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

Refer to NMFS No: 2009/01540

May 15, 2009

Suzanne Rainville, Forest Supervisor
Payette National Forest
P.O. Box 1026
102 West Lake Street
McCall, Idaho 83638

Re: Endangered Species Act Section 7 Formal Consultation and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Consultation for the Warren Wagon Road Improvement Project, Secesh River, 6th field HUC# 170602080502, Idaho County, Idaho (One project)

Dear Ms. Rainville:

The enclosed document contains a biological opinion (Opinion) prepared by the National Marine Fisheries Service (NMFS) pursuant to section 7(a)(2) of the Endangered Species Act (ESA) on the effects of the Warren Wagon Road Improvement Project. The Payette National Forest (PNF) is proposing the action according to their authority under the Forest and Rangeland Renewable Resources Planning Act (1974), as amended by the National Forest Management Act (1976) and its implementing regulations. In this Opinion, NMFS concludes that the action, as proposed, is not likely to jeopardize the continued existence of Snake River spring/summer Chinook salmon, Snake River Basin steelhead, or result in the destruction or adverse modification of their designated critical habitat.

As required by section 7 of the ESA, NMFS provided an incidental take statement with the Opinion. The incidental take statement describes reasonable and prudent measures NMFS considers necessary or appropriate to minimize incidental take associated with this action. The take statement sets forth nondiscretionary terms and conditions, including reporting requirements, that the Federal agency and any person who performs the action must comply with to carry out the reasonable and prudent measures. Incidental take from actions that meet these terms and conditions will be exempt from the ESA take prohibition.

This document also includes the results of our analysis of the action's likely effects on Essential Fish Habitat (EFH) pursuant to section 305(b) of the Magnuson-Stevens Fishery Conservation and Management Act (MSA), and includes two conservation recommendations to avoid, minimize, or otherwise offset potential adverse effects on EFH. These Conservation Recommendations are a non-identical set of the ESA Terms and Conditions. Section 305(b)(4)(B) of the MSA requires Federal agencies to provide a detailed written response to NMFS within 30 days after receiving these recommendations.

If the response is inconsistent with the EFH conservation recommendations, the PNF must explain why the recommendations will not be followed, including the justification for any disagreements over the effects of the action and the recommendations. In response to increased oversight of overall EFH program effectiveness by the Office of Management and Budget, NMFS established a quarterly reporting requirement to determine how many conservation recommendations are provided as part of each EFH consultation and how many are adopted by the action agency. Therefore, in your statutory reply to the EFH portion of this consultation, we ask that you clearly identify the number of conservation recommendations accepted.

If you have questions regarding this consultation, please contact Bill Lind (208) 378-5697 or Rick Edwards (208) 378-5645 of the South Idaho Branch Office.

Sincerely,

Michael Dehar

for Barry A. Thom
Acting Regional Administrator

Enclosure

cc: J. Foss – USFWS
R. Nelson - PNF
S. Penney – Nez Perce Tribe
B. Elmo – Shoshone-Bannock Tribes

Endangered Species Act – Section 7 Consultation
Biological Opinion

&

Magnuson-Stevens Fishery Conservation and Management Act
Essential Fish Habitat Consultation

Wagon Road Improvement Project, Secesh River,
6th field HUC# 170602080502, Idaho County, Idaho

Lead Action Agency: USDA Forest Service, Payette National Forest

Consultation Conducted By: National Marine Fisheries Service
Northwest Region

Date Issued: May 15, 2009

Issued by: for Barry A. Thom
Acting Regional Administrator

NMFS No.: 2009/01540

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ACRONYMS

AASHTO	American Association of State Highway and Transportation Officials
BA	Biological Assessment
BMPs	Best Management Practices
BRT	Biological Review Team
CHART	Critical Habitat Analytical Review Team
CRB	Columbia River Basin
dB	decibels
dbh	diameter at Breast Height
DNR	Department of Natural Resources
DPS	Distinct Population Segment
DQA	Data Quality Act
EFH	Essential Fish Habitat
EFSFSR	East Fork South Fork Salmon River
ESA	Endangered Species Act
ESU	Evolutionarily Significant Unit
FH	Forest Highway
HUC	Hydrologic Unit Code
ICTRT	Interior Columbia Technical Recovery Team
ISAB	Independent Scientific Advisory Board
IFPA	Idaho Forest Practices Act
ips	inches per second
LSRCP	Lower Snake River Compensation Plan
LWD	Large Woody Debris
MPGs	Major Population Groups
MSA	Magnuson-Stevens Fishery Conservation and Management Act
NMFS	National Marine Fisheries Service
NTUs	Nephelometric Turbidity Units
Opinion	Biological Opinion
Pa	pascal
PCE	Primary Constituent Elements
PDF	Project Design Features
PFMC	Pacific Fishery Management Council
PNF	Payette National Forest
RAC	Resource Advisory Committee
RCAs	Riparian Conservation Areas
RPMs	Reasonable and Prudent Measures
SFSR	South Fork Salmon River
SPCP	Spill Prevention and Containment Plan
TRT	Technical Recovery Team
VSP	Viable Salmonid Population
WCIs	Watershed Condition Indicators
μPa	micro-pascal

1. INTRODUCTION

The biological opinion (Opinion) and incidental take statement 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. With respect to designated critical habitat, the following analysis relied only on the statutory provisions of the ESA, and not on the regulatory definition of "destruction or adverse modification" at 50 CFR 402.02.

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 USC 1801, *et seq*.) and implementing regulations at 50 CFR 600. The administrative record for this consultation is on file at the NMFS Idaho State Habitat Office in Boise.

1.1. Background and Consultation History

The lead action agency for this consultation is the Payette National Forest (PNF). The PNF proposes to widen portions of Warren Wagon Road between Burgdorf Junction and the Secesh River Bridge, located north of McCall, Idaho, in Idaho County. Improvement of the five identified road segments would enhance highway safety for private and commercial vehicles traveling to or from Secesh and Warren. A draft biological assessment (BA) was received by the National Marine Fisheries Service (NMFS) on January 4, 2007. The PNF Level 1 Team met to discuss the draft on November 16, 2007, prior to the PNF submitting a revised draft on May 4, 2008. The final BA was received by NMFS on March 5, 2009. The contents of the BA fully explain the potential impacts on Snake River spring/summer Chinook salmon, Snake River Basin steelhead, designated critical habitat, and Essential Fish Habitat (EFH) under NMFS review.

The Secesh River parallels the southern side of Forest Highway (FH) 21 and the road segments in the project area correspond with river miles 0.71 to 2.63. The Secesh River is a major tributary to the South Fork Salmon River (SFSR). The road segment in the project area lies within the Secesh Inventoried Roadless Area. The Secesh River adjacent to the project area has been found suitable for National Wild and Scenic River designation because of its outstanding fisheries values. The recommended classification for this segment is Recreational.

Copies of the draft Opinion were provided to the Nez Perce and Shoshone-Bannock Tribes (Tribes) on May 1, 2009. No response was received.

1.2. Proposed Action

The PNF proposes to widen portions of Warren Wagon Road between Burgdorf Junction and the Secesh River Bridge, located north of McCall, Idaho (Figure 1), in Idaho County. Improvement of the five identified road segments would enhance highway safety for private and commercial

vehicles traveling to or from Secesh and Warren. Currently, Warren Wagon Road is maintained and under the jurisdiction of Idaho County. The project area is on the McCall Ranger District in T22N, R5E, Sections 4, 7, 8, and 9.

The Warren Wagon Road Improvement Project is a Title II funded project. The project has been reviewed and approved for funding by the Southwest Idaho Resource Advisory Committee (RAC). Under the proposed action, five segments of the existing road alignment along a 2.1-mile section of the Warren Wagon Road would be improved and widened. The proposed action would widen and remove materials on the cut slopes of these five road segments for greater traffic safety in narrow, restricted locations. The segments would begin 0.8 mile east of Burgdorf Junction and would be spread out across the next 2.1 miles of Warren Wagon Road (Figure 2). The segments would have differing lengths and requirements to meet the purpose of the project but would not exceed 0.25 mile in overall construction length. The roadway at each segment would be extended approximately10- to12-feet, increasing the width of the road prism to no more than 26 feet. Currently the road prisms in these areas are 14 to18 feet in width. Where they are stable, the existing Jersey barriers along the outer road shoulder would be left in place or, where they are not stable, they would be repositioned 2 to 4 feet toward the inside of the road.

Construction time is estimated to take approximately 1 to 2 weeks per segment, plus an additional 3 to 4 days for the road widening portion of the project. However, because of uncertainties with funding and local sensitivity regarding long road closures, construction on the project is proposed to start in the summer of 2009 but may not be completed until the fall of 2012. The project would be consistent with the road standards for the PNF which are the American Association of State Highway and Transportation Officials (AASHTO) engineering standards, the Idaho Forest Practices Act (IFPA) standards and guidelines for road construction, and the PNF best management practices (BMPs) outlined in the Stibnite Mine BA Erosion Plan. Details of the proposed action are summarized here and described in detail in Section IV of the BA.

The purpose of this action is to provide adequate and safe motorized traffic movement on Idaho County-maintained roadways across National Forest System lands, while minimizing potential impacts to fish, wildlife, and water resources. The growth throughout the State of Idaho and particularly the recreational growth in Valley and Idaho Counties have contributed to a larger volume of traffic on Warren Wagon Road to Secesh Meadows, Warren, and the SFSR. As a result of this growth in traffic, and to ensure proper road maintenance and safety, road systems in this area are being evaluated for need of repair, resurfacing, culvert replacement and widening. This section along Warren Wagon Road is in need of widening in order to safely accommodate the traffic that has increased over the last several years. Jersey barriers along the outer shoulder need to be stabilized along the Secesh River in order to reduce their potential movement toward the river.

Figure 1. Warren Wagon Road Improvement Project Location Map.

