOAA Fisheries a revised BA for the proposed action based on NOAA Fisheries information requests and reviews that reflect the June 19, 2003, interagency negotiations and consensus before construction starts. The June 19, 2003 agreements are considered part of the proposed action and are analyzed as such in this Opinion. If the revised BA does not reflect those agreed upon components of the action analyzed in this Opinion, this may trigger Reinitiation of Consultation (refer to section 2.5, below).

The SEF 10 and 11 Project would likely affect tribal trust resources. Because the action is likely to affect tribal trust resources, NOAA Fisheries has contacted the Shoshone-Bannock Tribes and Nez Perce Tribe pursuant to the Secretarial Order (June 5, 1997). The Shoshone-Bannock Tribes expressed interest in this consultation and a tribal representative participated in the interagency consultation meeting (mentioned above). The tribal representative found no technical problems with this Opinion, however, the Shoshone-Bannock Tribal Council has not formally voiced its views on the SEF 10 and 11 Project.

1.2 Proposed Action

Proposed actions are defined in the Services' consultation regulations (50 CFR 402.02) as "all activities or programs of any kind authorized, funded, or carried out, in whole or in part, by Federal agencies in the United States or upon the high seas." Additionally, U.S. Code (16 U.S.C. 1855(b)(2)) further defines a Federal action as "any action authorized, funded, or undertaken or proposed to be authorized, funded, or undertaken by a Federal agency." Because the BPA proposes to fund the action that may affect listed resources, it must consult under ESA section 7(a)(2) and MSA section 305(b)(2).

The purpose of the proposed action is to improve passage for all life stages of anadromous and resident fish species. To accomplish this, the Project will consolidate points of diversion, reduce head cutting actions in the river at the SEF 10 location by eliminating an instream push-up diversion berm, replace the existing SEF 11 push-up gravel berm that impedes anadromous fish passage and requires regular instream mechanized maintenance and repairs with a permanent rock weir that also spans the EFSR. To enable fish passage during low flows, a 20-foot wide fish passage weir will be installed near the left upstream bank with the fish weir 2.1 feet below the crest of the rock weir. The weir is designed at a 5-to-1 slope. Thus, fish passage will be enabled during low flow conditions. The existing SEF 10 diversion berm, headgate and fish screen structure will be abandoned, allowing the river to reclaim and assimilate the push-up berm structure naturally. Water historically diverted at this location will be diverted approximately 0.85 miles upstream at SEF 11 Diversion.

Conservation measures that were identified by BPA include:

1. In-channel work will take place from July 7 to August 15, 2003. Fish passage and sediment control structures and provisions will be in place at all times.

2. Project inspection will be provided by the District, and the BOR during the construction period.

3. Best Management Practices (BMPs) will be in place at all times as appropriate to the type of work performed (IDEQ 1997).

4. Staging and storage areas for vehicles and equipment will be at least 100 feet from any waterway or wetland area.

5. Heavy equipment left on site will use drip pans as necessary to minimize soil contamination from leaks.

6. All fuel and petroleum products will be stored at least 100 feet from existing waterways and wetlands, if they are stored on site.

7. Equipment used in the river will be inspected each day and whenever fueling takes place to ensure there are no leaks from hydraulic lines or other locations on the equipment. Any leaks found will be fixed prior to the equipment entering the streambed to work.

8. Emergency spill containment equipment will be available at all times to manage any petroleum product spills or leaks that may occur. If a spill or leak should occur it will be cleaned up immediately and the appropriate officials notified.

9. No chemical dust suppressants will be used within 25 feet of any waterway. The use of water for dust suppression is preferred. Water will only be drawn from a site approved by NOAA Fisheries and/or USFWS fisheries biologists. Water drawn from any location other than immediately below the fish screen will use 3/32 inch screens on the intake hose.

10. Areas disturbed by construction will be replanted and/or reseeded by the beginning of the next growing season, or at the end of the Project if there is sufficient growing time before the onset of cold weather. Site reclamation will include replanting with native vegetation similar to what was removed during construction. Recommendations for types of species to plant, timing of planting and additional technical information are referenced in Technical Bulletins 24, 32, and 38 in the Idaho BMPs publication (IDEQ 1997). The recommendations from these Technical Bulletins will guide the revegetation at these project sites. Specific timing and species used will be coordinated with the landowner, NOAA Fisheries and USFWS prior to implementation.

11. Fish salvage operations in coordination with Idaho Department of Fish and Game (IDFG), USFWS, and NOAA Fisheries will be conducted (if necessary), as agreed to by BPA, BOR, and their contractors at the June 19, 2003, interagency meeting, and by consensus agreement that is deemed part of the proposed action.

12. All construction and design criteria developed for the Project will be implemented as stated in the SEF 10 and 11 Project contract documents and specifications (BOR 2003a; BOR 2003b).

13. In the event that there are changes in the project plan, NOAA Fisheries and USFWS will be notified and consultation may be reinitiated as described below (section 2.5).

1.3 Description of the Action Area

An action area is defined by the Services' regulations (50 CFR Part 402) as "all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action." The action area starts at about 14 miles upstream from the confluence with the Salmon River, in T.9N., R.18E., Section 5, (SEF 10) and T10N, R18E, Section 31 (SEF 11), Custer County, Idaho. The ESFR carries substantial flows throughout the year (mean monthly January flow of 79.0 cubic feet per second (cfs) for 1928-1981) (USGS 2003). Due to the transient nature of the instream construction for the permanent replacement of the SEF11 Diversion structure, temporary coffer dams and other BMPs for controlling sedimentation will mitigate the increased turbidity, siltation, and the filling of gravel interstitial spaces with fine sediments. Negative effects should be negligible in the lower reaches of the EFSR, the mainstem

Salmon River, and downstream of their confluence. Downstream of the project area the effects of sedimentation will greatly attenuated. Therefore, the downstream extent of the action area is identified as 1,000 meters. The fifth field hydrologic unit code (HUC) encompassing the action area is 1706020109. This area serves as a migratory corridor for Snake River spring/summer chinook salmon and Snake River Basin steelhead juveniles and adults, spawning and rearing, and growth and development to adulthood for EFH and the salmonid Evolutionarily Significant Units (ESUs) (Reeves et al., 1995).

This stream reach is occupied by all life stages of Snake River spring/summer chinook salmon and Snake River Basin steelhead and is designated critical habitat for Snake River spring/summer chinook salmon. Snake River sockeye salmon do not occur in the EFSR.

2. ENDANGERED SPECIES ACT - BIOLOGICAL OPINION

The objective of this Opinion is to determine whether the SEF 10 and 11 Project is likely to jeopardize the continued existence of the Snake River spring/summer chinook salmon and Snake River steelhead or destroy or adversely modify the designated critical habitat of chinook salmon.

2.1 Evaluating the Effects of the Proposed Action

The standards for determining jeopardy and destruction or adverse modification of critical habitat are set forth in section 7(a)(2) of the ESA. In conducting analyses of habitat-altering actions under section 7 of the ESA, NOAA Fisheries uses the following steps of the consultation regulations and when appropriate[1] combines them with The Habitat Approach (NMFS 1999): (1) Consider the biological requirements and status of the listed species; (2) evaluate the relevance of the environmental baseline in the action area to the species' current status; (3) determine the effects of the proposed or continuing action on the species, and whether the action is consistent with any available recovery strategy; and (4) determine whether the species can be expected to survive with an adequate potential for recovery under the effects of the proposed or continuing action, the effects of the environmental baseline, and any cumulative effects, and considering measures for survival and recovery specific to other life stages. In completing this step of the analysis, NOAA Fisheries determines whether the action under consultation, together with all cumulative effects when added to the environmental baseline, is likely to jeopardize the ESA-listed species or result in the destruction or adverse modification of critical habitat. If jeopardy or adverse modification is found, NOAA Fisheries may identify RPAs for the action that avoid jeopardy and/or destruction or adverse modification of critical habitat.

[1]The Habitat Approach is intended to provide guidance to NOAA Fisheries staff for conducting analyses, and to explain the analytical process to interested readers.

The fourth step above (jeopardy/adverse modification analysis) requires a two-part analysis. The first part focuses on the action area and defines the proposed action's effects in terms of the species' biological requirements in that area (i.e., effects on essential features). The second part focuses on the species itself. It describes the action's effects on individual fish, populations, or both, and places that impact in the context of the ESU as a whole. Ultimately, the analysis seeks to determine whether the proposed action is likely to jeopardize a listed species' continued existence or destroy or adversely modify its critical habitat.

2.1.1 Biological Requirements

The first step NOAA Fisheries uses when applying ESA section 7(a)(2) to the listed ESUs considered in this Opinion includes defining the species' biological requirements within the action area. Biological requirements are population characteristics necessary for the listed ESUs to survive and recover to naturally reproducing population sizes at which protection under the ESA would become unnecessary. The listed species' biological requirements may be described as characteristics of the habitat, population or both (McElhany *et al.* 2000).

NOAA has identified population size biological requirements through interim recovery targets. The target for Snake River steelhead in the Upper Salmon River subbasin is 4,700 adult spawners, while the target for spawning adult Snake River spring/summer chinook salmon for the Upper Salmon River subbasin is 5,100 fish (NMFS 2002).

For actions that affect freshwater habitat, NOAA Fisheries may describe the habitat portion of a species' biological requirements in terms of a concept called properly functioning condition (PFC). The PFC is defined as the sustained presence of natural[2] habitat-forming processes in a watershed that are necessary for the long-term survival of the species through the full range of environmental variation (NMFS 1999). The PFC, then, constitutes the habitat component of a species' biological requirements. Although NOAA Fisheries is not required to use a particular procedure to describe biological requirements, it typically considers the status of habitat variables in a matrix of pathways and indicators (MPI) (NMFS 1996b) that were developed to describe PFC in forested montane watersheds. Appendix E presents the MPI developed for the SEF 10 and 11 Project. In the PFC framework, baseline environmental conditions are described as "properly functioning," "at risk," or "not properly functioning."

The SEF 10 and 11 Project would occur within designated critical habitat for the Snake River spring/summer chinook salmon ESU. Freshwater critical habitat can include all waterways,

[2]The word "natural" in this definition is not intended to imply "pristine," nor does the best available science lead us to believe that only pristine wilderness will support salmon.

substrates, and adjacent riparian areas[3] below longstanding, natural impassable barriers (i.e., natural waterfalls in existence for at least several hundred years) and dams that block access to former habitat (see citations in Table 1).

Essential features of critical habitat for the listed species are: (1) Substrate, (2) water quality, (3) water quantity, (4) water temperature, (5) water velocity, (6) cover/shelter, (7) food (juvenile only), (8) riparian vegetation, (9) space, and (10) safe passage conditions. For this consultation, the essential features that function to support successful adult and juvenile migration, adult holding, spawning, incubation, rearing, and growth and development to adulthood include substrate, water quality, water quantity, water temperature, water velocity, and safe passage conditions. These essential features of critical habitat are included in the MPI (NMFS 1996b) (discussed in more detail in Section 2.2.1 and Appendix E).

2.1.2 Status and Generalized Life History of Listed Species

In this step, NOAA Fisheries also considers the current status of the listed species within the action area, taking into account population size, trends, distribution, and genetic diversity. To assess the current status of the listed species, NOAA Fisheries starts with the determinations made in its decision to list the species and also considers any new data that is relevant to the species' status. Please refer to Appendices A and B (online at:
http://www.nwr.noaa.gov/1habcon/habweb/habguide/appendix_a_june2001.pdf),
which include a discussion of the general life history of the listed species.

The BPA found that the SEF 10 and 11 Project may affect, but is not likely to adversely affect the Snake River Basin steelhead and Snake River spring/summer chinook salmon and designated critical habitat for chinook salmon identified in Table 1. Based on the life histories of these ESUs, the BPA determined that it is not likely that incubating eggs, alevins, juveniles, smolts, and adults life stages of these listed species would be adversely affected by the proposed modifications to the SEF 11 Diversion structure. NOAA Fisheries determined, however, that because of the close proximity of historic and recent redds, the presence of juvenile fish, the extensive instream work proposed, and experiences with similar projects in the Salmon River Basin at a similar magnitude of disturbance, adverse effects on those ESUs are likely. Therefore, formal consultation and a Biological Opinion are required.

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[3]Riparian areas adjacent to a stream provide the following functions: shade, sediment delivery/filtering, nutrient or chemical regulation, streambank stability, and input of large woody debris and fine organic matter.

Table 1. References for additional background on listing status, critical habitat designation, protective regulations, and life history for the ESA-listed and candidate species considered in this consultation.

SPECIES ESU	STATUS	CRITICAL HABITAT DESIGNATION	PROTECTIVE REGULATIONS	LIFE HISTORY
Snake River spring/summer chinook salmon (*Oncorhynchus tshawytscha*)	Threatened; April 22, 1992; 57FR 14653[4]	October 25, 1999; 64 FR 57399[5]	July 10, 2000; 65 FR 42422	Matthews and Waples 1991; Healey 1991
Snake River Basin steelhead (*O. mykiss*)	Threatened; August 18, 1997; 62 FR 43937		July 10, 2000; 65 FR 42422	Busby et al. 1996; Fish Passage Center 2001a&b; BRT 1998

2.1.2.1 Snake River Spring/Summer Chinook Salmon

The Snake River spring/summer chinook salmon ESU, listed as threatened on April 22, 1992 (67 FR 14653), includes all natural-origin populations in the Tucannon, Grande Ronde, Imnaha, and Salmon Rivers. Some or all of the fish returning to several of the hatchery programs are also listed including those returning to the Tucannon River, Imnaha, and Grande Ronde hatcheries, and to the Sawtooth, Pahsimeroi, and McCall hatcheries on the Salmon River. Critical habitat was designated for Snake River spring/summer chinook salmon on December 28, 1993 (58 FR 68543) and was revised on October 25, 1999 (64 FR 57399).

Historically, the Snake River drainage is thought to have produced more than 1.5 million adult spring/summer chinook salmon in some years during the late 1800s (Matthews and Waples 1991). By the 1950s, the abundance of spring/summer chinook had declined to an annual average of 125,000 adults, and by the mid-1960s, further declines resulted to an average of about 60,000 adults. Adult returns counted at Lower Granite Dam reached all-time lows in the mid-1990s, and numbers have begun to increase since 1997. Over a 10-year period from 1992 to 2001, which includes the year of listing (1992), returns of wild/natural fish ranged from 183 in 1994 to 12,475 in 2001, and averaged 3,314 salmon adults. The estimated smolt production capacity of 10 million smolts for rivers in Idaho, coupled with historic smolt to adult return rates of two percent to six percent, indicate Idaho could produce wild/natural runs of 200,000 to 600,000 adults (Fish Passage Center 2002). The recent low

[4] Also see, June 3, 1992, 57 FR 23458, correcting the original listing decision by refining ESU ranges.

[5] This corrects the original designation of December 28, 1993, 58 FR 68543 by excluding areas above Napias Creek Falls, a naturally impassable barrier to fish migration.

numbers are reflected throughout the entire distribution of chinook salmon subpopulations scattered throughout the Grande Ronde,
Imnaha, Tucannon, and Salmon River subbasins. Redd counts and estimates of parr and smolt densities generally indicate that fish production is well-below the potential, and continuing to decline.

These generalizations for the entire Snake River Basin hold true for the EFSR watershed. The 11 miles of adequate spawning habitat in the EFSR watershed should be capable of producing 720,000 smolts per year (based on an assumption of 200 adult fish per mile and an egg-to-smolt survival rate of 15 %) (ISCC 1995).

Although there were record returns in 2000 and 2001, numbers are in general very low in comparison to historic levels (Bevan et al. 1994). Average returns of adult Snake River spring/summer chinook salmon (averaging 3,314 over a recent 10-year period) are also low in comparison to interim target species recovery levels of 44,766 for the Snake River Basin (April 4, 2002, Interim Abundance and Productivity Targets for Interior Columbia Basin Salmon and Steelhead Listed under the ESA, NMFS 2002). The low returns amplify the importance that a high level of protection be afforded to each adult chinook salmon, particularly because a very small percentage of salmon survive to the life stage of a returning, spawning adult, and because these fish are in the final stage of realizing their reproductive potential (approximately 2,000 to 4,000 progeny per adult female).

Habitat impairment is common in the range of this ESU. Spawning and rearing habitats are likely impaired by factors such as tilling, water withdrawals, timber harvest, grazing, mining, and alteration of floodplains and riparian vegetation. Mainstem Columbia River and Snake River hydroelectric developments have altered flow regimes and estuarine habitat, and disrupted migration corridors. Competition between natural indigenous stocks of spring/summer chinook salmon and spring/summer chinook of hatchery origin has likely increased due to an increasing proportion of naturally-reproducing fish of hatchery origin.

Compared to the greatly reduced numbers of returning adults for the last several decades, exceptionally large numbers of adult chinook salmon returned to the Snake River drainage in 2000 and in 2001. These large returns are thought to be a result of favorable ocean conditions, and above average flows in the Columbia River Basin when the smolts migrated downstream. These large returns are only a fraction of the estimated returns of the late 1800s. Recent increases in the population are not expected to continue, and the long-term trend for this species indicates a decline. Detailed information on the current range-wide status of Snake River chinook salmon, under the environmental baseline, is described in a chinook salmon status review (Myers et al. 1998). Habitat improvements may not always result in increased salmon productivity because a myriad of other factors can still depress populations, but diminished quality would probably correspond to reduced productivity (Regetz 2003).

2.1.2.2 Snake River Basin Steelhead

The Snake River Basin steelhead ESU, listed as threatened on August 18, 1997 (62 FR 43937), includes all natural-origin populations of steelhead in the Snake River basin of Southeast Washington, northeast Oregon, and Idaho. None of the hatchery stocks in the Snake River basin are listed, but several are included in the ESU. Critical habitat for Snake River Basin steelhead was administratively withdrawn on April 30, 2002, therefore critical habitat is not designated at this time.

Natural runs of Snake River Basin steelhead have been declining in abundance over the past decades. Some of the significant factors in the declining populations are mortality associated with the many dams along the Columbia and Snake Rivers, losses from harvest, loss of access to more than 50 percent of their historic range, and degradation of habitats used for spawning and rearing. Possible genetic introgression from hatchery stocks is another threat to Snake River Basin steelhead since wild fish comprise such a small proportion of the population. Additional information on the biology, status, and habitat elements for Snake River Basin steelhead are described in Busby et al. (1996).

The 2000 and 2001 counts at Lower Granite Dam indicate a short-term increase in returning adult spawners. Adult returns (hatchery and wild) in 2001 were the highest in 25 years and 2000 counts were the sixth highest on record (Fish Passage Center 2001a). Increased levels of adult returns are likely a result of favorable ocean and instream flow conditions for these cohorts. Although steelhead numbers have dramatically increased, wild steelhead comprise only 10-20 % of the total returns since 1994. Consequently, the large increase in fish numbers does not reflect a change in steelhead status based on historic levels. Recent increases in the population are not expected to continue, and the long-term trend for this species indicates a decline.

Survival of downstream migrants in 2001 was the lowest level since 1993. Low survival was due to record low run-off volume and elimination of spills from the Snake River dams to meet hydropower demands (Fish Passage Center 2001b). Average downstream travel times for steelhead nearly doubled and were among the highest observed since recording began in 1996. Consequently, wide fluctuations in population numbers are expected over the next few years when adults from recent cohorts return to spawning areas. Detailed information on the current range-wide status of Snake River Basin steelhead, under the environmental baseline, is described in steelhead status review (Busby et el. 1996), and status review update (BRT 1998). Please see Appendix B for more information.

<u>2.1.3 Environmental Baseline in the Action Area</u>

The environmental baseline is defined as: "the past and present impacts of all Federal, state, or private actions and other human activities in the action area, including the anticipated impacts of all proposed Federal projects in the action area that have undergone section 7 consultation and the impacts of state and private actions that are contemporaneous with the consultation in progress" (50 CFR 402.02). In step 2, NOAA Fisheries' evaluates the relevance of the environmental baseline in the action area to the species' current status. In describing the environmental baseline, NOAA Fisheries evaluates essential features of designated critical habitat and the listed Pacific salmon ESUs affected by the proposed action. The action area is described in section 1.3 of this document.

In general, the environment for listed species in the Columbia River Basin (CRB), including those that migrate past or spawn upstream from the action area, has been dramatically affected by the development and operation of the FCRPS. Storage dams have eliminated mainstem spawning and rearing habitat, and have altered the natural flow regime of the Snake and Columbia Rivers, decreasing spring and summer flows, increasing fall and winter flow, and altering natural thermal patterns. Power operations cause fluctuation in flow levels and river elevations, affecting fish movement through reservoirs, disturbing riparian areas and possibly stranding fish in shallow areas as flows recede. The eight dams in the migration corridor of the Snake and Columbia Rivers kill or injure a portion of the smolts passing through the area. The low velocity movement of water through the reservoirs behind the dams slows the smolts' journey to the ocean and enhances the survival of predatory fish (Independent Scientific Group 1996, National Research Council 1996). Formerly complex mainstem habitats in the Columbia, Snake, and Willamette Rivers have been reduced, for the most part, to single channels, with floodplains reduced in size, and off-channel habitats eliminated or disconnected from the main channel (Sedell and Froggatt 1984; Independent Scientific Group 1996; and Coutant 1999). The amount of large woody debris in these rivers has declined, reducing habitat complexity and altering the rivers' food webs (Maser and Sedell 1994).

Other human activities that have degraded aquatic habitats or affected native fish populations in the CRB include stream channelization, elimination of wetlands, construction of flood control dams and levees, construction of roads (many with impassable culverts), timber harvest, splash dams, mining, water withdrawals, unscreened water diversions, agriculture, livestock grazing, urbanization, outdoor recreation, fire exclusion/suppression, artificial fish propagation, fish harvest, and introduction of non-native species (Henjum *et al.* 1994; Rhodes *et al.* 1994; National Research Council 1996; Spence *et al.* 1996; and Lee *et al.* 1997). In many watersheds, land management and development activities have: (1) reduced connectivity (i.e., the flow of energy, organisms, and materials) between streams, riparian areas, floodplains, and uplands; (2) elevated fine sediment yields, degrading spawning and rearing habitat; (3) reduced large woody material that traps sediment, stabilizes streambanks, and helps form pools; (4) reduced vegetative canopy that minimizes solar heating of streams; (5) caused streams to become straighter, wider, and shallower, thereby reducing rearing habitat and increasing water temperature fluctuations; (6) altered peak flow volume and timing, leading to channel changes and potentially altering fish migration behavior; and (7) altered floodplain function, water tables and base flows (Henjum *et al.* 1994; McIntosh *et al.* 1994; Rhodes *et al.* 1994; Wissmar *et al.* 1994; National Research Council 1996; Spence *et al.* 1996; and Lee *et al.* 1997).

To address problems inhibiting salmonid recovery in CRB tributaries, the Federal resource and land management agencies developed the *All H Strategy* (Federal Caucus 2000). Components of the *All H Strategy* commit these agencies to increased coordination and a fast start on protecting and restoring salmon and steelhead habitat.

Pacific salmon populations also are substantially affected by variation in the freshwater and marine environments. Ocean conditions are a key factor in the productivity of Pacific salmon populations. Stochastic events in freshwater (flooding, drought, snowpack conditions, volcanic eruptions, etc.) can play an important role in a species' survival and recovery, but those effects tend to be localized compared to the effects associated with the ocean. The survival and recovery of these species depends on their ability to persist through periods of low natural survival due to ocean conditions, climatic conditions, and other conditions outside the action area. Freshwater survival is particularly important during these periods because enough smolts must be produced so that a sufficient number of adults can survive to complete their oceanic migration, return to spawn, and perpetuate the species. Therefore it is important to maintain or restore essential features and PFC in order to sustain the ESU through these periods (Reeves et al. 1995). Additional details about the importance of freshwater survival to Pacific salmon populations can be found in Federal Caucus (2000), NMFS (2000), and Oregon Progress Board (2000).

The EFSR watershed drains approximately 560 square miles (Emmett 1975; USDI-BLM 1998) between the Sawtooth Mountain range and the White Cloud Peaks range, with a length of about 42 miles. As a seventh-order stream and a major tributary of the Salmon River, the EFSR consists of about 1,441 different stream channels, with first order streams averaging about 0.6 miles long. This accounts for a total of 1,416 miles of stream channel within the drainage area of the EFSR (Emmett 1975). Elevations range from 5,377 feet above mean sea level (amsl) at the confluence with the Salmon River (River Mile 343), 18 miles south of the town of Challis and five miles east of Clayton (Custer County, Idaho), to over 11,800 feet amsl in the Sawtooth Wilderness. Within the basin, the EFSR mainstem has an average gradient of about one percent and an average channel width of 40 to 60 feet. The major tributaries of the EFSR watershed are relatively small in width (from 7 to 19 feet) with relatively steep gradients (four to five percent).

Average annual precipitation ranges from 7.5 inches at lower elevations near Challis (lowest in Idaho) to 25 inches in the mountains, with an estimated average of 10 to 15 inches (USDI-BLM 1998). Severe winters with six or more feet of snow accumulated at the higher elevations are possible, while snowfall near the mouth is less, but more variable. Most of the land immediately adjacent to the EFSR and its major tributaries is in private ownership, while the Bureau of Land Management (BLM) manages the land at the mid-elevations and the U.S. Forest Service (USFS) manages the high elevation forests and meadows, including the headwaters contained in the Sawtooth National Recreation Area and Sawtooth Wilderness. Portions of the BLM lands are within a wilderness study area and much of the EFSR watershed are in the White Cloud and Boulder Mountain proposed wilderness areas. State-owned lands (14 mile square sections) are scattered throughout the basin (USDI-BLM 1999).

