Endangered Species Act-Section 7(a)(2)Biological Opinion, "Not Likely to Adversely Affect" Determination, and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Consultation

Restoration Activities at Stream Crossings on National Forests and Bureau of Land Management Public Lands in Idaho (10-year Programmatic with Numerous Projects), Snake, Salmon, and Clearwater River Basins, 170601, 170602 & 170603, Idaho

Action Agencies: U.S. Forest Service, Regions 1 and 4, Idaho Bureau of Land Management, and U.S. Army Corps of Engineers

NMFS No.: 2011/05875 (USFS), 2011/05876 (BLM), and 2011/05877 (COE)

Affected Species and Determinations:

ESA-Listed Species	Status	Is Action Likely to Adversely Affect Species or Critical Habitat?	Is Action Likely To Jeopardize the Species?	Is Action Likely To Destroy or Adversely Modify Critical Habitat?
Snake River steelhead (*Oncorhynchus mykiss*)	Threatened	Yes	No	No
Snake River spring/summer Chinook (*O. tshawytscha*)	Threatened	Yes	No	No
Snake River Sockeye (*O. nerka*)	Endangered	Yes	No	No

Fishery Management Plan That Describes EFH in the Project Area	Does Action Have an Adverse Effect on EFH?	Are EFH Conservation Recommendations Provided?
Pacific Coast Salmon	Yes	Yes

Consultation Conducted By: National Marine Fisheries Service
Northwest Region

Issued by: David Mabe
for
William W. Stelle, Jr.
Regional Administrator

Date: June 4, 2012

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ACRONYMS

BA	Biological Assessment
BLM	Bureau of Land Management
BMP	Best Management Practices
BOR	Bureau of Reclamation
CHART	critical habitat analytical review team
COE	U.S. Army Corps of Engineers
CWA	Clean Water Act
dB	decibels
dbh	diameter at breast height
DPS	Distinct Population Segment
DQA	Data Quality Act
EFH	Essential Fish Habitat
ESU	Evolutionarily Significant Unit
FCRPS	Federal Columbia River Power System
FO	Field Office
FWS	U.S. Fish and Wildlife Service
HUC	Hydrologic Unit Codes
ICBTRT	Interior Columbia Basin Technical Recovery Team
IDEQ	Idaho Department of Environmental Quality
IDFG	Idaho Department of Fish and Game

ITS	Incidental Take Statement
LAA	May Affect, Likely to Adversely Affect
LRMP	Land and Resource Management Plans
LUPs	Land Use Plans
MPGs	Major Population Groups
MSA	Magnuson-Stevens Fishery Conservation and Management Act
NEPA	National Environmental Policy Act
NLAA	May Affect, Not Likely to Adversely Affect
NMFS	National Marine Fisheries Service
NTU	nephelometric turbidity units
Opinion	Biological Opinion
PCE	Primary Constituent Elements
PCTS	Public Consultation Tracking System
PDT	Project Design Team
PFMC	Pacific Fishery Management Council
RPAs	Reasonable and Prudent Alternative
RPMs	Reasonable and Prudent Measures
SDTDC	San Dimas Technology and Development Center
Services	NMFS and FWS
SPCCP	spill prevention, containment and control plan
SWIE	Southwest Idaho Ecogroup
USFS	U.S. Forest Service
VSP	Viable Salmonid Population

1. INTRODUCTION

This Introduction section provides information relevant to the other sections of this document and is incorporated by reference into Sections 2 and 3 below.

1.1. Background

The biological opinion (Opinion) and incidental take statement (ITS) portions of this consultation were prepared by the National Marine Fisheries Service (NMFS) in accordance with section 7(b) of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531, *et seq.*), and implementing regulations at 50 CFR 402. However, consistent with a decision rendered by the Ninth Circuit Court of Appeals on August 6, 2004,[1] we did not apply the regulatory definition of "destruction or adverse modification of critical habitat" at 50 CFR 402.02 to complete the following analysis with respect to a critical habitat, and instead relied on statutory provisions of the ESA.

The essential fish habitat (EFH) consultation was prepared in accordance with section 305(b)(2) of the Magnuson-Stevens Fishery Conservation and Management Act (MSA) (16 U.S.C. 1801 *et seq.*) and implementing regulations at 50 CFR 600. The administrative record for this consultation is on file at the Idaho State Habitat Office.

Regions 1 and 4 of the U.S. Forest Service (USFS) and Idaho Bureau of Land Management (BLM) propose a 10-year program that would implement an annual maximum of 156 stream crossing replacement/removal actions within *occupied* habitat for ESA-listed fish. The USFS and BLM (lead action agencies) also propose to implement an unknown number of stream crossing replacement/removal actions in intermittent and perennial channels that are *not occupied* by ESA-listed fish species over the same time period (2012-2022). Additionally, the U.S. Army Corps of Engineers (COE) may issue permits under section 404 of the Clean Water Act (CWA) (33 U.S.C. 1251 et seq) for stream crossing replacement/removal actions authorized under this consultation and subsequent opinions. If a 404 permit is required, the COE will review the project to verify that consultation has occurred and, as a condition of the permit, will require that the project be completed according to the direction herein. Any reasonable and prudent measures (RPMs) or terms and conditions outlined in this Opinion will be included as conditions of any 404 permit authorizing activity.

The proposed action addresses seven activity categories that may be addressed under this consultation: (1) Culvert removal and associated channel rehabilitation; (2) culvert, bridge or ford replacement with a culvert or open-bottomed arch; (3) culvert or ford replacement with a bridge; (4) culvert replacement with a low-water trail ford; (5) programmatic project maintenance; (6) road and trail relocation and decommissioning related to crossing replacement; and (7) bridge construction in migratory sockeye salmon habitat. This program, along with the

[1] *Gifford Pinchot Task Force et al. v. U.S. Fish and Wildlife Service*, 378 F.3d 1059 (9th Cir. 2004).

Opinion on the program, will provide USFS, BLM, and COE administrative units consistent methodology and criteria for implementing, documenting, evaluating, and monitoring stream crossing and fish passage rehabilitation activities.

The purpose of the action is to continue the removal or replacement of undersized, poorly designed or obsolete stream crossing structures. These structures generally block upstream fish passage while contributing to elevated sediment levels and poorly functioning watershed processes upstream and downstream of individual sites. Continuation and implementation of the state-wide programmatic action will result in increased fish habitat connectivity, decreased sediment inputs, reduced stream crossing failure potential, and improved hydrological processes. The USFS and BLM are proposing to continue the programmatic action into 2012-2022 according to their authority under the Forest and Rangeland Renewable Resources Planning Act (1974), as amended by the National Forest Management Act (1976) and it's implementing regulations.

1.2. Consultation History

During the early portion of the previous decade, the USFS and BLM were evaluating ways to implement stream crossing rehabilitation and restoration projects across the Pacific Northwest and Intermountain states. Among six National Forests (i.e., Payette, Boise, Sawtooth, Salmon-Challis, Nez Perce, and Clearwater) and seven BLM Field Offices (i.e., Challis, Cottonwood, Coeur d'Alene, Four Rivers, Jarbidge, Salmon, and Upper Snake) with ESA-listed anadromous fish and/or bull trout (*Salvelinus confluentus*) in Idaho (and BLM lands supporting bull trout in Nevada), several thousand culverts were inventoried from 2002-2004 using the "San Dimas protocol" to evaluate stream crossing structures (Clarkin et al. 2003). The San Dimas protocol documented pertinent variables including culvert type, length, width, height, culvert slope, channel alignment, pool depth at culvert outlet, jumping height to culvert outlet, and channel gradient. The results revealed that 75-90% of the inventoried culverts failed to pass one or more ESA-listed fish species at some life stage.

In discussion with NMFS and the U.S. Fish and Wildlife Service (FWS), the Federal land management agencies in Idaho agreed that a statewide approach to ESA section 7 and EFH consultation would most efficiently streamline the process for individual projects. Utilizing a programmatic approach was expected to reduce costs and time spent completing individual consultations, while ensuring consistency in design and implementation of individual projects. Interagency informal programmatic consultation discussions were initiated early in 2003 for stream crossing replacement/removal projects. A biological assessment (BA) team was formed including representatives from the USFS, NMFS, and FWS, and was joined by the BLM in 2004. The BA team benefitted from similar programmatic consultations completed in Oregon/Washington (2003) and Montana (2001, hull trout). NMFS and the FWS (together Services) were able to ensure adequate design criteria were incorporated into the proposed action to avoid or minimize effects to ESA-listed fish species.

As technical aspects of the consultation progressed, discussions shifted to identifying the appropriate number of crossings to consult on and assessing effects of the programmatic action. Identifying the number of crossings would aid the Services in quantifying any incidental take that may occur. Due to the diverse site conditions and potential complexity of design, a Project Design Team (PDT) was established for each project to ensure that local expertise and knowledge was utilized in project design, implementation, and project review. Pre and post project checklists were developed and used by Level 1 teams for project review and tracking purposes, as well as to validate take assumptions made in this consultation. Team reviews allowed for improved development of proposed stream crossing projects that maximized the restorative nature of each project while avoiding or minimizing adverse effects to ESA-listed fish species.

The USFS and BLM submitted the original final BA to the Services with a request for formal consultation in November, 2005. NMFS identified a need to confirm the assumptions of the extent, duration, and intensity of suspended sediment exposure and thus a means to monitor the level of incidental take that actually occurred as a result of programmatic action implementation. The BA team worked together to develop a suitable monitoring proposal that would meet the needs of regulatory agencies and would still be reasonable for the action agencies to implement. That monitoring proposal was appended to the final BA in July, 2006 as part of the proposed action. NMFS issued an opinion on August 8, 2006, which identified the level of incidental take that would occur as a result of programmatic action implementation (NMFS Tracking numbers: 2005/06396, 07635, and 07366). The 2006 NMFS opinion exempted incidental take for the actions described in the final USFS/BLM BA for a period of 5 years. Excluded actions (which did not meet the programmatic criteria) still required separate consultation. Table 1 summarizes the number of stream crossings removed or replaced during the 5-year time span (2006-2011) of the previous programmatic consultation.

Table 1. Number of Crossings Removed or Replaced Under Previous Programmatic BA/Opinion

Public Land Management Unit	Total Number of Crossings (average annual accomplishment)
Payette National Forest	7 (1)
Boise National Forest	12 (2)
Sawtooth National Forest	12 (2)
Salmon-Challis National Forest	4 (1)
Nez Perce-Clearwater National Forest	21 (4)
Idaho Panhandle National Forests	1 (1)
Idaho BLM (all Field Offices)	9 (2)
Total Accomplishment from 2006-2011	**66 (~15)**

With the expiration of the 2006 ESA section 7 consultation approaching at the end of 2011, the USFS and BLM began developing an updated stream crossing program and BA earlier that year. In addition to the five activity categories involved in the original consultation, the USFS and BLM added two more (*Road and Trail Relocation and Decommissioning Related to Crossing Replacement,* and *Bridge Construction in Migratory Sockeye Salmon Habitat*) that were not addressed in the 2006 consultation. Also, three more National Forests (i.e., Idaho Panhandle, Kootenai, and Idaho portion of the Bitterroot) joined the programmatic approach, as did another BLM Field Office (Bruneau). Finally, the COE (Walla Walla District) also joined the stream crossing programmatic consultation to include issuance of stream alteration permits related to stream crossings (that fit the programmatic criteria) under section 404 of the CWA. These agencies intended the updated BA to span 10 years of stream crossing programmatic action implementation (2012-2022).