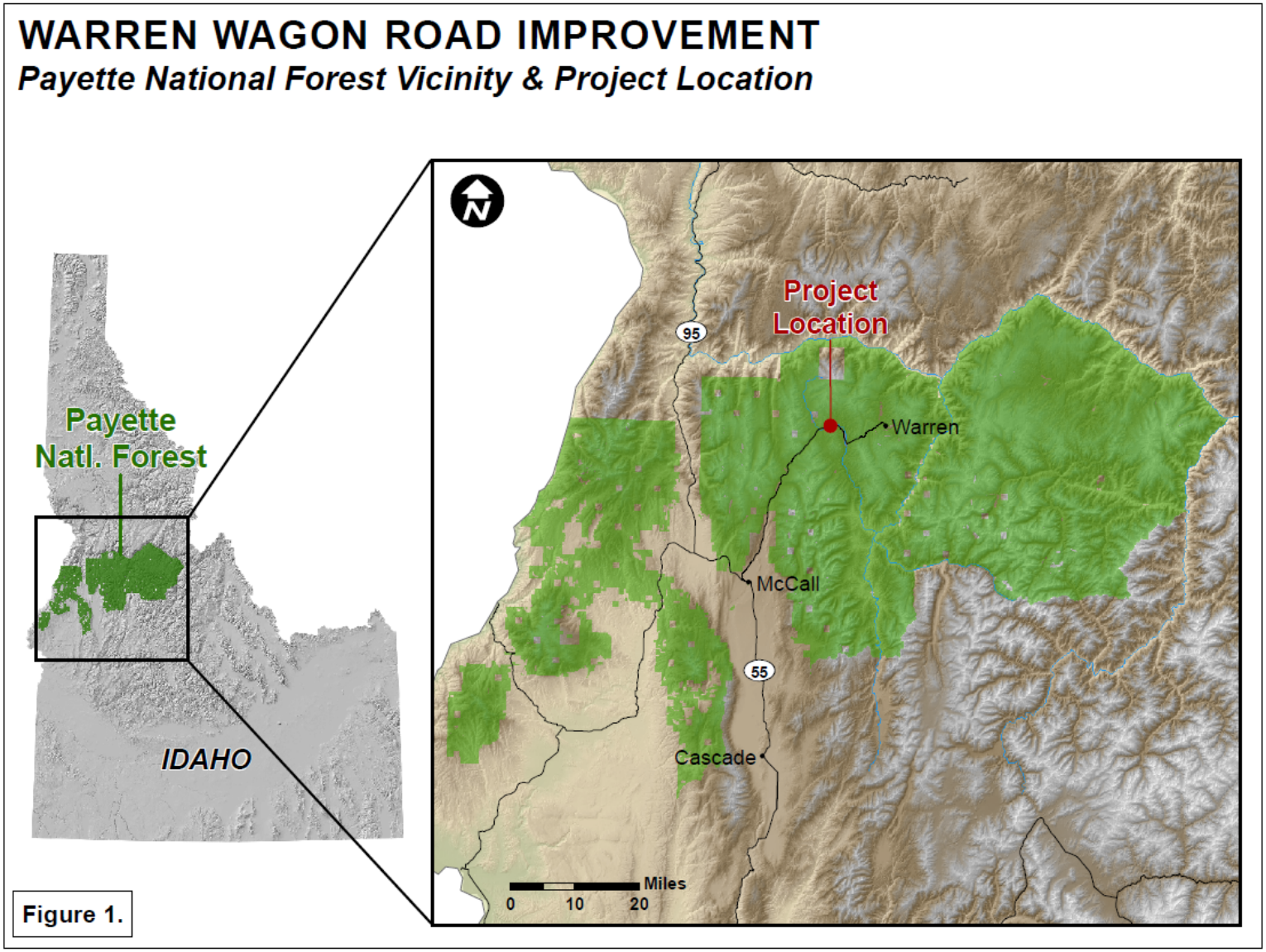
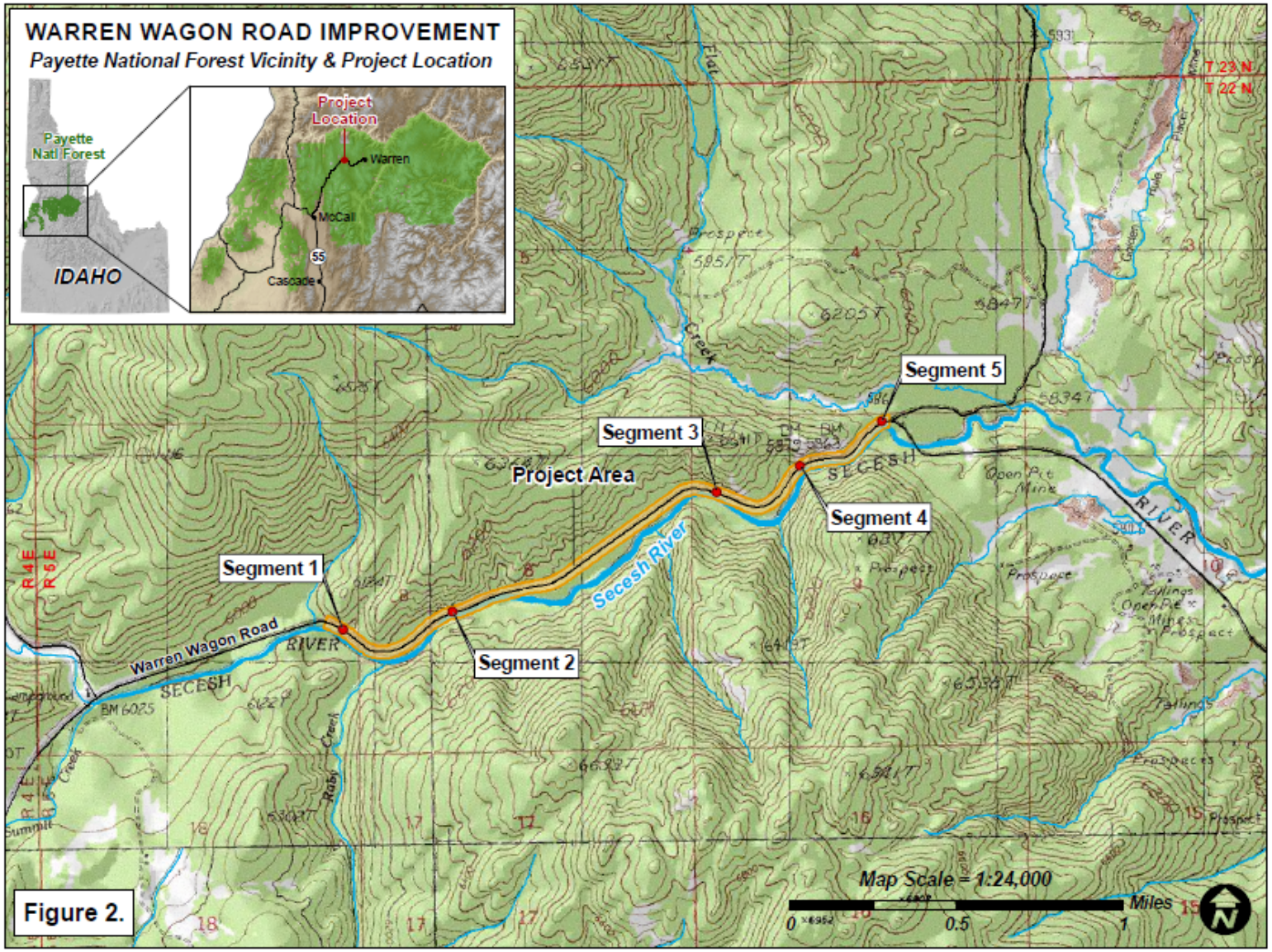


Figure 2. Location of the Five Proposed Segments for the Warren Wagon Road Improvement Project.



The increased traffic along the narrow and winding road bordering the Secesh River has provided adequate reason for the funding of the project as a Title II project, approved by the Southwest Idaho RAC.

As previously described, road widening of the Warren Wagon Road will occur at five locations (Table 1). The existing roadway at each segment would be widened to increase the road prism to a uniform width of 24 to 26 feet. A catchment ditch on the inside shoulder would be included as part of the road prism and would not exceed 2 feet. The catchment ditch would be graveled to decrease erosion potential from hardening of the road surface. The existing Jersey barriers along the outer road shoulder would be repositioned 2 to 4 feet towards the inside of the road in Segments 1, 2 and 3, and remain in place in Segments 4 and 5. Heavy equipment and blasting (Segments 1 and 2) would be used to loosen and remove the fill. Tree felling would be required to facilitate removal of fill.

Table 1. Road Segment Features for the Proposed Action

SEGMENT	LOCATION (miles from Burgdorf Junction)	LENGTH (feet)	FILL REMOVAL (cubic yards)	SLOPE CONFIGURATION
1	0.8	370	3,200 (max.)	0.5: 1 to vertical:angle
2	1.2	250	2,400 (max.)	0.5: 1 to vertical:angle
3	2.1	250	250	0.5: 1 to vertical
4	2.5	240	170	0.5: 1 to vertical
5	2.9	260	-250	Fill Area

The five road segments would commit a maximum of 0.6 acres of soil to the road prism, exposing less than 1.5 acres of hillside to erosion from disturbed cut and fill. Construction will require 2 to 3 trucks, and 2 to 3 large pieces of equipment including loader, backhoe, and grader. A brief summary of the work to be completed at each road segment follows.

1.2.1. Segment 1

Segment 1 is 370 feet in length, including the approaches which are 20 feet on either side. This segment is the longest of the five segments and is broken down into four sections of approaches (40 feet), three cross sections or cut slope areas of 220 feet total, and two intervals between the cross sections that total 110 feet. Specific features of Segment 1 include:

- A cut slope of 0.5:1 to vertical along 220 feet of the roadway widening (maximum of 3,200 cubic yards of removal from the cut slope). The maximum fill removal would account for that which may be needed to meet the angle of repose if solid rock is not encountered as indicated in the preliminary design phase (BA Appendix E). Revegetation activities would be implemented to stabilize the slopes and reduce a long term source of erosion.

- This segment would be widened from 8 to 12 feet to 24 to 26 feet of overall width.

- Two 15-inch diameter functioning drainage culverts would be extended to meet the new road width (30 feet extended to 42 feet, and 28 feet extended to 40 feet). Extension will occur to the inside of the road, the side opposite of the Secesh River. If damage to the culverts is observed, they will be replaced with 18-inch culverts.

- The exiting Jersey barriers in the first section of Segment 1 are stable and located 4 to 6 feet from the Secesh River. These barriers would remain in place and continue to reduce sediment movement, prevent sidecasting, and function as a barrier for escaped vehicles. There are five unstable Jersey barriers in the second K-rail section of the segment. These barriers would be realigned with the remaining section and stabilized with materials (larger boulders) from the cut areas, as available. This would move the Jersey barriers approximately 2 to 4 feet further away from the streambank.

- Blasting for removal is not expected in Segment 1. However, if blasting is required, guidelines outlined in Table 2 and project design features (PDFs; described below) would be followed. This includes distance from the stream, size of the blasts, timing of the blasts, and mitigation to reduce noise-related impacts to fish and wildlife. Additional mitigation and BMPs for noise and sediment movement from blasting are outlined in the mitigation and BMP sections that follow.

- The following buffer restrictions (Table 2), which apply to single shots of a given weight of explosive or single shots in a multiple charge if each shot is separated by an 8 millisecond or longer delay, would be followed during construction blasting activities.

Table 2. Blasting project design features.

Explosive Charge Weight* (pounds)	Distance from stream necessary to protect fish from swimbladder effects and egg disturbance (feet)
0.5	30
1.0	50
2.0	80
5.0	120

*These restrictions have been determined to protect fish from both swimbladder effects and egg disturbances and have been approved in programmatic consultation for road maintenance projects in Idaho National Forests, including the PNF (Faurot and Burton 2005).

- An estimated 14 to 18 trees (lodgepole pine [*Pinus contorta*] and alpine fir [*Abies lasiocarpa*), ranging in size from 4- to 16-inches diameter at breast height (dbh) would be removed and stored on site (within the road right-of-way or placed upslope in the project area outside of the cut slope areas). Where appropriate (as designated by the project contract manager), trees would be repositioned on the exposed cut slopes or moved to other locations in the project area to reduce soil movement and promote the establishment of vegetation.

1.2.2. Segment 2

Segment 2 is 250 feet in length, including the approaches of 40 feet, one cross-section or cut slope of 140 feet, and two intervals between approaches and the steep cut slope of 70 feet (BA Appendix E). Specific features of Segment 2 include:

- A cut slope of 0.5:1 to vertical along 140 feet of the roadway widening (maximum of 2,200 cubic yards of removal from the cut slope). The maximum fill removal would account for that which may be needed to meet the angle of repose if solid rock is not encountered, as indicated in the preliminary design phase. Additional material may need to be removed from the cut slope to meet the angle of repose, if solid rock is not encountered, as indicated in the preliminary design phase (BA Appendix E). Revegetation activities would be implemented to stabilize the slopes and reduce a long-term source of erosion.

- This segment would be widened from 10 to 14 feet to 24 to 26 feet of overall width.

- Two 15-inch diameter drainage culverts would be extended to meet the new road width (23 and 25 feet extended to 38 feet). Extension will occur to the inside of the road, the side opposite of the Secesh River. If damage to the culverts is observed, they will be replaced with 18-inch culverts.

- Five unstable Jersey barriers would be realigned with the existing rails and moved approximately 2 to 4 feet from the river.

- Blasting would occur but is expected to be minimal in Segment 2. Blasting would follow the guidelines outlined in Table 2 and the PDFs (below).

- An estimated 18 to 20 trees (lodgepole pine and alpine fir) ranging in diameter from 4 to18 inches dbh would be removed and stored on site (where appropriate, as designated by the project contract manager). Trees will be repositioned on exposed cut slopes or moved to other locations in the project area to reduce soil movement and promote the establishment of vegetation.