Historic annual peak flows of EFSR downstream from its confluence with Big Boulder Creek to its mouth at the Salmon River range from 1,200 cfs to 3,500 cfs (IDEQ 2003a). Human activities since the mid-1800s are likely to have changed the hydrology of the EFSR as a result of beaver trapping and dam removal, stream channel alterations, rip rapping of banks, riparian vegetation removal, and diversion of flows for irrigation and livestock watering. Limiting streamflow access to the floodplain has changed the hydrography of the river system from one that slowly releases upgradient stored water to one that releases water within a shortened time frame ("flashy"). The results of these modifications are reflected in a degraded aquatic habitat for ESA-listed anadromous salmonids with lower late summer flows and higher water temperatures (USDI-BLM 1998). Attenuation of flow fluctuations has reduced the ability of the EFSR to maintain its historic natural features, thereby reducing the number and quality of deep pools and meanders, which provide high quality fish habitat.

Riparian habitats in the EFSR watershed include not only riverine and lacustrine ecosystems, but also the vegetation associated with seeps, springs, wet meadows, bogs, and ponds (USDI-BLM 1998). The community plant structure within the riparian zone varies based on the frequency of flooding, amount of scouring, and the intensity of human disturbance (past and current). Much of the riparian lands along EFSR (approximately 6,400 acres) and its tributaries are dedicated to livestock and forage production and include extensive water diversion and conveyance systems. According to the USFS and BLM (1998), there are 33 private stream diversions within the EFSR watershed, most of which are protected by fish screens of various ages. Unscreened diversions are on smaller tributaries such as Fox, Pine, and McDonald creeks. According to Trapani (2002), two diversions were consolidated and an improved weir was installed to improve fish passage in this reach of EFSR. Fencing projects to exclude livestock grazing and bank destruction in the riparian zone for 3.6 miles of the 10.2 mile reach has resulted in some improvements to the degraded riparian habitat.

Historically, gold mining in the 1860s occurred in the watershed, with the Livingston Mine on Big Boulder Creek the most notable. A dam built on the creek for power generation for mine operations blocked fish migrations for many decades and was finally removed in 1991. Sedimentation and heavy metal contamination of Big Boulder Creek, EFSR and the mainstem Salmon River resulted from more than 50 years of gold mining.

The Idaho Department of Environmental Quality (IDEQ) classifies the EFSR as a cold water aquatic community, which supports salmonid spawning in the state's surface water quality standards (IDEQ 2003b). The EFSR is also designated as primary contact recreation waters and receives a high level of water quality protection under standards designed to protect domestic drinking water supply and special resource waters designated uses. The EFSR and its tributaries were not included in the 1998 303(d) list of impaired stream segments for the Upper Salmon subbasin (IDEQ 2003a).

The EFSR has a long history of anadromous fish runs by spring/summer chinook salmon and steelhead (ISCC 1995; Trapani 2002). Average annual chinook salmon redd counts for the period between 1957 and 1969 was 675, with a maximum of 1,177 (Trapani 2002). From 1957 to 1962, redd counts for the steelhead and chinook salmon ESUs averaged 1,385 redds per year within the EFSR watershed, which accounts for about 34% of the total redd counts for these two ESA-listed ESUs in the Upper Salmon River Basin during the same time period (ISCC 1995). Of the 1,385 redds counted on average during this time period, approximately 679 (49%) were chinook salmon redds (Trapani 2002). During the period between 1977 and 1981, EFSR spring/summer chinook and steelhead redds accounted for 19% of the combined total (chinook salmon and steelhead) of Upper Salmon River Basin redds. Since 1981, the percentage has continued to decline to 10% or less (ISSC 1995) as the combined total of the entire basin also continues to decline.

The IDFG maintains a fish weir on the EFSR about 0.25 miles upstream of the confluence with Big Boulder Creek. The circa-1984 weir is used to trap adult steelhead to collect eggs (chinook salmon collection suspended in 1997) for the supplementation program at the Sawtooth Hatchery (IDFG personal communication; ISCC 1995).

NOAA Fisheries MPI (NMFS 1996b) provides a tool for assessing the current conditions of various chinook salmon and steelhead trout habitat parameters in the EFSR watershed. Use of the matrix identified all habitat indicators as either at risk or not properly functioning within the action area (Appendix E).

Fisheries habitat within the EFSR watershed is generally divided into three principle stream segments: (1) mouth of the river to HC, approximately 10.3 miles long, (2) HC to Little Boulder Campground, approximately 10.2 miles long, and (3) HC, approximately 6 miles long (ISCC 1995; IMWP 2000; Trapani 2002). The proposed project area begins approximately 14 miles upstream from the confluence with the Salmon River in EFSR segment 2. SEF 11 is 0.85 miles upstream from SEF 10. The IDFG (IDFG 2002) 2002 survey data show approximately 82 redds in the 6 miles above HC in segment 2. Arial surveys show 10 redds were in the vicinity of the SEF 10 and 11 Project sites (IDFG 2002). According to the BA, there were no redds at the existing SEF 11 Diversion structure.

The EFSR is critical for the recovery and enhancement of anadromous fish stocks in the Upper Salmon River basin. Historically, the EFSR watershed supported large runs of both chinook salmon and steelhead. The IDFG fish biologists rate the EFSR with excellent spawning potential, especially for chinook salmon (USDI-BLM 1999). The stream habitat inventory that was completed by Trapani (2002) in 1994 reveals that the anadromous fish habitat in the EFSR has great potential to support historical salmon runs and unlike other major Upper Salmon River subbasin tributaries, is not limited by high water temperatures, low flow conditions, or high embeddedness due to fine sediments. Cobble embeddedness in the mainstem EFSR is approximately 26 % (Trapani 2002). Bank stability of this reach of the EFSR was rated as 66 % stable in 1994 (Trapani 2002). Large substrate deposits from upstream cause numerous bar complexes and channel shifts resulting in significant bank erosion (Trapani 2002). Physical barriers to anadromous fish migrations from irrigation diversions and road crossings, and sedimentation associated with repeated repairs to push-up dams and bank erosion, and livestock grazing are habitat impairments identified in the MPI analysis.

Completed projects in the watershed include the HC Bridge Replacement Project, which was finished in 2000 under an individual project consultation between the BLM and NOAA Fisheries. The BLM found that the bridge replacement did not affect the overall baseline conditions in HC and the downstream reaches of the EFSR and mainstem Salmon River (USDI-BLM 2002). Ongoing grazing in the EFSR, HC, and other basin allotments continue to degrade riparian vegetation, bank stability, water temperatures, and water quality. The area between Marco Creek and Cherry Gulch is maintained as bighorn sheep winter range and is excluded from livestock grazing. Other proposed projects to improve existing diversion and conveyance systems similar to the SEF 10 and 11 Project are proposed at SEF 12 and HC 1 and HC 2. Under the USBWP, completed projects include bank stabilization activities (6 miles), livestock grazing exclusion fencing (3.6 miles), consolidation of two irrigation diversions and removal of fish passage obstructions, and a tributary reconnection project accomplished by converting a former flood irrigation system into a sprinkler system (IMWP 2000; Trapani 2002).

2.2 Analysis of Effects

Effects of the action are defined as: "the direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated or interdependent with the action, that will be added to the environmental baseline" (50 CFR 402.02). Direct effects occur at the project site and may extend upstream or downstream based on the potential for impairing the value of habitat for meeting the species' biological requirements or impairing the essential features of critical habitat. Indirect effects are defined in 50 CFR 402.02 as "those that are caused by the proposed action and are later in time, but still are reasonably certain to occur." They include the effects on listed species or critical habitat of future activities that are induced by the proposed action and that occur after the action is completed. "Interrelated actions are those that are part of a larger action and depend on the larger action for their justification" (50 CFR 403.02). "Interdependent actions are those that have no independent utility apart from the action under consideration" (50 CFR 402.02).

In step 3 of the jeopardy and adverse modification analysis, NOAA Fisheries evaluates the effects of proposed actions on listed species and seeks to answer the question of whether the species can be expected to survive with an adequate potential for recovery. In watersheds where critical habitat has been designated, NOAA Fisheries must make a separate determination of whether the action will result in the destruction or adverse modification of critical habitat (ESA, section 3, (3) and section 3(5A)).

2.2.1 Habitat Effects (which may also affect listed species)

NOAA Fisheries will consider any scientifically credible analytical framework for determining an activity's effect. In order to streamline the consultation process and to lead to more consistent effects determinations across agencies, NOAA Fisheries where appropriate recommends that action agencies use the MPI and procedures in NMFS (1996b), particularly when their proposed action would take place in forested montane environments. NOAA Fisheries is working on similar procedures for other environments. Regardless of the analytical method used, if a proposed action is likely to impair properly functioning habitat, appreciably reduce the functioning of already impaired habitat, or retard the long-term progress of impaired habitat toward PFC, it cannot be found consistent with conserving the species.

For the streams typically considered in salmon habitat-related consultations, a watershed is a logical unit for analysis of potential effects of an action (particularly for actions that are large in scope or scale). Healthy salmonid populations use habitats throughout watersheds (Naiman *et al*. 1992), and riverine conditions reflect biological, geological and hydrological processes operating at the watershed level (Nehlsen 1997; Bisson *et al*. 1997; and NMFS 1999).

Although NOAA Fisheries prefers watershed-scale consultations due to greater efficiency in reviewing multiple actions, increased analytic ability, and the potential for more flexibility in management practices, often it must analyze effects at geographic areas smaller than a watershed or basin due to a proposed action's scope or geographic scale. Analyses that are focused at the scale of the site or stream reach may not be able to discern whether the effects of the proposed action will contribute to or be compounded by the aggregate of watershed impacts. This loss of analytic ability typically should be offset by more risk averse proposed actions and ESA analysis in order to achieve parity of risk with the watershed approach (NMFS 1999).

The SEF 10 and 11 Project BA provides an analysis of the effects of the proposed action on Snake River spring/summer chinook salmon and Snake River Basin steelhead and the critical habitat for chinook salmon in the action area. The analysis uses the MPI (Appendix D) and procedures in NMFS (1996b), the information in the BA, and the best scientific and commercial data available to evaluate elements of the proposed action that have the potential to affect the listed fish or essential features of their critical habitat.

Direct effects from the project include instream installation work to remove the existing rock push-up dam and install the rock weir, fish passage weir, and the "T"plates (a type of metal water control gate structure). This action would likely cause a short-term increase in turbidity and sedimentation of the substrate at and below the work site, and could disrupt migration and mainstem spawning activities or the development of fish redds. Operations of the permanent replacement SEF 11 Diversion structure should allow additional fish passage during low flow periods, and will eliminate instream disturbance and sediment delivery associated with annual installation and maintenance of push-up dams. The effectiveness of the proposed custom engineering design in minimizing sedimetation and providing fish passage remains somewhat unknown. If the design does not perform as expected in the BA and Contract Documents, reinitiation of consultation with NOAA Fisheries may be required and additional design modifications may be necessary. Work will take place between July 7 and August 15 to avoid direct effects on spawning activities and salmonid redds, and fish passage will not be blocked during construction. Downstream (and potentially upstream) effects include short-term streambed changes that reduce hiding and resting cover in the immediate project area, and thus increase stress on upstream migrants as they move through the section of river to spawning habitat. Installation and removal of the temporary coffer dams will increase sediment inputs in the short-term. Construction during low water conditions, the use of coffer dams to work under dry conditions, and the use of BMPs will minimize the amount of sediment introduced to the water column and the stream substrate.

Additionally, existing refugia and resting cover for fry, juveniles, and adults will be disturbed, but will become reestablished as the channel adjusts to the changes. Instream habitat will be improved by the construction of the weirs because of the scour pools that will be installed below each weir. The legs of the weirs will also establish new resting areas, particularly for juveniles and adults.

Effects of the SEF 10 and 11 Project by essential feature include:

1. Substrate: The primary concern is potential recruitment of fine sediments into the EFSR. Sediment inputs that exceed a stream's transport ability can become embedded in spawning gravels, greatly reducing salmonid egg and alevin survival. Stream substrates contaminated with fine particles are less or not suitable as future spawning and redd production areas, and salmonid populations are typically negatively correlated with the amount of fine sediment in stream substrate (Chapman and McLeod 1987). Excess sedimentation and deposition may also destroy overwintering habitat and pools that act as cover for fry and juveniles, alter production of macroinvertebrate prey species, and reduce total pool volume (various studies summarized in Spence et al. 1996).

   Excessive concentrations of fine sediments in spawning and rearing habitats can reduce survival of embryos and alevins by entombing embryos and reducing flow of dissolved oxygen and decrease the availability of interstitial cover habitat. Egg deposition and survival are reduced when sediment fills the interstitial spaces between gravels and prevents the flow of oxygen and the flushing of metabolic wastes. Fine sediment deposited in stream substrates is directly related to chinook salmon egg-to-fry survival. As fine sediment increases above approximately 19 %, chinook salmon egg-to-fry survival declines rapidly (Tappel and Bjornn 1983; Chapman and McLeod 1987; Burton et al. 1993). Rhodes et al. (1994) concluded that survival to emergence for chinook salmon in the Snake River Basin is probably substantially reduced when fine sediment concentrations (<6.4 millimeters in size) in spawning gravel exceed 20 %. They recommended suspension of ongoing activities and prohibition of new activities where this standard is exceeded.

Emerging fry can also be trapped and smothered by sediment deposition in the gravels. As sediment becomes deposited in interstitial spaces, rearing habitat for juvenile salmonids is also reduced. Rearing areas are diminished as sediment fills pools and other areas. Sedimentation of deep pools and coarse substrate used for rearing and overwintering limits the space available for fish. Increased sediment load can be detrimental to juvenile salmon not only by causing siltation, but also by introducing suspended particulate matter that interferes with feeding and territorial behavior (Berg and Northcote 1985). Bell (1986) cited a study in which salmonids did not move in streams where the suspended sediment concentration exceeded 4,000 milligrams per liter (mg/L) because of a landslide. Newly emerged fry appear to be more susceptible to even moderate turbidity than older fish. Turbidity in the range of 25-50 nephalometer turbidity units (NTUs) (equivalent to 125-275 mg/L of suspended bentonite clay in water) reduced growth and caused more young salmon and steelhead to emigrate from laboratory streams than did clear water (Sigler et al. 1984).

A major concern in the relationship between sediment and invertebrates is the question of the effect on fish production as the result of reduced invertebrate production due to sediment. Potential effects of sedimentation on benthic invertebrates include interference with respiration and the overwhelming of filtering insects such as some caddisfly (Trichoptera) larvae that employ fine-meshed catch nets for obtaining drifting food particles. However, the major effect upon benthic invertebrates is the mass smothering of physical habitat by heavy sediment deposition on the streambed, including the loss of interstitial space occupied by burrowing or hyporheic animals (Waters 1995).

Project activities involving alteration of streambanks during removal of materials associated with the push-up berm structures are most likely to introduce fines into the stream. Conservation measures such as the use of straw bales and timing of construction are expected to greatly reduce the amount of fines entering the stream or being disturbed by construction activities. These countermeasures will avoid the likelihood of long-term adverse effects to spawning and rearing habitat.

Existing irrigation methods require that the irrigator perform annual (or more frequent) instream maintenance of the push-up berm using heavy machinery in the wetted ("live") stream channel. This results in regular disturbance and compaction of the stream substrate and increased introduction and suspension of sediment into the water column. Replacing the push-up berm with a permanent structure should improve conditions for spawning and rearing of eggs salmon and steelhead by eliminating regular instream structure maintenance. In order to minimize sediment delivery to the stream, work will be done behind coffer dams installed at the upper end of each project area.

2. <u>Safe Passage Conditions</u>: Coffer dams will be used to direct water away from the work area, yet still allow for fish passage as the old diversion is removed and the new structure is installed.

A temporary coffer dam will block one side of the river channel while the other is open for unobstructed stream passage. When in-channel work behind the first coffer dam is completed, it will be removed and the other side of the river channel will be temporarily blocked by a second coffer dam. In this manner, only a portion of the river channel will be obstructed and dewatered at any one time, leaving the remaining channel for upstream and downstream anadromous salmonid movements. These flow modifications will last no more than two to three weeks on each side of the river channel. During construction, the hours of instream work are restricted to allow for some period of noise-free and other disturbance-free time to facilitate chinook salmon and steelhead movement.

Replacing the push-up berm with a permanent structure will improve conditions for upstream and downstream migrating fish by eliminating annual instream maintenance, improving water quality conditions, creating step pools, increasing flow over the new structures, and by creating a well defined thalweg, which will enable fish passage during low flow periods. Most notably, the removal and replacement of the push-up dam across the EFSR will eliminate a major fish passage obstruction.

3. Riparian Vegetation: Negligible amounts of streambank vegetation, if any, will be removed as a result of project activities. Some minimal amount may be lost or damaged due to the results of keying in the new diversion structure into the bank. In the case that some willows may be removed, they will be incorporated into the new rip-rap to the best extent possible. No net reduction of riparian vegetation is expected with project conservation measures in place.

4. Water Quality: Heavy equipment will be used for project implementation in and near EFSR. To ensure water quality is not adversely affected, a contingency plan is specified in the contract documents for the handling of fuels and other hazardous materials and in the case of spills. No waste disposal of petroleum products is allowed on or near the project site. Fueling of equipment will occur outside of 100 feet of any water body. The BA and the Contract Documents for the SEF 10 and 11 Project put in place vehicle inspection and leakage prevention measures.

   The existing diversion and irrigation methods require annual or more frequent instream maintenance of the push-up berm using heavy machinery. Increased potential risks to water quality impairment or catastrophic pollution events associated with the introduction of petroleum products or antifreeze into the EFSR and downstream reaches of the Salmon River are linked to regular push-up berm maintenance with instream heavy equipment. The new, permanent structure for SEF 11 Diversion will not require similar instream disturbances on a regular basis with heavy equipment vehicles once it is installed and operational.

2.2.2 Species Effects

If fish salvage (as agreed to at the June 19, 2003, interagency meeting) is required during construction, the direct effects will be maintaining the survival rates of juvenile and adult chinook salmon and steelhead in this reach and downstream reaches of the EFSR. Under existing practices with the push-up berm, there are no contingency plans or fish salvage operations. Although there is no direct evidence of fish kills, the potential for fish mortality is greater under the existing design and ongoing maintenance of the SEF 10 and 11 Diversion structures, because of the regular disturbance of the streambed and push-up berms, and the possibility of crushing fish or redds with heavy equipment operating in the wetted stream channel.

The effect that a proposed action has on particular essential features or MPI pathways can be translated into a likely effect on population growth rate. In the case of this consultation it is not possible to quantify an incremental change in survival for Snake River spring/summer chinook salmon and Snake River Basin steelhead.

While population growth rates have been calculated at the large ESU scale, changes to the environmental baseline from the proposed action were described only within the action area (typically a watershed). An action that improves habitat in a watershed, and thus helps meet essential habitat feature requirements, may therefore increase lambda[6] for the populations of the ESUs in the action area.

Based on the effects on steelhead and chinook salmon habitat described above, the SEF 10 and 11 Project will have a net positive effect on the survival and recovery of Snake River spring/summer chinook salmon and Snake River Basin steelhead. Although the positive influences of this Project are very hard to quantify, even over time, the combined effects of this Project, similar diversion structure projects, and other anadromous salmonid habitat improvements in the EFSR, its tributaries, and mainstem Salmon River should be measurable in increased number of redds and increases in outmigrations for ESA-listed anadromous fishes.

2.2.3 Cumulative Effects

Cumulative effects are defined in 50 CFR 402.02 as "those effects of future State or private activities, not involving Federal activities, that are reasonably certain to occur within the action area of the Federal action subject to consultation." These activities within the action area also have the potential to adversely affect the listed species and critical habitat. Future Federal actions, including the ongoing operation of hydropower systems, hatcheries, fisheries, and land

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[6]lambda is the annual rat of population change (See Appendices A & B)

management activities are being reviewed through separate section 7 consultation processes. Federal actions that have already undergone section 7 consultations have been added to the description of the environmental baseline in the action area.

State, tribal, and local government actions will likely be in the form of legislation, administrative rules or policy initiatives. Government and private actions may encompass changes in land and water uses–including ownership and intensity–any of which could adversely affect listed species or their habitat. Government actions are subject to political, legislative, and fiscal uncertainties.

Changes in the economy have occurred in the last 15 years, and are likely to continue, with less large-scale resource extraction, more targeted extraction, and significant growth in other economic sectors. Growth in new businesses, primarily in the technology sector, is creating urbanization pressures and increased demands for buildable land, electricity, water supplies, waste-disposal sites, and other infrastructure.

Economic diversification has contributed to population growth and movement, and this trend is likely to continue. Such population trends will result in greater overall and localized demands for electricity, water, and buildable land in the action area; will affect water quality directly and indirectly; and will increase the need for transportation, communication, and other infrastructure. The impacts associated with these economic and population demands will probably affect habitat features such as water quality and quantity, which are important to the survival and recovery of the listed species. The overall effect will likely be negative, unless carefully planned for and mitigated.

Existing activities that occur within the immediate vicinity of the SEF 10 and 11 Project include general agriculture, livestock grazing, water withdrawals from surface and groundwater sources, septic system use, and cropland irrigation.

Dramatic changes are not expected in land use patterns from the existing, low density rural lifestyle that concentrates on livestock and forage production on farmsteads and ranches interspersed with homesteads and diffuse, low-level recreation. The proposed action creates a permanent, hard structure for diverting water for irrigation and livestock watering as a replacement for a more temporary push-up dam and leaking, earthen conveyance ditch, and thus increases the likelihood that land uses will remain the same for a longer period of time as farming and grazing practices become more efficient and cost-effective.

The IDEQ will establish Total Maximum Daily Loads (TMDLs) in the Snake River basin, a program regarded as having positive water quality effects. The TMDLs are required by court order, so it is reasonably certain that they will be set. The State of Idaho has created an Office of Species Conservation to work on subbasin planning and to coordinate the efforts of all state offices addressing natural resource issues. Demands for Idaho's groundwater resources have caused groundwater levels to drop and have reduced flow in springs for which there are senior water rights. The Idaho Department of Water Resources has begun studies and promulgated rules that address water right conflicts and demands on a limited resource. The studies have identified aquifer recharge as a mitigation measure with the potential to affect the quantity of water in certain streams, particularly those essential to listed species. As part of this Project, the irrigator/private landowner and the IDFG have entered into an Optimum Maximum Diversion Flow Agreement (Appendix C).

Plans for replacement and modification of the diversion structures at SEF 12 Project and HC 1 and HC 2 are also being reviewed. These actions, while likely to have a net positive effect on stream substrate and fish passage conditions, as the proposed action does, will be subject to section 7 consultation, and thus are not considered cumulative effects in this consultation.

2.2.4 Consistency with Listed Species ESA Recovery Strategies

Recovery is defined by NOAA Fisheries (formerly known as the National Marine Fisheries Service or NMFS) regulations (50 CFR 402) as an "improvement in the status of listed species to the point at which listing is no longer appropriate under the criteria set out in section 4 (a)(1) of the Act." Recovery planning is underway for listed Pacific salmonid species in the Northwest with technical recovery teams identified for each domain. Recovery planning will help identify measures to conserve listed species and increase the survival of each life stage. NOAA Fisheries also intends that recovery planning identify the areas/stocks most critical to species conservation and recovery and thereby evaluate proposed actions on the basis of their effects on those areas/stocks.

Until the species-specific recovery plans are developed, the FCRPS Opinion and the related December 2000 *Memorandum of Understanding Among Federal Agencies Concerning the Conservation of Threatened and Endangered Fish Species in the Columbia River Basin* (together these are referred to as the Basinwide Salmon Recovery Strategy) provide the best guidance for judging the significance of an individual action relative to the species-level biological requirements. In the absence of completed recovery plans, NOAA Fisheries strives to ascribe the appropriate significance to actions to the extent available information allows. Where information is not available on the recovery needs of the species, either through recovery planning or otherwise, NOAA Fisheries applies a conservative substitute.

The BPA has specific commitments to uphold under the Basinwide Salmon Recovery Strategy. For Federal lands, PACFISH, the Northwest Forest Plan, and land management plans define these commitments. The proposed action is consistent with the specific commitments and primary objectives of the Basinwide Salmon Recovery Strategy (Appendix D).

2.2.4.1 Habitat Effects

The proposed action is not likely to impair properly functioning habitat, to appreciably reduce the functioning of already impaired habitat, or to retard the long-term progress of impaired habitat toward PFC. The SEF 10 and 11 Project will eliminate the degrading effects of the current operations of the diversion structure and the regular instream maintenance of the push-up dam with heavy equipment and will improve fish passage through this reach of the EFSR. Degradation of the critical habitat associated with the construction phase of the SEF 10 and 11 Project is considered limited and temporary and is minimized by utilizing BMPs for reducing erosion, and measures to avoid and reduce introduction of petroleum products and herbicides into the waters of the EFSR mainstem and tributaries.