NMFS received a draft BA on March 15, 2011, and participated in a conference call on May 17, 2011, to discuss the BA. NMFS provided listing information to the action agencies on May 19, 2011, regarding listing status of the species. NMFS received another draft BA on June 14, 2011, and provided comments on that draft later in June. NMFS participated in a conference call on July 29, 2011, and indicated that the BA was sufficient. The USFS and BLM completed the updated BA on December 6, 2011, and submitted it to the Services with a request to initiate formal consultation. Formal consultation was initiated by NMFS at that time.

For the purposes of this Opinion, the USFS and BLM identified the Snake River fall Chinook salmon, Snake River spring/summer Chinook salmon, Snake River Basin steelhead, Snake River sockeye (*O. nerka*) salmon; and designated critical habitat for each of these species as occurring within the project area and under the jurisdiction of NMFS. Fall Chinook salmon addressed within the BA comprise one Evolutionarily Significant Unit (ESU)[2], consisting of one population as identified by the Interior Columbia Basin Technical Recovery Team (ICBTRT) (2003). Spring/summer Chinook salmon addressed within the BA comprise one ESU consisting of three major population groups (MPGs) with 21 populations as identified by the ICBTRT. Steelhead addressed within the BA comprise one Distinct Population Segment (DPS) consisting of three MPGs with 17 populations identified by the ICBTRT. Sockeye salmon addressed by the BA comprise one ESU consisting of one population as identified by the ICBTRT. Table 2 displays the USFS and BLM determinations for individual species, critical habitat, and EFH. For consistency throughout this document all future references to affected ESUs or DPSs will be made with the term 'ESA-listed species'.

The action would likely affect tribal trust resources. Because the action is likely to affect tribal trust resources, NMFS has contacted the Nez Perce and Shoshone Bannock pursuant to the Secretarial Order (June 5, 1997). On May 11, 2012, NMFS sent out an e-mail describing this consultation and requesting input on tribal resources from each Tribe. NMFS has not received feedback from the Tribes.

[2] An "evolutionarily significant unit" (ESU) of Pacific Salmon (Waples 1991) and a "distinct population segment" (DPS) of steelhead (71 FR 834) are considered to be "species," as defined in Section 3 of the ESA.

Table 2. USFS and BLM Effects Determinations for the Proposed Action (USFS & BLM, 2011).

Listed Entity	Status	Determination
Snake River Fall Chinook Salmon		
Species	Threatened	NLAA
Critical Habitat	Designated	NLAA
Snake River Spring/Summer Chinook Salmon		
Species	Threatened	LAA
Critical Habitat	Designated	LAA
Chinook and Coho Salmon EFH		
EFH	Designated	May Adversely Affect
Snake River Sockeye Salmon		
Species	Endangered	NLAA
Critical Habitat	Designated	LAA
Snake River Basin Steelhead		
Species	Threatened	LAA
Critical Habitat	Designated	LAA

Key: LAA – May Affect, Likely to Adversely Affect; NLAA – May Affect, Not Likely to Adversely Affect.

1.3. Proposed Action

For the purposes of this consultation, the proposed Federal action is the action agencies programmatic implementation of stream crossing removal and/or replacement activities within the action area. Because the USFS and BLM propose to fund actions that may affect listed resources, and the COE must issue permits for these actions, they must consult under ESA section 7(a)(2) and MSA section 305(b)(2).

This consultation will cover stream crossing replacement and or removal actions initiated within 10 years of the issuance of this Opinion. This consultation effort is intended to remain flexible and adaptable, pending the collection and evaluation of monitoring data. Action agencies' PDTs and individual Level 1 Teams will be responsible for the collection and evaluation of data for these purposes. Reinitiation shall occur if any of the conditions described in Section 2.7 of this Opinion are met during the 10 year life of this consultation.

The USFS and BLM have proposed to conduct up to 156 stream crossing replacement and or removal actions in occupied habitat[3] each year within the action area. There are 16 USFS and BLM administrative units within the overall programmatic action area. This results in an average of approximately 10 projects per year, per administrative unit (156/16 units) in occupied habitat. For the purposes of this consultation, there is a cap of 12 projects per administrative unit each

[3] "Occupied habitat" for the purposes of this consultation is defined as habitat within perennial or intermittent channels that are occupied by ESA-listed fish species including habitat within 600 feet upstream of known or suspected occupied habitat. Definition is derived from the FWS Opinion for Fish Passage Restoration Activities in Eastern Oregon and Washington, where effects of culvert replacement/removal construction were determined to impact bull trout up to 600 feet downstream of project sites (FWS 2004b).

year. All stream simulation design criteria and mitigation measures apply to these projects (see Sections 1.2.3.1 & 1.2.6). The proposed action also includes an unknown number of stream crossing replacement and or removal projects in unoccupied habitat each year. See Section 1.2.3 Design Parameters and 1.2.6 Mitigation Measures, for criteria and measures relevant to unoccupied habitats.

The USFS and BLM intend to use this programmatic consultation to expedite completion of on-the-ground projects while hastening project development and consultation timeframes. Implementation of the proposed action will improve fish habitat connectivity and reduce anthropogenic sediment yields across the action area. Should any administrative unit plan on exceeding the 12 projects in a given year, Level 1 Teams will be consulted to ensure that effects remain within those anticipated in the BA and ensure all terms and conditions from the Opinion are met. Level 1 Teams will coordinate annual project plans across the action area by annually reviewing submissions made by individual PDTs (pre- and post-project report forms).

The main objective of all actions is to provide for stream simulation at all treated sites. Stream simulation mimics natural stream processes at stream crossings and rehabilitated sites. The proposed action is consistent with the following regional plans and strategies: (1) FWS Draft Bull Trout Recovery Plans (FWS 2002; 2004a); (2) NMFS Restoration Activities to Restore Anadromous Stocks (Roni et al. 2002); (3) Interior Columbia Basin Strategy Aquatic Framework (USDA and USDI 2004); (4) PACFISH/INFISH Roads Management Standard and Guidelines RF-4 and RF-5 (USDA and USDI 1994)[4]; (5) Aquatic Conservation Strategy for the SWIE revised Land and Resource Management Plans (LRMPs) - Roads Objective 11, Facilities and Roads Standard FRST02, and Soil, Water, Riparian, and Aquatic Resources Goal 2 (USDA USFS 2003).

1.3.1. Activity Categories

The proposed action consists of the following seven activity categories. These activities are covered either as stand-alone projects, or as components of larger projects. Coverage of project activities as components of larger projects is warranted only if consultations for the remaining components of larger projects have "Not Likely to Adversely Affect" determinations for listed species and/or critical habitat. Should a larger scope project have a "Likely to Adversely Affect" determination, the culvert replacement component would be addressed in the BA for the larger action.

Section 1.3.2 of this Opinion describes design parameters that are applicable to all the seven following activity categories.

[4] Not applicable to National Forests within the Southwest Idaho Ecogroup [SWIE].

1.3.1.1. Culvert Removal and Associated Channel Rehabilitation

This activity is intended to restore physical and biological connectivity, most notably passage for ESA-listed fish. These actions can be associated with closed, intermittently closed, or decommissioned (provided all valley-bottom fill is removed) roads, including unauthorized routes.

Following culvert removal, channels will be rehabilitated to the bankfull width, gradient, substrate composition, and active floodplain dimensions that exist upstream and downstream of the project area.

1.3.1.2. Culvert, Bridge or Ford Replacement with a Bridge

This activity will occur to reestablish physical and biological connectivity where: (1) An existing forest road or trail is required for USFS or BLM access or transportation needs; (2) an existing bridge is adversely affecting channel dynamics; (3) a bridge has been determined to pose a safety hazard or has outlived its useful life; or (4) if expected 100-year flows and associated debris cannot be accommodated with a culvert or open-bottomed arch. Structures and/or fords will be removed and replaced with stream simulation bridges. Bridge footings will be placed beyond bankfull width with possible flood relief culverts or additional spans.

1.3.1.3. Culvert or Ford Replacement with a Culvert or Open-Bottomed Arch

This activity will occur to reestablish physical and biological connectivity where an existing forest road or trail is required for USFS or BLM access or transportation needs, and 100-year flows and associated debris can be accommodated by a culvert or open-bottomed arch culvert. Culverts and/or fords will be removed and replaced with culverts or open-bottomed arches that incorporate stream simulation through the crossing. Culvert and open-bottomed arch widths will be at least bankfull width. Flood relief culverts on floodplains, embedded hox culverts, and structural plate (constructed on site) as well as corrugated metal pipe (pre-assembled) may be used.

1.3.1.4. Culvert Replacement with Low-Water Trail Ford

This activity will be covered by this consultation only if the ford design reduces overall potential effects to stream channels, assures fish passage, and/or reduces or eliminates adverse effects to ESA-listed fish species by replacing the culvert with a trail ford. This category does not cover road culvert replacement with road fords, even when used on an intermittent basis. This activity will occur to reestablish connectivity only where a road-to-trail conversion project is planned, or on an existing trail where a trail culvert is inadequate for fish passage, and is difficult or impossible to maintain due to inaccessibility. Design features will typically include hardening the trail ford so that erosion is minimized, but no ford hardening will occur where suitable spawning habitat is present. This activity could be a component of a larger action that changes the travel status of a road converted to a trail.

1.3.1.5. Programmatic Project Maintenance

Maintenance activities will be directed at the aforementioned actions designed and constructed under this proposed action. Maintenance actions include removal of woody debris (not sediment) that has accumulated at stream crossing structure inlets during flood events, and that has been determined (by the PDT) to obstruct fish passage or pose threats to the integrity of the road crossing. Woody debris removed from the culvert inlet would be placed within the immediate vicinity of the crossing (in-channel, outside the channel, and/or in the downstream floodplain). Maintenance also includes armoring around crossing structure inlets, and revegetation. Maintenance activities under this programmatic are only authorized at crossings which received coverage under this consultation effort.

1.3.1.6. Road and Trail Relocation and Decommissioning Related to Crossing Replacement

In some instances, it may be necessary to move the location of a crossing to an area that provides better access or has less potential for failure. Changing the location of the crossing will include decommissioning and reclamation of approaches on existing crossing and construction of new approaches at proposed crossing, with no net increase in route density within riparian areas. If a crossing is moved to a new location, the crossing is considered "in-kind," when it is within 1/4 mile of the existing crossing and includes no more than 1/2 acre of new road or trail reconstruction (~ 1/4 mile of road at 14-foot width). If the proposed crossing location does not meet these requirements, separate consultation is required. Routes will be constructed with the application of Regional Best Management Practices (BMPs) and built to agency standards for road or trail construction.

1.3.1.7. Bridge Construction in Migratory Sockeye Salmon Habitat

Crossings removed or replaced in migratory hahitat for sockeye salmon may only be replaced with a single span bridge. Bridges with instream piers will require separate consultation. Structures or fords will he removed and replaced with stream simulation bridges. If bridge requires multiple spans and relief culverts, specific analysis and consultation would be necessary.

1.3.2. Design Parameters

This section describes general design parameters applicable to all activity categories. Design parameters specific to only occupied habitats and/or perennial streams are indicated where relevant.

1.3.2.1. Stream Simulation

Stream simulation designs are intended to mimic the natural stream processes at a culvert removal site or at a stream crossing within a culvert, open-bottom arch, ford, or under a bridge. Fish passage, sediment transport, and flood and debris conveyance within the structure are intended to imitate the stream conditions upstream and downstream of the crossing as close to natural conditions as the structure type allows. Stream simulation requires a high level of information regarding stream hydrology, geomorphology, and engineering. It is critical that a hydrological/geomorphological evaluation of the project site be completed to determine project design, and potential impacts of the project at the site and along the stream channel.