1.2.3. Segment 3

Segment 3 is 250 feet in length, including the approaches of 40 feet, cut slope of 180 feet, and an interval area of 30 feet (BA Appendix E). Specific features of Segment 3 include:

- A cut slope of 0.5:1 to vertical along 180 feet of the roadway widening (250 cubic yards). This portion of the road would be widened from 12 to 16 feet to 24 to 26 feet of overall width.

- No drainage culverts exist in Segment 3.

- There are six unstable Jersey barriers that would be stabilized by being repositioned approximately 2 to 4 feet away from the streambank.

- No blasting would occur in Segment 3.

- Only two saplings and four to five seedlings (alpine fir) less than 4-inches dbh would be cut. This site burned in the Burgdorf 2000 fire and has very few standing trees. These trees would be lopped and scattered upslope from the roadway.

1.2.4. Segment 4

Segment 4 is 240 feet in length, including the approaches of 40 feet and a cut slope area of 200 feet (BA Appendix E). Specific features of Segment 4 include:

- A cut slope of 0.5:1 to vertical along 200 feet of the roadway widening (170 cubic yards).

- This segment would be widened from 14 to18 feet to 24 to 26 feet of overall width.

- One 15-inch diameter drainage culvert would be extended to meet the new road width (25 feet extended to 40 feet). Extension will occur to the inside of the road, the side opposite of the Secesh River. If damage to the culvert is observed, it will be replaced with an 18-inch culvert.

- The Jersey barriers in this segment are stable and away from the streambank by 8 to 12 feet. They would not be moved.

- No blasting would occur in Segment 4.

- An estimated 18 to 20 trees (lodgepole pine and alpine fir) ranging in diameter from 4 to 20 inches dbh would be cut. Many of these trees were burned in the 2007 East Zone Complex fires. These trees would be lopped and scattered upslope from the roadway or moved to other portions of the project area where they would be used to retain soil stability.

1.2.5. Segment 5

Segment 5 is 260 feet in length, including the approaches of 40 feet (BA Appendix E). Specific features of Segment 4 include:

- This area will require approximately 250 cubic yards of fill to accommodate the new road width.

- This segment would be widened from the existing 14 to 18 feet to 24 to 26 feet of overall width.

- One 15-inch diameter drainage culvert (box culvert) would be extended to meet the new road width (36 feet extended to 48 feet). Extension will occur to the inside of the road, the side opposite of the Secesh River. If damage to the culvert is observed, it will be replaced with an 18-inch culvert.

- The Jersey barriers in this segment are stable, away from the streambank by 10 to 15 feet, and would not be moved.

- No blasting would occur in Segment 5.

- An estimated 14 to 18 trees (lodgepole pine and alpine fir) ranging in diameter from 4 to 20 inches dbh would be removed. These trees would be removed or lopped and scattered upslope from the roadway or moved to other portions of the project area where they would be used to retain soil stability.

1.2.6. Project Design Features

The following PDFs are included as a part of the proposed action:

- The project would be consistent with the road standards for the PNF, which include the AASHTO engineering standards, the IFPA standards and guidelines for road construction, and the PNF BMPs outlined in the Stibnite Mine Erosion Plan.

- Roads would be graded and shaped to conserve existing surface material. The road grading would be sloped to the catch point or swale ditch to provide conveyance of runoff away from the roadway and the Secesh River.

- A high quality basalt aggregate would be used for the final grade in each segment and cover both road surfaces and catchment ditches.

- Mechanical excavation of overburden would be completed prior to blasting to minimize the extent of blasting required. Blasting would only be employed in those areas where mechanical removal is impractical.

- Blasting would only be permitted between mid-August and the first of October to minimize the likelihood of disturbing fish during spawning migration.

- A blast curtain to contain debris and minimize noise would be used during blasting in Segments 1 and 2.

- Cut slopes in segments 1 and 2 would be laid back to the angle of repose if solid rock is not encountered during excavation of the proposed slope. This would stabilize the hill slope, make it more conducive to revegetation, and reduce a potential chronic source of long-term erosion.

- Cut materials (dirt and rock) from Segments 1, 2, 3, and 4 would be disposed of in the government pit at Summit Pit, located approximately 2 miles from the project area, for future use. Larger boulders removed from the cut slopes would be placed behind the repositioned Jersey Barriers, as available, to stabilize and prevent future movement of barriers towards the Secesh River.

- The Summit Pit site would also be used for fuel storage, refueling of trucks and vehicles, and for staging and storage of equipment during construction.

- The Burgdorf pullout (approximately 0.8 miles from the project area) would be used to sequence vehicles and equipment to minimize congestion and maintain access during high construction periods (2 to 4 days per segment).

- Dust-abatement would be maintained through the use of water withdrawals upstream of the project. Use of chemicals is optional and not expected to occur based on the short duration of the project (1 to 2 weeks per segment) and the major construction timeframes (2 to 4 days). Fish screening and other appropriate BMPs would be implemented for water withdrawal and are outlined in BA Appendix F and BA Table 5 (e.g., Forest Plan Management Direction).

- No refueling or equipment maintenance activities would take place in the riparian conservation areas (RCAs) except where lugged vehicles or heavy equipment must be refueled on site to prevent travel. A spill containment plan has been completed and is provided in BA Appendix F.

- Each segment would be completed on an individual basis. During construction one lane of access would be maintained, except when blasting would occur. Blasting would close the road for up to 3 hours. It is expected that the one lane closure would last no longer than 3 days and would be scheduled mid-week during low traffic volume.

- Flaggers and safety precautions for local traffic would be implemented where appropriate. The project would be initiated outside of the high use recreational and hunting timeframes.

- When treating weeds or brush, all measures identified in the Federal action titled "Noxious Weed Control" would be followed. A copy of this would be provided to the contractor. Noxious weed treatment on the PNF is covered under a separate consultation with NMFS (2008/03332).

- When treating weeds or brush, management direction for non-native plants identified and referred to in the Forest Plan (p. III-35 to 37) would be followed.

- Debris that obstructs drainage systems would be promptly removed.

- During major construction timeframes, a journey-level Biologist or Forest Service Management personnel would be on site to provide construction management and monitor implementation of BMPs and PDFs.

- Erosion control would be placed at the work site prior to any construction so as to reduce sediment delivery to the streams (i.e., silt fences, blast curtains).

- BMPs (e.g., silt fence, straw bales, erosion control blankets, and mulching; see BMP subsection below) and specific PDFs for erosion control would be implemented to reduce the potential for construction-related sediment transport and turbidity.

- The disturbed cut and fill areas would be seeded and mulched.

- Sediment that has collected in the erosion control design features would be removed under the supervision of a Hydrologist, Soil Scientist, or Fisheries Biologist.

- Additional site-specific measures, including modifications to BMPs because of site-specific conditions, may be identified and approved by an onsite construction management person as long as no change to the range of effects is realized. This person may be either from the Forest Service or a qualified representative of Idaho County charged to monitor construction activities and provide expertise for fisheries, wildlife, and sediment transport questions. If additional measures that have the potential for adverse effects have not been previously consulted on, then the Level 1 Team would be notified and consultation would be reinitiated by the Forest Service.

- Road maintenance or construction would not be attempted when surface material is saturated with water and erosion problems could result.

- Directional felling would be used so that cut trees do not fall across the cut slope, road, or onto the streambank, and so that they lie on the ground in a manner that allows for the collection of soil (such as parallel to the hill slope contours). Cut trees would remain intact on site, or moved to other portions of the project area to minimize soil disturbance and potential sediment moving to streams. Felled trees may be used to create planting lattices, slash filters, grid structures, and/or slab wood structures on site to assist in revegetation and soil stabilization efforts.

- The project will meet Forest Plan management direction (See BA Table 5 for relevant direction). This direction is designed to protect Forest resources, and will be implemented during or after a project to meet Forest Plan requirements.

1.2.6.1. Proposed BMPs

- BMPs and Soil Water Conservation Practices for road activities would be utilized as applicable, in addition to PDFs, to reverse potential adverse impacts. BMPs for erosion control would follow those outlined for the SFSR Road Reconstruction Project (Faurot

and Burns 1999), as applicable, and would include the use of silt fences, straw-bale sediment barriers, erosion control blankets and mats, hydraulic planting, mulching, water bars and rolling dips, and/or temporary sediment basins. These BMPs would reduce or limit levels of soil disturbance, erosion and potential sedimentation, would meet requirements of the State of Idaho Non-point Source Pollution Management Plan, and maintain water quality and associated beneficial uses.

- BMPs for the use of explosives would also be used and would include drilling charge locations into the rock to direct the force of the charge away from aquatic resources, applying a heavy blasting mat to cover the charge to reduce the blast energy and contain any flying debris, and employing a sequential delay detonation system where each blast is subdivided into many smaller blasts separated by a minimum of 8 milliseconds to reduce the blast amplitude.

- Appropriate sediment control methods such as straw bales, slit fences, and erosion control blankets, will be used to avoid or reduce direct sediment input to streams. Disturbed areas will be seeded, mulched, and fertilized.

- Sediment fences, excelsior blankets, jute matting, or other erosion control measures will be used as needed when replacing or extending culverts. Cross-drain culverts will be installed at low flows and will use bypass channel and sediment traps if needed.

- Water drafting location(s) will be identified and approved prior to use. The Project Engineer will coordinate with a Fish Biologist and Hydrologist in identifying suitable sites. Screen intake hoses with 3/32-inch mesh will be used.

- All disturbed areas will be reclaimed immediately following project completion. Reclamation would include: (1) Sub-soiling to ameliorate compaction; (2) recontouring to the natural slope profile (as possible); (3) scattering of organic matter (as available) including slash, to provide a minimum of 50% effective ground cover; and (4) seeding with native seed to facilitate vegetation recovery. Where feasible, planting in lattices from felled trees would be considered to aid in soil stability and regeneration.

- Road drainage will be improved on all segments by installing water bars/dips, cleaning relief culverts, etc.

- A Spill Prevention and Containment Plan (SPCP) for hazardous materials and petroleum products approved by the Forest Service will be required. The plan will contain, at a minimum, response procedures for handling a spill, the measures to be taken, and a map of designated containment locations. This plan, a spill response kit, and containment equipment would be carried in all transport vehicles. Operators of equipment shall be familiar with use of spill equipment and trained to implement all aspects of the spill prevention, containment, and cleanup plans.

- No fuel storage will occur in RCAs. No refueling will take place in the RCAs except where lugged vehicles or heavy equipment must be refueled on site to prevent travel.

- Petroleum products will only be hauled in trucks without trailers.

- In order to prevent the potential spread of noxious weeds into the project or treatment areas, Forest Service contractors associated with project activities will clean all off-road equipment prior to entry onto the treatment area. This cleaning would remove plants, dirt, and material that may carry noxious weed seeds.

- Any materials such as mulches, straw, etc., used for rehabilitation, reclamation, etc., would be free of noxious weed seeds and comply with the 1995 weed free forage special order against the use of non-certified hay, straw, or mulch. Materials not covered in the special order, which have the potential to contain noxious weed seed, would be inspected and determined to be weed seed free before purchase and use. Certification that these materials are free of noxious weed seed would be done by qualified individuals, such as the Idaho Seed Lab, Idaho County Weed Supervisor, or Forest Service noxious weed management specialist.

- Source sites for gravel and borrow materials would be inspected before materials are used or transported. If noxious weeds are present, they would be treated to prevent seed production before use or transport. If noxious weeds are present, they would be treated to prevent seed production before use or transport. The source would not be used if noxious weed species were present that are not currently found at the site unless effective treatment or other mitigation measures identified by the District Ranger are implemented. Written documentation of the inspection by county weed agents, Forest Service noxious weed management specialists, or other individuals who the Forest Service stipulates are qualified would be required before material are used.