The proposed action is consistent with the specific habitat-based commitments and primary objectives of the Basinwide Salmon Recovery Strategy. The BPA and BOR involvement in the SEF 10 and 11 Project is, in part, helping to offset degradation of salmon and steelhead habitat in the EFSR watershed. In particular, the Project should help improve rearing and fish passage habitat and protect downstream spawning and in-gravel nursery habitat.

2.2.4.2 Species Effects

Based on the habitat effects described above, the proposed action will not reduce and may increase survival of ESA-listed Snake River spring/summer chinook salmon and Snake River Basin steelhead. Fish salvage as a contingency for fish strandings (as agreed to in the June 19, 2003, interagency meeting) should minimize or eliminate fish mortalities associated with the removal of the existing push-up berm and installation of the new, permanent SEF 11 Diversion structure. In reaching these determinations, NOAA Fisheries used the best scientific and commercial data available.

2.3 Conclusions

2.3.1 Critical Habitat Conclusion

After reviewing the current condition of the critical habitat, the environmental baseline for the action area, the effects of the proposed action, and cumulative effects in the action area, it is NOAA Fisheries' opinion that the SEF 10 and 11 Project is not likely to destroy or adversely modify their critical habitat.

2.3.2 Species Conclusion

After reviewing the current status of the Snake River Basin steelhead and the Snake River spring/summer chinook salmon, the environmental baseline for the action area, the effects of the proposed actions directly on the species and through modification of their habitat, and cumulative effects in the action area, it is NOAA Fisheries' opinion that the proposed action is not likely to jeopardize the continued existence of the Snake River Basin steelhead and the Snake River spring/summer chinook salmon.

2.4 Conservation Recommendations

Conservation recommendations are defined as "discretionary measures to minimize or avoid adverse effects of a proposed action on listed species or critical habitat or regarding the development of information" (50 CFR 402.02). Section 7 (a)(1) of the ESA directs Federal agencies to use their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of the threatened and endangered species. The conservation recommendations listed below are consistent with these obligations, and therefore should be implemented by the BPA.

1. The BPA should make every effort to minimize the duration of construction activities.

2. The BPA should attempt to minimize the spatial extent of disturbance.

3. The BPA should complete instream work within the established work window of July 7 and August 15 to avoid unnecessary risks to the most vulnerable life stages (eggs and alevins) of the ESA-listed Snake River spring/summer chinook salmon and Snake River Basin steelhead in the EFSR and downstream reaches of the mainstem Salmon River.

4. The BPA should conduct instream work during only part of any 24-hour period of a day to provide for a time for fish passage through the project area on the EFSR that is free from noise and other disturbances associated with construction with heavy equipment.

In order for NOAA Fisheries to be kept informed of actions minimizing or avoiding adverse effects, or those that benefit listed species or critical habitat, NOAA Fisheries requests notification of the achievement of any conservation recommendations when the BPA submits its monitoring report describing action under this Opinion or when the Project is completed.

2.5 Reinitiation of Consultation

As provided in 50 CFR 402.16, reinitiation of formal consultation is required if: (1) The amount or extent of taking specified in the Incidental Take Statement is exceeded, or is expected to be exceeded; (2) new information reveals effects of the action may affect listed species in a way not previously considered; (3) the action is modified in a way that causes an effect on listed species that was not previously considered; or (4) a new species is listed or critical habitat is designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease, pending conclusion of the reinitiated consultation.

2.6 Incidental Take Statement

Section 9 and rules promulgated under subsection 4(d) of the ESA prohibit any taking (harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect, or attempt to engage in any such conduct) of listed species without a specific permit or exemption. Harm is defined as an act that may include significant habitat modification or degradation where it actually kills or injures fish by impairing breeding, spawning, rearing, migrating, feeding, or sheltering." Harass is defined as actions that create the likelihood of injuring listed species by annoying it to such an extent as to significantly alter normal behavior patterns which include, but are not limited to, breeding, feeding, and sheltering. Incidental take is take of listed species that results from, but is not the purpose of, the Federal agency or the applicant carrying out an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to, and not intended as part of, the agency action is not considered prohibited taking provided that such taking is in compliance with the terms and conditions of this incidental take statement.

An incidental take statement specifies the impact of any incidental taking of endangered or threatened species. It also provides reasonable and prudent measures (RPMs) that are necessary to minimize impacts and sets forth terms and conditions with which the BPA must comply in order to implement the RPMs.

2.6.1 Amount or Extent of Take

The proposed action is reasonably certain to result in incidental take of the listed species. NOAA Fisheries is reasonably certain the incidental take described here will occur because: (1) the listed species for all life stages are known to occur in the action area; and (2) the proposed action is likely to cause impacts to critical habitat significant enough to impair feeding, breeding, migrating, or sheltering for the listed species, at least in a temporary fashion. Fish salvage is authorized by NOAA Fisheries, and if necessary, work shall stop immediately and fish salvage should proceed in coordination with NOAA Fisheries, USFWS, and IDFG. Based on salvage operations and lethal take of approximately 15 juvenile Snake River spring/summer chinook salmon associated with construction for the removal and replacement of a similar diversion structure on the Lemhi River, NOAA Fisheries anticipates a lethal take of 15 juvenile fish.

The lethal take of adult Snake River spring/summer chinook salmon and/or Snake River Basin steelhead or their active redds is not anticipated, except possibly under some authorized fish salvage operations. In case of adult lethal take, immediate notification of NOAA Fisheries and work stoppage is required. The extent of take is anticipated to be less than 100 yards downstream and including the SEF 10 and 11 Project site during the period of the established work window (July 7 to August 15, 2003) for 14 days or less. If the proposed action results in an exceedance in this incidental take statement, the BPA would need to notify NOAA Fisheries, stop work, and may have to reinitiate consultation. Work should not be resumed until cleared with NOAA Fisheries. The authorized take includes only take caused by the proposed action within the action area as defined in this Opinion. It does not authorize violations of the Clean Water Act and the State of Idaho Surface Water Quality Standards.

2.6.2 Reasonable and Prudent Measures

Reasonable and Prudent Measures (RPMs) are non-discretionary measures to minimize take, that may or may not already be part of the description of the proposed action. They must be implemented as binding conditions for the exemption in section 7(o)(2) to apply. The BPA has the continuing duty to regulate the activities covered in this incidental take statement. If the BPA fails to require the applicants to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, or fails to retain the oversight to ensure compliance with these terms and conditions, the protective coverage of section 7(o)(2) may lapse. NOAA Fisheries believes that activities carried out in a manner consistent with these RPMs, except those otherwise identified, will not necessitate further site-specific consultation. Activities which do not comply with all relevant RPMs will require further consultation.

NOAA Fisheries believes that the following RPMs are necessary and appropriate to minimize take of listed fish resulting from implementation of the action. These reasonable and prudent measures would also minimize adverse effects on designated critical habitat.

The BPA shall:

1. Monitor the effects of the proposed action to determine the actual project effects on listed fish (50 CFR 402.14 (I)(3)). The type of monitoring shall be able to detect adverse effects of the proposed action, assess the actual levels of incidental take in comparison with anticipated incidental take documented in the Opinion, and detect circumstances where the level of incidental take is exceeded. Monitoring shall also

address fish passage and ensure that it is improved with the replacement of the push-up berm and the operation of the improved SEF 11 Diversion structure. To ensure effectiveness of implementation of the RPMs, all fish removal and handling, spill containment, prevention, and control plans, and hazardous materials sites shall be monitored and evaluated both during and following construction, and meet criteria as described below in the terms and conditions.

2. Minimize the impact of incidental take by adhering to the work window days outlined in the BA, implementing the work during daylight hours, and by adhering to spill response/contingencies and the salvage operation plan described in the BA and agreed to at the June 19, 2003, interagency meeting.

3. Minimize the impact of incidental take from construction activities by implementing BMPs for controlling sedimentation and other forms of non-point source pollution associated with construction as outlined in the Contract Documents and Specifications (BOR 2003a; BOR 2003b). This includes phases of the proposed Project that occur outside of the EFSR stream channel and riparian area including modifications to the conveyance system and the farmstead, so that return waters associated with construction do not degrade ESA-listed salmonid habitat or harm listed fishes.

4. Minimize the extent of impacts on riparian vegetation and stream conditions and where impacts are unavoidable, replace or restore lost habitat functions.

5. Implement containment and clean-up procedures in any ditches and other waters that connect to the EFSR in the event of a fuel spill or other unanticipated accident or pollution event associated with the SEF 10 and 11 Project. This is in addition to spill response and contingency plans covered by the BA, Contract Documents, and the June 19, 2003, interagency meeting negotiations.

2.6.3 Terms and Conditions

To be exempt from the prohibitions of section 9 of the ESA, the action must be implemented in compliance with the following terms and conditions, which implement the RPMs described above for each category of activity. These terms and conditions are non-discretionary.

1. To implement RPMs #1, above, BPA shall have a qualified fish biologist onsite during instream construction and immediately report to NOAA Fisheries all instances of take as covered by ESA including harass, harm, or lethal take of

ESA-listed species and in particular, anadromous fishes (Snake River spring/summer chinook salmon and Snake River Basin steelhead). In addition, BPA has agreed to collect the following ecological data and meet the following additional requirements:

a. Baseline information on the fish populations and salmonid habitat features for each life history stage represented in the EFSR in the vicinity of the SEF 10 and 11 Project and downstream to its mouth and confluence with the Salmon River.

b. Fish population and salmonid habitat data will be collected during construction and after project completion. Monitoring of the effects of the Project should occur for 5 years following final construction and initiation of operations of the new structure for water diversion and conveyance.

c. Annual (by January 31 of the following calendar year) and final monitoring and evaluation reports will be provided to NOAA Fisheries (100 Courthouse Drive, Suite F, Salmon, ID 83467 or (208) 756-6498 facsimile).

d. Fish passage will be provided for any adult or juvenile salmonid species present in the project area during construction, and after construction for the life of the Project.

    (1) The BPA must ensure that the entire width of the EFSR is not obstructed at any one time during construction and should adhere to the plans outlined in the BA and Contract documents to construct temporary coffer dams in stages that only partially block the river.

    (2) The BPA should ensure that the "V-weir" is properly functioning during high and low flows to enable adult and juvenile salmonids to pass through the project area in an unimpeded manner. If the structure or other design features of SEF 11 Diversion that enable fish passage need modifications or repairs, BPA shall notify NOAA Fisheries and USFWS and obtain written concurrence.

    (3) The BPA, its contractors, and agents shall ensure that EFSR remains undisturbed from instream work, nearby blasting, and work in the riparian zone in the vicinity of the SEF 11 Diversion structure between 9:00 PM (MST) and sunrise.

(4) If flows and depths do not allow fish passage during the allowed work window, BPA must cease instream operations and contact NOAA Fisheries immediately. Based on necessary instream flows and depths, BPA may have to remove their coffer dams or propose a feasible alternative to allow unimpeded fish passage in the vicinity of the SEF 10 and 11 Project. Written permission from NOAA Fisheries is required to proceed in an alternative fashion that maintains the necessary instream flows and depths for fish passage during construction.

e. The structure shall be visually inspected at least annually to ensure structural integrity and unobstructed fish passage through the notches. The BOR engineer agreed at the June 19, 2003, interagency meeting to oversee the construction phase. If at any time a determination is made that the structure is not performing as intended, NOAA Fisheries and USFWS will be included in discussions regarding repair and/or modifications. Items that shall be monitored are:

(1) The notches will be inspected to ensure that debris such as rock or logs is not blocking them.

(2) The notches will be inspected to ensure they are functioning as designed over the entire flow regime of the EFSR, with particular attention to water depth and velocity through the notches, and especially under the lowest flow conditions.

2. To implement RPMs #2, above, BPA shall implement all spill response, contingency, and salvage plans identified in the final BA and Contract Documents. In addition,

a. In the case of a pollution event including but not limited to a fuel spill, notification of NOAA Fisheries, USFWS and the IDEQ is required.

b. In the case of the necessity of salvage, all work must stop and notification of NOAA Fisheries, USFWS, and IDFG is required.

c. If a sick, injured, or dead specimen of a threatened or endangered species is found, the finder must notify the Vancouver Field Office of NOAA Fisheries Law Enforcement at (360) 418-4246. The finder also has the responsibility to carry out instructions provided by Law Enforcement.

d. The finder must take care in handling sick or injured specimens to avoid further injury of individuals, and

e. In the event that any individuals of a listed species is killed, care will be provided in handling the dead specimen(s) to ensure proper scientific preservation of the biological material in the best possible state for later necropsy and for ensuring that evidence intrinsic to the specimen(s) is not unnecessarily disturbed and remains intact for further investigation.

f. The BPA and its contractors and other agents must adhere to the calendar date constraints as outlined in the final BA and Contract Documents, which limit the timing of all in-water work to the established work window of July 7 to August 15, 2003.

g. The BPA and its contractors and other agents must adhere to a daily schedule that leaves the stream undisturbed from 9:00 PM (MST) to sunrise.

h. Project operations will cease under high flow conditions that may result in inundation of the project area, except for efforts to avoid or minimize resource damage.

I. All water intakes used for the Project, including pumps used to isolate an in-water work area, will have a fish screen installed, operated and maintained according to NMFS' fish screen criteria.[7]

j. The BPA must stop work if spawning ESA-listed salmonids or a redd are found within the confines of the project area or in close proximity downstream of the SEF 10 and 11 Project. BPA must notify NOAA Fisheries and the agencies will determine under what specific timing and other requirements work can resume.

k. Exceptions to the daily time and calendar date constraints may be accommodated by NOAA Fisheries if supported by additional biological and other site-specific data and a sound ecological rationale is presented. These exceptions and modifications require written concurrence from NOAA Fisheries.

l. Within three months following completion of any fish removal activities, a report that contains all pertinent information for reporting take is provided to NOAA Fisheries.

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[7] National Marine Fisheries Service, *Juvenile Fish Screen Criteria* (revised February 16, 1995) and *Addendum: Juvenile Fish Screen Criteria for Pump Intakes* (May 9, 1996) (guidelines and criteria for migrant fish passage facilities, and new pump intakes and existing inadequate pump intake screens) (http://www.nwr.noaa.gov/1hydrop/hydroweb/ferc.htm).

3. To implement RPMs #3, above, BPA shall implement all BMPs for controlling sedimentation and other forms of non-point source pollution associated with construction as identified in the final BA and Contract Documents. In addition,

    a. Upon completion of the Project, a copy of all monitoring reports on the effectiveness of implementing and maintaining the site-specific water quality and other environmental conditions are provided to NOAA Fisheries.

4. To implement RPMs #4, above, BPA shall implement all conservation measures identified in the final BA and Contract Documents. These are identified in Section 1.2 of this Opinion. In addition,

    a. "Waterway" is defined as any perennial, intermittent, or manmade channel or water conveyance system.

    b. Alteration of native vegetation is minimized. Where possible native vegetation will be removed and stockpiled in a manner that ensures that roots are left intact and then replanted when appropriate.

    c. All exposed areas within the riparian corridor are replanted with endemic riparian species appropriate for the local floral community.

    d. If reseeding or replanting cannot occur immediately following completion of construction, soil conservation measures such as matting or straw bales shall be placed to minimize soil erosion until spring, when the area will be replanted.

    e. Revegetated areas will be monitored during the first fall following replanting and reseeding, the following spring, and then annually for five years. Any dead plantings of woody vegetation will be replanted to achieve a minimum of 80 % survival after three years, and grasses will be reseeded if not reestablished. Access by cattle and other livestock will be excluded for at least three years following construction to allow riparian vegetation to reestablish.

    f. Revegetated areas will be monitored to evaluate reestablishment of desired riparian plant species and avoidance of displacement by exotic and undesirable species. Weeds will be hand pulled whenever feasible.

g. A report documenting the results of riparian vegetation monitoring will be prepared annually and submitted to NOAA Fisheries (100 Courthouse Drive, Suite F, Salmon, ID 83467 or (208) 756-6498 facsimile) by the following January 31.

h. The BPA shall inform NOAA Fisheries of the planned construction schedule to allow NOAA Fisheries to observe any construction activities. Contact: NOAA Fisheries, ATTN: Jan Pisano, Team Leader, 100 Courthouse Drive, Suite F, Salmon, Idaho 83467; or call (208) 756-6478; or facsimile (208) 756-6498; or email at: jan.pisano@noaa.gov

5. To implement Reasonable and Prudent Measure #5, above, BPA shall ensure that:

a. The Spill Response/Contingency Plans, as delineated in the BA, Contract Documents, and the June 19, 2003 interagency meeting consensus decisions should also be applied to the conveyance system (ditch) and other waters that connect to the EFSR in the event of a spill or other unanticipated accident or pollution event.

b. The BPA and its contractors should notify NOAA Fisheries, USFWS, and IDEQ in case of a release or other pollution event.

6. All terms and conditions shall be included in any permit, grant, or contract issued for the implementation of the action described in this Opinion.

3. MAGNUSON-STEVENS FISHERY CONSERVATION AND MANAGEMENT ACT

3.1 Statutory Requirements

The MSA, as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-267), established procedures designed to identify, conserve, and enhance EFH for those species regulated under a Federal fisheries management plan.

Pursuant to the MSA:

- Federal agencies must consult with NOAA Fisheries on all actions, or proposed actions, authorized, funded, or undertaken by the agency, that may adversely affect EFH (section 305(b)(2)).

- NOAA Fisheries must provide conservation recommendations for any Federal or state action that may adversely affect EFH (section 305(b)(4)(A));

- Federal agencies must provide a detailed response in writing to NOAA Fisheries within 30 days after receiving EFH conservation recommendations. The response must include a description of measures proposed by the agency for avoiding, mitigating, or offsetting the impact of the activity on EFH. In the case of a response that is inconsistent with NOAA Fisheries EFH conservation recommendations, the Federal agency must explain its reasons for not following the recommendations (section 305(b)(4)(B)).

The EFH means those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity (MSA section 3). For the purpose of interpreting this definition of EFH: Waters include aquatic areas and their associated physical, chemical, and biological properties that are used by fish and may include aquatic areas historically used by fish where appropriate; substrate includes sediment, hard bottom, structures underlying the waters, and associated biological communities; necessary means the habitat required to support a sustainable fishery and the managed species' contribution to a healthy ecosystem; and "spawning, breeding, feeding, or growth to maturity" covers a species' full life cycle (50 CFR 600.10). Adverse effect means any impact which reduces quality and/or quantity of EFH, and may include direct (*e.g.*, contamination or physical disruption), indirect (*e.g.*, loss of prey or reduction in species fecundity), site-specific or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions (50 CFR 600.810).

The EFH consultation with NOAA Fisheries is required for any Federal agency action that may adversely affect EFH, including actions that occur outside EFH, such as certain upstream and upslope activities.

The objectives of this EFH consultation are to determine whether the proposed action may adversely affect designated EFH and to recommend conservation measures to avoid, minimize, or otherwise offset potential adverse effects on EFH.

3.2 Identification of EFH

Pursuant to the MSA the Pacific Fishery Management Council (PFMC) has designated EFH for three species of Federally-managed Pacific salmon: chinook (*Oncorhynchus tshawytscha*); coho (*O. kisutch*); and Puget Sound pink salmon (*O. gorbuscha*) (PFMC 1999). Freshwater EFH for Pacific salmon includes all those streams, lakes, ponds, wetlands, and other water bodies currently, or historically accessible to salmon in Washington, Oregon, Idaho, and California, except areas upstream of certain impassable man-made barriers (as identified by the PFMC 1999), and longstanding, naturally-impassable barriers (i.e., natural waterfalls in existence for several hundred years). Detailed descriptions and identifications of EFH for salmon are found in Appendix A to Amendment 14 to the Pacific Coast Salmon Plan (PFMC 1999). Assessment of potential adverse effects to these species' EFH from the proposed action is based, in part, on this information.

3.3 Proposed Actions

The proposed action and action area are detailed above in Sections 1.2 and 1.3 of this document. The action area includes habitats that have been designated as EFH for various life-history stages of chinook salmon (Table 2).

Table 2. Species of Fishes and Life Stages with Designated EFH in the Action Area

Species	Eggs	Larvae	Young Juvenile	Juvenile	Adult	Spawning
Chinook salmon	X	X	X	X	X	X

Table 2 shows the fish species and life stages of fish with EFH in the SEF 10 and 11 Project area. No ground fish or coastal pelagic species EFH will be affected by this proposed Project.

3.4 Effects of Proposed Action on EFH

The habitat requirements for chinook salmon have been evaluated and have been found to be the same as the habitat requirements for the Snake River spring/summer chinook salmon and Snake River Basin steelhead. As described in detail in Section 2.2.1 of this document, the proposed action may result in short- and long-term adverse effects on a variety of habitat parameters.

These adverse effects are:

1. Increases in siltation and substrate embeddedness associated with increased loading and mobilization of sediments, especially fine materials. This is considered a short-term adverse effect downstream of the SEF 10 and 11 Project.

2. Increase in turbidity associated with increased stream substrate and bank disturbance during the creation and destruction of temporary construction coffer dams. This is considered a short-term adverse effect downstream of the SEF 10 and 11 Project.

3. A temporary disruption of migration timing through the stream reach of EFSR in the general vicinity of the SEF 10 and 11 Project.

Additional potential short- and long-term adverse effects on EFH, not addressed in Section 2.2.1, include:

4. A temporary disruption of feeding habitat for fry, juveniles, and adult chinook salmon associated with increases in turbidity interfering with visual predation and siltation decreasing benthic invertebrate production.

5. A longer term disruption of benthic habitats, channel morphology and flow dynamics is likely in the EFSR upstream and downstream of the SEF 10 and 11 Project until natural flow regimes and events bring the stream channel back into a new equilibrium.

3.5 Conclusion

NOAA Fisheries concludes that the proposed action may adversely affect designated EFH for chinook salmon. However, NOAA Fisheries also believes that the project design features proposed as an integral part of the proposed actions would avoid, minimize, or otherwise offset potential adverse impacts to designated EFH, if the terms and conditions as described above in the ESA section of this Opinion are incorporated into the Project. Eventually, the completed Project is likely to improve current conditions for listed salmon and steelhead at and below the diversion site.

3.6 EFH Conservation Recommendations

Pursuant to section 305(b)(4)(A) of the MSA, NOAA Fisheries is required to provide EFH conservation recommendations to Federal agencies regarding actions that may adversely affect EFH. NOAA Fisheries understands that the conservation measures described in the final BA and contract documents will be implemented by the BPA, and believes that these measures are sufficient to minimize, to the maximum extent practicable on EFH. Although, these conservation measures are not sufficient to fully address the remaining adverse effects to EFH, specific Terms and Conditions outlined in Section 2.6.3 are generally applicable to designated EFH for chinook salmon, and do address these adverse effects. Consequently, NOAA Fisheries recognizes that the proposed actions include mitigative measures to avoid effects on EFH, and additional non-discretionary conservation measures are required by this Opinion as RPMs and Terms and Conditions. No further conservation measures are necessary for EFH.

3.7 Statutory Response Requirement

Pursuant to the MSA (section 305(b)(4)(B)) and 50 CFR 600.920(j), Federal agencies are required to provide a detailed written response to NOAA Fisheries' EFH conservation recommendations within 30 days of receipt of these recommendations. The response must include a description of measures proposed to avoid, mitigate, or offset the adverse impacts of the activity on EFH. In the case of a response that is inconsistent with the EFH conservation recommendations, the response must explain the reasons for not following the recommendations, including the scientific justification for any disagreements over the anticipated effects of the proposed action and the measures needed to avoid, minimize, mitigate, or offset such effects.

3.8 Supplemental Consultation

The BPA must reinitiate EFH consultation with NOAA Fisheries if the proposed action is substantially revised in a manner that may adversely affect EFH, or if new information becomes available that affects the basis for NOAA Fisheries' EFH conservation recommendations (50 CFR 600.920(l)).

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APPENDIX A - Biological Requirements, Current Status, and Trends: Snake River Steelhead

1.1. General Life History

Steelhead can be divided into two basic run-types based on the state of sexual maturity at the time of river entry and the duration of the spawning migration (Burgner et al. 1992). The stream-maturing type, or summer steelhead, enters fresh water in a sexually immature condition and requires several months in freshwater to mature and spawn. The ocean-maturing type, or winter steelhead, enters fresh water with well-developed gonads and spawns shortly after river entry (Barnhart 1986). Variations in migration timing exist between populations. Some river basins have both summer and winter steelhead, while others only have one run-type.

In the Pacific Northwest, summer steelhead enter fresh water between May and October (Busby et al. 1996; Nickelson et al. 1992). During summer and fall, prior to spawning, they hold in cool, deep pools (Nickelson et al. 1992). They migrate inland toward spawning areas, overwinter in the larger rivers, resume migration in early spring to natal streams, and then spawn (Meehan and Bjornn 1991; Nickelson et al. 1992). Winter steelhead enter fresh water between November and April (Busby et al. 1996; Nickelson et al. 1992), migrate to spawning areas, and then spawn in late winter or spring. Some adults, however, do not enter coastal streams until spring, just before spawning (Meehan and Bjornn 1991). Difficult field conditions (snowmelt and high stream flows) and the remoteness of spawning grounds contribute to the relative lack of specific information on steelhead spawning.

Steelhead are iteroparous, or capable of spawning more than once before death. However, it is rare for steelhead to spawn more than twice before dying and most that do so are females (Nickelson et al. 1992). Iteroparity is more common among southern steelhead populations than northern populations (Busby et al. 1996). Multiple spawnings for steelhead range from 3% to 20% of runs in Oregon coastal streams.