Stream simulation parameters for programmatic actions are defined by the San Dimas Stream Simulation Design Training Manual (USDA FS San Dimas Technology and Development Center ([SDTDC] 2004). Parameters are the same for occupied and unoccupied habitats in intermittent and perennial channels unless otherwise indicated.

For ***occupied habitat***, specific objectives of activities include:

- Simulate bed material and structure, bankfull cross-section, and slope of the natural channel to provide diverse avenues for passage by organisms moving in a natural channel;

- Provide for some of the culvert bed material to be mobile;

- Design project to accommodate valley and floodplain processes, 100-year flows, sediment and debris movement, and stream meander migration;

- Control velocity by designing roughness and slope to accommodate the varying endurance and swimming abilities of specific fish species;

- Minimize delay of movement of listed species;

- Provide for ecological connectivity; and

- Provide for wildlife passage.

For ***unoccupied habitat*** in perennial and intermittent channels, specific objectives include:

- Simulate bankfull cross-section and slope of the natural channel;

- Design project to accommodate valley and floodplain processes;

- For all crossings, design project to accommodate 100-year flows or, alternatively, provide for site-specifically analyzed recurrence flows;

- For crossings determined to pose a substantial risk, design project to accommodate 100-year flows and associated sediment and debris movement; and,

- Provide for ecological connectivity.

1.3.2.2. Grade Control

Grade control treatment may be included in project design based on site limitations (i.e., channel slope or bed material type), material availability, economics, land use, design competence or familiarity, and/or regulatory restrictions. Treatment alternatives that control grade so that incision is prevented can include large roughness element grade controls, rock and log weir grade controls, constructed step-pool and cascade grade controls, and sizing the culvert to contain the floodplain (Castro 2003).

1.3.2.3. Structure Width

Widths for all structures replaced under this programmatic consultation shall be greater than or equal to the bankfull channel widths. Structures should be wide enough to remove the hydraulic signature of the structure on the stream, and to sustain general bed shape, channel forms, and elevation. Bankfull cross-section shape and dimensions should he similar to natural channel reference reaches and fit with stream reaches adjacent to crossing site (reference reach lengths for perennial streams should be at least 20 times the stream width upstream and downstream of the stream crossing).

Structure widths greater than hankfull widths are suggested by NMFS (NMFS 2008a) and Washington Department of Fish and Wildlife (Bates 2003). Required structure widths in occupied habitats under this programmatic consultation must be greater than bankfull widths only when the following conditions exist or are desired:

- When required to pass debris;

- When necessary to minimize effects to meander pattern in low-gradient channels; or

- When site-specific conditions dictate additional width (to be described in pre-project review).

1.3.2.4. Culvert Length

Culverts will be designed to be long enough to avoid fill failures or chronic erosion from fill.

1.3.2.5. Embedment

Culverts will be embedded 20% or more if desired, which puts the stream bed near the widest part of the culvert. Embedment shall be deep enough to account for scour, grade adjustments, footings, and bed integrity.

1.3.2.6. Bridges

No abutments shall be placed within the bankfull channel. Exposed riprap shall not be placed within the bankfull channel unless necessary to achieve passage objectives, maintain channel features, and protect structures. Installation of multiple-span bridges is not included.

1.3.2.7. Trail Fords

The PDT (including a trail building specialist for this category) will design ford and trail approaches during project planning to ensure long-term stability and minimize the potential for sediment entry. Design will prevent creation of a low-water barrier to fish passage, by having similar grade and bankfull width as the channel while maintaining adequate water velocities and depths to allow fish passage. Design will minimize ground disturbance and excessive grade (less than 15%) on the approach and exit, and avoid existing or potential spawning locations. Trail fords will be 24 inches (foot and stock use only) to 50 inches (all-terrain vehicle use) in width (USDA USFS 2000, Trail Construction and Maintenance Handbook). Trail approaches and fords will typically be hardened with rocks, and may include grade control structures. Adequate drainage on approaches will reduce hydrologic connectivity and minimize trail-generated sediment delivery. Design features will typically include hardening the trail ford so that erosion is minimized and so that spawning is not encouraged at improved crossing if there are indications that fish spawn in this general vicinity.

1.3.3. Excluded Projects

The USFS and BLM have indicated that the following list of project types would not be included in the proposed programmatic actions, or covered by this programmatic BA:

- Any projects that would facilitate the expansion of brook trout (*Salvelinus fontinalis*) into occupied bull trout habitat (or potentially occupied should passage be restored);
- Projects with structure widths less than bankfull width;
- Maintenance of projects conducted outside of that described in Section 1.3.1.5, and reconstruction of projects not meeting objectives of this Opinion;

- Placement of any kind of culvert retofitting, (e.g., baffled culvert or fish ladders inside culverts);
- Multiple-span bridges (bridges requiring instream piers);
- Projects with spawning ESA-listed fish or their redds within the area that would be directly disturbed or disrupted by project actions;
- Projects not conducted during low flow conditions;
- Actions that are components of larger projects for which a determination of "Likely to Adversely Affect ESA-listed species" has been made; or
- Any newly constructed stream crossing that does not replace or remove an existing stream crossing.

1.3.4. Project Design Team

The design and construction of naturalized stream crossings typically requires expertise in multiple disciplines, such as: engineering, hydrology, fluvial geomorphology, contract administration, and fisheries and wildlife biology. The PDTs should be comprised of individuals with this expertise. The degree of involvement of individual team members will vary, depending on whether the project is in occupied or unoccupied habitat, within perennial or intermittent channels, and depending on the information required during particular planning phases. In the following sections, the term "PDT" can mean one, several, or all members of the team, depending on the information and the level of analysis required for implementation.

Prior to design, a PDT will conduct a field review of a given proposed project in occupied habitats, identifying biological and physical requirements that need to be met during the design and implementation process. The PDTs will evaluate existing and desired conditions, and consider alternatives that may be incorporated into the project design, in order to emulate natural conditions (i.e., stream simulation). The design should also evaluate the potential debris flows, flood flows, channel stability, and floodplain characteristics.

1.3.4.1. Guidance for Project Prioritization

Prioritization of projects may tie to partner availability, funding sources, components of other projects, existing recovery plans, LRMPs, Land Use Plans (LUPs), and the Aquatic Framework of the Interior Columbia Basin Strategy. Prioritization factors may include biological and physical parameters that define the potential for restoring access and function to habitats for ESA-listed species. Increased prioritization may be placed on projects that will implement identified recovery actions from (draft) recovery plans. The PDTs may also consider watershed assessments, transportation analysis, quantity and quality of habitat, number of fish species affected, presence of exotic fish species, risk of headcutting, risk of failure, culvert condition, funding restrictions, and planning status.

1.3.4.2. Project Design

The PDTs will conduct full field reviews of potential sites in occupied habitats, identifying those biological and physical characteristics that need to be met by the design process. The PDTs will consider existing and desired environmental conditions, and will recommend alternatives that can be feasibly incorporated into project design to rehabilitate natural conditions that support ESA-listed fish.

The PDTs will oversee the collection of project site data essential for the design of a stream simulation structure in occupied habitats and perennial channels, and the design of structures in intermittent channels. This includes information that describes physical watershed and stream processes and provides parameters for designing crossing structures. The information will include potential for landslide and debris flows, flood flows, channel character and stability, floodplain character, and flooding potential. This information will help PDTs consider and develop feasible project alternatives and project-specific plans for the selected alternative.

1.3.4.3. Pre and Post Project Documentation

Pre and post project information is critical to ensure project design and implementation meet stream simulation goals. Monitoring information also ensures that take assumptions made in this Opinion are validated while providing data necessary to evaluate the need for reinitiation over the 10 year life of the consultation.

Prior to implementation, PDTs will notify their Level 1 Team of proposed actions that are being considered under this programmatic Opinion through the Level 1 Team process. National Environmental Policy Act (NEPA) and Level 1 processes will describe how the project meets the conditions outlined in this Opinion (up to 12 per year per administrative unit). The PDTs will document project design, review, and implementation of each of the projects in occupied habitat. Appendix A provides a pre project checklist and template of the information to be reported. Level 1 Teams will ensure that copies of pre project checklists are submitted to the NMFS Idaho Habitat Branch and FWS Idaho Offices.

The PDTs will also notify Level 1 Teams of all completed actions in occupied habitat covered under this programmatic Opinion through the Level 1 Team process. Level 1 Teams will conduct annual implementation and effectiveness monitoring reviews of randomly selected projects within occupied habitat from previous years and will include personnel from the appropriate BLM or USFS action agency (engineers, hydrologists, geomorphologists, and/or fisheries biologists), FWS, and NMFS. Formats for annual field reviews will be developed by individual Level 1 Teams, and at a minimum will include the information provided in the post project checklist provided in Appendix B. Level 1 Team members will ensure that copies of post project checklists, as well as any Level 1 Team documentation of field reviews, are also submitted to the NMFS Idaho Habitat Branch and FWS Idaho Offices.

1.3.5. Construction Methods, Impacts, and Applied Conservation Measures

This section describes construction phases and design parameters generally necessary to implement programmatic activities addressed in this Opinion. These methods and measures are designed to minimize potential detrimental effects to ESA-listed fish species, critical habitat, and EFH. All measures should be incorporated into design and implementation, unless there are alternatives for accomplishing the underlying objectives of the measure and alternatives are accepted by the PDT. Based on site-specific conditions and activity category, the phases, methods, and timing may vary to more effectively meet the goals of stream simulation. Variations in design features will involve the Level 1 Team and PDT input, to ensure that adverse effects to ESA-listed species, stream channels, and aquatic habitats are minimized.

Table 3 summarizes the typical methods and conservation measures that will be applied during each phase of an individual project, and provides the relevant required mitigation measures specific to each construction phase. A complete discussion of conservation measures (including identification of personnel responsible for implementation) is found in the BA and included in Appendix C of this Opinion.

Many streams have invasive aquatic species such as the New Zealand mudsnail (*Potamopyrgus antipodarum*) and whirling disease. Many of these species are practically invisible to the naked eye and nearly impossible to detect if attached to heavy equipment. Projects in streams known or suspected to contain non-native, invasive, or competitive fish species (e.g., brook trout) will require evaluation by the PDT during project planning to prevent invasive's expansion into occupied bull trout habitat.

The following construction elements, phases and mitigation measures represent *typical* actions required for implementation of programmatic activities. Based on site-specific conditions and activity category, the phases, methods, and timing may vary to more effectively meet the goals of stream simulation. To ensure that adverse effects to ESA-listed species, stream channels, and/or watershed integrity are minimized, construction methods will be coordinated and planned within the PDT, involving fisheries biologists, hydrologists, other aquatic specialists, and engineers. Conservation measures apply to all projects unless specified otherwise in Appendix C.

Table 3. Applicable mitigation measures for typical construction phases for programmatic stream crossing structure replacement and removal activities.

	Site Preparation	Excavation of Road Fill and Diversion Channel	Dewatering of Construction Site	Removal of Culvert	Reconstruction of Channel	Construction of Trail Ford	Construction of New Structure	Removal of Diversion	Backfill to Road Surface	Site Rehabilitation	Maintenance
F1. Buffers	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓
F2. Low-water Work Windows		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
F3. Fish Avoidance		✓	✓								
F4. Pollution Control Measures											
a. Clean Water Act	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
b. Spill Prevention, Containment, and Reporting	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
c. Minimize Exposure to Equipment Fuel/Oil Leakage	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
F5. Aquatic Invasive Control Measures	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
F6. Erosion Control Measures											
a. Minimize Site Preparation Impacts	✓										
b. Minimize Earthmoving-related Erosion		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
c. Minimize Temporary Stream Crossing Sedimentation		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
d. Minimize Sedimentation Through De-watering		✓			✓	✓					
e. Flow Reintroduction								✓			
f. Site Rehabilitation				✓						✓	

Note: Mitigation measures are fully detailed in Appendix C. Typical construction phases are described in Section 1.3.5.