The proposed PDFs and BMPs (collectively minimization/avoidance measures), described here and in the consultation initiation package as parts of the proposed action, are intended to reduce or avoid adverse effects on ESA-listed species and their habitats. NMFS regards these minimization/avoidance 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 deviation from these minimization/avoidance measures will be beyond the scope of this consultation and will not be exempted from the prohibition against take as described in the attached incidental take statement. Further consultation will be required to determine what effect the modified action may have on listed species or designated critical habitats.

1.3. Action Area

'Action area' means all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action (50 CFR 402.02). The project is located about 18 miles northeast of McCall, Idaho, on the McCall Ranger District of the PNF. It is located along and adjacent to a section of Warren Wagon Road (FH 21) in Idaho County. The legal description of the area is T22N, R5E, Sections 4, 7, 8, and 9. For purposes of this consultation,

the action area includes the project area footprint along the Secesh River, from the uppermost portion of Segment 1 (0.8 miles from Burgdorf Junction), downstream to the Secesh River's confluence with Flat Creek.

The action area is used by the freshwater life history stages of threatened Snake River spring/summer Chinook salmon and Snake River Basin steelhead (Table 3). This segment of the Secesh River is designated critical habitat for each species. The Secesh River in the action area is also EFH for Chinook salmon (Pacific Fishery Management Council [PFMC] 1999), and is in an area where environmental effects of the proposed project may adversely affect EFH for this species.

Table 3. Federal Register notices for final rules that list threatened and endangered species, designate critical habitats, or apply protective regulations to listed species considered in this consultation.

Species	Listing Status	Critical Habitat	Protective Regulations
Chinook salmon (*Oncorhynchus tshawytscha*)			
Snake River spring/summer run	T 6/28/05; 70 FR 37160	10/25/99; 64 FR 57399	6/28/05; 70 FR 37160
Steelhead (*O. mykiss*)			
Snake River Basin	T 1/05/06; 71 FR 834	9/02/05; 70 FR 52630	6/28/05; 70 FR 37160

Note: Listing status: 'T' means listed as threatened under the ESA; 'E' means listed as endangered.

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 U.S. Fish and Wildlife Service, NMFS, or both, to ensure that their actions are not likely to jeopardize the continued existence of endangered or threatened species or adversely modify or destroy their designated critical habitats. Section 7(b)(4) requires the provision of an incidental take statement that specifies the impact of any incidental taking and includes reasonable and prudent measures (RPMs) to minimize such impacts.

2.1. Biological Opinion

This Opinion presents NMFS' review of the status of each ESA-listed species of Pacific salmon and steelhead[1] considered in this consultation, the condition of designated critical habitat, the environmental baseline for the action area, all the effects of the action as proposed, and cumulative effects (50 CFR 402.14(g)). For the jeopardy analysis, NMFS analyzes those combined factors to conclude whether the proposed action is likely to appreciably reduce the likelihood of both the survival and recovery of the affected listed species.

[1] An 'evolutionarily significant unit' (ESU) of Pacific salmon (Waples 1991) and a 'distinct population segment' (DPS) of steelhead (final steelhead FR notice) are considered to be 'species,' as defined in section 3 of the ESA.

The critical habitat analysis determines whether the proposed action will destroy or adversely modify designated critical habitat for listed species by examining any change in the conservation value of the essential features of that critical habitat. This analysis relies on statutory provisions of the ESA, including those in section 3 that define "critical habitat" and "conservation," in section 4 that describe the designation process, and in section 7 that sets forth the substantive protections and procedural aspects of consultation. The regulatory definition of "destruction or adverse modification" at 50 CFR 402.02 is not used in this Opinion.

2.1.1. Status of the Species and Critical Habitat

This section defines the biological requirements of each ESA-listed species affected by the proposed action, and the status of each designated critical habitat relative to those requirements. ESA-listed species facing a high risk of extinction and critical habitats with degraded conservation value are more vulnerable to the aggregation of effects considered under the environmental baseline, the effects of the proposed action, and cumulative effects.

2.1.1.1. Status of the Species.

NMFS reviews the condition of the listed species affected by the proposed action using criteria that describe a 'viable salmonid population' (VSP) (McElhany *et al*. 2000). Attributes associated with a VSP include abundance; productivity, spatial structure, and genetic diversity that maintain its 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.

Snake River Spring/Summer Chinook Salmon

The Snake River spring/summer Chinook salmon ESU, listed as threatened on April 22, 1992, (67 FR 14653), includes all natural-origin populations in the Tucannon, Grande Ronde, Imnaha, and Salmon Rivers. Fish returning to several of the hatchery programs are also listed, including those returning to the Tucannon River, Imnaha, and Grande Ronde River hatcheries, and to the Sawtooth, Pahsimeroi, and McCall hatcheries on the Salmon River.

The Snake River drainage is thought to have produced more than 1.5 million adult spring/ summer Chinook salmon in some years during the late 1800s (Matthews and Waples 1991). By the 1950s the abundance of spring/summer Chinook had declined to an annual average of 125,000 adults and by the mid-1960s, further declined to an average of about 60,000 adults. Adult returns counted at Lower Granite Dam reached all-time lows in the mid-1990s, although numbers have begun to increase since 1997. Over a 10-year period from 1992 to 2001, which includes the year of listing (1992), returns of wild/natural fish ranged from 183 in 1994 to 12,475 in 2001, and averaged 3,314 adults. In 2003, 70,609 adult spring Chinook salmon passed over Lower Granite Dam, and in 2004, the number remained about the same at 70,742 fish (Fish Passage Center 2005). Approximately 73% of the spring run Chinook salmon in 2004 were of

hatchery origin, which means approximately 19,100 of the 2004 Snake River spring Chinook salmon run were wild/natural fish. From 2004 to 2005 there was a 60% drop in Snake River spring Chinook salmon adults passing Lower Granite Dam. The 2007 adult spring Chinook salmon count of 22,905 was 44% lower than the 10-year average of 51,772 from 1997 to 2006 (Fish Passage Center 2008). A total of 7,312 adult summer Chinook salmon was counted in 2007 at Lower Granite Dam, which is about 33% of the 2002 count (22,159 adult Snake River summer Chinook salmon) and about 75% the 10-year average of 9,714 from 1997 to 2006 (Fish Passage Center 2008).

Summer run Snake River Chinook salmon primarily return to the SFSR. The estimated smolt production capacity of 10 million smolts for rivers in Idaho, coupled with historic smolt to adult return rates of 2% to 6%, indicate Idaho could produce wild/natural runs of 200,000 to 600,000 adults (Fish Passage Center 2002; Fish Passage Center 2003). The relatively low numbers of the last decade are reflected throughout the entire distribution of Chinook salmon subpopulations scattered throughout the Grande Ronde, Imnaha, Tucannon, and Salmon River basins. Redd counts and estimates of parr and smolt densities generally indicate that fish production is well below the potential, and continuing to decline.

Despite fluctuations in the number of adult returns, the general trend in adult returns since 1977 has been a gradual population decline with episodic oscillations (McClure *et al.* 2003). Chinook salmon numbers were higher since 2000 than during the 24 previous years of record (Fish Passage Center 2004). Although there were record returns in 2000 and 2001, and relatively high returns from 2002 to 2004, ESU numbers are in general very low in comparison to historic levels (Beven *et al.* 1994). The low returns amplify the importance that a high level of protection be afforded to each adult Chinook salmon, particularly because a very small percentage of salmon survive to the life stage of a returning, spawning adult, and because these fish are in the final stage of realizing their reproductive potential (approximately 2,000 to 4,000 progeny per adult female) (Behnke 2002).

Habitat impairment is common in the range of this species. Spawning and rearing habitats have been impaired by factors such as tilling, water withdrawals, timber harvest, grazing, mining, and alteration of floodplains and riparian vegetation. Mainstem Columbia River and Snake River hydroelectric developments have altered flow regimes and estuarine habitat, and disrupted migration corridors (Raymond 1979; Raymond 1988; NMFS 2000). Competition between natural indigenous stocks of spring/summer Chinook salmon and spring/summer Chinook of hatchery origin has likely increased due to an increasing proportion of naturally-reproducing fish of hatchery origin (Behnke 2002).

Compared to the greatly reduced numbers of returning adults for the last several decades, exceptionally large numbers of adult Chinook returned to the Snake River drainage in 2000 and in 2001. These large returns are thought to have been a result of favorable ocean conditions (Logerwell *et al.* 2003; Meeings and Lackey 2005), and above average flows in the Columbia River Basin (CRB) when the smolts migrated downstream. Later, they migrate through the northeast Pacific Ocean (Hart 1973; Hartt and Dell 1986). However, even these large returns are only a fraction (5% to 10%) of the estimated returns of the late 1800s (Behnke 2002). Recent increases in the population are not expected to continue, and the long-term trend for this species

indicates a decline. Detailed information on the range wide status of Snake River spring/summer Chinook salmon under the environmental baseline is described in Chinook salmon status reviews (Myers *et al.* 1998; Biological Review Team (BRT) 2003; NMFS 2004). Habitat improvements would not necessarily correspond to increased salmon productivity because a myriad of other factors can still depress populations, but diminished quality would probably correspond to reduced productivity (Regetz 2003). Additional information on the biology, status, and habitat elements for Snake River spring/summer Chinook salmon is described in the status review updates (BRT 1998; BRT 2003; NMFS 2004; Good *et al.* 2005).

NMFS and its Federal partners recently updated the status of the Snake River spring/summer Chinook salmon ESU by identified Technical Recovery Team (TRT) populations and for each fifth field hydrologic unit code (HUC) or subwatershed for the remand of the Federal Columbia River Power System Opinion (Cooney 2004; NMFS 2004). The Snake River Salmon and Steelhead Recovery Plan, which includes the Snake River spring/summer Chinook salmon ESU, is being developed by NMFS, the State of Idaho, and their Federal and state partners (NMFS 2006a). Drafts are available online at: http://www.idahosalmonrecovery.net/recoverplans/spsumchinook.html. Under the recovery plan, the Snake River spring/summer Chinook salmon includes five Major Population Groups (MPGs), one of which is included within the action area (i.e., the SFSR MPG).

The SFSR MPG includes four independent populations. Independent populations in the MPG include: (1) Little Salmon River; (2) SFSR Mainstem; (3) Secesh River; and (4) East Fork South Fork Salmon River (EFSFSR). As defined by the Interior Columbia Technical Recovery Team (ICTRT) (McClure *et al.* 2003), the SFSR Mainstem and EFSFSR populations have been classified as a *Large* populations, while the other two are classified as *Intermediate* populations (Table 4). The Little Salmon River population, which includes spring- and summer-run fish, is included in this MPG on the basis of geographic proximity (ICTRT 2005; NMFS 2006a).

Table 4. Characteristics of independent populations in the South Fork Salmon River spring/summer Chinook Salmon MPG (NMFS 2006a).

Population	Extant/ Extinct	Life History	Size	Threshold Abundance	Minimum Productivity
South Fork Salmon MPG					
Little Salmon River	Extant	Spring/summer	Intermediate	750	1.6
South Fork Salmon River	Extant	Summer	Large	1,000	1.45
Secesh River	Extant	Summer	Intermediate	750	1.6
East Fork South Fork Salmon River	Extant	Summer	Large	1,000	1.45

Note - Minimum abundance and productivity values represent levels needed to achieve a 95% probability of existence over 100 years. Shaded populations are found within the action area.

Hatchery supplementation programs have targeted natural production areas in two of the three independent populations within the SFSR drainage, the SFSR Mainstem and the EFSFSR populations. The SFSR Mainstem population also is influenced by a harvest mitigation program (segregated hatchery program) that utilizes within-population stock. The Secesh River

population is managed for natural wild production; however, hatchery strays have been documented in the population in recent years. A spring Chinook salmon segregated hatchery mitigation program is operated on Rapid River, within the Little Salmon River population. Rapid River upstream from the Rapid River Hatchery weir supports naturally produced summer-run Chinook salmon, with annual returns of 200 to 400 adult salmon. The remainder of the Little Salmon population consists of naturally produced putative spring-run fish (NMFS 2006a).