Steelhead spawn in cool, clear streams containing suitable gravel size, depth, and current velocity. Intermittent streams may also be used for spawning (Barnhart 1986; Everest 1973). Steelhead enter streams and arrive at spawning grounds weeks or even months before they spawn and are vulnerable to disturbance and predation. Cover, in the form of overhanging vegetation, undercut banks, submerged vegetation, submerged objects such as logs and rocks, floating debris, deep water, turbulence, and turbidity (Giger 1973) are required to reduce disturbance and predation of spawning steelhead. Summer steelhead usually spawn further upstream than winter steelhead (Withler 1966; Behnke 1992).

Depending on water temperature, steelhead eggs may incubate for 1.5 to 4 months (August 9, 1996, 61 FR 41542) before hatching. Summer rearing takes place primarily in the faster parts of pools, although young-of-the-year are abundant in glides and riffles. Winter rearing occurs more uniformly at lower densities across a wide range of fast and slow habitat types. Productive steelhead habitat is characterized by complexity, primarily in the form of large and small wood. Some older juveniles move downstream to rear in larger tributaries and mainstem rivers (Nickelson et al. 1992).

Juveniles rear in fresh water from 1 to 4 years, then migrate to the ocean as smolts. Winter steelhead populations generally smolt after 2 years in fresh water (Busby et al. 1996). Steelhead typically reside in marine waters for 2 or 3 years prior to returning to their natal stream to spawn at 4 or 5 years of age. Populations in Oregon and California have higher frequencies of age-1-ocean steelhead than populations to the north, but age-2-ocean steelhead generally remain dominant (Busby et al. 1996). Age structure appears to be similar to other west coast steelhead, dominated by 4-year-old spawners (Busby et al. 1996).

Based on purse seine catches, juvenile steelhead tend to migrate directly offshore during their first summer rather than migrating along the coastal belt as do salmon. During fall and winter, juveniles move southward and eastward (Hartt and Dell 1986).

1.2. Population Dynamics and Distribution

The following section provides specific information on the distribution and population structure (size, variability, and trends of the stocks or populations) of the Snake River ESU. Most of this information comes from observations made in terminal, freshwater areas, which may be distinct from the action area. This focus is appropriate because the species status and distribution can only be measured at this level of detail as adults return to spawn.

The longest consistent indicator of steelhead abundance in the Snake River Basin is based on counts of natural-origin steelhead at the uppermost dam on the lower Snake River (Lower Granite Dam). The abundance of natural-origin summer steelhead at the uppermost dam on the Snake River has declined from a 4-year average of 58,300 in 1964 to an average of 8,300 ending in 1998. In general, steelhead abundance declined sharply in the early 1970s, rebuilt modestly from the mid-1970s through the 1980s, and again declined during the 1990s (Figure 1).

These broad scale trends in the abundance of steelhead were reviewed through the Plan for analyzing and testing hypotheses (PATH) process. The PATH report concluded that the initial, substantial decline coincided with the declining trend in downstream passage survival. However, the more recent decline in abundance, observed over the last decade or more, does not coincide with declining passage survival, but can be at least partially accounted for by a shift in climatic regimes that has affected ocean survival (Marmorek and Peters 1998).

B-run steelhead are distinguished from the A-run component by their unique life history characteristics. B-run steelhead were traditionally distinguished as larger and older, later-timed fish that return primarily to the South Fork Salmon, Middle Fork Salmon, Selway, and Lochsa rivers. The recent All Species Review by the Technical Advisory Committee (TAC) concluded that different populations of steelhead do have different size structures, with populations dominated by larger fish (i.e., greater than 77.5 cm) occurring in the traditionally defined B-run basins (TAC 1999). Larger fish occur in other populations throughout the basin, but at much lower rates (evidence suggests that fish returning to the Middle Fork Salmon and Little Salmon are intermediate in that they have a more equal distribution of large and small fish).

B-run steelhead are also generally older. A-run steelhead are predominately age-1-ocean fish, whereas most B-run steelhead generally spend two or more years in the ocean prior to spawning. The differences in ocean age are primarily responsible for the differences in the size of A- and B-run steelhead. However, B-run steelhead are also thought to be larger at the same age than A-run fish. This may be due, in part, to the fact that B-run steelhead leave the ocean later in the year than A-run steelhead and thus have an extra month or more of ocean residence at a time when growth rates are thought to be greatest.

Historically, a distinctly bimodal pattern of freshwater entry could be used to distinguish A-run and B-run fish. A-run steelhead were presumed to cross Bonneville Dam from June to late August whereas B-run steelhead enter from late August to October. The TAC reviewed the available information on timing and confirmed that the majority of large fish do still have a later timing at Bonneville; 70% of the larger fish crossed the dam after August 26, the traditional cutoff date for separating A- and B-run fish (TAC 1999). However, the timing of the early part of the A-run has shifted somewhat later, thereby reducing the timing separation that was so apparent in the 1960s and 1970s. The timing of the larger, natural-origin B-run fish has not changed.

The abundance of A-run versus B-run components of Snake River Basin steelhead can be distinguished in data collected since 1985. Both components have declined through the 1990s, but the decline of B-run steelhead has been more significant. The 4-year average counts at Lower Granite Dam declined from 18,700 to 7,400 beginning in 1985 for A-run steelhead and from 5,100 to 900 for B-run steelhead. Counts over the last 5 or 6 years have been stable for A-run steelhead and without significant trend (Figure 2). Counts for B-run steelhead have been low and highly variable, but also without apparent trend (Figure 3).

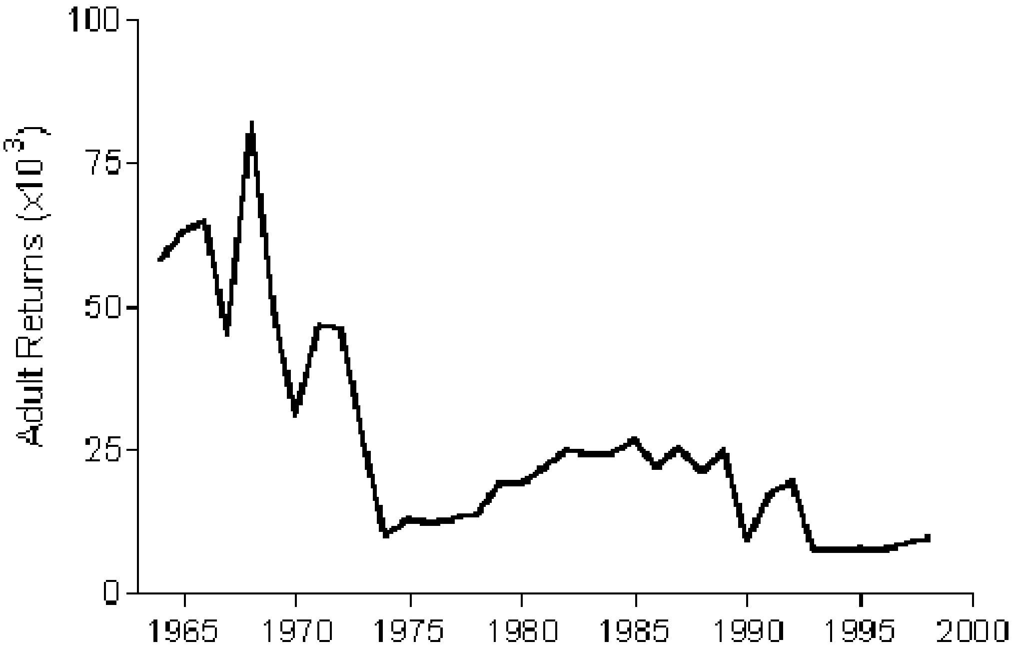
Comparison of recent dam counts with escapement objectives provides perspective regarding the status of the evolutionary significant unit (ESU). The management objective for Snake River steelhead stated in the Columbia River Fisheries Management Plan was to return 30,000 natural/wild steelhead to Lower Granite Dam. The All Species Review (TAC 1997) further clarified that this objective was subdivided into 20,000 A-run and 10,000 B-run steelhead. Idaho has reevaluated these escapement objectives using estimates of juvenile production capacity. This alternative methodology lead to revised estimates of 22,000 for A-run and 31,400 for B-run steelhead (pers. comm., S. Keifer, Idaho Department of Fish and Game with P. Dygert, NOAA’s National Marine Fisheries Service).

The State of Idaho has conducted redd count surveys in all of the major subbasins since 1990. Although the surveys are not intended to quantify adult escapement, they can be used as indicators of relative trends. The sum of redd counts in natural-origin B-run production subbasins declined from 467 in 1990 to 59 in 1998 (Figure 4). The declines are evident in all four of the primary B-run production areas. Index counts in the natural-origin A-run production areas have not been conducted with enough consistency to permit similar characterization.

Idaho has also conducted surveys for juvenile abundance in index areas throughout the Snake River Basin since 1985. Parr densities of A-run steelhead have declined from an average of about 75% of carrying capacity in 1985 to an average of about 35% in recent years through 1995 (Figure 5). Further declines were observed in 1996 and 1997. Parr densities of B-run steelhead have been low, but relatively stable since 1985, averaging 10% to 15% of carrying capacity through 1995. Parr densities in B-run tributaries declined further in 1996 and 1997 to 11% and 8%, respectively.

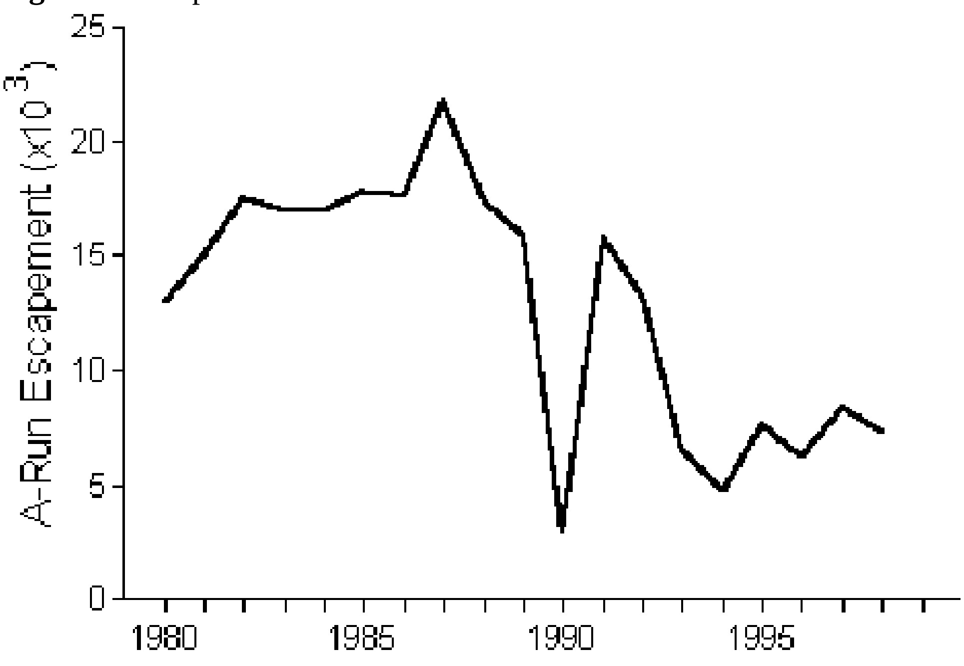
It is apparent from the available data that B-run steelhead are much more depressed than the A-run component. In evaluating the status of the Snake River Basin steelhead ESU, it is pertinent to consider if B-run steelhead represent a "significant portion" of the ESU. This is particularly relevant because the Tribes have proposed to manage the Snake River Basin steelhead ESU as a whole without distinguishing between components, and further, that it is inconsistent with NOAA’s National Marine Fisheries Service (NOAA Fisheries) authority to manage for components of an ESU.

Figure 1. Adult Returns of Wild Summer Steelhead to Lower Granite Dam on the Snake River.



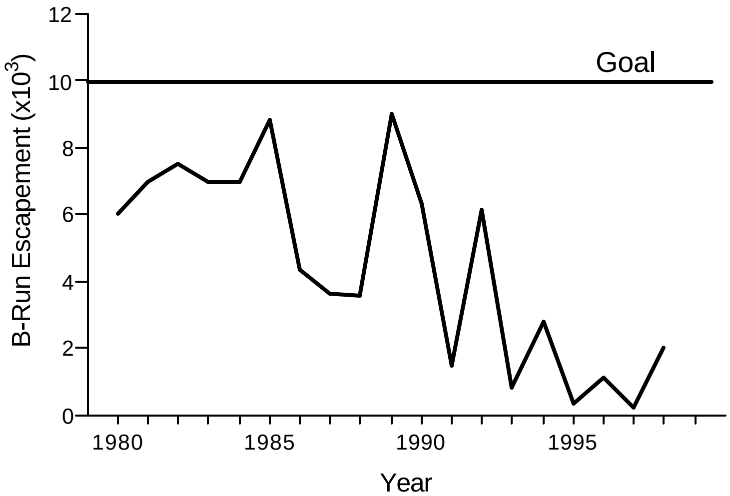
Source: Escapement through 1995 from TAC (1997); escapement for 1996–1998 from pers. comm. G. Mauser (IDFG).

Figure 2. Escapement of A-Run Snake River Steelhead to Lower Granite Dam.



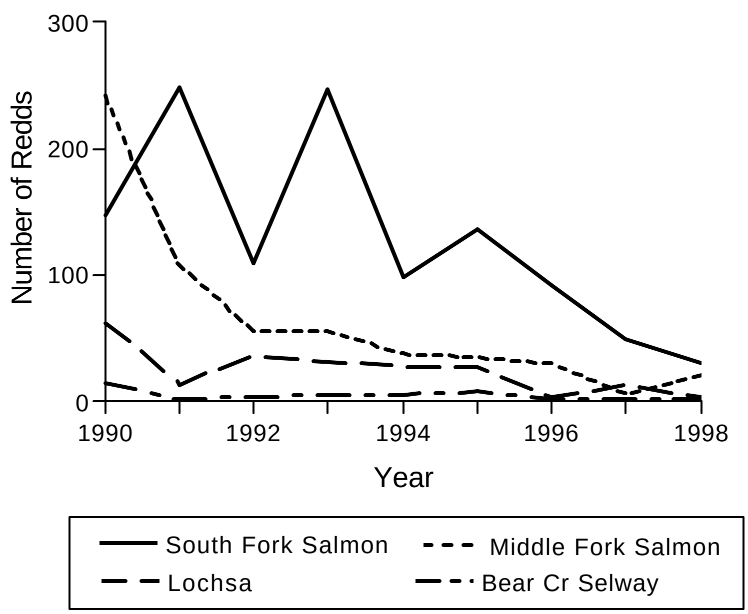
Source: Data for 1980 through 1984 from Figures 1 and 2 of Section 8 in TAC (1997). Data for 1985 through 1998 from Table 2 of Section 8
(TAC 1997) and pers. comm . G. Mauser, (IDFG).

Figure 3. Escapement of B-Run Snake River Steelhead to Lower Granite Dam.



Source: Data for 1980 through 1984 from Figures 1 and 2 of Section 8 in TAC (1997). Data for 1985 through 1998 from Table 2 of Section 8(TAC 1997) and pers. comm. G. Mauser (IDFG).

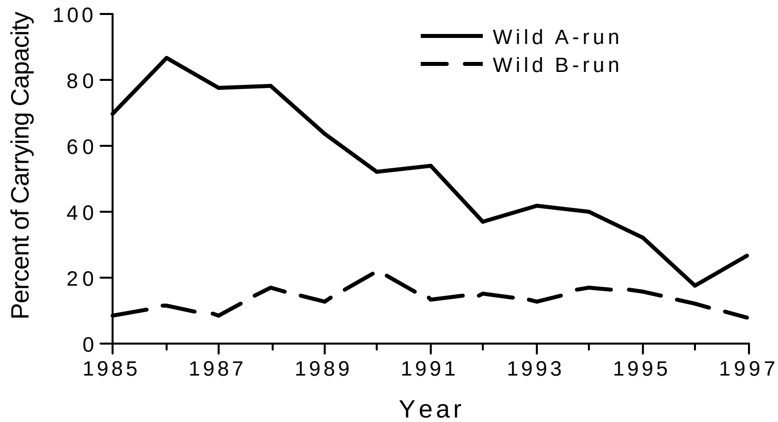
Figure 4. Redd Counts for Wild Snake River (B-Run) Steelhead in the South Fork and Middle Fork Salmon, Lochsa, and Bear Creek-Selway Index Areas.



Data for the Lochsa exclude Fish Creek and Crooked Fork.

Sources: memo from T. Holubetz (IDFG), “1997 Steelhead Redd Counts”, dated May 16, 1997, and IDFG (unpublished).

Figure 5. Estimated Carrying Capacity for Juvenile (Age-1+ and -2+) Wild-A and B-Run Steelhead in Idaho Streams



Source: Data for 1985 through 1996 from (Hall-Griswold and Petrosky 1998); data for 1997 from IDFG (unpublished).

It is first relevant to put the Snake River basin into context. The Snake River historically supported over 55% of total natural-origin production of steelhead in the Columbia River Basin and now has approximately 63% of the basin's natural production potential (Mealy 1997). B-run steelhead occupy four major subbasins including two on the Clearwater River (Lochsa and Selway) and two on the Salmon River (Middle Fork and South Fork Salmon), areas that for the most part are not occupied by A-run steelhead. Some natural B-run steelhead are also produced in parts of the mainstem Clearwater and its major tributaries. There are alternative escapement objectives for B-run steelhead of 10,000 (TAC 1997) and 31,400 (Idaho). B-run steelhead, therefore, represent at least 1/3 and as much as 3/5 of the production capacity of the ESU.

As pointed out above, the geographic distribution of B-run steelhead is restricted to particular watersheds within the Snake River Basin (areas of the mainstem Clearwater, Selway, and Lochsa Rivers and the South and Middle Forks of the Salmon River). No recent genetic data are available for steelhead populations in South and Middle Forks of the Salmon River. The Dworshak National Fish Hatchery (NFH) stock and natural populations in the Selway and Lochsa Rivers are thus far the most genetically distinct populations of steelhead in the Snake River Basin (Waples et al. 1993). In addition, the Selway and Lochsa River populations from the Middle Fork Clearwater appear to be very similar to each other genetically, and naturally produced rainbow trout from the North Fork Clearwater River (above Dworshak Reservoir) clearly show an ancestral genetic similarity to Dworshak NFH steelhead. The existing genetic data, the restricted geographic distribution of B-run steelhead in the Snake (Columbia) River Basin, and the unique life history attributes of these fish (i.e. larger, older adults with a later distribution of run timing compared to A-run steelhead in other portions of the Columbia River Basin) clearly support the conservation of B-run steelhead as a biologically significant component of the Snake River ESU.

Another approach to assessing the status of an ESU being developed by NOAA Fisheries is to consider the status of its component populations. For this purpose a population is defined as a group of fish of the same species spawning in a particular lake or stream (or portion thereof) at a particular season, which to a substantial degree do not interbreed with fish from any other group spawning in a different place or in a the same place at a different season. Because populations as defined here are relatively isolated, it is biologically meaningful to evaluate the risk of extinction of one population independently from any other. Some ESUs may be comprised of only one population whereas others will be constituted by many. The background and guidelines related to the assessment of the status of populations is described in a recent draft report discussing the concept of viable salmonid populations (McElhany et al. 2000).

The task of identifying populations within an ESU will require making judgements based on the available information. Information regarding the geography, ecology, and genetics of the ESU are relevant to this determination. Although NOAA Fisheries has not compiled and formally reviewed all the available information for this purpose, it is reasonable to conclude that, at a minimum, each of the major subbasins in the ESU represent a population within the context of this discussion. A-run populations would therefore include at least the tributaries to the lower Clearwater, the upper Salmon River and its tributaries, the lower Salmon River and its tributaries, the Grand Ronde, Imnaha, and possibly the Snake River mainstem tributaries below Hells Canyon Dam. B-run populations would be identified in the Middle Fork and South Fork Salmon Rivers and the Lochsa and Selway Rivers (major tributaries of the upper Clearwater), and possibly in the mainstem Clearwater River, as well. These basins are, for the most part, large geographical areas and it is quite possible that there is additional population structure within at least some of these basins. However, because that hypothesis has not been confirmed, NOAA Fisheries assumes that there are at least five populations of A-run steelhead and five populations of B-run steelhead in the Snake River basin ESU. Escapement objectives for A and B-run production areas in Idaho, based on estimates of smolt production capacity, are shown in Table 1.

Table 1. Adult Steelhead Escapement Objectives Based on Estimates of 70% Smolt Production Capacity

A-Run Production Areas		**B-Run Production Areas**	
Upper Salmon	13,570	Mid Fork Salmon	9,800
Lower Salmon	6,300	South Fork Salmon	5,100
Clearwater	2,100	Lochsa	5,000
Grand Ronde	(1)	Selway	7,500
Imnaha	(1)	Clearwater	4,000
Total	**21,970**	**Total**	**31,400**

Note: comparable estimates are not available for populations in Oregon and Washington subbasins.

1.2.1. Lower Snake River Subbasin

Information on steelhead distribution, important watersheds, and conditions and trends in the Lower Snake River is summarized from the Lower Snake River Subbasin Biological Assessment (BLM 2000a), except where noted.

1.2.1.1. Species Distribution:

Within the Lower Snake River Subbasin steelhead use occurs in most of the accessible streams when stream conditions are suitable. Steelhead use the mainstem Snake River for upstream and downstream passage. A limited amount of juvenile rearing and overwintering by adults occurs in the Snake River. Most accessible tributaries are used by steelhead for spawning and rearing. The larger streams used for spawning and rearing include Asotin, Ten Mile, Couse, Captain John, Jim, and Cook Creeks. Other smaller tributary streams with limited rainbow/steelhead use include Tammany, Tenmile, Corral, Cache, Cottonwood, and Cherry Creeks.

1.2.1.2. Location of Important Spawning and Rearing Areas:

Asotin Creek, followed by Captain John, Ten Mile, and Couse Creeks have the highest potential for steelhead production within the subbasin. Priority watersheds include Asotin and Captain John Creeks.

1.2.1.3. Conditions and Trends of Populations:

Despite their relatively broad distribution, very few healthy steelhead populations exist (Quigley and Arbelbide 1997). Recent status evaluations suggest many steelhead stocks are depressed. A recent multi-agency review showed that total escapement of salmon and steelhead to the various Columbia River regions has been in decline since 1986 (Anderson et al. 1996). Existing steelhead stocks consist of four main types: wild, natural (non-indigenous progeny spawning naturally), hatchery, and mixes of natural and hatchery fish. Production of wild anadromous fish in the Columbia River Basin has declined about 95% from historical levels (Huntington et al. 1994). Most existing steelhead production is supported by hatchery and natural fish as a result of large-scale hatchery mitigation production programs. Wild, indigenous fish, unaltered by hatchery stocks, are rare and present in only 10% of the historical range and 25% of the existing range. Remaining wild stocks are concentrated in the Salmon and Selway (Clearwater Basin) rivers in central Idaho and the John Day River in Oregon. Although few wild stocks were classified as strong, the only subwatersheds classified as strong were those sustaining wild stocks.

1.2.2. Clearwater River, North Fork Clearwater River, and Middle Fork Clearwater River Subbasins

Information on steelhead distribution, important watersheds, and conditions and trends in the Clearwater River is summarized from the Clearwater River, North Fork Clearwater River and Middle Fork Clearwater River Subbasins Biological Assessment (BLM 2000b), except where noted.

1.2.2.1. Species Distribution:

Within the Clearwater River Subbasin steelhead use is widespread and most accessible tributaries are used year-long or seasonally. In the Clearwater River drainage, the primary steelhead producing streams include: Potlatch River; Lapwai, Big Canyon, Little Canyon, Lolo, and Lawyer Creeks. Other Clearwater River mainstem tributary streams providing spawning and/or rearing habitat for steelhead trout include Lindsay, Hatwai, Lapwai, Catholic, Cottonwood, Pine, Bedrock, Jacks, Big Canyon, Orofino, Jim Ford, Big, Fivemile, Sixmile, and Tom Taha Creeks. Some of these streams provide sub-optimal spawning and rearing habitat because of steep stream gradients, barriers, low flows, limited spawning gravels, and small size of tributaries.

In the 1969 the U.S. Army Corps of Engineers finished construction of Dworshak Dam on the North Fork Clearwater River, which totally blocked access to anadromous fish. To mitigate for the steelhead losses resulting from the dam, Dworshak National Fish Hatchery (NFH) was constructed in 1969. Wild B-run steelhead are collected at the base of the dam and used as the brood stock for Dworshak NFH. Since 1992, steelhead eggs collected at Dworshak NFH have been shipped as eyed eggs to the Clearwater Fish Hatchery, located at the confluence of the North Fork Clearwater River and the Clearwater River, for incubation and rearing. Three satellite facilities are associated with the Clearwater Fish Hatchery: Crooked River, Red River, and Powell. The Kooskia NFH is located on Clear Creek, a tributary to the Middle Fork Clearwater River.

1.2.2.2. Location of Important Spawning and Rearing Areas:

The only watershed identified as a special emphasis or priority watershed for steelhead in the Clearwater River Subbasin is Lolo Creek.