1.3.5.1. Equipment

Equipment used for all culvert removal and replacement projects would typically consist of a mix of the following: Back hoe, bulldozer, tractor, grader, dump truck, front-end loader, excavator, crane, concrete pumper truck, paving machine, pile driver, pumps, helicopters, explosives, hydraulic hammers, hydroseeding truck, large and small compactors, hand shovels, and rakes.

1.3.5.2. Site Preparation

Site preparation would include flagging staging areas, access routes, and stockpile areas recommended by the PDT in order to minimize disturbance, reduce impacts to riparian vegetation, and minimize the potential erosion into stream channels. Existing disturbed locations would be used wherever possible (for example, road prisms). Areas of sufficient size would be cleared if sufficient staging or stockpile areas do not exist. Material excavated from clearing would be stored in the stockpile area. Machinery, equipment, and materials would be stored in the staging area. Expected impacts include vegetation removal and exposing disturbed areas to potential erosion. Trees that are removed in order to facilitate structure placement, will be stockpiled for use in stream channel or floodplain rehabilitation or maintenance. Where needed, sediment harriers (e.g., silt fences, weed free straw bales, sandbags, etc.) would be placed around disturbed areas (e.g., stockpile and staging areas) to prevent erosion into the stream channel and road ditches. A supply of surplus sediment barriers will be kept on hand, to respond to unanticipated events that have the potential to deliver sediment to stream channels. Table 3 indicates additional conservation measures to be employed.

Riparian huffers will he designated and flagged to avoid the potential for delivery of sediment or contaminants to streams. Buffers of different widths may be recommended for different activities such as site preparation, equipment work areas, equipment staging areas, equipment fueling and maintenance areas, earthmoving, and stockpile areas, depending on the level of protection necessary. Site specificity and the level of protection necessary will be evaluated by the PDT, and will take into account, but may not be limited to the following: presence of ESA-listed species, flow regime, floodplain width, riparian characteristics, stream size, and/or valley shape.

1.3.5.3. Excavation of Road Fill and Diversion Channel

Road fill would be excavated around the culvert to just above the wetted perimeter in preparation for dewatering procedures. However, sometimes dewatering would be conducted before any excavation. Excavating equipment would typically work from the road fill without disturbing water flow or sidecasting material into stream channels.

In some cases, project design will call for a pipe or side-channel diversion to carry diverted streamflow from a diversion point around the project site to a location downstream of the project site (See Section 1.3.5.4). Where the project design calls for an excavated, lined channel to dewater the project area (rather than a pipe or side-channel diversion), excavation would be required from the diversion point through the floodplain, and down to a reentry point below the project site. Excavation would not be conducted in the live channel.

Excavated material from road fills would be stored at a designated stockpile site for use in site rehabilitation, or hauled to a permanent waste area. Excavated material from diversion channels would be stored at the designated stockpile site (subject to erosion control measures) for use in filling the excavated channel after the stream is re-watered or other site rehabilitation actions. Machinery may cross streams only at designated temporary crossings (as recommended by the PDT).

Aggregate construction impacts to this point would likely include the staging and stockpile areas, road fill around the culvert, excavated diversion channel, designated crossings, and possibly the road prism crossing the floodplain. Table 3 indicates the proposed conservation measures.

1.3.5.4. Dewatering of Construction Site

In most cases, project design will call for rerouting of stream flows to isolate the project work area from the stream prior to excavation. The length of the dewatered stream channel will vary, depending on the width of the road prism at the crossing. The dewatering process will include the construction of water diversion structures and removal of aquatic organisms from the project site. Prior to constructing a water diversion, a fisheries biologist will conduct or direct an inspection of the stream and identify the appropriate means necessary to minimize the potential for fish to enter a constructed diversion and associated dewatering conveyance.

Dewatering will be accomplished slowly to capture and move stranded fish and other aquatic organisms to the extent possible. The diversion structure may act as a temporary barrier to fish passage, or fish may be allowed to move downstream through the diversion, when it is determined that entrapment will not occur. If diversion inlet is not screened, the diversion outlet will be placed in a location that facilitates safe reentry of fish into the stream channel.

Sites that necessitate electrofishing to clear the work area would be dewatered differently than sites not using electrofishing. Blocknets would be placed at the upstream end of the diversion channel. In addition to blocknets, electrofished sites would have a fish biologist attempt to clear the area of fish before the site is dewatered and the flow is bypassed. This could be accomplished by a variety of methods, including seining, dipping, or electroshocking, depending on specific site conditions. Non-electrofished sites would be cleared of fish by dewatering the site and then using dipnets to salvage remaining fish from isolated pools (Appendix C). Standard fish handling procedures would be used to minimize handling stress.

The dewatering structure would typically be a temporary dam built just upstream of the project site or a structure that diverts flow to one side of the channel. In most cases, a pipe would carry the stream flow from the diversion dam around the project site to a location immediately downstream of the construction zone. Pumping of diverted water may occur to facilitate dewatering, as long as screening, velocity, and water disposal parameters are met. Pumps will have fish screen installed, and operated and maintained in accordance with NMFS fish screen criteria (NOAA Fisheries 2011). It may be necessary to have temporary equipment access through the riparian area to the site of the dewatering structure.

If a lined channel, rather than a pipe or side-channel diversion, is used for dewatering, excavation would be required from the diversion point, through the floodplain, and down to a reentry point below the project site. Flow diversion structures around project sites will be constructed with rock or sand bags filled with clean gravel, and covered with plastic sheeting; however, mining of stream or floodplain rock cannot be used for diversion dam construction. Cofferdams, portable bladder dams or other diversion technologies constructed of non-erodible material may be used to contain stream flow. Outflow will be directed to an area that minimizes or prevents erosion. A revegetated abandoned stream channel of appropriate size may be used to accommodate peak flows that may be expected during construction (including storm events). If appropriate, water from the dewatering activities may be pumped to a temporary storage/treatment site, or into upland areas, and allowed to filter through vegetation prior to water reentering the stream channel.

Within-channel rerouting may occur at low flows when the stream channel is wide enough to accommodate rerouting within the active channel and the diversion path, which may include a pipe or one side of the existing channel, is essentially non-erosive. This method is typically associated with the construction of open-bottomed arches and bridges. The length of stream reroute will vary, depending on the width of the road prism at the stream crossing.

Aggregate construction impacts include the exposed staging and stockpile areas, road fill at the crossing, dewatered stream channel, constructed diversion channel, designated crossings, and possibly the road prism crossing the floodplain. Equipment access to the stream edge and diversion construction may impact a narrow cross section of riparian area, removing vegetation and exposing bare soil to erosion. If a diversion channel is excavated, material will be stored at designated stockpile areas, for use in rehabilitating the excavated channel. Table 3 indicates the proposed conservation measures.

1.3.5.5. Removal of Culvert

Removal of culverts involves removal of road fill immediately associated with existing culverts and is completed entirely within the dewatered work area. Road fill would be removed and stored at a designated stockpile site or hauled to a permanent waste area. At this point, the culvert would be removed, and the remaining material would be excavated down to streambed elevations. Excavation widths and depths would vary depending on whether the culvert would be removed or replaced with a bankfull culvert, open-bottom arch, bridge footings, or trail ford. Excavating equipment would typically work from the road fill and cross the stream within the dewatered area or at a designated stream crossing. Excess groundwater may be removed from the work area by pumping to a settling area before discharging back into any water body. Table 3 indicates the proposed conservation measures.

1.3.5.6. Reconstruction of Channel

All work under this activity phase would occur within the dewatered work area. The stream channel cross-section and gradient would be reconstructed within the area formerly occupied by the culvert in a manner that mimics natural conditions found upstream and downstream. Grade control structures and barbs upstream and downstream of project sites may be included in this channel reconstruction. The floodplain would be reconstructed to mimic floodplain elevations and dimensions that occur upstream and downstream of the project site. Large wood and/or boulders may be placed in the reconstructed stream channel and floodplain (as recommended by the PDT) where natural conditions possess these attributes. Table 3 indicates the proposed conservation measures.

1.3.5.7. Construction of Trail Ford

All work under this activity phase would occur within the dewatered work area. Ford locations would be excavated to accommodate any permanent ford structure being installed. Waste material would be staged in designated locations or end hauled to an approved disposal site. The ford structure would then be installed and trail approaches to and from the ford rebuilt to access a suitable graded stream section. Table 3 indicates the proposed conservation measures.

1.3.5.8. Construction of New Structure

All actions described under this construction phase would occur within the dewatered channel segment. Headwalls may be applied to the culvert, arch, and bridge construction phases, outside of bankfull widths. Riprap placement for structure protection and where needed to achieve passage objectives and maintenance of channel features may occur (as recommended by PDT).

For culvert placement and backfilling over the culvert, bedding material would be placed and shaped, the culvert would be assembled and placed in position, and fill would be placed around it in successive layers to begin the reconstruction of the road prism. Culverts would then be embedded with appropriate substrate from offsite locations, or suitable material would be used from a project stockpile. Culverts will be embedded at 20% or more, so that the stream bed at the widest part of the culvert would be deep enough to account for scour, grade adjustments, footings, and bed integrity. Culverts will be designed to sufficient length to avoid fill failures or chronic erosion from fill. Infill material will consist of suitable material from a project stockpile, or may be hauled from an offsite location, provided the material is of similar characteristics to the project site. Machinery would typically operate from the road fill and cross streams at dewatered areas, temporary bridges, or at designated temporary crossings. If part of the design, flood relief culverts would be installed at this time. Concrete may be poured to provide bedding for squashed culverts in some instances. Properly sized and sorted substrate would be placed and compacted in lifts inside the culvert to the designed height.

Likely construction methods for open-bottomed arch placements and backfill would include excavation of footing locations for either poured-in-place or pre-cast footings. Placement of forms or pre-cast footings, or pouring and curing of concrete would generally occur next. To embed the open-bottomed arch with substrate, infill material would be hauled from an offsite location, or suitable material would be used from a project stockpile. Properly sized substrate would be placed and compacted in thin lifts to the required height within the footings. Assembly of the arch and its attachment to the concrete footings usually would follow. Fill would then be placed in thin lifts or layers around the structure to begin restoration of the road prism. Machinery would typically operate from the road fill and cross streams at dewatered areas, temporary bridges, or at designated temporary crossings.

One of the following three construction methods would likely be used for bridge placements: (1) Pile abutments would be constructed by driving piles below stream channel then forming and pouring a concrete cap; (2) concrete footings or piers would be built below the stream channel through excavation, and placement of forms followed by pouring and curing of concrete; or (3) pre-cast, I-beam, steel, gabion, or cast- in-place footings would be placed, and compacted fill would be protected by riprap if necessary to achieve project objectives. Each method will occur outside bankfull width, and no abutments shall be placed within the bankfull channel. Headwalls may be constructed to protect the road fill prism. Fill would be placed where necessary to help restore the road prism. Exposed riprap shall not be placed within the bankfull channel unless necessary to achieve passage objectives, maintain channel features, and protect structures. Machinery would typically operate from the road fill and cross streams at dewatered areas, temporary bridges, or at designated temporary crossings (recommended by the PDT). Other construction actions, depending on design, may include: placement of substrate material and fill-slope riprap, beam placement, grout seam, deck construction, form curbs, place guardrails and approach rails, and paving. Table 3 indicates the necessary proposed measures for this construction phase. Multiple-span bridges are not allowed and large projects requiring multiple spans, or flood relief will require site specific consultation.