The SFSR MPG currently does not meet MPG-level viability criteria (Table 5). The SFSR drainage contains three of the populations; the fourth lies outside of that drainage (i.e., Little Salmon River). At least two of the populations (one *Intermediate* and one *Large*) must be at viable status for the MPG to be considered viable, and one of the two must be *Highly* Viable.

Table 5. VSP risk matrix for independent salmonid populations in the SFSR MPG.

		Spatial Structure/Diversity Risk			
		Very Low	**Low**	**Moderate**	**High**
Abundance/ Productivity Risk	**Very Low <1%**	**HV**	**HV**	**V**	
	Low 1-5%	**V**	**V**	**V**	
	Moderate 6 – 25%				
	High >25%		Secesh; EFSFSR.	SFSR Mainstem.	Little Salmon

Viability Key: HV = Highly Viable; V= Viable; Shaded cells= does not meet viability criteria.

For a detailed discussion and updates regarding the status and viability of Snake River spring/summer Chinook salmon and its independent populations, please refer to the following website: http://www.idahosalmonrecovery.net/.

Surveys for adult Chinook salmon were conducted from 2004 to 2006 in the mainstem Secesh River, approximately 6.6 miles downstream from the eastern end of the project area. The number of adults estimated in the Secesh River ranged from 209 in 2006 to 914 in 2004 (Kucera and Orme 2007).

Spring/summer Chinook salmon spawning grounds were surveyed between 2004 and 2006 in the Secesh River (five locations) and in five tributaries to the Secesh River (*e.g.*, Lake Creek, Summit Creek, Grouse Creek, Lick Creek, and Loon Creek). Summit Creek and Lake Creek converge at Burgdorf Junction to form the Secesh River approximately 0.8 miles upstream from the western edge of the project area, and the mouths of Grouse Creek, Loon Creek, and Lick Creek are approximately 0.9, 10, and 21 miles downstream from the eastern edge of the project area, respectively. Total number of redds counted in the mainstem Secesh River was 25. All redds were counted downstream of the project area; no redds were counted in the reach between Grouse Creek and Lake Creek, which overlaps the project area. An additional 39, 9, and 2 redds were counted in Lake Creek, Summit Creek, and Grouse Creek, respectively (Adult Technical

Team 2007). Considering spawning surveys and site-specific habitat conditions, the Secesh River in the action area is not likely used by Chinook salmon for spawning, providing more rearing and migratory habitat.

Snake River Basin Steelhead

Snake River Basin steelhead, were listed as threatened on August 18, 1997 (62 FR 43937), with a revised listing as a DPS on January 5, 2006 (71 FR834). Snake River Basin steelhead include all natural-origin populations of steelhead in the Snake River Basin of southeast Washington, northeast Oregon, and Idaho. One of the hatchery stocks in the Snake River Basin is listed (originating from Dworshak Reservoir) under the B-Run Program, and most hatchery stocks are included in the listing under the 2004 NMFS hatchery stock policy (June 14, 2004, 69 FR 33102).

Natural runs of Snake River Basin steelhead have been declining in abundance over the past decades. Some significant factors in the declining populations are mortality associated with the many dams along the Columbia and Snake Rivers, losses from harvest, loss of access to more than 50% of their historic range, and degradation of habitats used for spawning and rearing (NMFS 2006b). Another potential threat to Snake River Basin steelhead is genetic introgression from hatchery stocks since wild fish comprise such a small proportion of the populations (Behnke 2002). Additional information on the biology, status, and habitat elements for Snake River Basin steelhead is described in Busby et al. (1996) and NMFS (2004).

The longest and most consistent indicator of Snake River Basin steelhead abundance is derived from counts of natural-origin steelhead at Lower Granite Dam, the uppermost dam on the lower Snake River. The 2000 and 2001 counts at Lower Granite Dam indicated a short-term increase in returning pre-spawning adults. Adult returns (hatchery and wild) in 2001 were the highest in 25 years, and 2000 counts were the sixth highest on record (Fish Passage Center 2001). According to estimates, the abundance of natural-origin summer steelhead at Lower Granite Dam declined from a 4-year average of 58,300 in 1964 to a 4-year average of 8,300, ending in 1998. The more recent 4-year return average from 2004 to 2007 is 33,775 wild fish, where natural-origin fish represented approximately 22% of the total adult returns (Fish Passage Center 2008). Increased levels of adult returns were likely a result of favorable ocean (Logerwell *et al.* 2003; Meeings and Lackey 2005) and instream flow conditions for these cohorts. Although steelhead numbers have dramatically increased, wild steelhead comprise only 10% to 26% of the total returns since 1994 (Fish Passage Center 2008). Recent increases in the population are not expected to continue, and the long-term trend for this species indicates a decline (McClure *et al.* 2003; NMFS 2006b).

Survival of downstream migrants in 2001 was the lowest level since 1993. Low survival was due to record low run-off volume and elimination of spills from the Snake River dams to meet hydropower demands (Fish Passage Center 2002). Average downstream travel times for steelhead nearly doubled and were among the highest observed since recording began in 1996. Consequently, wide fluctuations in population numbers are expected over the next few years when adults from recent cohorts return to spawning areas. Detailed information on the current

range-wide status of Snake River Basin steelhead, under the environmental baseline, is described in the steelhead status review (Busby *et al.* 1996), the status review update (BRT 2003), and the DPS listing (January 5, 2006, 71 FR834).

The Salmon River steelhead MPG includes 12 independent populations (NMFS 2006b), all of which are currently considered extant (Table 6). Eight of the populations are classified as supporting A-run steelhead and four are classified as supporting B-run steelhead. Population size designations, based on intrinsic potential habitat, range from Basic to Large.

Table 6. Characteristics of independent populations in the Salmon River steelhead MPG.

Population	Extant/ Extinct	Life History	Size	Threshold Abundance	Minimum Productivity
Little Salmon River	Extant	A-Run	Intermediate	1,000	1.2
South Fork Salmon	Extant	B-Run	Intermediate	1,000	1.2
Secesh River	Extant	B-Run	Basic	500	1.4
Chamberlain Creek	Extant	A-Run	Intermediate	1,000	1.2
Lower Middle Fork	Extant	B-Run	Large	1,500	1.13
Upper Middle Fork	Extant	B-Run	Large	1,500	1.13
Panther Creek	Extant	A-Run	Intermediate	1,000	1.2
North Fork Salmon	Extant	A-Run	Basic	500	1.4
Lemhi	Extant	A-Run	Intermediate	1,000	1.2
Pahsimeroi River	Extant	A-Run	Intermediate	1,000	1.2
East Fork Salmon	Extant	A-Run	Intermediate	1,000	1.2
Upper Salmon Mainstem	Extant	A-Run	Intermediate	1,000	1.2

Note – Minimum abundance and productivity values represent levels needed to achieve a 95% probability of persistence over 100 years. Shaded populations or portions of those populations occur in the action area.

Steelhead artificial propagation programs in the Salmon River drainage have been developed to mitigate for the impacts of hydropower dams outside of the drainage. Hatchery programs funded by the Idaho Power Company have been developed to mitigate for the effects of the Hells Canyon Dam complex, constructed in the Hells Canyon reach of the Snake River. Approximately 1.5 million smolts are released annually from Idaho Power Company-funded hatcheries; release locations include the Little Salmon River, upper Salmon River, and Pahsimeroi River (mitigation hatchery location). Mitigation for the four lower Snake River dams is provided through the Lower Snake River Compensation Plan (LSRCP), which is administered by the U.S. Fish and Wildlife Service. The annual planned production release in the Salmon River drainage for the LSRCP program is 3.07 million smolts. Those smolts are released in the Little Salmon and upper Salmon rivers. The mitigation hatchery releases are primarily made for harvest augmentation purposes. All juvenile hatchery steelhead released under the harvest augmentation programs are marked by an adipose fin clip.

Hatchery steelhead also are released at locations within the Salmon River steelhead MPG for supplementation purposes. Numbers of fish to be released and release locations are determined through U.S. v Oregon negotiations. Target annual release numbers for brood years 2006 through 2008 at all locations in the Salmon River drainage sum to 730,000 smolts, of which 530,000 are not adipose-clipped. Approximately 1 million steelhead eyed-eggs will be outplanted annually in addition to the supplementation smolt releases. The Secesh River population, the two Middle Fork Salmon River populations, and the Chamberlain Creek population have no history of hatchery steelhead releases and are managed for wild production.

Independent population viability assessments were completed for the 12 populations in the MPG (Table 7; NMFS 2006b). The Salmon River steelhead MPG currently does not meet MPG-level viability criteria. For the MPG to be considered viable, a minimum of six of the 12 extant independent populations in the MPG must be considered viable. The current recovery planning objective for the MPG is for the Chamberlain Creek, Secesh River, SFSR, Upper MFSR, and Upper Salmon River Mainstem populations (plus one additional *Large* or *Intermediate* population) to be rated as viable, and one must be rated as highly viable. Currently, none of the 12 extant populations in the MPG meet population level viability criteria. For a detailed discussion and updates regarding the status and viability of Snake River Basin steelhead and its independent populations, please refer to the following website: http://www.idahosalmonrecovery.net/.

Table 7. VSP risk matrix for independent steelhead populations in the Salmon River steelhead MPG.

		Spatial Structure/Diversity Risk			
		Very Low	**Low**	**Moderate**	**High**
Abundance/ Productivity Risk	**Very Low** (<1%)	HV	HV	V	
	Low (1-5%)	V	V	V	
	Moderate (6 – 25%)				
	High (>25%)		Secesh River		

Viability Key: HV – Highly Viable; V – Viable; Shaded cells = does not meet viability criteria.

Snake River Basin steelhead are known to occur within the action area. Information on spawning locations of steelhead is generally unknown in the basin. However, based on site-specific habitat conditions, the Secesh River in the action area is more likely used for steelhead rearing and migration than spawning.

2.1.1.2. Status of Critical Habitat.

NMFS reviews the status of designated critical habitat affected by the proposed action by examining the condition and trends of primary constituent elements (PCEs) throughout the designated area. The PCEs consist of the physical and biological features identified as essential to the conservation of the listed species in the documents that designate critical habitat (Table 8).

As a result of increasing urbanization, agricultural development, and industrialization throughout the CRB, fish and wildlife populations in and near the river are exposed to a wide variety of contaminants from both runoff and atmospheric deposition. More than 2,500 streams, river reaches, and lakes in the Northwest do not meet Federally-approved, state, and/or tribal water quality standards, and are now listed as water quality limited under section 303(d) of the Clean Water Act (NMFS 2005a).

Table 8. Types of sites and essential physical and biological features designated as PCEs, and the species life stage each PCE supports.

Site	Essential Physical and Biological Features	ESA-listed Species Life Stage
Snake River Steelhead[a]		
Freshwater spawning	Water quality, water quantity, and substrate	Spawning, incubation, and larval development
Freshwater rearing	Water quantity & floodplain connectivity to form and maintain physical habitat conditions	Juvenile growth and mobility
	Water quality and forage[b]	Juvenile development
	Natural cover[c]	Juvenile mobility and survival
Freshwater migration	Free of artificial obstructions, water quality and quantity, and natural cover[c]	Juvenile and adult mobility and survival
Snake River Spring/summer Chinook Salmon		
Spawning & Juvenile Rearing	Spawning gravel, water quality and quantity, cover/shelter, food, **riparian vegetation**, and **space**	Juvenile and adult.
Migration	Substrate, water quality and quantity, water temperature, water velocity, cover/shelter, food[d], riparian vegetation, space, **safe passage**	Juvenile and adult.

a Additional PCEs pertaining to estuarine, nearshore, and offshore marine areas have also been described for Snake River steelhead. These PCEs will not be affected by the proposed action and have therefore not been described in this Opinion.
b Forage includes aquatic invertebrate and fish species that support growth and maturation.
c Natural cover includes shade, large wood, log jams, beaver dams, aquatic vegetation, large rocks and boulders, side channels, and undercut banks.
d Food applies to juvenile migration only.