1.2.2.3. Conditions and Trends of Populations:

Refer to “Conditions and Trends of Populations” under Lower Snake River Subbasin above.

1.2.3. South Fork Clearwater River Subbasin

Information on steelhead distribution, important watersheds, and conditions and trends in the South Fork Clearwater River is summarized from the Draft Clearwater Subbasin Assessment (CPAG 2002), except where noted.

1.2.3.1. Species Distribution:

Within the South Fork Clearwater River Subbasin, steelhead use is widespread, and most accessible tributaries are used year-long or seasonally. In the South Fork drainage, the primary steelhead producing drainages include Newsome Creek, American River, Red River, and Crooked River. Other South Fork Clearwater River mainstem tributary streams providing spawning and/or rearing habitat for steelhead trout include Tenmile, Johns, Meadow, and Mill Creeks (Jody Brostrom, Idaho Department of Fish and Game, pers. comm. March 30, 2001). Low order streams and accessible headwater portions of high order streams provide early rearing habitat (Nez Perce National Forest 1998).

1.2.3.2. Location of Important Spawning and Rearing Areas:

Important spawning habitat in the South Fork Clearwater occurs primarily in Newsome Creek, American River, Red River, and Crooked River.

1.2.3.3. Conditions and Trends of Populations:

The South Fork Clearwater River may have historically maintained a genetically unique stock of steelhead trout, but hatchery supplementation has since clouded the lines of genetic distinction between stocks (Nez Perce National Forest 1998). Robin Waples (In a letter to S. Kiefer, Idaho Department of Fish and Game, August 25, 1998) found that steelhead in Johns and Tenmile Creeks are genetically most similar to fish originating from the Selway River system, suggesting that some genetic difference may have existed historically within the South Fork Clearwater drainage. A statewide genetic analysis is currently being conducted using DNA markers, and may provide more information on past and current genetic distinctions between steelhead stocks in the Clearwater subbasin (Byrne 2001).

1.2.4. Selway River Subbasin

Information on steelhead distribution, important watersheds, and conditions and trends in the Selway River is summarized from the Lower Selway Biological Assessment (USFS 1999a), the

Biological Opinion on Culvert Replacements on Lolo Creek and Lochsa River (NMFS 2002a), and the Biological Opinion on Recreational Suction Dredge Mining in Lolo Creek (NOAA Fisheries 2003), except where noted.

1.2.4.1. Species Distribution:

High numbers of juvenile steelhead have been documented in all of the fifth code watersheds above the Selway-Bitterroot wilderness boundary. In addition, Meadow and Gedney Creeks also support high numbers of both steelhead and resident rainbow trout. Densities of steelhead are less in O'hara, Swiftwater, Goddard, and Falls Creeks (USFS unpublished data 1990 - 1998). Densities in Nineteenmile, Rackliffe, Boyd, and Glover Creeks are limited by small size and accessibility although the species is present. Spawning habitat for steelhead has been documented in most of the surveyed tributaries, including small third order streams such as Renshaw and Pinchot Creeks. In the Selway River, stream survey data and casual observations suggest that the steelhead/rainbow population in the larger tributaries, i.e. Meadow and Moose Creeks, are composed of a significant resident rainbow/redband component (USFS unpublished data 1996, 1997). Survey data and observations revealed the presence of large number of rainbow trout greater than 220 mm, especially in North Moose Creek. In addition, observations suggest the presence of two distinct forms of this species. Steelhead and rainbow of all sizes differed phenotypically; there appeared to be a distinct "steelhead" presmolt form, which was more bullet-shaped and silvery in color, and a distinct "trout" form, which was less bullet-shaped, retained parr marks at larger sizes, and exhibited coloration and spotting more typical of other inland rainbow populations. It is possible that resident rainbow trout and steelhead are reproductively isolated, which may have resulted in genetic divergence. Analysis of the genetic composition of the Moose Creek population may be attempted in future years.

1.2.4.2. Location of Important Spawning and Rearing Areas:

The most important spawning and rearing areas for steelhead are located in the larger tributaries, such as Meadow, Moose, Gedney, Three Links, Marten, Bear, Whitecap, Running, Ditch, Deep, and Wilkerson Creeks. Moose Creek may support the most significant spawning and rearing habitat for steelhead trout of any of these tributaries.

1.2.4.3. Conditions and Trends of Populations:

The Selway River drainage (along with the Lochsa and lower Clearwater River tributary systems) is one of the only drainages in the Clearwater Subbasin where steelhead populations have little or no hatchery influence (Busby et al. 1996; IDFG 2001). The USFS (1999a) identified the Lochsa and Selway River systems as refugia areas for steelhead based on location, accessibility, habitat quality, and number of roadless tributaries. The Idaho Department of Fish and Game (IDFG) estimates that approximately 80% of the wild steelhead in the Clearwater River Subbasin are destined for the Lochsa River and Selway River drainages. The Clearwater River Basin produces the majority of B-run steelhead in the Snake River ESU, and most of the Clearwater steelhead are produced in the Lochsa River Subbasin. The Lochsa River Subbasin has the highest observed densities of age 1+ B-run steelhead parr, and the highest percent carrying capacity (IDFG 1999). Hatchery steelhead were used to supplement natural populations in the Lochsa River drainage before 1982, but current management does not include any hatchery supplementation. Current adult returns are considered to be almost entirely wild steelhead trout progeny.

1.2.5. Lochsa River Subbasin

Information on steelhead distribution, important watersheds, and conditions and trends in the Lochsa River is summarized from the Biological Opinion on Culvert Replacements on Lolo Creek and Lochsa River (NMFS 2002a) and the Biological Opinion on Recreational Suction Dredge Mining in Lolo Creek (NOAA Fisheries 2003), except where noted.

1.2.5.1. Species Distribution:

Adult Snake River steelhead are present in the upper mainstem Clearwater River in September and October, and in the upper mainstem and Middle Fork Clearwater Rivers in the winter. Spawning and incubation occurs in streams such as the Lochsa River from March through July. Steelhead juveniles then typically rear for 2 to 3 years in the tributaries and larger rivers before beginning a seaward migration during February through May.

1.2.5.2. Location of Important Spawning and Rearing Areas:

Steelhead have been observed in most of the larger tributaries to the Lochsa River, with high steelhead productivity occurring in Fish, Boulder, Deadman, Pete King, and Hungery Creeks (USFS 1999b).

1.2.5.3. Conditions and Trends of Populations:

Refer to “Conditions and Trend of Populations” under Selway River Subbasin above.

1.2.6. Lower Salmon River Subbasin

Information on steelhead distribution, important watersheds, and conditions and trends in the Lower Salmon River is summarized from the Lower Salmon River Subbasin Biological Assessment (BLM 2000c).

1.2.6.1. Species Distribution:

Within the Lower Salmon River Subbasin, steelhead use occurs in most of the accessible streams when stream conditions are suitable. Steelhead use the mainstem Salmon River for upstream and downstream passage. A limited amount of juvenile rearing and adult overwintering may occur in the Salmon River. Most accessible tributaries are used by steelhead for spawning and rearing. The larger streams used for spawning and rearing include China, Eagle, Deer, Cottonwood, Maloney, Deep, Rice, Rock, White Bird, Skookumchuck, Slate, John Day, Race, Lake, Allison, Partridge, Elkhorn, and French Creeks. Other smaller tributary streams with limited rainbow/steelhead use include Flynn, Wapshilla, Billy, Burnt, Round Springs, Telcher, Deer, McKinzie, Christie, Sherwin, China, Cow, Fiddle, Warm Springs, Van, and Robbins Creeks.

1.2.6.2. Location of Important Spawning and Rearing Areas:

Slate Creek, followed by White Bird Creek, has the highest potential for steelhead production within the subbasin. Priority watersheds identified for steelhead include China, Eagle, Deer, White Bird, Skookumchuck, Slate, John Day, Race, Allison, Partridge, and French Creeks. Other streams which are important for spawning and rearing include Cottonwood, Maloney, Deep, Rice, Rock, Lake, and Elkhorn Creeks.

1.2.6.3. Conditions and Trends of Populations:

The Bureau of Land Management (BLM) noted that current numbers of naturally spawning steelhead in the Salmon River Subbasin are at all time lows, and overall trend is downward. Adult steelhead were commonly observed in most larger tributaries during the 1970s through 1980s, but now such observations have significantly declined (BLM 2000c).

The Nez Perce National Forest conducted an ecosystem analysis at the watershed scale for Slate Creek (USFS 2000) and concluded that the distribution of fish species assessed is relatively consistent with historic distribution. Steelhead populations are thought to have experienced a great decline from historic levels although the data to describe the extent of this reduction is not available (USFS 2000). The BLM has conducted trend monitoring of fish populations in lower Partridge Creek and French Creek. Partridge Creek densities of age 0 rainbow/steelhead in 1988 were 0.30 fish/m2 and age 1 rainbow/steelhead trout densities were 0.19 fish/m2. In 1997, age 0 densities were 0.003 fish/m2 and age 1 densities were 0.01 fish/m2. French Creek densities of age 0 rainbow/steelhead trout in 1991 were 0.07 fish/m2 and age 1 rainbow/steelhead densities were 0.07 fish/m2. In 1997, age 0 densities were 0.0075 fish/m2 and age 1 densities were 0.02 fish/m2. Densities of steelhead trout have significantly declined from the 1980s through the late 1990s.

1.2.7. Little Salmon River Subbasin

Information on steelhead distribution, important watersheds, and conditions and trends in the Little Salmon River is summarized from the Little Salmon River Subbasin Biological Assessment (BLM 2000d), except where noted.

1.2.7.1. Species Distribution:

Within the Little Salmon River Subbasin, steelhead trout use occurs in the lower portion of the subbasin and tributaries, downstream from barriers located at river mile (RM) 21 in the Little Salmon River. No recent or historic documentation exists for steelhead using streams above RM 24 in the Little Salmon River. Welsh et al. (1965) reports that no known passage by salmon or steelhead exists above the Little Salmon River falls. Ineffectual fish passage facilities were constructed at the falls by the Civilian Conservation Corps during the 1930s (Welsh et al. 1965). Streams and rivers providing important spawning and rearing for steelhead include Little Salmon and River Rapid Rivers, and Boulder, Hazard, and Hard Creeks. Other Little Salmon River mainstem tributary streams providing spawning and rearing habitat include Squaw, Sheep, Hat, Denny, Lockwood, Rattlesnake, Elk, and Trail Creeks. Adult steelhead have been documented in these streams. Primary steelhead use of these streams is often associated with the mouth area or a small stream segment or lower reach, before steep gradients/cascades or a barrier restricts upstream fish passage. These streams generally provide sub-optimal spawning and rearing habitat because of steep stream gradients, barriers, low flows, limited spawning gravels, and small size of tributaries.

1.2.7.2. Location of Important Spawning and Rearing Areas:

Priority watersheds for steelhead include Rapid River, Boulder, Hazard, and Hard Creeks. These streams provide important spawning and rearing habitat for steelhead. Rapid River is a stronghold and key refugia area for steelhead.

1.2.7.3. Conditions and Trends of Populations:

The BLM noted that current numbers of naturally spawning steelhead in the Little Salmon River Subbasin are at all-time lows, and overall trend is downward. The highest number of adult natural spawning steelhead counted at the Rapid River weir was 162 in 1993, and the lowest counted was 10 in 1999 (BLM 2000d).

1.2.8. Middle Salmon River Subbasin

Information on steelhead distribution, important watersheds, and conditions and trends in the Middle Salmon River is summarized from the Middle Salmon River and South Fork Salmon River Subbasins Biological Assessment (BLM 2000e), except where noted.

1.2.8.1. Species Distribution:

Within the Middle Salmon River Subbasin, steelhead use the mainstem Salmon River for upstream and downstream passage. A limited amount of juvenile rearing and adult overwintering may occur in the Middle Salmon River. Most accessible tributaries are used by steelhead for spawning and rearing. Key steelhead spawning and rearing is probably occurring in Crooked, Bargamin and Sabe Creeks and the lower Wind River on the north side of the Salmon River and California, Warren, Chamberlain, and Horse Creeks on the south side of the Salmon River.

1.2.8.2. Location of Important Spawning and Rearing Areas:

Priority watersheds for steelhead include Warren and California Creeks. Steelhead use Warren Creek for spawning and rearing habitat. No fish passage barriers exist for steelhead within the drainage. Steelhead were found in Richardson, Stratton, Steamboat, and Slaughter Creeks (Raleigh 1995). Most other tributaries were surveyed, but no steelhead were found. Because of habitat alterations from past mining (e.g., in-channel dredging, piling of dredged material adjacent to streams) and limited suitable habitat, steelhead use of the upper portion of the Warren Creek subwatershed is limited. Carey and Bear Creeks provide habitat in the lower reaches.

1.2.8.3. Conditions and Trend of Populations:

Refer to “Conditions and Trends of Populations” under Lower Salmon River Subbasin above.

1.2.9. South Fork Salmon River Subbasin

Information on steelhead distribution, important watersheds, and conditions and trends in the South Fork Salmon River is summarized from the Middle Salmon River and South Fork Salmon River Subbasins Biological Assessment (BLM 2000e), except where noted.

1.2.9.1. Species Distribution:

Steelhead have been documented in the South Fork Salmon River and lower portions of its major tributaries. Most of the mainstem spawning occurs between the East Fork Salmon River and Cabin Creek. Principle spawning areas are located near Stolle Meadows, from Knox Bridge to Penny Spring, Poverty Flat, Darling cabins, the Oxbow, and from 22 Hole to Glory Hole (USFS 1998).

1.2.9.2. Location of Important Spawning and Rearing Areas:

Primary spawning tributaries in the South Fork Salmon River Subbasin are Burntlog, Lick, Lake, and Johnson Creeks, the East Fork South Fork Salmon and Secesh Rivers (USFS 1998).

1.2.9.3. Conditions and Trends of Populations:

Refer to "Conditions and Trends of Populations" under Lower Salmon River Subbasin above.

1.2.10. Upper Salmon River Subbasin

Information on steelhead distribution, important watersheds, and conditions and trends in the Upper Salmon River is summarized from the Biological Opinion on Effects of 2002 Herbicide Treatment of Noxious Weeds on Lands Administered by the Salmon-Challis National Forest (NMFS 2002b).

1.2.10.1. Species Distribution:

Steelhead in the Upper Salmon River subbasin occur in most of the accessible streams when stream conditions are suitable. Steelhead use the mainstem for upstream and downstream passage. A limited amount of juvenile rearing and adult overwintering occurs in the Upper Salmon River. Most accessible tributaries are used for spawning and rearing.

1.2.10.2. Location of Important Spawning and Rearing Areas:

Key steelhead spawning and rearing probably occurs in Morgan, Thompson and Panther Creeks, in addition to the Yankee Fork Salmon, Pahsimeroi, North Fork Salmon, East Fork Salmon, and Lemhi Rivers.

1.2.10.3. Conditions and Trends of Populations:

Refer to "Conditions and Trends of Populations" under Lower Salmon River Subbasin above.

1.3. Hatchery Populations

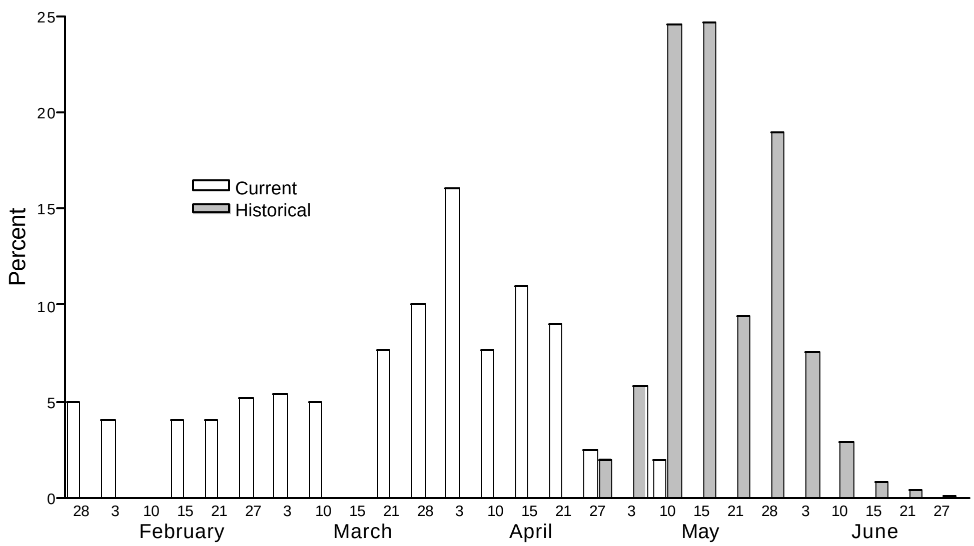
Hatchery populations, if genetically similar to their natural-origin counterparts, provide a hedge against extinction of the ESU or of the gene pool. The Imnaha and Oxbow hatcheries produce A-run stocks that are currently included in the Snake River basin steelhead ESU. The Pahsimeroi and Wallowa hatchery stocks may also be appropriate and available for use in developing supplementation programs; NOAA Fisheries required in its recent biological opinion on Columbia basin hatchery operations that this program begin to transition to a local-origin broodstock to provide a source for future supplementation efforts in the lower Salmon River (NMFS 1999). Although other stocks provide more immediate opportunities to initiate supplementation programs within some subbasins, it may also be necessary and desirable to develop additional broodstocks that can be used for supplementation in other natural production areas. Despite uncertainties related to the likelihood that supplementation programs can accelerate the recovery of naturally spawning populations, these hatchery stocks provide a safeguard against the further decline of natural-origin populations.

The Dworshak NFH is unique in the Snake River Basin in producing a B-run hatchery stock. The Dworshak stock was developed from natural-origin steelhead from the North Fork Clearwater River, is largely free of other hatchery introductions, and was therefore included in the ESU, although not as part of the listed population. However, past hatchery practices and possibly changes in flow and temperature conditions related to Dworshak Dam have lead to substantial divergence in spawn timing of the hatchery stock compared to historical timing in the North Fork Clearwater River, and compared to natural-origin populations in other parts of the Clearwater Basin. Because the spawn timing of the hatchery stock is much earlier than historically (Figure 6), the success of supplementation efforts using these stocks may be limited. In fact, past supplementation efforts in the South Fork Clearwater River using Dworshak NFH stock have been largely unsuccessful, although improvements in out-planting practices have the potential to yield different results. In addition, the unique genetic character of Dworshak NFH steelhead will limit the degree to which the stock can be used for supplementation in other parts of the Clearwater Subbasin, and particularly in the Salmon River B-run basins.
Supplementation

efforts in those areas, if undertaken, will more likely have to rely on the future development of local broodstocks. Supplementation opportunities in many of the B-run production areas may be limited because of logistical difficulties associated with high mountain, wilderness areas.

Because opportunities to accelerate the recovery of B-run steelhead through supplementation, even if successful, are expected to be limited, it is essential to maximize the escapement of natural-origin steelhead in the near term.

Figure 6. Historical Versus Current Spawn-Timing of Steelhead at Dworshak Hatchery.



1.4. Conclusion

Finally, the conclusion and recommendations of the TAC's All Species Review (TAC 1997) are pertinent to this status review of Snake River steelhead. Considering information available through 1996, the 1997 All Species Review stated:

> "Regardless of assessment methods for A and B steelhead, it is apparent that the primary goal of enhancing the upriver summer steelhead run is not being achieved. The status of upriver summer steelhead, particularly natural-origin fish, has become a serious concern. Recent declines in all stocks, across all measures of abundance, are disturbing."

> "There has been no progress toward rebuilding upriver runs since 1987. Throughout the Columbia River basin, dam counts, weir counts, spawning

surveys, and rearing densities indicate natural-origin steelhead abundance is declining, culminating in the proposed listing of upriver stocks in 1996. Escapements have reached critically low levels despite the relatively high productivity of natural and hatchery rearing environments. Improved flows and ocean conditions should increase smolt-adult survival rates for upriver summer steelhead. However, reduced returns in recent years are likely to produce fewer progeny and lead to continued low abundance."

> "Although steelhead escapements would have increased (some years substantially) in the absence of mainstem fisheries, data analyzed by the TAC indicate that effects other than mainstem Columbia River fishery harvest are primarily responsible for the currently depressed status and the long term health and productivity of wild steelhead populations in the Columbia River."

> "Though harvest is not the primary cause of declining summer steelhead stocks, and harvest rates have been below guidelines, harvest has further reduced escapements. Prior to 1990, the aggregate of upriver summer steelhead in the mainstem Columbia River appears at times to have led to the failure to achieve escapement goals at Lower Granite Dam. Wild Group B steelhead are presently more sensitive to harvest than other salmon stocks, including the rest of the steelhead run, due to their depressed status and because they are caught at higher rates in the Zone 6 fishery."

Small or isolated populations are much more susceptible to stochastic events such as drought and poor ocean conditions. Harvest can further increase the susceptibility of such populations. The Columbia River Fish Management Plan (TAC 1997) recognizes that harvest management must be responsive to run size and escapement needs to protect these populations. The parties should ensure that TAC 1997 harvest guidelines are sufficiently protective of weak stocks and hatchery broodstock requirements.

For the Snake River steelhead ESU as a whole, the median population growth rate (lambda) from years 1980-1997, ranges from 0.699 to 0.978, depending on the assumed number of hatchery fish reproducing in the river (Table 2). NOAA Fisheries estimated the risk of absolute extinction for A- and B-runs, based on assumptions of complete hatchery spawning success, and no hatchery spawning success. At the low end, assuming that hatchery fish spawning in the wild have not reproduced (i.e., hatchery effectiveness = 0), the risk of absolute extinction within 100 years is 0.01 for A-run steelhead and 0.93 for B-run fish. At the high end, assuming that the hatchery fish spawning in the wild have been as productive as wild-origin fish (hatchery effectiveness = 100%), the risk of absolute extinction within 100 years is 1.00 for both runs.

Table 2. Annual rate of population change (λ) in Snake River steehead, absolute risk of extinction (1 fish/generation), and risk of 90% decline in 24 and 100 years for the period 1980-1997†. The range of reported values assumes that hatchery-origin fish either do not contribute to

Model Assumptions	l	**Risk of Extinction**		**Probability of 90% decrease in stock abundance**	
		24 years	100 years	24 years	100 years
No Correction for Hatchery Fish	0.978	A-Run 0.000 B-Run 0.000	A-Run 0.000 B-Run 0.000	A-Run 0.000 B-Run 0.060 Aggregate 0.000	A-Run 0.000 B-Run 0.520 Aggregate 0.434
No Instream Hatchery Reproduction	0.910	A-Run 0.000 B-Run 0.000	A-Run 0.010 B-Run 0.093	A-Run 0.200 B-Run 0.730 Aggregate 0.476	A-Run 1.000 B-Run 1.000 Aggregate 1.000
Instream Hatchery Reproduction = Natural Reproduction	0.699	A-Run 0.000 B-Run 0.000	A-Run 1.000 B-Run 1.000	A-Run 1.000 B-Run 1.000 Aggregate 1.000	A-Run 1.000 B-Run 1.000 Aggregate 1.000

† From Table B-2a and B-2b. Cumulative Risk Initiative. September 5, 2000, revised appendix B (McClure et al. 2000).

natural production or are as productive as natural-origin spawners.

1.5. References

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APPENDIX B - Biological Requirements, Current Status, and Trends: Snake River Spring/Summer Chinook Salmon

1.1. Chinook Salmon Life History

Chinook salmon is the largest of the Pacific salmon. The species' distribution historically ranged from the Ventura River in California to Point Hope, Alaska, in North America, and in northeastern Asia from Hokkaido, Japan, to the Anadyr River in Russia (Healey 1991). Additionally, chinook salmon have been reported in the Mackenzie River area of northern Canada (McPhail and Lindsey 1970). Of the Pacific salmon, chinook salmon exhibit arguably the most diverse and complex life history strategies. Healey (1986), described 16 age categories for chinook salmon, seven total ages with three possible freshwater ages. This level of complexity is roughly comparable to that seen in sockeye salmon (Oncorhynchus nerka), although the latter species has a more extended freshwater residence period and uses different freshwater habitats (Miller and Brannon 1982, Burgner 1991). Two generalized freshwater
life-history types were initially described by Gilbert (1912): "stream-type" chinook salmon, which reside in freshwater for a year or more following emergence, and "ocean-type" chinook salmon, which migrate to the ocean within their first year. Healey (1983, 1991) has promoted the use of broader definitions for "ocean-type" and "stream-type" to describe two distinct races of chinook salmon. Healey's approach incorporates life history traits, geographic distribution, and genetic differentiation and provides a valuable frame of reference for comparisons of chinook salmon populations.

The generalized life history of Pacific salmon involves incubation, hatching, and emergence in freshwater; migration to the ocean; and the subsequent initiation of maturation and return to freshwater for completion of maturation and spawning. The juvenile rearing period in freshwater can be minimal or extended. Additionally, some male chinook salmon mature in freshwater, thereby foregoing emigration to the ocean. The timing and duration of each of these stages is related to genetic and environmental determinants and their interactions to varying degrees. Although salmon exhibit a high degree of variability in life-history traits, there is considerable debate as to what degree this variability is shaped by local adaptation or results from the general plasticity of the salmonid genome (Ricker 1972, Healey 1991, Taylor 1991). More detailed descriptions of the key features of chinook salmon life history can be found in Myers et al. (1998) and Healey (1991).