1.3.5.9. Removal of Diversion

The restoration of stream flow to the work site involves the removal of the inwater diversion structures. The diversion dam and water routing equipment would be removed. Heavy machinery or manual laborers operating from the bank or within the channel, may be used to remove diversion structures. Rewatering will be done slowly, so as to minimize large pulses of sediment. Reconstructed stream channel will be pre-washed into a reach equipped with sediment capture devices such as Sedimat®, prior to reintroduction of flow to the stream. Stream channels will be re-watered slowly to prevent loss of surface water downstream as the construction site streambed absorbs water and to minimize a sudden increase in turbidity. Table 3 indicates the proposed conservation measures for this construction phase.

1.3.5.10. Backfill to Road Surface

Completion of road fill and surfacing may include construction of headwalls (if part of the design), placing fill in thin lifts over the culvert or open-bottomed arch to top of the subgrade using backfill material from stockpiling or outside sources, and final construction of road surface. Most, if not all, work will occur on the road prism. Table 3 indicates the proposed conservation measures for this construction phase.

1.3.5.11. Site Rehabilitation

Site rehabilitation after construction generally includes establishing long-term erosion protection measures using boulder-sized riprap, plantings, erosion control fabric, seed, and mulch. Trees will be retained at project sites wherever possible. Trees (greater than 8 inches diameter at breast height [dbh]) will not be felled in the riparian area for site rehabilitation purposes unless necessary for safety. If necessary for safety, trees may be felled toward the stream and left in place, or placed in the stream channel or floodplain. Whenever possible, woody shrubs that need to be removed as part of the project will be excavated with root ball intact, retained on site, and replanted as part of the site rehabilitation. Instream or floodplain rehabilitation materials such as large wood and boulders will mimic as much as possible those found in the project vicinity. Such materials may be salvaged from the project site or hauled in from offsite but cannot be taken from streams, wetlands, or other sensitive areas. Any stockpiled woody debris would be scattered and placed outside of the active stream channel. Woody debris may be placed within the stream in the project vicinity, if recommended by the PDT to be a habitat component of the area or if beneficial for channel stabilization. Disturbed areas will be rehabilitated to conditions similar to pre-work conditions through spreading of stockpiled materials (large woody debris), seeding, and/or planting with native seed mixes or plants. If native stock is not available, soil-stabilizing vegetation (seed or plants) will he used but does not promote the introduction of exotic species.

For culvert removal or bridge projects, the stream channel cross-section and gradient will be reconstructed within the area formerly occupied by a culvert in a manner that reflects more natural conditions found up and downstream. No herbicide application will occur as part of the permitted action. When deemed necessary by the PDT or aquatic specialist, compacted access roads, staging areas, and stockpile areas will be mechanically loosened.

Equipment and excess supplies would then be removed, work storage areas cleaned, and temporary erosion control materials removed. If required to reduce erosion, impacted areas would be seeded and/or planted. All actions are intended to be those necessary for site restoration and would be confined to areas impacted throughout the project. Site rehabilitation activities will be completed prior to the end of the current field season, although subsequent seeding and revegetation may be necessary in following years. Table 3 indicates the proposed conservation measures for this construction phase.

1.3.5.12. Programmatic Project Maintenance

Maintenance of rehabilitated crossings may be necessary within the lifespan of this proposed action. Armoring of structures and revegetation, necessary for long-term maintenance, are included within this category. Large wood that has accumulated at the inlet of a culvert, open-bottomed arch, or bridge, and is determined to obstruct fish passage or pose threats to the crossing's integrity would be removed and placed immediately downstream of the outlet. When access permits, and where appropriate, large wood would be placed within the bankfull channel.

Machinery used to remove and place large wood would normally operate from the road prism. If not possible, a temporary access to the stream channel or within the stream channel may be necessary (Conservation measures prohibit working within live channels in 'occupied' streams). In most cases, maintenance activities would usually be completed in 2 days or less. Tahle 3 indicates the proposed conservation measures for this construction phase.

1.3.6. Summary

Conservation measures summarized above and described in tbeir entirety in Appendix C are proposed as part of the action and are intended to avoid or reduce adverse effects on ESA-listed species and their habitats. NMFS regards these conservation measures as integral components of the proposed action and expects that all proposed project activities will be completed consistent with those measures. We have completed our effects analysis accordingly. Any project activity that deviates from these conservation measures will be beyond the scope of this consultation and will not be exempted from the prohibition against take as described in the attached ITS. Further consultation will be required to determine what effect the modified action may have on ESA-listed species or critical habitats.

1.4. Action Area

The BA describes the action area for proposed restoration activities at stream crossings that extends across 40 4th -level hydrologic unit codes (HUCs) located in the Salmon, Snake, Kootenai, Pend Oreille, Spokane, and Clearwater basins.

The action area addressed by NMFS in this Opinion (that pertains only to ESA-listed anadromous fish) is a subset of the action area described in the BA where restoration activities at stream crossings are proposed. NMFS action area involves 18 4th field HUCs located within the Salmon River basin, Clearwater River basin, and a portion of the Snake River basin where ESA-listed anadromous fish species are present in Idaho. These 18 subbasins are located within the following National Forest and BLM administrative units: Payette, Boise, Sawtooth, Salmon-Challis, Nez Perce, and Clearwater National Forests; and Idaho BLM Public Lands in the Challis, Cottonwood, and Salmon Field Offices. Figure 1 illustrates the 18 4th field HUCs that are included in this Opinion. Table 4 lists these 18 4th field HUCs by name, HUC number, and public land management units where they are located. Table 4 also lists those subbasins in Idaho that are outside of the range of anadromous fish and therefore excluded from this Opinion.

Some explanation is warranted here regarding the Lower North Fork Clearwater River subbasin #17060308 which is excluded from this Opinion, even though the lowest 2-mile reach of the North Fork Clearwater River does support ESA-listed salmon and steelhead. This lowest reach of the mainstem North Fork Clearwater River flows from the base of Dworshak Dam to its confluence with the main Clearwater River (at Ahsahka). This section only involves a small parcel of BLM-managed land and no opportunities exist for stream crossing restoration within that parcel, and therefore is excluded from this Opinion.

Figure 1. National Forest and BLM lands and subbasins included in the NMFS action area.

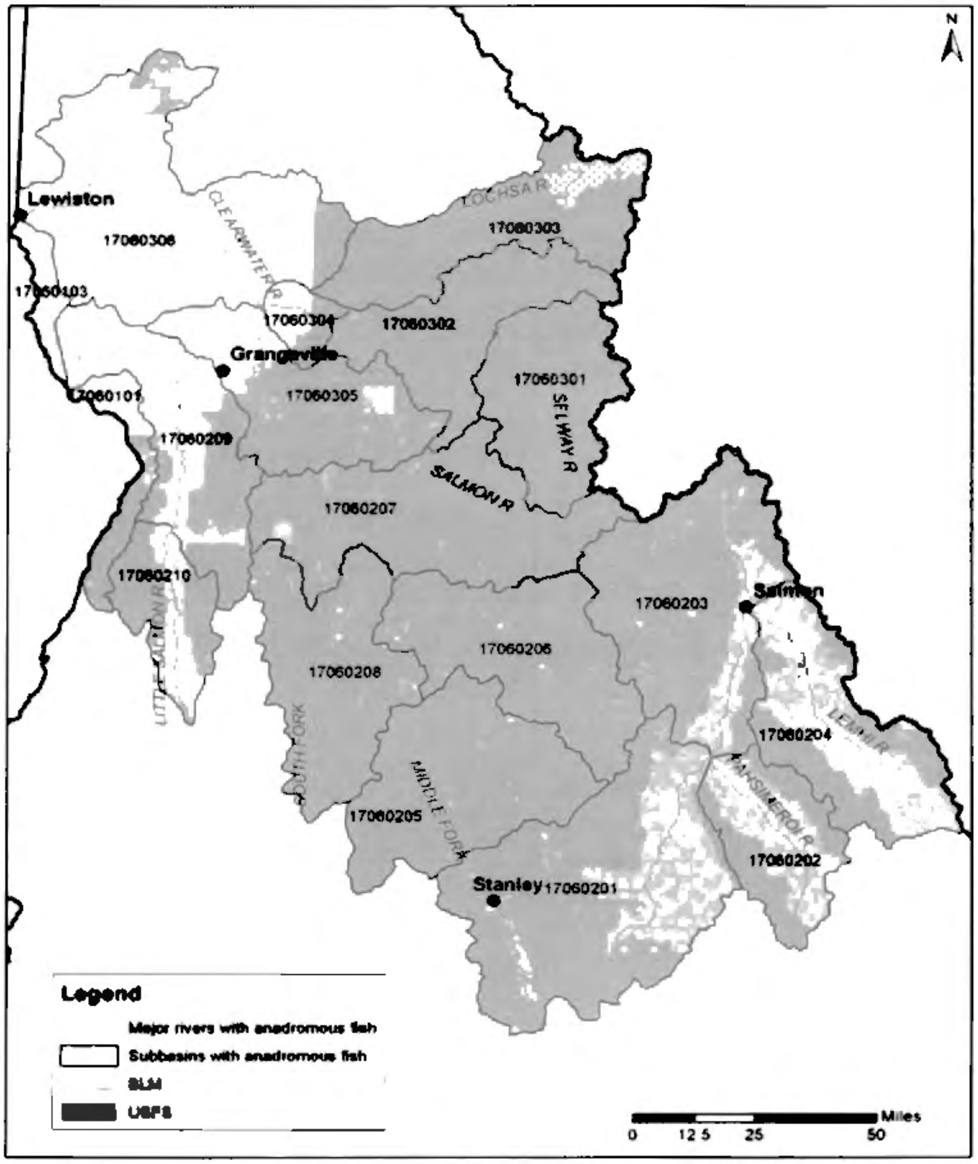

Table 4. Subbasins & Land Management Units in Action Area for 2012-2022 Stream Crossing Programmatic

HUC #	Subbasin Name	Land Management Unit
Included in NMFS Action Area		
17060101	Hells Canyon	Payette National Forest (NF), Nez Perce N.F.
17060103	Lower Snake River-Asotin	Cottonwood BLM Field Office (FO)
17060201	Upper Salmon River	Salmon-Challis N.F., Challis BLM, Salmon BLM FO
17060202	Pahsimeroi River	
17060203	M Salmon River-Panther Creek	
17060204	Lemhi River	
17060205	Upper Middle Fork Salmon River	Salmon-Challis NF
17060206	Lower Mid Fork Salmon River	
17060207	Middle Salmon River-Chamberlain	Salmon-Challis NF, Challis BLM FO
17060208	South Fork Salmon River	Payette NF
17060209	Lower Salmon River	Nez Perce NF, Cottonwood BLM FO
17060210	Little Salmon River	Payette NF, Nez Perce NF, Cottonwood BLM FO
17060301	Upper Selway River	Nez Perce NF, Bitterroot NF
17060302	Lower Selway River	Nez Perce-Clearwater NF
17060303	Lochsa River	
17060304	Middle Fork Clearwater River	
17060305	South Fork Clearwater River	Nez Perce-Clearwater NF, Cottonwood BLM FO
17060306	Mainstem Clearwater River	Cottonwood BLM FO
Excluded from NMFS Action Area Due to Absence of Anadromous Fish		
17050102	Bruneau River	Bruneau, Jarbidge BLM FO
17050201	Brownlee Reservoir	Payette NF, Four Rivers BLM FO
17050124	Weiser River	
17050111	North and Middle Fork Boise River	Boise NF, Sawtooth NF
17050112	Boise River-Mores Creek	Boise NF
17050113	South Fork Boise River	Boise NF, Sawtooth NF
17050115	Middle Snake River-Payette River	Four Rivers BLM FO
17050120	South Fork Payette River	Boise NF
17050121	Middle Fork Payette River	
17050122	Payette River	Four Rivers BLM FO
17050123	North Fork Payette River	Boise NF
17040217	Little Lost River	Salmon-Challis NF, Challis BLM FO, Salmon BLM FO, Upper Snake BLM FO
17060307	Upper North Fork Clearwater River	Nez Perce-Clearwater NF
17010101	Middle Kootenai River	Kootenai NF
17010104	Lower Kootenai River	
17010105	Moyie River	
17010213	Lower Clark Fork River	Idaho Panhandle NF
17010214	Pend Oreille Lake	
17010215	Priest River	
17010303	Coeur d'Alene Lake	Idaho Panhandle NF, Coeur d'Alene BLM FO
17010304	St. Joe River	Idaho Panhandle NF

Because of the potential for downstream and cumulative effects within watersheds, NMFS action area encompasses entire subbasins where the ESA-listed anadromous fish and proposed or designated critical habitat occur. The subbasins comprising the NMFS action area often span across USFS and BLM administrative unit boundaries, and sometimes extend outside of Federal administrative unit boundaries to include private lands.