Climate change is likely to have negative implications for the conservation value of designated critical habitats in the Pacific Northwest (CIG 2004; Scheuerell and Williams 2005; Zabel et al. 2006; Independent Scientific Advisory Board [ISAB] 2007). Average annual Northwest air temperatures have increased by approximately 1ºC since 1900, or about 50% more than the global average warming over the same period (ISAB 2007). The latest climate models project a warming of 0.1 to 0.6 ºC per decade over the next century. According to the ISAB, these effects may have the following physical impacts within the next forty or so years:

- Warmer air temperatures will result in a shift to more winger/spring rain and runoff, rather than snow that is stored until the spring/summer melt season.

- With a shift to more rain and less snow, the snowpacks will diminish in those areas that typically accumulate and store water until the spring freshet.

- With a smaller snowpack, these watersheds will see their runoff diminished and exhausted earlier in the season, resulting in lower streamflows in the June through September period.

- River flows in general and peak river flows are likely to increase during the winter due to more precipitation falling as rain rather than snow.

- Water temperatures will continue to rise, especially during the summer months when lower streamflow and warmer air temperatures will contribute to the warming regional waters.

These changes will not be spatially homogenous. Areas with elevations high enough to maintain temperatures well below freezing for most of the winter and early spring would be less affected. Low-lying areas that historically have received scant precipitation contribute little to total streamflow and are likely to be more affected. These long-term effects may include, but are not limited to, depletion of cold water habitat, variation in quality and quantity of tributary rearing habitat, alterations to migration patterns, accelerated embryo development, premature emergence of fry, and increased competition among species.

Snake River Spring/Summer Chinook Salmon Critical Habitat

Critical habitat was designated for Snake River spring/summer Chinook salmon on December 28, 1993 (58 FR 68543), and was revised on October 25, 1999 (64 FR 57399). The segment of the Secesh River addressed in this Opinion is designated critical habitat for Snake River spring/summer Chinook salmon Critical habitat is designated to include all river reaches presently or historically accessible to Snake River spring/summer Chinook salmon. Critical habitat includes the stream bottom, the water, and the adjacent riparian zone, which is defined as the area within 300 feet of the line of high water of a stream channel or from the shoreline of a standing body of water.

Habitat impairment is common in the range of this ESU, including the action area streams. Spawning and rearing habitats are impaired by factors such as water withdrawals, timber harvest,

mining, and alteration of floodplains and riparian vegetation. Mainstem Columbia and Snake River hydroelectric developments have altered flow regimes and estuarine habitat, and disrupted migration corridors.

During all life stages, Snake River spring/summer Chinook salmon require cool water that is relatively free of contaminants. Water quality impairments in the designated critical habitat of this ESU include inputs from fertilizers, insecticides, fungicides, herbicides, surfactants, heavy metals, acids, petroleum products, animal and human sewage, dust suppressants (e.g., magnesium chloride), radionuclides, sediment in the form of turbidity, and other anthropogenic pollutants. Pollutants enter the surface waters and riverine sediments from the headwaters of the Salmon River to the Columbia River estuary as contaminated stormwater runoff, aerial drift and deposition, and via point source discharges. Some contaminants such as mercury and pentachlorophenol enter the aquatic food web after reaching water and may be concentrated or even biomagnified in the salmon tissue. This species also requires rearing and migration corridors with adequate passage conditions (water quality and quantity available at specific times) to allow access to the various habitats required to complete their life cycle.

Many activities have affected the essential features in the designated critical habitat on the PNF. Water temperature, water quality, water quantity, and instream sediment levels have been affected due to the effects of fire, roads, mining, grazing, recreation, and irrigation diversions. However, specifically within the action area, floodplain connectivity and peak/base flows have been affected (discussed in more detail in the Environmental Baseline section of this Opinion). The proposed action has the potential to directly affect water quality, substrate/spawning gravel, riparian vegetation, water temperature, and floodplain connectivity. The conservation role of the habitat in the Salmon River basins remains important because it supports several Chinook salmon populations, including some with essentially no hatchery influence.

Snake River Basin Steelhead Critical Habitat

Critical habitat for Snake River Basin steelhead was designated on September 2, 2005, with an effective date of December 31, 2005 (70 FR 52630). Critical habitat on the PNF includes the segment of the Secesh River included in this consultation; Table 21 in the Federal Register notice details the streams within the Snake River basin steelhead geographical range but excluded from critical habitat designation. Designated critical habitat for the Snake River Basin steelhead only includes the stream channel, with a lateral extent as defined by the ordinary high-water line; the bankfull elevation is used in areas where ordinary high-water line has not been defined.

The Snake River Basin Critical Habitat Analytical Review Team (CHART) concluded that all occupied areas contain spawning, rearing, or migration PCEs for this species. The CHART concluded that many of the watersheds within the PNF have high conservation values. For example, 15 watersheds from the SFSR were determined to have high conservation value (NMFS 2005b).

The complex life cycle of steelhead gives rise to complex habitat needs, particularly during the freshwater phase (Spence *et al.* 1996). Spawning gravels must be of a certain size and free of sediment to allow successful incubation of the eggs. Eggs also require cool, clean, and well-oxygenated waters for proper development. Juvenile steelhead need abundant food sources, including insects, crustaceans, and other small fish. They need places to hide from predators (mostly birds and bigger fish), such as under logs, root wads and boulders in the stream, and beneath overhanging vegetation. They also need places to seek refuge from periodic high flows (side channels and off channel areas) and from warm summer water temperatures (coldwater springs, cool tributaries, and deep pools). Returning adults generally do not feed in fresh water but instead rely on limited energy stores to migrate, mature, and spawn. Like juvenile steelhead, the adults also require cool water and places to rest and hide from predators.

During all freshwater life stages, steelhead require cool water that is relatively free of contaminants. Water quality impairments in the range of the Snake River Basin steelhead species include inputs from fertilizers, insecticides, fungicides, herbicides, surfactants, heavy metals, acids, petroleum products, animal and human sewage, dust suppressants (e.g., magnesium chloride), radionuclides, sediment in the form of turbidity, and other anthropogenic pollutants. Pollutants enter the surface waters and riverine sediments from the headwaters of the Salmon River to the Columbia River estuary as contaminated stormwater runoff, aerial drift and deposition, and via point source discharges. Some contaminants such as mercury and pentachlorophenol enter the aquatic food web after reaching water, and may be concentrated or even biomagnified in the steelhead tissue. Steelhead also require rearing and migration corridors with adequate passage conditions (water quality and quantity available at specific times) to allow access to the various habitats required to complete their life cycle.

The CHART identified several management activities that have affected the PCEs in the designated critical habitat on the PNF, including agriculture, forestry, fire activity and disturbance, grazing, irrigation impoundments and withdrawals, mineral mining, recreation, urbanization, and road building and maintenance. Effects to the PCEs from these activities are scattered across the Forest (NMFS 2005b).

2.1.2. Environmental Baseline

'Environmental baseline' includes the past and present impacts of all Federal, state, or private actions and other human activities in the action area, the anticipated impacts of all proposed Federal projects in the action area that have already undergone formal or early section 7 consultation, and the impact of state or private actions which are contemporaneous with the consultation in process (50 CFR 402.02). An environmental baseline that does not meet the biological requirements of an ESA-listed species may increase the likelihood that adverse effects of the proposed action will result in jeopardy to a listed species or in destruction or adverse modification of a designated critical habitat.

NMFS describes the environmental baseline in terms of the biological requirements for habitat features and processes necessary to support all life stages of each listed species within the action area. Each listed species considered in this Opinion resides in or migrates through the action

area. Thus, for this action area, the biological requirements for salmon and steelhead are the habitat characteristics that support successful adult and juvenile migration, adult holding, spawning, incubation, rearing, and growth and development to smoltification. The habitat features likely to be affected by the proposed action are water quality, substrate, passage, and riparian vegetation.

The Secesh River analysis area comprises about 158,000 acres. The main river enters the mainstem SFSR approximately 1 mile downstream of the EFSFSR. Channel gradients range from less than one percent along Lake Creek and the upper Secesh Meadows to over 10% in canyon sections of the lower river. Primary fish-bearing tributaries to the Secesh River include Lake Creek, Summit Creek, Grouse Creek, Ruby Creek, Loon Creek, and Victor Creek. Wildfire is a common disturbance in the watershed, with 2,546 acres burned from 2001 to 2005 in the analysis area and an additional 64,685 acres burned in the recent East Zone Complex fire of 2007 (USDA 2008).

Baseline conditions for the proposed action have been evaluated for the program at the watershed and action area scales. The PNF based its evaluation of the environmental baseline on Southwest Idaho's version of NMFS' "matrix of pathways and indicators" (NMFS 1996). This method assesses the current condition of instream, riparian, and watershed factors that collectively provide properly functioning aquatic habitat essential for the survival and recovery of the ESA-listed species.

At the watershed scale, habitat conditions are generally "functioning at risk" in the Secesh River watershed (USDA 2007). Within the Secesh, the sediment, chemical contamination/nutrients, pool frequency/quality, off-channel habitat, refugia, width to depth ratio, and streambank disturbance watershed condition indicators (WCIs) were all rated "functioning appropriately." All other WCIs were "functioning at risk." The environmental baseline matrices in Appendix B of the BA address the status of WCIs for the Secesh River action area. All WCIs are either "functioning appropriately" or "functioning at risk" at this scale. However, the BA described changed conditions at the action area scale for several WCIs since the watershed BA was completed (USDA 2008). Within the action area, intragravel quality, interstitial sediment, pool frequency, pool quality, and streambank condition are "functioning appropriately." Floodplain connectivity and peak/base flows were identified as "functioning at unacceptable risk." Please refer to the section 7 watershed BA (USDA 2007) and the BA (USDA 2008) for a more detailed analysis of the environmental baseline.

2.1.3. Effects of the Action

'Effects of the action' means the direct and indirect effects of an action on the ESA-listed species or critical habitat, together with the effects of other activities that are interrelated or interdependent with that action, that will be added to the environmental baseline (50 CFR 402.02). Effects of the action that reduce the ability of an ESA-listed species to meet its biological requirements may increase the likelihood that the proposed action will result in jeopardy to that listed species or in destruction or adverse modification of a designated critical habitat.

2.1.3.1. Effects on Listed Species

Road construction, fill removal, creation of larger cut slopes, clearing of vegetation, and extension/replacement of cross-drain culverts are ground disturbing activities that all have the potential to generate sediment. Increased sediment delivery to the Secesh River could increase turbidity levels and increase fine sediment deposition in downstream habitats. Fish could also be affected through impacts on water quality from increased stream temperatures and/or through chemical contamination. Chemical contamination may occur from dust suppression chemicals or anytime construction equipment is working adjacent to the stream channel. Fish could also be injured or killed as a result of blasting activities.

Sediment/Turbidity. Fish exposed to elevated turbidity levels may be temporarily displaced from preferred habitat or could potentially exhibit sublethal responses such as gill flaring, coughing, avoidance, and increases in blood sugar levels (Bisson and Bilby 1982; Sigler *et al*. 1984; Berg and Northcote 1985; Servizi and Martens 1991), indicating some level of stress (Bisson and Bilby 1982; Berg and Northcote 1985; Servizi and Martens 1987). The magnitude of these stress responses is generally higher when turbidity is increased and particle size decreased (Bisson and Bilby 1982; Servizi and Martens 1987; Gregory and Northcote 1993). The most critical aspects of sediment-related effects are timing, duration, intensity and frequency of exposure (Bash et al. 2001). Depending on the level of these parameters, turbidity can cause lethal, sublethal, and behavioral effects in juvenile and adult salmonids (Newcombe and Jensen 1996). Although turbidity may cause stress, Gregory and Northcote (1993) have shown that moderate levels of turbidity (35 to 150 nephelometric turbidity units [NTUs]) accelerate foraging rates among juvenile Chinook salmon, likely because of reduced vulnerability to predators (camouflaging effect). Turbidity and fine sediments can reduce prey detection, alter trophic levels, reduce substrate oxygen, smother redds, and damage gills, among other deleterious effects (Bjornn 1991; Spence et al. 1996). The proposed action is likely to elevate turbidity during construction and for some period afterward as disturbed slopes revegetate.