2.1. Population Dynamics, Distribution, Status and Trends

The following sections provide specific information on the distribution and population structure (size, variability, and trends of the stocks or populations) for the listed evolutionary significant unit (ESU). Most of this information comes from observations made in terminal, freshwater areas, which may be distinct from the action area. This focus is appropriate because the species status and distribution can only be measured at this level of detail as adults return to spawn.

2.1.1. Snake River Spring/Summer Chinook Salmon

The present range of spawning and rearing habitat for naturally-spawned Snake River spring/summer chinook salmon is primarily limited to the Salmon, Grande Ronde, Imnaha, and Tucannon Subbasins. Most Snake River spring/summer chinook salmon enter individual subbasins from May through September. Juvenile Snake River spring/summer chinook salmon emerge from spawning gravels from February through June (Perry and Bjornn 1991). Typically, after rearing in their nursery streams for about 1 year, smolts begin migrating seaward in April and May (Bugert et al. 1990; Cannamela 1992). After reaching the mouth of the Columbia River, spring/summer chinook salmon probably inhabit near shore areas before beginning their northeast Pacific Ocean migration, which lasts 2 to 3 years. Because of their timing and ocean distribution, these stocks are subject to very little ocean harvest. For detailed information on the life history and stock status of Snake River spring/summer chinook salmon, see Matthews and Waples (1991), NMFS(1991), and 56 FR 29542 (June 27, 1991).

Bevan et al. (1994) estimated the number of wild adult Snake River spring/summer chinook salmon in the late 1800s to be more than 1.5 million fish annually. By the 1950s, the population had declined to an estimated 125,000 adults. Escapement estimates indicate that the population continued to decline through the 1970s. Returns were variable through the 1980s, but declined further in recent years. Record low returns were observed in 1994 and 1995. Dam counts were modestly higher from 1996 through 1998, but declined in 1999. For management purposes the spring and summer chinook in the Columbia River Basin, including those returning to the Snake River, have been managed as separate stocks. Historical databases, therefore, provide separate estimates for the spring and summer chinook components. Table 1 reports the estimated annual return of adult, natural-origin Snake River spring and summer chinook salmon returning to Lower Granite Dam since 1979.

Table 1. Estimates of Natural-Origin SR Spring/Summer Chinook Salmon Counted at Lower Granite Dam in Recent Years (Speaks 2000)

Year	Spring Chinook	Summer Chinook	Total
1979	2,573	2,712	5,285
1980	3,478	2,688	6,166
1981	7,941	3,326	11,267
1982	7,117	3,529	10,646
1983	6,181	3,233	9,414
1984	3,199	4,200	7,399
1985	5,245	3,196	8,441
1986	6,895	3,934	10,829
1987	7,883	2,414	10,297
1988	8,581	2,263	10,844
1989	3,029	2,350	5,379
1990	3,216	3,378	6,594
1991	2,206	2,814	5,020
1992	11,285	1,148	12,433
1993	6,008	3,959	9,967
1994	1,416	305	1,721
1995	745	371	1,116
1996	1,358	2,129	3,487
1997	1,434	6,458	7,892
1998	5,055	3,371	8,426
1999	1,433	1,843	3,276
		Recovery Esc Level	31,440

NOAA's National Marine Fisheries Service (NOAA Fisheries) set an interim recovery level for Snake River spring/summer chinook salmon (31,400 adults at Ice Harbor Dam) in its proposed recovery plan (NMFS1995). The Snake River spring/summer chinook salmon ESU consists of 39 local spawning populations (subpopulations) spread over a large geographic area (Lichatowich et al. 1993). The number of fish returning to Lower Granite Dam is therefore divided among these subpopulations. The relationships between these subpopulations, and particularly the degree to which individuals may intermix is unknown. It is unlikely that all 39 are independent populations per the definition in McElhany et al. (2000), which requires that each be isolated such that the exchange of individuals between populations does not substantially affect population dynamics or extinction risk over a 100-year time frame. Nonetheless, monitoring the status of subpopulations provides more detailed information on the status of the species than would an aggregate measure of abundance.

Seven of these subpopulations have been used as index stocks for the purpose of analyzing extinction risk and alternative actions that may be taken to meet survival and recovery requirements. The Snake River Salmon Recovery Team selected these subpopulations primarily because of the availability of relatively long time series of abundance data. The Biological Requirements Work Group (BRWG 1994)) developed recovery and threshold abundance levels for the index stocks, which serve as reference points for comparisons with observed escapements (Table 2). The threshold abundances represent levels at which uncertainties (and thus the likelihood of error) about processes or population enumeration are likely to be biologically significant, and at which qualitative changes in processes are likely to occur. They were specifically not developed as indicators of pseudo-extinction or as absolute indicators of "critical" thresholds. In any case, escapement estimates for the index stocks have generally been well below threshold levels in recent years (Table 2).

Table 2. Number of Adult Spawners, Recovery Levels, and BRWG Threshold Abundance Levels

Brood year	Bear Valley	Marsh	Sulphur	Minam	Imnaha	Poverty Flats	Johnson
1979	215	83	90	40	238	76	66
1980	42	16	12	43	183	163	55
1981	151	115	43	50	453	187	102
1982	83	71	17	104	590	192	93
1983	171	60	49	103	435	337	152
1984	137	100	0	101	557	220	36
1985	295	196	62	625	699	341	178
1986	224	171	385	357	479	233	129
1987	456	268	67	569	448	554	175
1988	1109	395	607	493	606	844	332
1989	91	80	43	197	203	261	103
1990	185	101	170	331	173	572	141
1991	181	72	213	189	251	538	151
1992	173	114	21	102	363	578	180
1993	709	216	263	267	1178	866	357
1994	33	9	0	22	115	209	50
1995	16	0	4	45	97	81	20
1996	56	18	23	233	219	135	49
1997	225	110	43	140	474	363	236
1998	372	164	140	122	159	396	119
1999	72	0	0	96	282	153	49
2000	*58*	*19*	*24*	*240*	na	*280*	*102*
Recovery Level	**900**	**450**	**300**	**450**	**850**	**850**	**300**
BRWG Threshold	**300**	**150**	**150**	**150**	**300**	**300**	**150**

These values are for SR spring/summer chinook salmon index stocks. Spring chinook index stocks: Bear Valley, Marsh, Sulphur and Minam. Summer-run index stocks: Poverty Flats and Johnson. Run-timing for the Imnaha is intermediate. Estimates for 2000 (shown in italics) are based on the preseason forecast.

As of June 1, 2000, the preliminary final aggregate count for upriver spring chinook salmon at Bonneville Dam was 178,000, substantially higher than the 2000 forecast of 134,000[8]. This is the second highest return in 30 years (after the 1972 return of 179,300 adults). Only a small

[8] Source: June 1, 2000, E-mail from R. Bayley (NOAA Fisheries) to S. H. Smith (NOAA Fisheries). “Spring chinook update (end-of-season at Bonneville Dam).”

portion of these are expected to be natural-origin spring chinook destined for the Snake River (5,800). However, the aggregate estimate for natural-origin Snake River spring chinook salmon is substantially higher than the contributing brood year escapements. Comparable returns to the Columbia River mouth in 1995 and 1996 were 1,829 and 3,903, respectively. The expected returns to the index areas were estimated by multiplying the anticipated return to the river mouth by factors that accounted for anticipated harvest (approximately 9%), interdam loss (50%), prespawning mortality (10%), and the average proportion of total natural-origin spring chinook salmon expected to return to the index areas (14.3%). This rough calculation suggests that the returns to each index area would just replace the primary contributing brood year escapement (1996) (Table 2). These results also suggest that other areas may benefit more than the index areas in terms of brood year return rates. The index areas, on average, account for about 14% of the return of natural-origin spring chinook stocks to the Snake River. The substantial return of hatchery fish will also provide opportunities to pursue supplementation options designed to help rebuild natural-origin populations subject to constraints related to population diversity and integrity. For example, expected returns of the Tucannon River (500 listed hatchery and wild fish), Imnaha River (800 wild and 1,600 listed hatchery fish), and Sawtooth Hatchery (368 listed hatchery fish) all represent substantial increases over past years and provide opportunities for supplementation in the local basins designed to help rebuild the natural-origin stocks.

The 2000 forecast for the upriver summer chinook stocks is 33,300, which is again the second highest return in over 30 years, but with only a small portion (2,000) being natural-origin fish destined for the Snake River. The return of natural-origin fish compares to brood year escapements in 1995 and 1996 of 534 and 3,046 and is generally lower than the average returns over the last 5 years (3,466). The expect returns to the Poverty Flats and Johnson Creek index areas using methods similar to those described above indicates that returns will approximately double the returns observed during 1996, the primary contributing brood year (Table 2) and would be at least close to threshold escapement levels. Again, the substantial returns of hatchery fish can be used in selected areas to help rebuild at least some of the natural-origin stocks. Unfortunately, with the exception of the Imnaha, local brood stocks are not currently available for the spring and summer chinook index areas.

The probability of meeting survival and recovery objectives for Snake River spring/summer chinook under various future operation scenarios for the hydrosystem was analyzed through a process referred to as PATH (Plan for Analyzing and Testing Hypotheses). The scenarios analyzed focused on status quo management, and options that emphasized either juvenile transportation or hydro-project drawdown. PATH also included sensitivity analyses to alternative harvest rates and habitat effects. PATH estimated the probability of survival and recovery for the seven index stocks using the recovery and escapement threshold levels as abundance indicators. The forward simulations estimated the probability of meeting the survival thresholds after 24 and 100 years.

A 70% probability of exceeding the threshold escapement levels was used to assess survival. Recovery potential was assessed by comparing the projected abundance to the recovery abundance levels after 48 years. A 50% probability of exceeding the recovery abundance levels was used to evaluate recovery by comparing the eight-year mean projected abundance. In general, the survival and recovery standards were met for operational scenarios involving drawdown, but were not met under status quo management or for the scenarios that relied on juvenile transportation (Marmorek et al. 1998). If the most conservative harvest rate schedule was assumed, transportation scenarios came very close to meeting the survival and recovery standards.

For the Snake River spring/summer chinook ESU as a whole, NOAA Fisheries estimates the median population growth rate (lambda), from 1980-1994, ranges from 1.012 to 0.796 (Table 3), depending on the assumed success of hatchery fish spawning in the wild. Lambda decreases with increasing success of instream hatchery fish reproduction, compared to fish of wild origin (Tables B-2a and B-2b in McClure et al. 2000). NOAA Fisheries estimated the risk of absolute extinction for the aggregate Snake River spring/summer chinook population to be zero in 24 years regardless of hatchery fish reproduction, and from 0.00 to 1.00 in 100 years, depending the success of instream hatchery fish reproduction (Table 3). This analysis period does not include the higher returns observed since 1996. Since 1996, the average proportional increase in hatchery fish compared to wild fish has been substantially greater, consequently, even though the number of recruits per spawner has increased for natural fish since lambda was calculated, the estimate of lambda for natural fish may actually decline from the values in Table 3, due to the disproportionate increase in hatchery fish.

Table 3. Annual rate of population change (λ) in Snake River Spring Chinook salmon, absolute risk of extinction (1 fish/generation), and risk of 90% decline in 24 and 100 years for the period 1980-1994[†]. The range of reported values assumes that hatchery-origin fish either do not contribute to natural production or are as productive as natural-origin spawners.

Model Assumptions	l	**Risk of Extinction**		**Probability of 90% decrease in stock abundance**	
		24 years	100 years	24 years	100 years
No Correction for Hatchery Fish	1.012	0.00	0.00	0.014	0.072
No Instream Hatchery Reproduction	0.964	0.00	0.04	0.002	0.914
Instream Hatchery Reproduction = Natural Reproduction	0.796	0.00	1.00	0.996	1.000

† From Table B-2a and B-2b. Cumulative Risk Initiative. September 5, 2000, revised appendix B (McClure et al. 2000).

1.2.1. Lower Snake River Subbasin

Information on spring/summer chinook salmon distribution, important watersheds, and conditions and trends in the Lower Snake River is summarized from the Lower Snake Subbasin Biological Assessment (BLM 2000a).

1.2.1.1. Species Distribution:

Spring/summer chinook salmon use the mainstem Snake River for upstream and downstream migration and, to a limited extent, juvenile rearing. Migrating adult salmon may use the Snake River for staging prior to migrating to natal streams to spawn. Accessible tributary streams are used for spawning and/or juvenile rearing when stream conditions are suitable. Asotin Creek is the only tributary stream that is currently used for spawning and rearing by chinook salmon. Juvenile rearing may occur at the mouth or lower reach of accessible tributary streams. The Snake River has elevated summer water temperatures that are sub-optimal for rearing, therefore, tributary streams provide cool water refugia for juveniles. Often these tributary streams may have low water barriers, but are accessible during high spring flows (i.e., June). Low numbers of rearing juvenile chinook salmon may be found in the lower reaches of larger tributary streams. It should be noted that other smaller accessible tributaries may potentially be used if stream conditions are favorable.

1.2.1.2. Location of Important Spawning and Rearing Areas:

Asotin Creek is an important spawning and rearing watershed for spring/summer chinook in the Lower Snake River Subbasin. Historically, other larger tributaries within the subbasin (i.e., Captain John Creek) may have been used for spawning and rearing. Priority watersheds identified for spring/summer chinook salmon include Asotin and Captain John Creeks.

1.2.1.3. Conditions and Trend of Populations:

The Bureau of Land Management (BLM) noted that current numbers of naturally spawning spring/summer chinook salmon in the Lower Snake River Subbasin are at all time lows, and the overall trend is downward. Asotin Creek is the only tributary stream that is used by chinook salmon for spawning. Current use of Asotin Creek by spring/summer chinook is at very low levels and does not have a stable return of adults (BLM 2000a).

1.2.2. Lower Salmon River Subbasin

Information on spring/summer chinook salmon distribution, important watersheds, and conditions and trends in the Lower Salmon River is summarized from the Lower Salmon River Subbasin Biological Assessment (BLM 2000b), except where noted..

1.2.2.1. Species Distribution:

Spring/summer chinook salmon use the mainstem Salmon River for upstream and downstream migration and, to a limited extent, juvenile rearing. Migrating adult salmon may use the Salmon River for staging prior to migrating to natal streams to spawn. Accessible tributary streams are used for spawning and/or juvenile rearing when stream conditions are suitable. Slate Creek and White Bird Creek are the only tributary streams that are currently used for spawning and rearing. Stray adult chinook salmon may be found occasionally in other tributary streams (i.e., John Day Creek and French Creek). Juvenile chinook salmon rearing may occur at the mouth or lower reach of accessible tributary streams. The Salmon River has elevated summer water temperatures that are sub-optimal for rearing, therefore, tributary streams may provide cool water refugia for juveniles. Often these tributary streams have low water barriers, but are accessible during high spring flows (i.e., June). Tributary streams that may be used by juvenile chinook salmon for rearing include China, Eagle, Deer, Cottonwood, Maloney, Deep, Rice, Rock, Skookumchuck, John Day, Race, Lake, Allison, Partridge, Elkhorn, and French Creeks. It should be noted that other smaller accessible tributaries may potentially be used if stream conditions are favorable.

1.2.2.2. Location of Important Spawning and Rearing Areas:

Slate Creek and White Bird Creek are important spawning and rearing watersheds for spring/summer chinook salmon in the lower Salmon River drainage. Historically, other larger tributaries may have been used for spawning and rearing. Priority watersheds identified for spring/summer chinook salmon within the subbasin include China, Eagle, Deer, White Bird, Skookumchuck, Slate, John Day, Race, Partridge, and French Creeks.

1.2.2.3. Conditions and Trend of Populations:

The BLM noted that current numbers of naturally spawning spring/summer chinook salmon in the Lower Salmon River Subbasin are at all time lows, and the overall trend is downward. Slate Creek is the only tributary stream that is used by chinook salmon annually for spawning. White Bird Creek may be used by stray adults on occasion, but such use is expected to be very low (BLM 2000b).

1.2.3. Little Salmon River Subbasin

Information on spring/summer chinook salmon distribution, important watersheds, and conditions and trends in the Little Salmon River is summarized from the Little Salmon River Subbasin Biological Assessment (BLM 2000c), except where noted.

1.2.3.1. Species Distribution:

Spring/summer chinook salmon occur in the lower portion of the Little Salmon River and its tributaries, downriver from barriers located on the mainstem at river mile (RM) 24. An 1879 account of a trip through the Little Salmon River valley stated: "That salmon did not come into the valley because of rapids and falls below apparently prevented them" (Wiley 1879). No recent or formal historic documentation exists for spring/summer chinook salmon using streams above the RM 21 barrier. Welsh et al. (1965), reports that no known passage by salmon or steelhead exists above the Little Salmon River falls (RM 21). Ineffectual fish passage facilities were constructed at the falls by the Civilian Conservation Corps during the 1930s (Welsh et al. 1965). Streams and rivers providing spawning and rearing for spring/summer chinook salmon include the Little Salmon and Rapid Rivers, and Boulder, Hazard, and Hard Creeks. Mainstem Little Salmon River tributary streams providing potential rearing habitat at the mouth and/or lower reach area only (below barrier) include Squaw, Sheep, Hat, Denny, Lockwood, Rattlesnake, Elk, and Trail Creeks. These streams provide sub-optimal rearing habitat because of steep stream gradients, barriers, and small size of tributaries.

1.2.3.2. Location of Important Spawning and Rearing Areas:

Priority watersheds for spring/summer chinook salmon in the Little Salmon River Subbasin include Rapid River and Boulder, Hazard, and Hard Creeks. These streams provide spawning and rearing habitat for spring/summer chinook salmon. Rapid River is a stronghold and key refugia area for spring/summer chinook salmon.

1.2.3.3. Conditions and Trend of Populations:

The BLM noted that current numbers of naturally spawning spring/summer chinook salmon in the Little Salmon River Subbasin are at all time lows, and the overall trend is downward. The highest number of intercepted adult natural spawning chinook salmon counted at the Rapid River weir was 1,269 in 1985, and the lowest counted was 4 in 1997. In 1998, a total of 42 adult natural spawning chinook salmon were counted and in 1999 a total of nine natural spawning chinook salmon were counted (BLM 2000c).

<u>1.2.4. Middle Salmon River Subbasin</u>

Information on spring/summer chinook salmon distribution, important watersheds, and conditions and trends in the Middle Salmon River is summarized from the Middle Salmon River and South Fork Salmon River Subbasins Biological Assessment (BLM 2000d), except where noted.

1.2.4.1. Species Distribution:

Spring/summer chinook salmon use the mainstem Middle Salmon River for upstream and downstream passage. A limited amount of juvenile rearing may also occur in the Salmon River. Spawning and rearing for spring/summer chinook salmon occurs in lower Wind River and Crooked, Bargamin, Chamberlain, and Horse Creeks. Other accessible tributaries may be used for juvenile rearing when flow conditions and water temperatures are acceptable. Use generally occurs in the mouth area or lower reaches of tributary streams.

1.2.4.2. Location of Important Spawning and Rearing Areas:

Priority watersheds for spring/summer chinook salmon in the Middle Salmon River Subbasin include Bargamin and Warren Creeks. These streams provide spawning and rearing habitat for adult and juvenile spring/summer chinook salmon. Spring/summer chinook salmon juveniles were observed in Warren Creek from the mouth to RM 2.4 (USFS 1998). Raleigh (1995), conducted snorkeling surveys in Warren Creek in late August 1994, and found juvenile chinook salmon in the lower reach only (RM 2.4). Spring/summer chinook salmon may use the mouth area or lower reaches of accessible tributaries such as Carey, California, and Bear Creeks for rearing.

1.2.4.3. Conditions and Trend of Populations:

The BLM noted that current numbers of naturally spawning spring/summer chinook salmon in the Middle Salmon River Subbasin are at all time lows, and the overall trend is downward (BLM 2000d).

1.2.5. South Fork Salmon River Subbasin

Information on spring/summer chinook salmon distribution, important watersheds, and conditions and trends in the South Fork Salmon River is summarized from the Middle Salmon River and South Fork Salmon River Subbasins Biological Assessment (BLM 2000d), except where noted.

1.2.5.1. Species Distribution:

Most spring/summer chinook salmon spawning areas within the South Fork Salmon River are found upstream of the confluence of the Secesh River and the South Fork Salmon River. The largest spawning concentration occurs in the Poverty Flats to Fourmile area and in Stolle Meadows.

1.2.5.2. Location of Important Spawning and Rearing Areas:

Concentrated spawning areas for Snake River spring/summer chinook salmon are found in the Glory Hole, Oxbow, Lake Creek, and Dollar Creek areas, the Icehole area in Johnson Creek, and the Secesh Meadows in the Secesh River. Rearing and overwintering occurs throughout the South Fork Salmon River.

1.2.5.3. Conditions and Trend of Populations:

Historically, the South Fork Salmon River was the single most important summer chinook spawning stream in the Columbia River Basin (Mallet 1974). Redd counts in the South Fork have declined from 3,505 redds in 1957, to 810 in 1992. The Secesh River and Lake Creek redd counts (combined) were more than 500 redds in 1960 and declined to a low of 10 redds in 1975.

Counts of 112 redds in 1991 dropped to 28 redds in 1995 (IDFG 1995). Based on standard transects (IDFG 1992), chinook parr densities are estimated to be less than 15% of potential habitat carrying capacity.

1.2.6. Upper Salmon River Subbasin

Information on chinook salmon distribution, important watersheds, and conditions and trends in the Upper Salmon River is summarized from the Biological Opinion on Effects of 2002 Herbicide Treatment of Noxious Weeds on Lands Administered by the Salmon-Challis National Forest (NOAA Fisheries 2002a), and the Biological Opinion on L3A Irrigation Diversion Modification in the Lemhi River (NOAA Fisheries 2002b).

1.2.6.1. Species Distribution:

Spring/summer chinook salmon in the Upper Salmon River Subbasin may occur in most of the accessible streams when stream conditions are suitable. Chinook salmon use the mainstem Salmon River for upstream and downstream passage. Spawning and rearing may also occur in the mainstem Salmon River. In addition, most accessible tributaries may be used by spring/summer chinook salmon for spawning and rearing.

1.2.6.2. Location of Important Spawning and Rearing Areas:

Important spring/summer chinook salmon spawning and rearing areas in the Upper Salmon River Subbasin probably occurs in Yankee Fork Salmon, Pahsimeroi River, East Fork Salmon River, Lemhi River and Pole, Alturas Lake, Valley, and Loon Creeks.

1.2.6.3. Conditions and Trend of Populations:

Compared to the greatly reduced numbers of returning adults for the last several decades, increased numbers of adult chinook salmon returned to the Upper Salmon River drainage in 2000 and 2001. These large returns are thought to be a result of favorable ocean conditions, and above average flows in the Columbia River Basin when the smolts migrated downstream. However, these large returns are only a fraction of the returns of the late 1800s. Recent increases in the population are not expected to continue, and the long-term trend for this species indicates a decline (NOAA Fisheries 2002b).

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APPENDIX C - Optimum Maximum Diversion Flow Agreement

(Idaho Department of Fish and Game and Wayne Baker)

for SEF 10 AND 11 Diversion and Screen (May 1995)

THIS SHEET SUBSTITUTES FOR APPENDIX C: OPTIMUM MAXIMUM DIVERSION FLOW AGREEMENT (IDAHO DEPARTMENT OF FISH AND GAME AND WAYNE BAKER) FOR SEF-10 AND 11 (DATED MAY 1995).

The Optimum Maximum Diversion Flow Agreements (May 1995) between the Idaho Department of Fish and Game (IDFG) and the water user/landowner Wayne Baker for the East Fork Diversion Structure 10 (SEF-10) and East Fork Diversion Structure 11 (SEF-11) are original, completed forms that are signed and dated by both parties. Because of technological limitations, these original documents could not be made electronically available with the rest of this Biological Opinion and appendices.

The original documents are housed in the files of the IDFG, Screen Shop, Post Office Box 1336, Salmon, Idaho 83467. They can be reached at (208)-756-6022 or visited during normal business hours during the week at their offices on Highway 93 North, just outside of the city of Salmon, Idaho. Photocopies of the documents are kept in the files of NOAA Fisheries in the Salmon Field Office and also in the Idaho State Office in Boise. In Salmon, you can view the photocopied documents during normal business hours during the week at their offices at
100 Courthouse Drive, Suite F, Salmon, ID 83467 or contact either by telephone (208) 756-6472 or via FAX at (208) 756-6498. Contact persons are: Jan Pisano, Larry Zuckerman, or Jim Huinker in the Salmon Field Office.

APPENDIX D - Objectives of the Basinwide Salmon Recovery Strategy

Objectives of the Basinwide Salmon Recovery Strategy
and Federal Agency FCRPS Commitments and Interim Recovery Numbers

Table of Contents

A. Overview of Appendix D

Appendix D outlines the objectives of the Basinwide Salmon Recovery Strategy (Recovery Strategy) and major federal agency commitments to support conservation of non-federal habitat and federal land management initiatives in Columbia River tributaries, mainstem, and estuary under the Federal Columbia River Power Systems (FCRPS) biological opinion.

This appendix also includes interim abundance and productivity targets for Endangered Species Act (ESA) listed salmon and steelhead in the Interior Columbia Basin. These interim targets are only a starting point. NOAA's National Marine Fisheries Service (NOAA Fisheries) will replace these targets with scientifically more rigorous and comprehensive recovery goals using viability criteria developed through the Interior Columbia Technical Recovery Team (TRT) process that commenced in October, 2001.