The action area provides habitat for spawning, rearing, and migrating adult and juvenile individuals for the ESA listed-species noted in Table 5. Due to the large extent of the action area, uncertainty of exact project locations and potential to influence proposed or critical habitat, consultation is being completed for all species listed in Table 5. Fall Chinook salmon are not expected to occur in streams where projects will take place (primarily due to species distribution); therefore, direct effects to this species is unlikely. Spring/summer Chinook salmon and steelhead are more widely distributed within the action area, and incubating, juvenile, and adult individuals may be exposed to effects from the proposed action. The Columbia, Snake, and Salmon Rivers provide migratory habitat for Snake River sockeye salmon as well as the other anadromous species addressed in this Opinion. However, Snake River sockeye salmon are unique in that the only extant population in Idaho occurs in Redfish Lake. The Redfish Lake population is dependent on a broodstock program, and some progeny from this program have also been released in Alturas, Stanley, and Pettit Lakes in the Sawtooth Valley. The potential effects of this programmatic proposal on such limited habitat for sockeye salmon reproduction in Idaho is addressed in detail in this Opinion.

The EFH is coincident with designated critical habitat for Chinook salmon within the analysis area. Amendment 14 to the Pacific Coast Salmon Plan designated EFH for Chinook salmon (PFMC 1999). The action area is in an area where environmental effects of the proposed project may adversely affect EFH for Chinook salmon.

Table 5. Federal Register Notices for Final Rules that list species, designate critical habitat, or apply protective regulations to ESA-listed species considered in this consultation.

Species ESU	Listing Status	Critical Habitat	Protective Regulations
Chinook salmon (*Oncorhynchus tshawytscha*)			
Snake River spring/summer run	T 4/22/92; 57 FR 14653	10/25/99; 64 FR 57399	7/10/00; 65 FR 42422
Snake River fall-run	T 6/3/92; 57 FR 23458	12/28/93; 58 FR 68543	7/10/00; 65 FR 42422
Sockeye salmon (*O. nerka*)			
Snake River	E 11/20/91; 56 FR 58619	12/28/93; 58 FR 68543	ESA Section 9 applies
Steelhead (*O. mykiss*)			
Snake River Basin	T 8/18/97; 62 FR 43937	9/02/05; 70 FR 52630	7/10/00; 65 FR 42422

(Listing status: 'T' means listed as threatened under the ESA; 'E' means listed as endangered; and 'P' means proposed for listing, proposed for designation as critical habitat, or proposed as protective regulations. See also, proposed listing determinations for 27 ESUs of West Coast salmonids, at 69 FR 33102, 6/14/04; and proposed designation of critical habitat for 13 ESUs of Pacific salmon and steelhead and proposed protective regulations at 69 FR 74572, 12/14/04.)

2. ENDANGERED SPECIES ACT

The ESA establishes a national program to conserve 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 FWS and NMFS 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 critical habitats. Section 7(b)(4) requires the provision of an ITS that specifies the impact of any incidental taking and includes RPMs to minimize such impacts.

2.1. Introduction to the Biological Opinion

Section 7(a)(2) of the ESA requires Federal agencies, in consultation with NMFS, 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 habitat. The jeopardy analysis considers both survival and recovery of the species. The adverse modification analysis considers the impacts to the conservation value of the designated critical habitat.

"To jeopardize the continued existence of a listed species" means to engage in an action that would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species (50 CFR 402.02).

This Opinion does not rely on the regulatory definition of 'destruction or adverse modification' of critical habitat at 50 CFR 402.02. Instead, NMFS has relied upon the statutory provisions of the ESA to complete the following analysis with respect to critical habitat[5].

We will use the following approach to determine whether the proposed action described in Section 1.3 of this Opinion is likely to jeopardize listed species or destroy or adversely modify critical habitat:

- *Identify the rangewide status of the species and critical habitat likely to be adversely affected by the proposed action.* This section describes the current status of each listed species and its critical habitat relative to the conditions needed for recovery. For listed salmon and steelhead, NMFS has developed specific guidance for analyzing the status of the listed species' component populations in a "viable salmonid populations" paper (Viable Salmonid Population [VSP]; McElhany et al. 2000). The VSP approach considers the abundance, productivity, spatial structure, and diversity of each population as part of the overall review of a species' status. For listed salmon and steelhead, the VSP criteria therefore encompass the species' "reproduction, numbers, or distribution"

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[5] Memorandum from William T. Hogarth to Regional Administrators, Office of Protected Resources, NMFS (Application of the "Destruction or Adverse Modification" Standard Under section 7(a)(2) of the Endangered Species Act) (November 7, 2005).

(50 CFR 402.02). In describing the range-wide status of listed species, we rely on viability assessments and criteria in technical recovery team documents and recovery plans, where available, that describe how VSP criteria are applied to specific populations, MPGs, and species. We determine the range-wide status of critical habitat by examining the condition of its physical or biological features (also called "primary constituent elements" (PCEs) in some designations) - which were identified when the critical habitat was designated. Species and critical habitat status are discussed in Section 2.2 of this Opinion.

- *Describe the environmental baseline for the proposed action.* The environmental baseline includes the past and present impacts of Federal, state, or private actions and other human activities *in the action area.* It includes the anticipated impacts of proposed Federal projects that have already undergone formal or early section 7 consultation and the impacts of state or private actions that are contemporaneous with the consultation in process. The environmental baseline is discussed in Section 2.3 of this Opinion.

- *Analyze the effects of the proposed actions.* In this step, NMFS considers how the proposed action would affect the species' reproduction, numbers, and distribution or, in the case of salmon and steelhead, their VSP characteristics. NMFS also evaluates the proposed action's effects on critical habitat features. The effects of the action are described in Section 2.4 of this Opinion.

- *Describe any cumulative effects.* Cumulative effects, as defined in NMFS' implementing regulations (50 CFR 402.02), are the effects of future state or private activities, not involving Federal activities, that are reasonably certain to occur within the action area. Future Federal actions that are unrelated to the proposed action are not considered because they require separate section 7 consultation. Cumulative effects are considered in Section 2.5 of this Opinion.

  Integrate and synthesize the above factors to assess the risk that the proposed action poses to species and critical habitat. In this step, NMFS adds the effects of the action (Section 2.4) to the environmental baseline (Section 2.3) and the cumulative effects (Section 2.5) to assess whether the action could reasonably be expected to:
  (1) Appreciably reduce the likelihood of both survival and recovery of the species in the wild by reducing its numbers, reproduction, or distribution; or (2) reduce the value of designated or proposed critical habitat for the conservation of the species. These assessments are made in full consideration of the status of the species and critical habitat (Section 2.2). Integration and synthesis occurs in Section 2.6 of this Opinion.

- *Reach jeopardy and adverse modification conclusions.* Conclusions regarding jeopardy and the destruction or adverse modification of critical habitat are presented in Section 2.7 of this Opinion. These conclusions flow from the logic and rationale presented in the Integration and Synthesis Section 2.6 of this Opinion.

- *If necessary, define a reasonable and prudent alternative to the proposed action.* If, in completing the last step in the analysis, NMFS determines that the action under consultation is likely to jeopardize the continued existence of listed species or destroy or adversely modify designated critical habitat, NMFS must identify a reasonable and prudent alternative (RPA) to the action in Section 2.8. The RPA must not be likely to jeopardize the continued existence of ESA-listed species nor adversely modify their designated critical habitat and it must meet other regulatory requirements.

2.2. Rangewide Status of the Species and Critical Habitat

The summaries that follow describe the status of the four ESA-listed species and their designated critical habitats that occur within the geographic area of this proposed action and are considered in this Opinion. More detailed information on the status and trends of these ESA-listed resources, and their biology and ecology, can be found in the listing regulations and critical habitat designations published in the Federal Register (Table 5). On August 15, 2011, NMFS published the results of the agency's most recent 5-year review of ESA-listed Pacific salmonid species, including the four listed species in Idaho (Ford et al. 2010). NMFS defines the three salmon species as ESUs and the steelhead species as a DPS.

Climate change is likely to play an increasingly important role in determining the abundance of ESA-listed species, and the conservation value of designated critical habitats, in the Pacific Northwest. These changes will not be spatially homogeneous across the Pacific Northwest. Areas with elevations high enough to maintain temperatures well below freezing for most of the winter and early spring will be less affected. Low-elevation areas are likely to be more affected. During the last century, average regional air temperatures increased by 1.5°F, and increased up to 4°F in some areas (USGCRP 2009). Warming is likely to continue during the next century as average temperatures increase another 3°F to 10°F (USGCRP 2009). Overall, about one-third of the current cold-water fish habitat in the Pacific Northwest is likely to exceed key water temperature thresholds by the end of this century (USGCRP 2009).

Precipitation trends during the next century are less certain than for temperature but more precipitation is likely to occur during October through March and less during summer months, and more of the winter precipitation is likely to fall as rain rather than snow (ISAB 2007; USGCRP 2009). Where snow occurs, a warmer climate will cause earlier runoff so stream flows in late spring, summer, and fall will be lower and water temperatures will be warmer (ISAB 2007; USGCRP 2009).

Higher winter stream flows increase the risk that winter floods in sensitive watersheds will damage spawning redds and wash away incubating eggs. Earlier peak stream flows will also flush some young salmon and steelhead from rivers to estuaries before they are physically mature, increasing stress and the risk of predation. Lower stream flows and warmer water temperatures during summer will degrade summer rearing conditions, in part by increasing the prevalence and virulence of fish diseases and parasites (USGCRP 2009). Other adverse effects are likely to include altered migration patterns, accelerated embryo development, premature emergence of fry, variation in quality and quantity of tributary rearing habitat, and increased competition and predation risk from warm-water, non-native species (ISAB 2007).

The earth's oceans are also warming, with considerable interannual and inter-decadal variability superimposed on the longer-term trend (Bindoff *et al.* 2007). Historically, warm periods in the coastal Pacific Ocean have coincided with relatively low abundances of salmon and steelhead, while cooler ocean periods have coincided with relatively high abundances (Scheuerell and Williams 2005; Zabel *et al.* 2006; USGCRP 2009). Ocean conditions adverse to salmon and steelhead may be more likely under a warming climate (Zabel *et al.* 2006).