The effects of road construction and maintenance on fish habitat and watershed function have been described by Furniss et al. (1991). Roads and associated ditch systems increase watershed drainage networks, intercept overland flow, and shift timing of peak flows. During precipitation events, fine sediments can be washed from the road surface into streams. Surface erosion from forest roads affect the fine sediment budget in streams and may impose a chronic condition of sediment inputs that directly affect the stream substrate and the health of aquatic life (Luce et al. 2001). Planned activities such as placement of cross drains, ditching, grading and graveling may result in disturbances that typically create short-term increases in sediment delivery that taper off after disturbed areas become compacted or after several runoff events occur.

Road work results in increased runoff rates and fine sediment delivery, particularly during rain events at tributary crossings or where roads are in close proximity to streams. Road surfaces are compacted, impermeable surfaces lacking vegetation. As a result, most water falling on the road surface in the form of rain or delivered there from upslope does not infiltrate, but rather, quickly runs off the road surface. Water flowing on the road surface picks up fine sediment and delivers

it to nearby streams, resulting in increased turbidity and fine sediment deposition onto substrate. Widening of the road exposes new soil and prevents vegetation from becoming established on a larger portion of the watershed. Generally a vegetative strip between the road and the stream allows runoff to infiltrate or be filtered prior to entering the river. However, in many locations within the action area, vegetation between the road and the Secesh River is narrow to non-existent, and runoff is quickly delivered directly into the river.

An estimated 2,900 to 6,000 cubic yards of fill will be removed from project segments 1 through 4. As described in the BA, this will result in the increase the area of unvegetated, hard-packed surface in the RCA over existing conditions by a maximum of 0.6 acres. Given the action's proximity to the river, raw cut slopes created by the action will generate and potentially deliver those fine sediments to the Secesh River until stabilized by vegetation.

To facilitate fill removal and road expansion, live and dead trees, primarily lodgepole pine, would be felled in the RCA. Tree cutting would create a temporary disturbance to the ground and would expose more soil to potential erosion by eliminating the soil binding capabilities of the roots. This could result in potential sediment delivery to the Secesh River in the short term (0 to 3 years) until disturbed slopes become revegetated. However, no trees would be removed between the road and the river, and all cut trees would remain on site on the uphill side of the road. Trees would not be brought across the road cut slope, which will eliminate potential damage to the cut slope and streambank, and the subsequent potential for erosion. Prior to fill removal, the trees would be felled and stockpiled along the inside curve of the construction site or scattered upslope within the project area. Upon completion of fill removal, site rehabilitation would include scattering the remaining trees on the upslope and cut slope area. Hillslopes would be seeded where soil exists (unless it is a sheer rock face). Keeping cut trees on site, in addition to the presence of other deadfall logs, would reduce soil mobilization on hillslopes and reduce the amount of sediment delivered to the streams. It would also create a place for soil to collect where vegetation could establish. Riparian vegetation, including streamside trees, would continue to filter sediments from overland flow. Proposed minimization/avoidance measures (such as sediment control structures, seeding and mulching, and maintaining cut trees on site) and site rehabilitation measures should effectively trap most sediment generated both during and post construction. This will limit the potential for sediment to reach the river and degrade fish habitat and downstream spawning redds.

Although exposed cut slopes are likely to increase sediment delivery in the short term, PDF could also benefit fish and fish habitat in the long term. Maintaining roads in good condition decreases chronic delivery of fine sediment to streams, as roads in close proximity to streams can convey large amounts of fine sediments (Furniss et al. 1991). Surfacing these road segments and their ditches with basalt aggregate, outsloping the road prism to drain to the ditchline, and relocating problem Jersey barriers away from the rivers edge, could result in a localized reduction on overall sediment delivery to the Secesh River over the long term. Although not likely to be of a magnitude sufficient to benefit conditions at the stream reach or watershed scales, these localized improvements could locally reduce factors which limit reproductive success and juvenile survival, abundance, and productivity.

Sediment could also be delivered during movement of the Jersey barriers. Several Jersey barriers on the outer shoulder of certain road segments would be repositioned towards the inside of the road, 2 to 4 feet from their current position. There would be temporary disturbance to the top of the streambank from repositioning the barriers. The barriers would be lifted off the ground by heavy equipment and repositioned, which will loosen soil around the anchoring structures (rebar). This loosened soil could potentially move down the bank and into the river. However, because no digging or other ground-disturbance would be required to complete this task, little sediment is expected to be generated by this effort. The installation of erosion control structures downslope should effectively limit the potential for sediment delivery during barrier repositioning. Repositioning of the barriers should also reduce the potential for sidecasting of sediment into the river during future road maintenance activities in the long term.

Proposed activities will likely deliver temporary pulses (minutes to hours) of turbidity, although the majority of this sediment would not be delivered until subsequent rain events. Quantifying turbidity levels and their effect on fish species and their habitat is complicated by several factors. First, turbidity from an activity will typically decrease as distance from the activity increases. The time needed to attenuate these levels depends on the quantity of material in suspension (e.g., mass or volume), particle size, the amount and velocity of ambient water (dilution factor), and the physical/chemical properties of the sediments. Second, the impact of turbidity on fish is not only related to the turbidity levels but also to the particle size of the suspended sediments.

Fine sediment delivered to action area streams from proposed activities is likely to increase turbidity in the Secesh River immediately downstream along the shoreline during rainstorms and potentially increase fine sediment levels in interstitial spaces of substrate nearshore. Turbidity is likely to exceed ambient levels and potentially affect ESA-listed fish species present downstream of project activities for a short distance. However, considering proposed erosion control measures, sediment suspended as a result of the project is expected to be minimal and is not expected to extend any further than 300 feet downstream from this disturbance. This sediment could later be mobilized at high flows and potentially affect ESA-listed fish or degrade instream habitat conditions further downstream. However, because the total amount of sediment contributed is expected to be minimal, and resuspension would likely occur during peak flow events, sediment resuspended will not result in levels beyond that normally being transported during peak flow events.

The response of fish to a turbidity plume for this short distance along the streams edge will likely be in the form of avoidance of the plume by rearing juveniles, forcing them to temporarily seek alternate rearing areas. Similarly, migrating adults in close proximity to the plume are also likely to move out of the plume until water clears. Increased turbidity is expected to be short-lived and highly localized because each road segment will be completed independently, and minimization/avoidance measures have been proposed to specifically reduce or avoid sediment delivery. Fish present downstream from construction activities are expected to be able to avoid or reduce their exposure to turbidity by swimming to adjacent, less turbid habitat (i.e., behavioral response only). However, take, in the form of harm, of juveniles is still likely to occur as a result of increased turbidity, as exposure of juveniles to predators will likely increase

as they seek alternate rearing habitat. Take of adults due to increased turbidity is not expected to occur since adults are not at risk of increased predation, and it is unlikely they will cease migration or abandon a redd even if they temporarily move out of turbid conditions.

Noise. Noise from heavy equipment operating adjacent to live water may disturb fish in the immediate vicinity causing short-term displacement. Heavy equipment operation near the Secesh River will create noise, vibration, and potentially water surface disturbance. Popper et al. (2003) and Wysocki et al. (2007) discussed potential impacts to fish from long-term exposure to anthropogenic sounds, predominately air blasts and aquaculture equipment, respectively. Popper et al. (2003) identified possible effects to fish including temporary, and potentially permanent hearing loss (via sensory hair cell damage), reduced ability to communicate with conspecifics due to hearing loss, and masking of potentially biologically important sounds. Studies evaluated noise levels ranging from 115 to 190 decibels (dB). Wysocki et al. (2007) did not identify any adverse impacts to rainbow trout from prolonged exposure to three sound treatments common in aquaculture environments (115, 130, and 150 dB). In the studies identified by Popper et al. (2003) that caused ear damage in fishes, all evaluated fish were caged and thus incapable of moving away from the disturbance.

Machinery operation adjacent to the stream will be intermittent with actual activity near the stream occurring only in daylight hours on any given day. The Federal Highway Administration (2008) indicates backhoe, grader, loader, and truck noise production ranging between 80 and 89 dB. Because the decibel scale is logarithmic, there is nearly a 100-fold difference between noise levels expected from the action and noise levels known to have generated adverse effects to surrogate species, as discussed above. Therefore, noise related disturbances of this magnitude are unlikely to result in injury or death. It is unknown if the expected dB levels will cause fish to temporarily move away from the disturbance or if fish will remain present. Even if fish move, they are expected to migrate only short distances to an area they feel more secure and only for a few hours in any given day. Each day fish are routinely disturbed by passing birds, walking mammals, and other fish. NMFS does not anticipate short-term movements caused by construction equipment noise will result in effects different than those typically experienced by fish. The expected noise levels and level of disturbance will be minimal and are insignificant.

Riparian Vegetation – As previously discussed, clearing of riparian vegetation can affect water quality by triggering increased surface erosion, which could result in increased suspended and/or instream sediment levels. Spence et al. (1996) notes that clearing of vegetation can affect both instream habitat and water quality by decreasing large woody debris (LWD) recruitment to the stream, or by increasing water temperatures, turbidity, and instream sediment levels. Clearing of riparian vegetation can affect water quality by reducing stream shade and increasing direct solar radiation to the stream, both of which may result in increased stream temperatures. Elevated water temperatures may adversely affect salmonid physiology, growth, development, alter life history patterns, induce disease, and may exacerbate competitive predator-prey interactions (Spence *et al.* 1996). It can also result in reduced habitat quality through reductions in LWD recruitment potential which potentially results in a corresponding reduction in habitat complexity and pool frequency.

Considering the baseline condition and proposed minimization/avoidance measure, the proposed action would result in minor localized reduction in short-term and long-term LWD recruitment, and insignificant effects on stream shading. The existing road prism already serves as a barrier to LWD, and recent fires in the project area and vicinity have resulted in an increased availability of LWD in the watershed, which could counteract the effect of the proposed LWD reduction.

Approximately 52 to 60 live trees, plus an additional 14 to 18 snags, 4- to 16-inches dbh would be felled during construction activities within the Secesh River RCA. This would result in a short-term and long-term reduction in LWD recruitment in the RCA. However, this reduction is insignificant for RCAs at both the stream reach and watershed scales. Many of the trees that would be felled are less than 12 inches dbh, and are too small to provide value as functional pieces of LWD instream. In addition, trees removed will be located on the on the uphill slope of FH21. Due to topography and the aspect of the road in the project area (primarily southern), trees on the uphill slope of the road do not provide essential shade to the Secesh River. There are no trees on the uphill side of road segment 3 due to the 2000 Burdorf Junction Fire, and the remaining trees present on the uphill side of segment 4 do not contain live foliage due to the recent East Zone Complex fires. Trees in segment 5 might provide shade for a few hours in the summer, but are not expected to be substantial in terms of affecting stream temperature on a river the size of the Secesh River. Furthermore, existing trees on the downhill, riparian side of the road segments would not be felled. Trees on the opposite side of the river (southern side) provide shade to the Secesh and would not be affected by the proposed action. Therefore, the effects of tree felling on shading and stream temperatures in the Secesh River will be discountable.

Blasting. The proposed action may require limited blasting to remove boulders and bedrock occurring in the expanded alignment. Blasting has the potential to affect fish species directly and indirectly. Blasting is only proposed in road segments 1 and 2. In segment 1, approximately 370 linear feet of hillslope comprising a maximum of approximately 3,200 cubic yards of material would be removed. In segment 2, approximately 250 linear feet of hillslope comprising a maximum of approximately 2,200 cubic yards of material would be removed. In both instances, overburden materials would be removed with mechanical equipment and blasting would only be employed in those areas where mechanical removal is impractical. Total volume of material to be removed via blasting is unknown pending further geotechnical evaluation of the sites but would not exceed the maximums presented.