B. Basinwide Salmon Recovery Strategy Objectives

! Biological Objectives

- " Maintain and improve upon the current distribution of fish and aquatic species, and halt declining population trends within 5-10 years.
- " Establish increasing trends in naturally-sustained fish populations in each subregion accessible to the fish and for each Evolutionarily Significant Unit (ESU) within 25 years.
- " Restore distribution of fish and other aquatic species within their native range within 25 years (where feasible).
- " Conserve genetic diversity and allow natural patterns of genetic exchange to persist.

! Ecological Objectives

- " Prevent further degradation of tributary, mainstem and estuary habitat conditions and water quality.
- " Protect existing high quality habitats.
- " Restore habitats on a priority basis.

! Water Quality Objective

- " In the long term, attain state and tribal water quality standards in all critical habitats in the Columbia River and Snake River basins.

C. Federal Agency Commitments

The federal agencies include: U. S. Forest Service (Forest Service), Bureau of Land Management (BLM), Bonneville Power Administration (BPA), NOAA Fisheries, U.S. Fish and Wildlife Service (USFWS), Environmental Protection Agency (EPA), Bureau of Indian Affairs, U.S. Army Corps of Engineers (COE), and Bureau of Reclamation (BOR) (and, if appropriate, the Natural Resource Conservation Service, the Farm Service Administration (FSA) and U. S. Geological Survey).

In the short term, federal land will be managed by current programs that protect important aquatic habitats. On the east side of the Cascades the Forest Service and BLM manage salmonid habitat according to PACFISH/INFISH, and on the west side of the Cascades the Forest Service and BLM manage salmonid habitat under the Northwest Forest Plan. PACFISH/INFISH and the Northwest Forest Plan aim to protect areas that contribute to salmonid recovery and improve riparian habitat and water quality throughout the Basin. To meet these objectives, the Northwest Forest Plan and PACFISH/INFISH:

- Establish watershed and riparian goals to maintain or restore all fish habitat
- Establish aquatic and riparian habitat management objectives
- Delineate riparian management areas
- Provide specific standards and guidelines for timber harvest, grazing, fire suppression and mining in riparian areas
- Provide a mechanism to delineate a system of key watersheds to protect and restore important fish habitats
- Use watershed analyses and subbasin reviews to set priorities and provide guidance on priorities for watershed restoration
- Provide general guidance on implementation and effectiveness monitoring
- Emphasize habitat restoration through such activities as closing and rehabilitating roads, replacing culverts, changing grazing and logging practices, and replanting native vegetation along streams and rivers.

In the longer term, management on the east side of the Cascades will be guided by the Interior Columbia Basin Ecosystem Management Project (ICBEMP) as that strategy is put in place.

The Forest Service and BLM have made the following commitments to ensure that federal land management under ICBEMP will help protect and recover listed fish (these principles may be adjusted by the ICBEMP NEPA process and Record of Decision):

- Retain or recharter the Interagency Implementation Team (IIT) (senior staff from BLM, Forest Service, USFWS, and NOAA Fisheries) or a similar interagency team to aid in the transition from interim aquatic management strategies and products developed by the IIT to the long term ICBEMP direction.

- Strategically focus Forest Service and BLM scarce restoration resources using broad scale aquatic/riparian restoration priorities to first secure federally-owned areas of high aquatic integrity and second, restore out from that core, rebuilding connected habitats that support spawning and rearing.

- Ensure that land managers consider the broad landscape context of site-specific decisions on management activities by requiring a hierarchically-linked approach to analysis at different geographic scales. This is important to ensuring that the type, location and sequencing of activities within a watershed are appropriate and done in the context of cumulative effects and broad scale issues, risks, opportunities and conditions.

- Cooperate with similar basin planning processes sponsored by the Northwest Power Planning Council, BPA and other federal agencies, states and tribes to identify habitat restoration opportunities and priorities. Integrate information from these processes into ICBEMP subbasin review when appropriate.

- Consult with NOAA Fisheries and USFWS on land management plans and actions that may affect listed fish species following the Streamlined Consultation Procedures for Section 7 of the ESA, July 1999.

- Collaborate early and frequently with states, tribes, local governments and advisory councils in land management analyses and decisions.

- Cooperate with the other federal agencies (in particular NOAA Fisheries and USFWS), states and tribes in the development of recovery plans and conservation strategies for listed and proposed fish species. Require that land management plans and activities be consistent with approved recovery plans and conservation strategies.

- Collaborate with other federal agencies, states, tribes and local watershed groups in the development of watershed plans for both federal and non federal lands and cooperate in priority restoration projects by providing technical assistance, dissemination of information and allocation of staff, equipment and funds.

- Share information, technology and expertise, and pool resources, in order to make and implement better-informed decisions related to ecosystems and adaptive management across jurisdictional boundaries.

- Collaborate with other federal agencies, states and tribes to improve integrated application of agency budgets to maximize efficient use of funds towards high priority restoration efforts on both federal and non-federal lands.

- Collaborate with other federal agencies, states and tribes in monitoring efforts to assess if habitat performance measures and standards are being met.

- Require that land management decisions be made as part of an ongoing process of planning, implementation, monitoring and evaluation. Incorporate new knowledge into management through adaptive management.

- Enhance the existing organizational structure with an interagency basinwide coordinating group and a number of sub-regional interagency coordinating committees. These coordinating groups and committees will ensure the implementation of ecosystem-based management across federal agencies' administrative boundaries, resolve implementation issues, be responsible for data management and monitoring, and incorporate new information through adaptive management.

Bureau of Reclamation (BOR)

Tributary

1. In priority watersheds, address all flow, passage and diversion problems over 10 years by restoring tributary flows, screening and combining water diversions, reduce passage obstructions.

Priority subbasins, organized by ESU are:

Upper Columbia Spring Chinook and Steelhead:
- Methow
- Entiat
- Wenatchee

Snake River Fall and Spring/Summer Chinook and Steelhead:
- Lemhi
- Upper Salmon
- Middle Fork Clearwater
- Little Salmon

Mid-Columbia Chinook, and Steelhead:

- North Fork John Day
- Upper John Day
- Middle Fork John Day

Lower Columbia Chinook, Steelhead and Chum:

- Lewis
- Upper Cowlitz
- Willamette-Clackamas

Upper Willamette Chinook and Steelhead:

- Clackamas
- North Santiam
- McKenzie

Corresponding 2000 FCRPS Reasonable Prudent Alternative (RPA) Action- 149

2. Federal agencies will develop an initial set of performance measures based on four key habitat factors: instream flows; amount and timing of sediment inputs to streams; riparian conditions that determine water quality, bank integrity, wood input and maintenance of channel complexity and habitat access. Changes in these attributes can be measured at the reach or the watershed level and aggregated to larger spatial scales to evaluate progress at the subbasin or basin level.

Mainstem

1. Study the feasibility (including both biological benefits and ecological risks) of habitat modification to improve spawning conditions for chum salmon in the Ives Island area.

The objectives of the study will be to determine whether it would be beneficial to increase the frequency of access to spawning habitat or the areal extent of spawning habitat by means other than flow augmentation. The feasibility study will evaluate actions to alter the hydraulic control points that limit flow in the Ives Island area to provide the same areal extent and quality of sustainable spawning habitat (including characteristics such as upwelling through the gravels currently present at the site) at lower levels of Bonneville discharge; reconstruct spawning channels to increase the extent of habitat available at a given level of Bonneville discharge; and maintain hydraulic connections between tributary habitats and the mainstem Columbia River to allow entry for adults and emergence channels for juveniles.

Corresponding 2000 FCRPS RPA Action- 156

Bonneville Power Administration (BPA)

Tributary

1. Restore tributary flows through a water brokerage. Beginning in 2001, BPA is to fund a project to experiment with innovative ways to increase tributary flows by, for example, establishing a water brokerage to increase flows. The project will also develop a plan for a pollution bank through which water quality credits could be exchanged in markets. The BPA also will fund the development of a methodology for ascertaining instream flows that meet ESA requirements.

Corresponding 2000 FCRPS RPA Action- 151

2. Support development of 303(d) lists and Clean Water Act (CWA) total maximum daily loads (TMDLs). The BPA and other Action Agencies (if it is within their jurisdiction) are to support the development of state or tribal 303(d) lists. Additionally, they are to provide funding to implement measures with direct ESA benefit in approved TMDLs and consult with state and tribal water quality entities to determine how water quality efforts can complement each other and avoid duplication.

Corresponding 2000 FCRPS RPA Action- 152

3. Fund efforts to protect currently productive non-Federal habitat in Subbasins with listed salmon and steelhead. The BPA is to place particular emphasis on protecting habitat that is at risk of being degraded, in accordance with criteria and priorities developed with NOAA Fisheries.

Corresponding 2000 FCRPS RPA Action- 150

4. Protect up to 100 stream miles per year. The BPA, working with agricultural incentive programs such as the Conservation Reserve Enhancement Program, will fund permanent or long-term protection for 100 miles of riparian buffers per year.

Corresponding 2000 FCRPS RPA Action- 153

5. Support Subbasin and Watershed Assessment and Planning. The BPA and the other Federal agencies will work with the Northwest Power Planning Council to develop and update subbasin assessments and plans. Complete preliminary subbasin assessments by early 2001, preliminary subbasin plans by 2002.

Corresponding 2000 FCRPS RPA Action- 154

6. Federal agencies will develop an initial set of performance measures based on four key habitat factors: instream flows; amount and timing of sediment inputs to streams; riparian conditions that determine water quality, bank integrity, wood input and maintenance of channel complexity and habitat access. Changes in these attributes can be measured at the reach or the watershed level and aggregated to larger spatial scales to evaluate progress at the subbasin or basin level.

Mainstem

1. As lead agency: (1) develop a baseline data set; (2) develop and implement a habitat improvement plan that, insofar as possible, mimics the range and diversity of historic habitat conditions; and (3) develop and implement a rigorous monitoring and evaluation action plan that may lead to changes in the mainstem habitat program.

Corresponding 2000 FCRPS RPA Action- 155

2. Study the feasibility (including both biological benefits and ecological risks) of habitat modification to improve spawning conditions for chum salmon in the Ives Island area.

The objectives of the study will be to determine whether it would be beneficial to increase the frequency of access to spawning habitat or the areal extent of spawning habitat by means other than flow augmentation. The feasibility study will evaluate actions to alter the hydraulic control points that limit flow in the Ives Island area to provide the same areal extent and quality of sustainable spawning habitat (including characteristics such as upwelling through the gravels currently present at the site) at lower levels of Bonneville discharge; reconstruct spawning channels to increase the extent of habitat available at a given level of Bonneville discharge; and maintain hydraulic connections between tributary habitats and the mainstem Columbia River to allow entry for adults and emergence channels for juveniles.

Corresponding 2000 FCRPS RPA Action- 156

3. The BPA will fund actions to improve and restore tributary and mainstem habitat for Columbia River chum salmon in the reach between The Dalles Dam and the mouth of the Columbia River. The purpose of this action is to compensate for effects of FCRPS water management in the Ives Island area, which appreciably diminish the value of critical spawning habitat for the survival and recovery of Columbia River chum salmon. The FCRPS has been a relatively important factor for decline of this ESU. Bonneville and The Dalles dams limit access to potential spawning habitat further upstream and Bonneville Reservoir drowned known historical habitat in Bonneville pool. Spawning is currently known in only two areas: the Grays River system in the Columbia River estuary and the Hardy/Hamilton creeks/Ives Island complex, downstream of Bonneville Dam.

Although most of the existing subbasin populations and the ESU as a whole are on a slightly positive growth trajectory (ESU-level lambda = 1.035), RPA water management operations will continue to limit the areal extent of spawning habitat in Bonneville pool and the Ives Island complex in most water years. Therefore, BPA will (1) fund surveys of existing and potential tributary and mainstem habitat in the Columbia River between The Dalles Dam and the mouth of the Columbia River for suitable protection and restoration projects, (2) develop and implement an effective habitat improvement plan, (3) protect, via purchase, easement, or other means, existing or potential spawning habitat in this reach and adjacent tributaries (i.e., protect, restore, and/or create potentially productive spawning areas). The overall goal of this effort will be to ensure the survival and recovery of Columbia River chum salmon by ensuring the availability of diverse, productive spawning habitats over a wide range of water years.

Corresponding 2000 FCRPS RPA Action- 157

Estuary

1. The BPA and the COE will seek funding and develop an action plan to rapidly inventory estuarine habitat, model physical and biological features of the historical lower river and estuary, identify limiting biological and physical factors in the estuary, identify impacts of the FCRPS system on habitat and listed salmon in the estuary relative to other factors, and develop criteria for estuarine habitat restoration.

RPA 158

2. The BPA and the COE, working with the Lower Columbia River Estuary Program (LCREP) and NOAA Fisheries, shall develop a plan addressing the habitat needs of salmon and steelhead in the estuary.

Specific plans will be developed for salmon and steelhead habitat protection and enhancement. These plans should contain clear goals for listed salmon conservation in the estuary, identify habitats with the characteristics and diversity to support salmon productivity, identify potential performance measures, identify flow requirements to support estuarine habitat requirements for salmon, and develop a program of research, monitoring, and evaluation. The plans should be completed by 2003.

Corresponding 2000 FCRPS RPA Action- 159

3. The COE and BPA, working with LCREP, shall develop and implement an estuary restoration program with a goal of protecting and enhancing 10,000 acres of tidal wetlands and other key habitats over 10 years, beginning in 2001, to rebuild productivity for listed populations in the lower 46 river miles of the Columbia River.

Much of the complexity of the estuary's historic shallow-water habitat and much of the estuary's saltwater wetlands have been lost due to the effects of local, navigational, and hydropower development. The LCREP proposes a 10-year program to protect and enhance high-quality habitat on both sides of the river to support salmon rebuilding. A high priority should be put on tidal wetlands and other key habitats to rebuild productivity in the lower 46 river miles. Federal agencies will provide technical and financial support for this program and for efforts to implement on-the-ground activities identified in planning.

As more information is gained from inventory and analytical work, the 10,000-acre goal may be modified to ensure that habitats that are determined to be important to the survival and recovery of anadromous fish are addressed. Examples of acceptable estuary habitat improvement work include the following:

- Acquiring rights to diked lands
- Breaching levees
- Improving wetlands and aquatic plant communities
- Enhancing moist soil and wooded wetland via better management of river flows
- Reestablishing flow patterns that have been altered by causeways
- Supplementing the nutrient base by importing nutrient-rich sediments and large woody debris into the estuary
- Modifying abundance and distribution of predators by altering their habitat
- Creating wetland habitats in sand flats between the north and south channels
- Creating shallow channels in inter-tidal areas
- Enhancing connections between lakes, sloughs, side channels, and the main channel

Corresponding 2000 FCRPS RPA Action- 160

4. The BPA and NOAA Fisheries will develop a conceptual model of the relationship between estuarine conditions and salmon population structure and resilience. The model will highlight the relationship among hydropower, water management, estuarine conditions, and fish response. The work will enable the agencies to identify information gaps that have to be addressed to develop recommendations for FCRPS management and operations.

Corresponding 2000 FCRPS RPA Action- 162

5. The Federal agencies will develop performance measures for the actions taken in the estuary.

NOAA Fisheries

Tributary

1. Restore tributary flows through a water brokerage. NOAA Fisheries is a co-lead agency with BPA in this commitment. NOAA Fisheries and BPA will jointly decide whether to continue to fund this project beyond the $5 million per year base in years 2-5. NOAA Fisheries and BPA will also explore the possibility of integrating this project into the Northwest Power Planning Council's land and water trust fund.

Corresponding 2000 FCRPS RPA Action- 151

2. Protect currently productive habitat. Develop, with BPA, criteria and priorities for efforts to protect currently productive non-federal habitat.

3. Establish recovery objectives, de-listing criteria and recovery measures for the Upper Willamette, Lower Columbia, and Interior Columbia.

4. Federal agencies will develop an initial set of performance measures based on four key habitat factors: instream flows; amount and timing of sediment inputs to streams; riparian conditions that determine water quality, bank integrity, wood input and maintenance of channel complexity and habitat access. Changes in these attributes can be measured at the reach or the watershed level and aggregated to larger spatial scales to evaluate progress at the subbasin or basin level.

Estuary

1. NOAA Fisheries, working with the BPA, the COE, and the LCREP, shall develop a plan addressing the habitat needs of salmon and steelhead in the estuary.

Specific plans will be developed for salmon and steelhead habitat protection and enhancement. These plans should contain clear goals for listed salmon conservation in the estuary, identify habitats with the characteristics and diversity to support salmon productivity, identify potential performance measures, identify flow requirements to support estuarine habitat requirements for salmon, and develop a program of research, monitoring, and evaluation. The plans should be completed by 2003.

2. Support a LCREP designated entity to build a major information management and public education initiative through the LCREP to focus on endangered species, habitat loss and restoration, biological diversity and human activities that impact the river.

3. The BPA and NOAA Fisheries will develop a conceptual model of the relationship between estuarine conditions and salmon population structure and resilience. The model will highlight the relationship among hydropower, water management, estuarine conditions, and fish response. The work will enable the agencies to identify information gaps that have to be addressed to develop recommendations for FCRPS management and operations.

4. The Federal agencies will develop performance measures for the actions taken in the estuary.

Environmental Protection Agency (EPA)

Tributary

1. Integration of the CWA TMDL process and the ESA. The EPA, NOAA Fisheries, USFWS and BPA will select pilot projects on the basis of nominations from Oregon, Washington and Idaho. These pilot projects would have the following objectives:

- Integrate CWA TMDL processes and ESA to avoid duplication of effort
- Develop one set of watershed goals that meet CWA and ESA requirements
- Provide CWA and ESA assurances to the extent allowable by law

Three TMDLs and implementation plans/Habitat Conservation Plans will be completed over three years.

2. Federal agencies will develop an initial set of performance measures based on four key habitat factors: instream flows; amount and timing of sediment inputs to streams; riparian conditions that determine water quality, bank integrity, wood input and maintenance of channel complexity and habitat access. Changes in these attributes can be measured at the reach or the watershed level and aggregated to larger spatial scales to evaluate progress at the subbasin or basin level.

Farm Service Agency (FSA)

Tributary

1. Protect up to 100 stream miles per year. The BPA is to work with agricultural incentive programs such as the Conservation Reserve Enhancement Program, will fund long-term protection for 100 miles of riparian buffers per year.

U.S. Fish and Wildlife Service

Tributary

1. Integration of the CWA TMDL process and ESA. The EPA, NOAA Fisheries, USFWS and BPA will select pilot projects on the basis of nominations from Oregon, Washington and Idaho. These pilot projects would have the following objectives:

- Integrate CWA TMDL processes and ESA to avoid duplication of effort
- Develop one set of watershed goals that meet CWA and ESA requirements
- Provide CWA and ESA assurances to the extent allowable by law

Three TMDLs and implementation plans/HCPs will be completed over three years.

2. Federal agencies will develop an initial set of performance measures based on four key habitat factors: instream flows; amount and timing of sediment inputs to streams; riparian conditions that determine water quality, bank integrity, wood input and maintenance of channel complexity and habitat access. Changes in these attributes can be measured at the reach or the watershed level and aggregated to larger spatial scales to evaluate progress at the subbasin or basin level.

Estuary

1. The COE, with the USFWS will significantly reduce Caspian tern and cormorant predation on salmonids. In the short term, it will preclude Caspian tern nesting on Rice Island. For the long term, it will disperse the tern population to its range of historic nesting in Pacific states.

2. Support a LCREP designated entity to build a major information management and public education initiative through the LCREP to focus on endangered species, habitat loss and restoration, biological diversity and human activities that impact the river.

3. The Federal agencies will develop performance measures for the actions taken in the estuary.

U. S. Army Corps of Engineers (COE)

Tributary

1. The COE will use available funding and authorities to implement restoration actions in priority subbasins and in areas such as the Walla Walla basin, where water-diversion-related issues could cause take of listed species.

This requirement is not in the Basinwide Strategy but is found in RPA Action 149, 2000 FCRPS BiOp.

Mainstem

1. Study the feasibility (including both biological benefits and ecological risks) of habitat modification to improve spawning conditions for chum salmon in the Ives Island area.

The objectives of the study will be to determine whether it would be beneficial to increase the frequency of access to spawning habitat or the areal extent of spawning habitat by means other than flow augmentation. The feasibility study will evaluate actions to alter the hydraulic control points that limit flow in the Ives Island area to provide the same areal extent and quality of sustainable spawning habitat (including characteristics such as upwelling through the gravels currently present at the site) at lower levels of Bonneville discharge; reconstruct spawning channels to increase the extent of habitat available at a given level of Bonneville discharge; and maintain hydraulic connections between tributary habitats and the mainstem Columbia River to allow entry for adults and emergence channels for juveniles.

Corresponding 2000 FCRPS RPA Action- 156

Estuary

1. The BPA and the COE will seek funding and develop an action plan to rapidly inventory estuarine habitat, model physical and biological features of the historical lower river and estuary, identify limiting biological and physical factors in the estuary, identify impacts of the FCRPS system on habitat and listed salmon in the estuary relative to other factors, and develop criteria for estuarine habitat restoration.

Corresponding 2000 FCRPS RPA Action- 158

2. The COE (federal lead) and BPA, working with LCREP and NOAA Fisheries, shall develop a plan addressing the habitat needs of salmon and steelhead in the estuary.

Specific plans will be developed for salmon and steelhead habitat protection and enhancement. These plans should contain clear goals for listed salmon conservation in the estuary, identify habitats with the characteristics and diversity to support salmon productivity, identify potential performance measures, identify flow requirements to support estuarine habitat requirements for salmon, and develop a program of research, monitoring, and evaluation. The plans should be completed by 2003.

Corresponding 2000 FCRPS RPA Action- 159

3. The COE and BPA, working with LCREP, shall develop and implement an estuary restoration program with a goal of protecting and enhancing 10,000 acres of tidal wetlands and other key habitats over 10 years, beginning in 2001, to rebuild productivity for listed populations in the lower 46 river miles of the Columbia River.

Much of the complexity of the estuary's historic shallow-water habitat and much of the estuary's saltwater wetlands have been lost due to the effects of local, navigational, and hydropower development. The LCREP proposes a 10-year program to protect and enhance high-quality habitat on both sides of the river to support salmon rebuilding. A high priority should be put on tidal wetlands and other key habitats to rebuild productivity in the lower 46 river miles. Federal agencies will provide technical and financial support for this program and for efforts to implement on-the-ground activities identified in planning.

As more information is gained from inventory and analytical work, the 10,000-acre goal may be modified to ensure that habitats that are determined to be important to the survival and recovery of anadromous fish are addressed. Examples of acceptable estuary habitat improvement work include the following:

- Acquiring rights to diked lands
- Breaching levees
- Improving wetlands and aquatic plant communities
- Enhancing moist soil and wooded wetland via better management of river flows
- Reestablishing flow patterns that have been altered by causeways
- Supplementing the nutrient base by importing nutrient-rich sediments and large woody debris into the estuary
- Modifying abundance and distribution of predators by altering their habitat
- Creating wetland habitats in sand flats between the north and south channels
- Creating shallow channels in inter-tidal areas
- Enhancing connections between lakes, sloughs, side channels, and the main channel

Corresponding 2000 FCRPS RPA Action- 160

4. The COE, with the USFWS will significantly reduce Caspian tern and cormorant predation on salmonids. In the short term, it will preclude Caspian tern nesting on Rice Island. For the long term, it will disperse the tern population to its range of historic nesting in Pacific states.

5. Support a LCREP designated entity to build a major information management and public education initiative through the LCREP to focus on endangered species, habitat loss and restoration, biological diversity and human activities that impact the river.

6. The Federal agencies will develop performance measures for the actions taken in the estuary.

D. Interim Abundance and Productivity Targets for Pacific Salmon and Steelhead Listed under the Endangered Species Act in the Interior Columbia Basin

These interim abundance and productivity targets are provided for geographic spawning aggregations of naturally produced spawning adults. They address the portion of each ESU's historical range below the major mainstem dams that do not provide for fish passage (e.g., Chief Joseph Dam on the upper Columbia, Hells Canyon Dam on the Snake mainstem and Dworshak Dam on the north fork Clearwater River). The potential role of geographic spawning aggregations above these dams in the ESU's viability as a whole will be evaluated through the formal recovery planning process guided by recommendations from the Interior Columbia Technical Recovery Team (Interior TRT).

It is important to note that these interim targets are not in the context of the whole ESUs, rather they are defined for tentative geographic spawning aggregations within the ESUs. The Interior TRT will develop more accurate population definitions to replace these preliminarily defined spawning aggregations. The TRT will also generate alternative delisting scenarios – different combinations of viable salmonid populations that would each provide for the recovery of the ESU as a whole.