2.2.1 Status of Listed Species

When evaluating the status of an ESA-listed species, the parameters considered in recovery plans, status reviews, and listing decisions are relevant. For Pacific salmon and steelhead, viability of the populations that comprise the species can be assessed using four parameters - spatial structure, diversity, abundance, and productivity (McElhany et al. 2000). Therefore, these VSP criteria encompass the species' "reproduction, numbers, or distribution" as described in 50 CFR 402.02. When these parameters are at appropriate levels, collectively, they maintain a population's capacity to adapt to various environmental conditions and allow it to sustain itself in the natural environment. These attributes are influenced by survival, behavior, and experiences throughout the entire life cycle, characteristics that are influenced, in turn, by habitat and other environmental conditions.

"Spatial structure" refers both to the spatial distributions of individuals in the population and the processes that generate that distribution. A population's spatial structure depends fundamentally on habitat quality and spatial configuration, and the dynamics and dispersal characteristics of individuals in the population.

"Diversity" refers to the distribution of traits within and among populations. These range in scale from deoxyribonucleic acid sequence variation at single genes to complex life history traits (McElhany et al. 2000).

"Abundance" generally refers to the number of naturally-produced adults (i.e., the progeny of naturally-spawning parents) in the natural environment (e.g., on spawning grounds).

"Productivity" as applied to viability factors refers to the entire life cycle (i.e., the number of naturally-spawning adults produced per parent). When progeny replace or exceed the number of parents, a population is stable or increasing. When progeny fail to replace the number of parents, the population is declining. McElhany et al. (2000) use the terms "population growth rate" and "productivity" interchangeably when referring to production over the entire life cycle. They also refer to "trend in abundance," which is the manifestation of long-term population growth rate.

Once the biological status of a species' populations has heen determined, NMFS assesses the status of the entire species using criteria for groups of populations, as described in recovery plans and guidance from technical recovery teams. Considerations for species viability include having multiple populations that are viable, ensuring that populations with unique life histories and phenotypes are viable, and that some viable populations are both widespread to avoid concurrent extinctions from mass catastrophes and spatially close to allow functioning as metapopulations (McElhany et al. 2000).

The four ESA-listed species in the Snake River fall under the Interior Columbia Recovery Domain. Recovery domains are geographically-based areas that NMFS is using to prepare multi-species recovery plans for salmon and steelhead. For each domain, NMFS appointed an interagency team of scientists to provide a scientific foundation for recovery plans. The Interior Columbia Basin Technical Recovery Team (ICBTRT) has delineated populations for each species in its domain, assessed the current viability of each population, and made recommendations for recovery of the species based on viability goals for the species' component populations. The rangewide species status summaries in this Opinion rely on several ICBTRT reports, such as population status assessments and viability criteria. These reports can be found at http://www.nwfsc.noaa.gov/trt/pubs.cfm, or by contacting the NMFS Boise office.

NMFS and the State of Idaho are currently developing a recovery plan for the four Snake River species, based on the recommendations of the ICBTRT. The recovery plan will describe the status of the species and their component populations, limiting factors, recovery goals, and actions to address limiting factors. The most recent working drafts of the Idaho Snake River recovery plan are posted at http://www.idahosalmonrecovery.net/.

2.2.1.1. Snake River Spring/Summer Chinook Salmon

The Snake River spring/summer Chinook salmon ESU was listed as threatened on April 22, 1992 (57 FR 14653). This ESU occupies the Snake River Basin, which drains portions of southeastern Washington, northeastern Oregon, and north/central Idaho. Several factors led to NMFS' conclusion that Snake River spring/summer Chinook were threatened: (1) Abundance of naturally produced Snake River spring and summer Chinook runs had dropped to a small fraction of historical levels; (2) short-term projections were for a continued downward trend in abundance; (3) hydroelectric development on the Snake and Columhia Rivers continued to disrupt Chinook runs through altered flow regimes and impacts on estuarine habitats; and (4) habitat degradation existed throughout the region, along with risks associated with the use of outside hatchery stocks in particular areas (Good et al 2005; Ford et al. 2010). On August 15, 2011, in the agency's most recent 5-year review for the Snake River ESU, NMFS concluded that the species should remain listed as threatened (76 FR 50448).

Adult spring and summer Chinook destined for the Snake River enter the Columbia River on their upstream spawning migration from February through March and arrive at their natal tributaries between June and August. Spawning occurs in August and September. Eggs incubate over the winter and hatch in late winter and early spring of the following year. Juveniles exhibit a river-type life history strategy, rearing in tributary streams during their first year of life before migrating to the ocean the following spring. Depending on the tributary and the specific habitat conditions, juveniles may migrate extensively from natal reaches into alternative summer-rearing or overwintering areas. After reaching the ocean as smolts, the fish typically spend 2 to 3 years in the ocean before beginning their migration back to their natal freshwater streams.

Spatial Structure and Diversity. The Snake River ESU includes all naturally spawning populations of spring/summer Chinook in the mainstem Snake River (below Hells Canyon Dam) and in the Tucannon River, Grande Ronde River, Imnaha River, and Salmon River subbasins (57 FR 23458); as well as the progeny of 15 artificial propagation programs (70 FR 37160). The hatchery programs include the South Fork Salmon River (McCall Hatchery), Johnson Creek, Lemhi River, Pahsimeroi River, East Fork Salmon River, West Fork Yankee Fork Salmon River, and Upper Salmon River (Sawtooth Hatchery) programs in Idaho; and the Tucannon River (conventional and captive broodstock programs), Lostine River, Catherine Creek, Lookingglass Creek, Upper Grande Ronde River, Imnaha River, and Big Sheep Creek programs in Oregon. The historical Snake River spring/summer Chinook ESU likely also included populations in the Clearwater River drainage and extended above the Hells Canyon Dam complex within the Snake River drainage.

Within the Snake River ESU, the ICBTRT identified 28 extant and 4 extirpated or functionally extirpated populations of spring/summer-run Chinook salmon, listed in Table 6 (ICBTRT 2003; McClure et al. 2005). The ICBTRT aggregated these populations into five MPGs, of which the South Fork Salmon, Middle Fork Salmon, and Upper Salmon River MPGs are in central Idaho. All populations in Idaho are extant with the exception of Panther Creek, which the ICBTRT classified as "functionally extirpated" due to severe water quality and habitat degradation in Lower Panther Creek during the 1950s and 1960s from Blackbird Mine operations (ICBTRT 2003). For each population, Table 6 shows the current risk ratings that the ICBTRT assigned to the four parameters of a VSP (spatial structure, diversity, abundance, and productivity).

In general, current spatial structure risk is low in this ESU and is not preventing the recovery of the species. Spring/summer Chinook spawners are distributed throughout the ESU, albeit at very low numbers. Diversity risk, on the other hand, is somewhat higher, driving the moderate and high combined spatial structure/diversity risks shown in Table 6 for some populations. In the Upper Salmon, high diversity risks are caused by chronically high proportions of hatchery spawners in natural areas, and by loss of access to tributary spawning and rearing habitats and the associated reduction in life history diversity (Ford et al. 2010). Diversity risk will need to be lowered in multiple populations in order for the ESU to recover (NMFS 2011b).

Abundance and Productivity. Historically, the Snake River drainage is thought to have produced more than 1.5 million adult spring/ summer Chinook salmon in some years (Matthews and Waples 1991), yet by the mid-1990s counts of wild fish passing Lower Granite Dam dropped to less than 10,000 (IDFG 2007). Wild returns have since increased somewhat but remain highly variable and a fraction of historic estimates (Ford et al. 2010). For individual populations, abundance remains below viability thresholds for all populations, reflected in the ICBTRT's high risk rating for abundance/productivity for each population listed in Table 6 (Ford et al. 2010).

For some populations, mean abundance from 2000 to 2009 is extremely low, such as for the Yankee Fork and Camas Creek populations, which have recent mean abundances of just 21 and 30 natural spawners, respectively, compared to minimum viability targets of at least 500 spawners (Ford et al. 2010). Relatively low natural production rates and spawning levels remain a major concern across the ESU, and each population in the ESU currently faces a high risk of extinction over the next 100 years (Tahle 6).

Table 6. Summary of viable salmonid population (VSP) parameter risks and overall current status for each population in the Snake River spring/summer Chinook salmon ESU within the action area (Ford et al. 2010; ICBTRT 2010a; ICBTRT 2010b; ICBTRT 2010c).

MPG	Popnlation	VSP Parameter Risk		Overall Viability Rating
		Abundance/ Productivity	Spatial Structure/Diversity	
South Fork Salmon River	Little Salmon River	High	High	High Risk
	South Fork Salmon River mainstem	High	Moderate	High Risk
	Secesh River	High	Low	High Risk
	East Fork South Fork Salmon River	High	Low	High Risk
Middle Fork Salmon River	Chamberlain Creek	High	Low	High Risk
	Middle Fork Salmon River below Indian Creek	High	Moderate	High Risk
	Big Creek	High	Moderate	High Risk
	Camas Creek	High	Moderate	High Risk
	Loon Creek	High	Moderate	High Risk
	Middle Fork Salmon River above Indian Creek	High	Moderate	High Risk
	Sulphur Creek	High	Moderate	High Risk
	Bear Valley Creek	High	Low	High Risk
	Marsh Creek	High	Low	High Risk
Upper Salmon River	North Fork Salmon River	High	Low	High Risk
	Lemhi River	High	High	High Risk
	Salmon River Lower Mainstem	High	Low	High Risk
	Pahsimeroi River	High	High	High Risk
	East Fork Salmon River	High	High	High Risk
	Yankee Fork Salmon River	High	High	High Risk
	Valley Creek	High	Moderate	High Risk
	Salmon River Upper Mainstem	High	Moderate	High Risk
	Panther Creek			Extirpated

Limiting Factors. Limiting factors and threats to the Snake River spring/summer-run Chinook salmon ESU include the following (NOAA Fisheries 2011; NMFS 2011a):

- Mainstem Columbia River and Snake River hydropower impacts;
- Degraded freshwater habitat: Floodplain connectivity and function, channel structure and complexity, riparian areas and large wood supply, stream substrate, elevated water temperature, stream flow, and water quality, have been degraded as a result of cumulative impacts of agriculture, mining, forestry, road-building, and development;
- Hatchery impacts;
- Predation by pinnipeds, birds, and piscivorous fish in the mainstem river and estuary migration corridor; and
- Harvest-related effects.

2.2.1.2. Snake River Basin Steelhead

The Snake River Basin steelhead was listed as a threatened ESU on August 18, 1997 (62 FR 43937), with a revised listing as a DPS on January 5, 2006 (71 FR 834). This DPS occupies the Snake River Basin, which drains portions of southeastern Washington, northeastern Oregon, and north/central Idaho. Reasons for the decline of this species include substantial modification of the seaward migration corridor by hydroelectric power development on the Snake and mainstem Columbia Rivers, and widespread habitat degradation and reduced streamflows throughout the Snake River Basin (Good et al. 2005). Another major concern for the species is the threat to genetic integrity from past and present hatchery practices, and the high proportion of hatchery fish in aggregate run of Snake River Basin steelhead over Lower Granite Dam (Good et al. 2005; Ford et al. 2010). On August 15, 2011, in the agency's most recent 5-year review for the Snake River ESU, NMFS concluded that the species should remain listed as threatened (76 FR 50448).

Adult Snake River Basin steelhead enter the Columbia River from late June to October to begin their migration inland. After holding over the winter in larger rivers in the Snake River Basin, steelhead disperse into smaller tributaries to spawn from March through May. Earlier dispersal occurs at lower elevations and later dispersal occurs at higher elevations. Juveniles emerge from the gravels in 4 to 8 weeks, and move into shallow, low-velocity areas in side channels and along channel margins to escape high velocities and predators (Everest and Chapman 1972). Juvenile steelhead then progressively move toward deeper water as they grow in size (Bjornn and Rieser 1991). Juveniles typically reside in fresh water for 1 to 3 years, although this species displays a wide diversity of life histories. Smolts migrate downstream during spring runoff, which occurs from March to mid-June depending on elevation, and typically spend 1 to 2 years in the ocean.