Existing Delisting Objectives – Snake River spring/summer chinook, Snake River sockeye, Upper Columbia spring chinook and Upper Columbia steelhead

Recommended recovery objectives have been developed for Snake River spring/summer chinook spawning aggregations, Snake River fall chinook and Snake River sockeye by the Snake River Recovery Team (Bevan et al. 1994). Those recommendations were modified to apply to index stock areas[9] based on recommendations from the Idaho Department of Fish and Game (IDFG) v NOAA Fisheries Biological Requirements Workgroup (BRWG 1994) and were incorporated into the 1995 Proposed Snake River Recovery Plan (NMFS 1995). The targets were further modified based on input from the IDFG and were included in another draft recovery plan for Snake River Salmon (NMFS 1997). Population definitions and recommended abundance and productivity objectives have also been developed for upper Columbia spring chinook and steelhead ESU spawning aggregations in the Methow, Entiat, and Wenatchee through the Quantitative Analytical Report (QAR) process (Ford et al. 2001). Ford et al. (2001) did not identify an abundance goal for the Okanogan due to a lack of sufficient historical information. However, the potential for naturally spawning aggregations in this area will be evaluated by the Interior TRT. Tables 1(a) and 1(b) summarize those specific recommendations for interim targets for listed chinook and sockeye stocks in the upper Columbia and Snake River basins. Productivity criteria for Snake River sockeye were developed in the 2000 FCRPS BiOp (NMFS 2000) for a 40-48 year time period, recognizing the time required to institute habitat rehabilitation options and the time lag of response in the sockeye populations. However, to be consistent with the targets provided for the other ESUs, the productivity targets given for Snake River sockeye in Table 1(b) represent only a general biological rule of thumb over a time period of 8 years.

New Delisting Objectives – Interior Columbia Steelhead and Middle Columbia Steelhead ESU

Population definitions, abundance and productivity targets for Snake River and Middle Columbia steelhead have not been formally developed. For these ESUs, geographic spawning aggregations and interim abundance targets are based upon the QAR approach used in the Upper Columbia Biological Requirements Report (Ford et al. 2001), and from: descriptions in the 1990 Subbasin Plans; recommendations from state level stock surveys (e.g., ODFW 1995; WDFW 1993; IDFG 1985); NOAA Fisheries' Proposed Recovery Plan for Snake River Salmon (NMFS 1995); the 2000 Biological Opinion on the operation of the FCRPS (FCRPS BiOp) (NMFS 2000); and Oregon Department of Fish and Wildlife reports regarding conservation assessments (Chilcote 2001; ODFW 1995). Table 2 lists possible interim abundance targets and interim productivity objectives for major steelhead spawning aggregations in the Upper Columbia, the Middle Columbia and the Snake River ESUs. The abundance values listed for the Wenatchee, Entiat and Methow subbasins are the levels recommended through the QAR process (Ford et al. 2001). Productivity criteria for Snake River and mid-Columbia steelhead were developed in the 2000 FCRPS BiOp (NMFS 2000) for a 40-48 year time period, recognizing the time required to institute habitat rehabilitation options and the time lag of response in the steelhead populations. However, to be consistent with the targets provided for the other ESUs, the productivity targets given for Snake River and mid-Columbia steelhead in Table 2 represent only a general biological rule of thumb over a time period of 8 years.

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[9] The index area recovery objectives were developed for use in assessing the status of Snake River spring chinook stocks. Index areas have established time-series of scientific observations (e.g., redd counts), and are generally smaller in scale than geographic spawning aggregations. Objectives for these specific index areas have played a key role in the recent series of Federal Hydropower system Biological Opinions (e.g., NMFS 2000; see section 1.3.1). Index area recovery objectives are included in Table 1(a).

Interim Targets – Description and Discussion of Caveats

Interim Abundance Targets

The enclosed Tables provide interim abundance targets generally representing the geometric mean of spawner escapement over time scales of eight years or approximately two generations. A challenge for co-managers, in the context of these interim abundance targets, is how to measure their progress toward recovery. Uncertainties associated with estimates of abundance and population trends must be considered when determining whether a population's recovery abundance goal has been met. These issues will need to be addressed in formal recovery planning.

Interim Productivity Objectives

In the long-term, a viable population will be characterized by a natural replacement rate (population growth rate) that fluctuates due to natural variability around an average of 1.0, but at an abundance high enough to provide a low risk of extinction. In many cases, spawner abundances are currently far below the levels required to minimize longer term risks of extinction. In those cases, average growth rates for spawner aggregations must exceed a 1:1 replacement rate until viable population abundance levels are achieved. These interim productivity and abundance targets should not be considered in isolation. A replacement rate >1 is indicative of a healthy population only if the abundance target has been achieved as well. However, a measure of the growth rate during the rebuilding/recovery phase may be most informative to subbasin planning groups in the near term, as population growth parameters are more reliably quantified than are abundance parameters. The enclosed Tables include recommendations of productivity objectives utilizing the above rules of thumb, as well as recommendations from the FCRPS BiOp (NMFS 2000), the QAR (Ford et al. 2001), and the Proposed Snake River Recovery Plan (NMFS 1995).

Interim Spatial Structure and Diversity Objectives

The provided interim abundance and productivity targets are just a start, and do not provide a comprehensive index of healthy populations. Typically, a recovered ESU would have healthy populations representative of all the major life history types, and of all the major ecological and geographic areas within an ESU. In the absence of specific diversity data about populations, conservation of habitat diversity might be used as a reasonable interim proxy. More specifically, the QAR Biological Requirements Report (Ford et al. 2001) developed the following objective for upper Columbia River populations: "In order to be considered completely recovered, spring chinook (and steelhead) populations should be able to utilize properly functioning habitat in multiple spawning streams within each major tributary, with patterns of straying among these areas free from human caused disruptions." Furthermore, the FCRPS BiOp (NMFS 2000) states that "... currently defined populations should be maintained to ensure adequate genetic and life history diversity as well as the spatial distribution of populations within each ESU." NOAA Fisheries recommends that these approaches be utilized in early Interior Columbia subbasin planning efforts.

Table 1(a). Interim Objectives – Listed Snake River and Upper Columbia Chinook ESUs[10]

Geographic Spawning Aggregations		Interim Abundance Targets[11]		Interim Productivity Objectives
***ESU*/Spawning Aggression**	**Index Areas**	**Spawning Aggregation**	**Index Areas**	
Upper Col. Spring Chinook ESU				Upper Col. Spring chinook populations are currently well below recovery levels. The geometric mean[12] Natural Replacement Rate (NRR) will therefore need to be greater than 1.0 (QAR recommendations; Ford et al. 2001)
Methow	Methow	2000	2000	
Entiat	Entiat	500	500	
Okanogan		– –[13]		
Wenatchee	Wenatchee	3750	3750	
Snake River Spring/Summer Chinook ESU				"For delisting to be considered, the eight year (approximately two generation) geometric mean cohort replacement rate of a listed species must exceed 1.0 during the eight years immediately prior to delisting. For spring/summer chinook salmon, this goal must be met for 80% of the index areas available for natural cohort replacement rate estimation." (Proposed Snake River Recovery Plan; NMFS 1995)
Tuccannon River		1000		
Grande Ronde River		2000		
	Minam		439	
Imnaha		2500		
	Mainstem		802	
Lower Mainstem tributaries		1000		
Little Salmon River Basin		1800		
Mainstem Salmon small trib's		700		
South Fork Salmon (Sum.)		9200		
	Johnson Cr.		288	

[10]These interim targets are derived from: Bevan et al. 1994; BRWG 1995; NMFS 1995; and NMFS 1997.

[11]Eight year, or approx. 2 generations, geometric mean of annual natural spawners. Abundance targets are also provided for smaller scale "Index Areas".

[12]Using the geometric mean as opposed to the arithmetic mean is a common practice when dealing with data series with inherently high annual variability. In the Columbia basin, the geometric mean has been used as a standard measure in the series of Biological Opinions issued covering the Federal Columbia River Power system (e.g., NMFS 2000, section 1.3) and in the upper Columbia QAR.

[13]Ford et al. (2001) did not identify an abundance goal for the Okanogan due to a lack of sufficient historical information. However, the potential for naturally spawning aggregations in this area will be evaluated by the Interior TRT.

Table 1(a) continued. Interim Objectives – Listed Snake River and Upper Columbia Chinook ESUs

Geographic Spawning Aggregations		Interim Abundance Targets		Interim Productivity Objectives
***ESU*/Spawning Aggression**	**Index Areas**	**Spawning Aggregation**	**Index Areas**	
Snake River Spring/Summer Chinook ESU (cont.)				*(see above)*
Middle Fork Salmon River		9300		
	Bear Valley/Elk		911	
	Marsh Creek		426	
Mainstem Trib's (Middle Fk. to Lemhi)		700		
Lemhi River		2200		
Pahsimeroi (Sum.)		1300		
Mainstem Trib's (Sum.) Lemhi to Redfish Lake Cr.		2000		
Mainstem Trib's (Spr.) Lemhi to Yahkee Fork		2400		
Upper East Fork Trib's (Spr.)		700		
Upper Salmon Basin (Spr.)		5100		

Table 1(b). Interim Objectives – Snake River Fall Chinook and Sockeye ESUs

ESU	**Interim Abundance Targets**[14]	**Interim Productivity Objectives**
Snake River Fall Chinook ESU	2500	"For delisting to be considered, the eight year (approximately two generation) geometric mean cohort replacement rate of a listed species must exceed 1.0 during the eight years immediately prior to delisting. For spring/summer chinook salmon,this goal must be met for 80% of the index areas available for natural cohort replacement rate estimation." (Proposed Snake River Recovery Plan; NMFS 1995)
Snake River Sockeye ESU	1000 spawners in one lake; 500 spawners per year in a second lake.	500 spawners per year in a second lake. The Snake River sockeye ESU is currently well below recovery levels. The geometric mean Natural Replacement Rate (NRR) will therefore need to be greater than 1.0.[15]

[14]These interim targets are derived from the Snake River Recovery Team recommendations included in the 1995 Proposed Snake River Recovery Plan (NMFS 1995). Eight year, or approx. 2 generations, geometric mean of annual natural spawners in the mainstem Snake River

[15]The 2000 FCRPS BiOp provided a productivity objective for Snake River sockeye, Snake River and Middle Columbia steelhead populations of "a median annual population growth rate (lambda) greater than 1.0 over a 40-48 year period." (NMFS 2000).

Table 2(a). Interim Objectives – Snake River Steelhead ESU[16]

***ESU*/Spawning Aggregations**	**Interim Abundance Targets[17]**	**Interim Productivity Objectives**
Snake River Steelhead ESU		Snake River ESU steelhead populations are currently well below recovery levels. The geometric mean Natural Replacement Rate (NRR) will therefore need to be greater than 1.0.
Tucannon R.	1300	
Asotin Cr.	400	
Grande Ronde		
Lower Gr. Ronde	2600	
Joseph Cr.	1400	
Middle Fork	2000	
Upper Mainstem	4000	
Imnaha	2700	
Clearwater River		
Mainstem	4900	
South Fork	3400	
Middle Fork	1700	
Selway R.	4900	
Lochsa R.	2800	
Salmon River		
Lower Salmon	1700	
Little Salmon	1400	
South Fork	4000	
Middle Fork	7400	
Upper Salmon	4700	
Lemhi	1600	
Pahsimeroi	800	

[16]These interim targets are derived from: Ford et al. 2001; Chilcote 2001; NMFS 1995; ODFW 1995; WDFW 1993; and IDFG 1985.

[17]Eight year, or approx. 2 generations, geometric mean of annual natural spawners.

Table 2(b). Interim Objectives – Upper & Middle Columbia River Steelhead ESUs[10]

***ESU*/Spawning Aggregations**	**Interim Abundance Targets[11]**	**Interim Productivity Objectives**
Upper Columbia Steelhead ESU		
Methow R.	2500	Geometric mean Natural Return Rate (NRR) should be 1.0 or greater over a sufficient number of years to achieve a desired level of statistical power. (QAR recommendations; Ford et al. 2001)
Entiat R.	500	
Okanogan R.	– –[12]	
Wenatchee R.	2500	
Middle Columbia Steelhead ESU		
Yakima River		Middle Columbia ESU steelhead populations are currently well below recovery levels. The geometric mean Natural Replacement Rate (NRR) will therefore need to be greater than 1.0.
Satus/Toppenish	2400	
Naches	3400	
Mainstem (Wapato to Roza)	1800	
Mainstem (Above Roza)	2900[13]	
Klickitat	3600	
Walla-Walla	2600	
Umitilla	2300	
Deschutes (Below Pelton Dam	6300	
John Day		
North Fork	2700	
Middle Fork	1300	
South Fork	600	
Lower John Day	3200	
Upper John Day	2000	

[10]These interim targets are derived from: Ford et al. 2001; and NMFS 2000.

[11]Eight year, or approx. 2 generations, geometric mean of annual natural spawners

[12]Ford et al. (2001) did not identify an abundance goal for the Okanogan due to a lack of sufficient historical information. However, the potential for naturally spawning aggregations in this area will be evaluated by the Interior TRT.

[13]NWPPC smolt capacity reduced by 50% to reflect shared production potential with resident form.

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APPENDIX E - Checklist for Documenting Environmental Baseline and Effects of Proposed Action(s) on Relevant Indicators

CHECKLIST FOR DOCUMENTING ENVIRONMENTAL BASELINE

AND EFFECTS OF PROPOSED ACTION(S) ON RELEVANT INDICATORS

Authorizing Agency: **Bonneville Power Administration/Custer SWCD** Management Unit(s): **Private Land**
Section 7 Watershed: **East Fork Salmon River** Subwatershed Name: **Lower East Fork**
Action Type: Timber/Grazing/Minerals/Roads/Recreation/Miscellaneous
Specific Actions (list): Baker Ranch Diversions SEF 10 and 11 Consolidation; SEF 12

Pathway	Indicators	Status of Baseline	Effects of the Action(s)	Basis for Rationale
Bull Trout Subpopulation Characteristics	Subpopulation Size	FA/FR/UR/**?**	R/**M**/D/NA	Resident and fluvial bull trout present, population density unknown.
	Growth and Survival	FA/**FR**/UR/?	R/**M**/D/NA	PJ; Age class data is unavailable, degraded habitat quality.
	Life History Diversity and Isolation	FA/**FR**/UR/?	**R**/M/D/NA	Channel dewatering, annual instream diversion work, diversion structures and unscreened ditches are seasonal barriers before and during irrigation season. Diversion reconstruction will eliminate 2 upstream barriers and eliminate annual instream work.
	Persistence and Genetic Integrity	**FA**/FR/UR/?	R/**M**/D/NA	The lower mainstem EF Salmon River is a bull trout migratory corridor, and bull trout are not reproductively isolated from the rest of the Upper Salmon River Subbasin. Bull trout migration in the Lower EF Salmon River may be interrupted during irrigation season due to instream work on push-up diversions.
Water Quality .	Temperature	FA/FR/UR/**?**	R/**M**/D/NA	No data (J. Vacira, YFRD Fish Bio, pers. com.). May exceed criteria for coldwater biota since Herd Creek, a major tributary, and other smaller tributaries with reduced riparian canopy cover exceed State standards (USDA 1999). This section of the river has a narrow riparian zone and areas of sediment deposition that may increase solar radiation and water temperature. Landform and coldwater contributions from Germania Creek, Boulder Creek, and Big Lake Creek are mitigating factors (USDA 1999).
	Sediment	FA/FR/**UR**/?	**R**/M/D/NA	PJ: The Lower EF is a low gradient, depositional area that accumulates sediment from upstream sources in the watershed. On-site sources, such as bank erosion and push-up irrigation dams contribute to the problem. Would be short-term increase during project implementation followed by long-term seasonal decline due to construction of a permanent structure.

	Chemical Contaminants/Nutrients	FA/**FR**/UR/?	R/**M**/D/NA	PJ; chemical or nutrient data not available; mining in the last 25 years has occurred in subbasin but no heavy metal contamination is known or suspected; probable fecal/fertilizer nutrification/contamination and pesticide contamination.
Habitat Access	Physical Barriers	FA/FR/**UR**/?	**R**/M/D/NA	A number of road crossings on tributaries and irrigation developments are migration barriers. Would eliminate 2 irrigation barriers.
Habitat Elements	Substrate Embed.	FA/FR/**UR**/?	**R**/M/D/NA	Cobble embeddedness was 41% in 1994 (USBWP 2002). The Lower EF has low gradient, depositional areas that accumulate sediment transported from upstream sources. On-site sources, such as bank erosion, irrigation diversions and push-up dams contribute to sediment production. Would be short-term increase during project implementation followed by long-term seasonal decline.
	LWD	FA/FR/**UR**/?	R/M/D/**NA**	PJ: Large wood recruitment is naturally limited in lower watershed. Very narrow riparian zone due to entrenchment, private land management has reduced cottonwood production. Road crossings prevent large wood transport from forested reaches in the upper watershed.
	Pool Frequency & Quality	FA/**FR**/UR/?	R/M/D/**NA**	The lower river is entrenched and controlled by geology and substrate with few pools or meanders. Pool to riffle ratio is 6:94, primarily lateral scour pools formed by bedrock and riparian vegetation (USBWP 2002). Loss of large wood and accumulation of fine sediment have decreased pool number, size, and complexity.
	Off-channel habitat	FA/**FR**/UR/?	R/**M**/D/NA	PJ; Relatively steep channel controlled by boulders and bedrock (USBWP 2002) so not a lot of potential side channel habitat but probably reduced from historic levels due to entrenchment, loss of beaver-created wetlands, and irrigation ditch system.
	Refugia	FA/**FR**/UR/?	R/**M**/D/NA	PJ; Bull trout and steelhead can access other subwatersheds within the EF Salmon River Watershed that have high percentages of federally managed land. Chinook are confined to main channel habitats in the lower watershed.
Channel Condition and Dynamics	Width/Depth Ratio	FA/FR/**UR**/?	R/**M**/D/NA	PJ: Most of the channel is degraded and entrenched due to bank erosion, grazing, boulder/bedrock, and past geologic events such as large floods (USBWP 2002).
	Streambank Condition	FA/FR/**UR**/?	R/**M**/D/NA	The channel is entrenched and controlled, and 51% of the banks are unstable with areas of active erosion (USBWP 2002).
	Floodplain Connectivity	FA/FR/**UR**/?	R/**M**/D/NA	PJ; Floodplain development is poor due to entrenchment/confinement, past geologic events, agricultural floodplain development, grazing, and boulder/bedrock substrate. Some of the irrigated hayfields still function as a floodplain at high flows in the project area.

Flow/Hydrology	Change in Peak/Base Flows	FA/FR/**UR**/?	R/**M**/D/NA	Spring/summer run-off can be torrential (USBWP 2002). Channelization, loss of large woody debris, pools, and disconnection from the floodplain probably results in increased stream power, bank erosion and bed scour during peakflows due to confinement/ entrenchment. Irrigation diversions reduce baseflow throughout the irrigation season.
	Increase in Drainage Networks	FA/**FR**/UR/?	R/M/**D**/NA	Substantial increase in drainage density due to irrigation ditch system and East Fork Road relative to loss of side-channel habitat and channel straightening. Combining SEF 10 and 11 will produce a modest increase in drainage densities as SEF 11 is widened to accommodate flow passage for the SEF 10. Will be a slight decrease in overall ditch length from point of diversion on SEF 10 to where SEF 11 supplies water to the system.
Watershed Conditions	Road Density and Location	FA/**FR**/UR/?	R/M/D/**NA**	Low density but East Fork Road is located in the RHCA and crosses the river a number of times.
	Disturbance History	FA/**FR**/UR/?	R/M/D/**NA**	Livestock grazing, roading, geologic events, flooding, irrigation ditches, removal of large wood, channelization, fire, mining.
	Riparian Conservation Areas	FA/**FR**/UR/?	R/**M**/D/NA	Grazing impacts lower East Fork and other parts of the watershed; riparian fencing has excluded grazing on some sections of private and public land. RHCAs have been established on federally managed land in the watershed.
	Disturbance Regime	FA/**FR**/UR/?	R/M/D/**NA**	East Fork has flashy, torrential run-off in the spring/summer that causes bedload scour and bank erosion in channelized sections of the lower watershed (USBWP 2002).
Integration of Species and Habitat Conditions	Habitat Quality and Connectivity	FA/FR/**UR**/?	**R**/**M**/D/NA	Reduction of large wood, entrenchment, and accumulation of fine sediment has decreased pool numbers, size, and complexity. Seasonal migration barriers due to irrigation developments and road crossings.

Status: Functioning Appropriately - FA Functioning at Risk - FR Functioning at Unacceptable Risk - UR

Effect: R - Restore: the action will result in a positive change in the indicator evaluated
M - Maintain: the action will have no effect on the status of the indicator evaluated
D - Degrade: the action will result in a negative change in the indicator evaluated

PJ: Professional Judgment

DICHOTOMOUS KEY DETERMINATION

1. Does the authorizing agency have discretionary authority to grant, modify, or amend provisions of the use authorization(s)? **Yes**/No

A "**No"**, results in a "**NO EFFECT**" determination and the evaluation is completed. If "**Yes**", move to question #2.

2. Are there naturally reproducing species listed or proposed for listing present at any time of the year in riverine habitat directly or indirectly affected by the actions? **Yes**/No

If "**Yes**", continue with question #3 through #11. If "**No**", document the "**NO EFFECT"** determination and the evaluation is completed.

3. Can the action change the existing input of Large Woody Debris (LWD) into occupied habitat? Yes/**No**/NA
4. Can the action affect stream morphology for occupied habitat? **Yes/**No/NA
5. Can the action affect properly functioning condition of the riparian area for occupied habitat? **Yes**/No/NA
6. Can the action affect water quality and/or quantity in occupied habitat? **Yes**/No/NA
7. Can the action affect the water flow regime/annual hydrography in occupied habitat? Yes/**No**/NA
8. Can the action affect juvenile or adult behavior related to survival or reproduction? **Yes**/No/NA
9. Will the action involve toxic and/or hazardous materials which may reach occupied habitat? **Yes**/No**/**NA
10. Can the action affect juvenile or adult access to habitat? Yes/**No**/NA
11. Can the action affect substrate material? **Yes**/No/NA

"**No**" responses to question #3-11 would result in a **"NO AFFECT"** finding and should be documented in the action file.

A "**Yes**" to any of the questions #3-11, results in a "**MAY AFFECT**" determination; continue with questions #12-14.

12. Are the effects described in #3-11 inconsequential/temporary in nature? **Yes**/No

13. Do the actions employ Best Management Practices (BMPs) designated to meet State water quality standards? **Yes**/No/NA

14. Is mitigation established that would preclude or reduce measurable effects on species and their habitat? **Yes**/No/NA

> "**Yes**" responses to #12-14 results in a "**NOT LIKELY TO ADVERSELY AFFECT**" determination.
>
> "**No**" responses to #12-14 results in a "**LIKELY TO ADVERSELY AFFECT**" determination. **If the project can't be mitigated to a "NOT LIKELY TO ADVERSELY AFFECT", go to Documentation of Expected Incidental Take.**

The following mitigation has been identified for projects to reverse any "**LIKELY TO ADVERSELY AFFECT**" determinations:

Project: SEF 10-11 **Mitigation**

1. In-channel work will take place from July 7 to August 15. Fish passage and sediment control structures and provisions will be in place at all times. These sediment control and passage provisions apply to salmon, steelhead and bull trout.
2. Reclamation personnel will provide full-time project inspection during the construction period. If problems are encountered that may be outside of these BMP guidelines, or a steelhead or chinook salmon redd are encountered, work will be stopped and NOAA Fisheries and U.S. Fish and Wildlife personnel will be notified.
3. Access to the site will be over the existing road used to access the fish screen. No new roads will be constructed.
4. Best Management Practices appropriate to the type of work being performed will be in place at all times when work is being performed (IDEQ 1997). These BMPs are part of the BOR contract documents and specifications, a few are listed here for reference:
   a. Vehicle and equipment staging, cleaning (including washing), maintenance, and refueling must take place at least 100 feet away from any waterway or wetland area.
   b. Heavy equipment left on-site will use drip pans as necessary to minimize soil contamination from leaks.
   c. All fuel and petroleum products will be stored at least 100 feet from existing waterways and wetlands, if they are stored on-site.
   d. Equipment used in the river will be inspected each day and whenever fueling takes place to ensure there are no leaks from hydraulic lines or other locations on the equipment. Any leaks found will be fixed prior to the

equipment entering into the streambed to work.

   e. Emergency spill containment equipment will be available at all times to manage any petroleum product spills or leaks that may occur. If a spill or leak should occur it will be cleaned up immediately and the appropriate officials notified.

5. No chemical dust suppressants will be used within 25 feet of any waterway. The use of water for dust suppression is preferred. Water will only be drawn from a site approved by NOAA Fisheries and/or USFWS fisheries biologists. Water drawn from any location other than immediately below the fish screen will use 3/32 inch screens on the intake hose.
6. Areas disturbed by construction will be replanted and/or reseeded by the beginning of the next growing season, or at the end of the project if there is sufficient growing time before the onset of cold weather. Site reclamation will include replanting with native vegetation similar to what was removed during construction. Recommendations for types of species to plant, timing of planting and additional technical information are referenced in Technical Bulletins 24, 32, and 38 in the Idaho Best Management Practices publication (IDEQ 1997). The recommendations from these Technical Bulletins will guide the revegetation at these project sites. Species of grass that should not be used to reestablish vegetation on-site include Kentucky bluegrass and several varieties of crested wheatgrass. Specific timing and species used will be coordinated with the landowner, NOAA Fisheries and USFWS prior to implementation.
7. In the event that there are changes in the project plan, NOAA Fisheries and USFWS will be notified and consultation will take place on any potential impacts to ESA listed species and their habitat.