Spatial Structure and Diversity. This species includes all naturally-spawning steelhead populations below natural and manmade impassable barriers in streams in the Snake River Basin of southeast Washington, northeast Oregon, and Idaho, as well as the progeny of six artificial propagation programs (71FR834). The hatchery programs include Dworshak National Fish Hatchery, Lolo Creek, North Fork Clearwater River, East Fork Salmon River, Tucannon River, and the Little Sheep Creek/Imnaha River steelhead hatchery programs. The Snake River Basin steelhead listing does not include resident forms of *O. mykiss* (rainbow trout) co-occurring with steelhead.

The ICBTRT identified 24 extant populations within this DPS, organized into 5 MPGs (ICBTRT 2003). The ICBTRT also identified a number of potential historical populations associated with watersheds above the Hells Canyon Dam complex on the mainstem Snake River, a harrier to anadromous migration. Two of the five MPGs with extant populations are in Idaho: the Clearwater River MPG (5 extant populations, 1 extirpated); and the Salmon River MPG (12 populations). In the Clearwater River, the historic North Fork population was blocked from accessing spawning and rearing habitat by the construction of Dworshak Dam. Current steelhead distribution extends throughout the DPS, such that spatial structure risk is generally low. For each population in the DPS, Table 7 shows the current risk ratings that the ICBTRT assigned to the four parameters of a VSP (spatial structure, diversity, abundance, and productivity).

The Snake River Basin steelhead DPS exhibit a diversity of life-history strategies, including variations in fresh-water and ocean residence times. Traditionally, fisheries managers have classified Snake River Basin steelhead into two groups, A-run and B-run, based on ocean age at return, adult size at return, and migration timing. A-run steelhead predominantly spend 1 year at sea and are assumed to he associated with low to mid-elevation streams in the Snake River Basin. B-run steelhead are larger with most individuals returning after 2 years in the ocean. The ICBTRT has identified each population in the DPS as either A-run or B-run. Recent research, however, suggests that some populations may support multiple life history strategies. Within one population in the Clearwater River, the Idaho Department of Fish and Game (IDFG) reports at least nine different phenotypes, with steelhead spending 1, 2, or 3 years in the ocean (Bowersox, et al. 2011). Maintaining life history diversity is important for the recovery of the species.

Diversity risk for the DPS is low to moderate, and drives the moderate combined spatial structure/diversity risks shown in Table 7 for some populations. Moderate diversity risks for some populations are caused by the high proportion of hatchery fish on natural spawning grounds. The current moderate diversity risks for populations in Idaho do not preclude those populations from achieving viability goals under the draft recovery plan for Idaho's salmon and steelhead (NMFS 2011c; NMFS 2011d).

Abundance and Productivity. Historical estimates of steelhead production for the entire Snake River Basin are not available, but the basin is believed to have supported more than half the total steelhead production from the Columbia River Basin (Mallet 1974, as cited in Good et al. 2005). Historical estimates do exist for portions of the basin. Estimates of steelhead passing Lewiston Dam (removed in 1973) on the lower Clearwater River were 40,000 to 60,000 adults (Ecovista et al. 2003). Based on relative drainage areas, the Salmon River Basin likely supported substantial production as well (Good et al. 2005). In contrast, at the time of listing the 5-year (1991-996) mean abundance for natural-origin steelhead passing Lower Granite Dam was 11,462 adults (Ford et al. 2010). Steelhead passing Lower Granite Dam include those returning to: (1) The Grande Ronde and Imnaha Rivers in Oregon; (2) Asotin Creek in Washington; and (3) the Clearwater and Salmon Rivers in Idaho. The most recent 5-year (2003-2008) mean abundance passing Lower Granite Dam was substantially larger at 18,847 natural-origin fish (Ford et al. 2010). These natural-origin fish represent just 10% of the total steelhead run over Lower Granite Dam of 162,323 adults for the same time period. However, a large proportion of the hatchery run returns to hatchery racks or is removed by hatchery selective harvest and therefore does not contribute to natural production in most Snake River tributaries (Ford et al. 2010).

Despite recent increases in steelhead abundance, population-level natural origin abundance and productivity inferred from aggregate data indicate that many populations in the DPS are likely below the viability targets necessary for species recovery (ICBTRT 2010d). Population-specific abundance estimates are not available for most Snake River Basin steelhead populations, including all populations in Idaho. Instead, the ICBTRT estimated average population abundance and productivity using annual counts of wild steelhead passing Lower Granite Dam, generating separate estimates for a surrogate A-run and B-run population. Most population abundance/productivity risks shown in Table 7 are based on a comparison of the surrogate population current abundance and productivity estimates to a population viability threshold of 1,000 natural-origin spawners and a productivity of 1.14 recruits per spawner. The surrogate A-run population has a mean abundance of 556 spawners and productivity of 1.86, indicating a moderate abundance/productivity risk. The surrogate B-run population has a mean abundance of 345 spawners and productivity of 1.09, indicating a high abundance/productivity risk (NMFS 2011c). Based on these tentative risk ratings, all populations in Idaho are currently at either high or moderate risk of extinction over the next 100 years. Joseph Creek in Oregon, for which population-specific abundance information is available, is the only population in the DPS currently rated as viable (Ford et al. 2010).

Limiting Factors. Limiting factors and threats to the Snake River Basin steelhead DPS include the following (NOAA Fisheries 2011; NMFS 2011e):

- Mainstem Columbia River and Snake River hydropower impacts;
- Degraded freshwater habitat: Floodplain connectivity and function, channel structure and complexity, riparian areas and large wood supply, stream substrate, elevated water temperature, stream flow, and water quality have been degraded as a result of cumulative impacts of agriculture, mining, forestry, road-building, and development;
- Impaired tributary fish passage;
- Harvest impacts, particularly for B-run steelhead;
- Predation by pinnipeds, birds, and piscivorous fish in the mainstem river and estuary migration corridor; and

- Genetic diversity effects from out-of-population hatchery releases.

Table 7. Summary of viable salmonid population (VSP) parameter risks and overall current status for each population in the Snake River Basin steelhead DPS within the action area (Ford et al. 2010; ICBTRT 2010d).

MPG	Population	VSP Parameter Risk		Overall Viability Rating
		Abundance/ Productivity	Spatial Structure/Diversity	
Lower Snake River	Tucannon River	High	Moderate	High Risk?
	Asotin Creek	Moderate	Moderate	High/Moderate Risk?
Clearwater River	Lower Mainstem Clearwater River	Moderate	Low	Moderate Risk?
	South Fork Clearwater River	High	Moderate	High Risk?
	Lolo Creek	High	Moderate	High Risk?
	Selway River	High	Low	High Risk?
	Lochsa River	High	Low	High Risk?
	North Fork Clearwater River			*Extirpated*
Salmon River	Little Salmon River	Moderate	Moderate	Moderate Risk?
	South Fork Salmon River	High	Low	High Risk?
	Secesh River	High	Low	High Risk?
	Chamberlain Creek	Moderate	Low	Moderate Risk?
	Lower Middle Fork Salmon River	High	Low	High Risk?
	Upper Middle Fork Salmon River	High	Low	High Risk?
	Panther Creek	Moderate	High	Moderate Risk?
	North Fork Salmon River	Moderate	Moderate	Moderate Risk?
	Lemhi River	Moderate	Moderate	Moderate Risk?
	Pahsimeroi River	Moderate	Moderate	Moderate Risk?
	East Fork Salmon River	Moderate	Moderate	Moderate Risk?
	Upper Mainstem Salmon River	Moderate	Moderate	Moderate Risk?
Hells Canyon	*Hells Canyon Tributaries*			*Extirpated*

2.2.1.3. Snake River Fall Chinook Salmon

The Snake River fall Chinook salmon ESU was listed as threatened on April 22, 1992 (57 FR 14653). This ESU occupies the Snake River Basin, which drains portions of southeastern Washington, northeastern Oregon, and north/central Idaho. Snake River fall Chinook salmon have substantially declined in ahundance from historic levels, primarily due to the loss of primary spawning and rearing areas upstream of the Hells Canyon Dam complex (57 FR 14653). Additional concerns for the species have been the high percentage of hatchery fish returning to natural spawning grounds and the relatively high aggregate harvest impacts by ocean and in-river fisheries (Good et al. 2005). On August 15, 2011, NMFS completed a 5-year review for the Snake River fall Chinook salmon ESU and concluded that the species should remain listed as threatened (76 FR 50448).

Fall Chinook salmon are larger on average than spring/summer Chinook salmon and spawn in larger, mainstem river reaches and the lower sections of larger tributaries (e.g., the Snake, Clearwater, and Salmon River mainstems in Idaho). Adults typically return to fresh water beginning in July, migrate past the lower Snake River dams from August through November, and spawn from October through early December. Juveniles emerge from the gravels in March and April the following spring. Snake River fall Chinook salmon generally exhibit an ocean-type life history. Parr undergo a smolt transformation usually as subyearlings in the spring and summer, at which time they migrate to the ocean. However, in recent years many Snake River fall Chinook juveniles have been overwintering in the reservoirs upstream of the Columbia River and Snake River dams and migrating to the ocean as yearlings the following year (ICBTRT 2010e). Adult Snake River fall Chinook return from the ocean to spawn when they are between 2 and 5 years of age, with 4 years being the most common.

Spatial Structure and Diversity. The Snake River fall Chinook salmon ESU includes one extant population of fish spawning in the lower mainstem of the Snake River and the lower reaches of several of the associated major tributaries including the Tucannon, Grande Ronde, Clearwater, Salmon, and Imnaha Rivers. The ESU also includes four artificial propagation programs: the Lyons Ferry Hatchery and the Fall Chinook Acclimation Ponds Program in Washington; the Nez Perce Tribal Hatchery in Idaho; and the Oxbow Hatchery in Oregon and Idaho (70 FR 37160). Historically, this ESU included two large additional populations spawning in the mainstem of the Snake River upstream of the Hells Canyon Dam complex, an impassable migration barrier. The spawning and rearing habitat associated with the current extant population represents approximately 15% of the total historical habitat available to the ESU (ICBTRT 2010e). Although most current spawning is concentrated in a relatively small section of the Snake River upstream from Asotin Creek, spawner surveys in recent years have documented spawning across almost the entire population (ICBTRT 2010e). Therefore, spatial structure risk for the existing ESU is low and is not precluding recovery of the species.

There are several diversity concerns for Snake River fall Chinook. The hydropower system and associated reservoirs on the Snake and Columbia Rivers appear to impose some selection on juvenile downstream and adult return migration timing (ICBTRT 2010e). Additionally, the natural run of Snake River fall Chinook salmon was historically predominated by a subyearling ocean-migration life history, but currently half of the adult returns have overwintered in freshwater reservoirs as juveniles (yearling migration life history). This change in life history strategy may be due to mainstem river flow and temperature conditions, which have been altered from historic conditions by the hydropower system, and may ultimately reduce the ESU's extinction risk (ICBTRT 2010e). On the other hand, substantial diversity risk is generated by the high proportion of hatchery fish spawning naturally. For the 5-year period ending in 2008, 78% of the estimated total spawners were of hatchery origin (Ford et al. 2010). Based on these factors, the ICBTRT gave the one extant population a moderate diversity risk, which leads to a