Blasting near water produces compressive shock waves that propagate from the earth into waterbodies. This has the potential to cause damage to the swimbladder of fish (Wright 1982, Bishaie 1961, Rasmussen 1967, Bird and Roberson 1984). These waves are associated with ground vibrations that are potentially lethal to incubating eggs (Wright 1982, Wright and Hopky 1998, Alaska DNR 1991). The killing power of the shock waves is greater near the air-water interface because of lower ambient pressures. Therefore, fish closer to the water surface are more susceptible to injury or mortality. This makes juvenile fish and spawning adults, which frequently occur in shallow waters, more susceptible to shock wave effects (Alaska Department of Natural Resources [DNR] 1991). Sublethal effects have been observed in relation to noise produced by explosives (Wright 1982). Blasting in or near streams may result in alteration of

habitat. Sedimentation resulting from the blast may cover spawning habitats or may fill interstitial spaces in the substrate affecting bottom-dwelling life forms used by fish for food (Wright and Hopky 1998).

According to Bishaie (1961) and Rasmussen (1967), swim-up fry will die if exposed to shock wave pressures exceeding 2.8 pounds per square inch (psi). Studies by Alaska Department of Fish and Game found that no mortality was observed at a psi of 2.7 for chum and coho salmon (Bird and Roberson 1984). Other studies have observed up to 8% mortality in salmon smolts at 4.4 psi (Munday et.al. 1986), 40% mortality as low as 7.2 psi (Coastline Environmental Studies 1987), and up to 50% mortality at psi ranges of 19.3 to 21 (Dames & Moore 1987). These investigations were unable to establish an absolute lower limit or psi standard for 0% mortality, although no mortality was observed in one study at the lowest psi of 2.7.

Studies by Smirnov (1955) found significant egg mortality resulting from ground vibrations at 2 inches per second (ips), the standard established by the U.S. Bureau of Mines. The Alaska DNR requires a more protective standard. No explosive will be detonated that is likely to result in a peak particle velocity (ground vibration) exceeding 0.5 ips in spawning beds during incubation. The same standard is also applied in or near Canadian fisheries habitats (Wright and Hopky 1998). The rationale for using this standard is based upon the fact that the 0.5 psi level is well below (one-fourth) the ground vibration peak velocities observed for mortality in incubating eggs. This standard should continue to be applied until more research is available to define a more appropriate level. However, it is unlikely that any redds will be present in this portion of the Secesh River, making the likelihood of affecting redds discountable.

As described in the BA, hydroacoustic pressure and particle velocity is measured in dB. A dB is defined as 10 times the base-10 logarithm of the ratio between squared test amplitude (pressure or particle velocity) and corresponding squared reference amplitude. When the amplitudes describe the pressure of acoustic waves, the squared amplitudes vary in direct proportion to the power transmitted by those waves. Thus, the dB measures the difference, in orders of magnitude ($\times 10$), between a test power and a reference power: 10 dB means 10 times the power, 20 dB means 100 times the power, 30 dB means 1,000 times the power, and so on. Because the dB is always a relative measure, any absolute value expressed in decibels is meaningless without an accompanying reference. In describing underwater sound pressure, the reference amplitude is usually 1 micro-pascal (μPa, or 10^{-6} pascals), and is expressed as "dB re 1 μPa." The SI (International System of Units; metric) measure of pressure amplitude is the pascal (Pa), approximately equivalent to 0.000145 pounds per square inch (Burgess and Blackwell 2003).

Barotraumas are pathologies associated with exposure to drastic changes in pressure, such as occur during explosions with short rise times and high peak levels on the order of 230 dB re 1μPa (Norris and Møhl 1983). Such conditions cause gas-filled spaces in the body, such as the swim bladder, to rapidly expand and/or contract resulting in the tearing and rupturing of surrounding tissues. Such exposure can result in internal hemorrhaging and loss of organ functions resulting in mortality. Non-fatal physiological injury can include reduced hearing sensitivity in some hearing specialist species, loss of hydrostatic control, impaired mobility, and impaired vision (Wright and Hopky 1998; Keevin and Hempen 1997; Kearns and Boyd 1965).

Physostomus fishes, such as salmonids, regulate the air in their swim bladders through a direct connection to the esophagus. Salmonids acclimate their swim bladders by gulping air at the surface and, as they swim deeper, the swim bladder becomes compressed. When exposed to a sudden positive pressure, or overpressure, the swim bladder compresses further. When exposed to a sudden negative pressure, or under pressure, the swim bladder may expand beyond its original volume at depth but may not suffer or injure any other organs because it has some room to expand. Physostomus fishes acclimated to the surface atmospheric pressure may suffer less injury or mortality the deeper they are in the water column, whereas those acclimated to deeper water pressure may suffer more injury in shallow areas (WSDOT 2006).

Short of direct injury or mortality, hydroacoustic pressure can result in limited duration behavioral effects resulting from a fish species' startle response. The startle response is observed as an involuntary reaction to an introduced noise disruption that results in a change in an individual's behavior. Such changes in behavior can result in indirect effects through alteration in feeding or breeding success, decreased predator avoidance, and displacement into less suitable habitat. These effects can result in injury or death, but more commonly constitute potential loss of species vigor (Hastings and Popper 2005). As such, they are generally viewed as a form of harassment-based take.

In order to assess impacts of the proposed action on ESA-listed species we will examine noise sources, elements that contribute to the attenuation of noise, established thresholds for noise levels, and mitigation measure to reduce the potential for mortality or harassment. Hydroacoustic measurement of blasting represents a relatively new area of interest in resource management. As a result, there is very little literature correlating charge size to sound pressure levels or particle velocities in the aquatic environment. Norris and Møhl (1983) estimate peak levels on the order of 230 dB re 1 μPa, but provide little information on the type of explosive used, the weight of the charge, or the whether the blast occurred upland or in the water. In previous consultations, NMFS has established threshold charge weight and buffer distance thresholds that were believed to be protective of salmonids respective to injury and mortality (Faurot and Burton 2005; NMFS 2006c). Table 2, proposed minimization/avoidance measures for blasting, utilize this same guidance (as originally adapted from Wright and Hopky [1998]).

The BA states that given the close proximity of the project area to the river, the proposed action will utilize the 0.5-pound charge recommendation of a 30-foot buffer. NMFS agrees with the conclusions in the BA that suggest that this approach should be sufficient to protect eggs and salmonids from injury or mortality. In coordination with John Stadler (NMFS), BA authors determined that NMFS has previously established a threshold hydroacoustic behavioral effects on salmonids at 150 $dB_{(RMS)}$. It is not likely that the 30-foot buffer distance is sufficient to necessarily reduce hydroacoustic levels below this harassment threshold. However, other proposed minimization avoidance measures are expected to sufficiently minimize potential harassment effects on salmonids: (1) Blasting will be timed between mid-August to the first of October to avoid migrating adults; (2) mechanical excavation of overburden will be completed prior to blasting to minimize the extent of blasting required; (3) distance and charge sizes for blasting will follow Table 2 guidance for blasting within 30 feet from aquatic resources; (4) detonation would employ a sequential delay system where each blast is subdivided into many smaller blasts, separated by a few milliseconds (minimum of 8 milliseconds). This would reduce

the likelihood of constructive interference increasing the amplitude of the blast (i.e. it would reduce the amplitude of the blast); (5) charge locations would be drilled into the rock, resulting in directivity of the force away from aquatic resources, which may better attenuate hydroacoustic pressure levels instream; and (6) heavy blasting mats would be used to cover the charge, employed to reduce the blast energy and contain any flying debris (USDOT 1995).

Given the small quantities proposed, blasting is not anticipated to take more than several days to complete. Given the above minimization/avoidance measures and the limited scope of blasting, no direct injury or mortality of protected fish resources is anticipated from this action. However, there is insufficient information (primarily geotechnical and hydroacoustic) to accurately model whether the proposed avoidance and minimization measures can reduce sound pressure levels below the 150 $dB_{(RMS)}$ harassment threshold. As such, it is likely that blasting will result in short-term behavioral effects on rearing and migrating salmonids, which may decrease individual's vigor or possibly increase their chance of predation. Such effects could result in harassment of ESA-listed fishes in the action area, but should be very brief in duration, lasting no more than several hours over the course of 2 or 3 days construction. No lethal take of ESA-listed fish species is anticipated to occur as a result of blasting as described. Conducting all blasting outside the active channel and allowing for proposed buffer widths should adequately prevent pressure, toxicity, and vibration effects that may harm ESA-listed fish in the action area.

Chemical Contamination and Dust Abatement. Heavy machinery use adjacent to the stream raises concern for the potential of an accidental spill of fuel, lubricants, hydraulic fluid or similar contaminant into the riparian zone, or directly into the water where they could adversely affect habitat, injure or kill aquatic food organisms, or directly impact ESA-listed species. Petroleum-based contaminants such as fuel, oil, and some hydraulic fluids, contain poly-cyclic aromatic hydrocarbons, which can cause chronic sublethal effects to aquatic organisms (Neff 1985). Ethylene glycol (the primary ingredient in antifreeze) has been shown to result in sublethal effects to rainbow trout at concentrations of 20,400 mg/L (Staples 2001). Brake fluid is also a mixture of glycols and glycol ethers, and has about the same toxicity as antifreeze.

Project activities will occur outside of flowing water which limits the potential for chemical contamination to occur. To further prevent toxic materials from entering live water, the PNF has required that fuel storage areas will be located outside of RCAs and that spill control facilities will be provided to contain the largest possible spill. However, as proposed, an exception has been included in the proposed action allowing refueling of lugged vehicles or heavy equipment on site to prevent travel. In these cases, additional containment measures may be necessary to fully minimize the risk of accidental fuel spills occurring during these refueling efforts. However, the quantities of fuel involved in these activities would be small. Equipment will be monitored for leaks of motor oil and hydraulic fluids to ensure water quality is not contaminated. Although not specified in the BA, it is anticipated that the operation of machinery completing road widening activities will occur from existing roadways and outside the ordinary high water mark.

In addition, it is unlikely that antifreeze, brake, or transmission fluid will be present on-site or spilled in volumes or concentrations large enough to harm salmonids in or downstream from project sites. Therefore, NMFS believes that fuel spill and equipment leak contingencies and

preventions described in the proposed action and the PNF mitigation measures are sufficient to effectively minimize the risk of negative impacts to ESA-listed fish and fish habitat from toxic contamination.

Although the BA states that only water is expected to be used for dust abatement activities, it also suggests the potential use of dust abatement chemicals ($MgCL_2$ salts) that can have negative effects on water quality when used near streams. Heffner (1996) concluded that although the overall risk to aquatic life from using dust abatement compounds is low, in certain circumstances, their use may cause some adverse effects. Salmonids have been shown to be able to withstand chloride levels of approximately 400 parts per million (ppm) (Heffner 1996). However, chloride levels in waterbodies receiving runoff from application areas would probably drop to 70 ppm where a 3 to 50 foot buffer between the application site and the water exists (Schwendeman 1981).

Plant life in the direct vicinity of the application site are at more risk, as application of dust abatement compounds can cause necrosis of plant tissues (Heffner 1996). Some vegetation, including pine, is sensitive to salt-based dust abatement chemicals. If these chemicals are applied to areas where pine trees are present close to the road, these trees can be killed. This can lead to a localized reduction in stream shade and LWD recruitment if not carried out with the proper minimization measures.

Magnesium is already present in most waters, commonly occurs in rocks and soils, and is readily soluble. Heffner (1996) noted that the addition of this chemical for dust suppression would likely be insignificant when compared to the amount already present in the environment. Furthermore, the author noted that magnesium toxicity only pertains to the immediate area around the application site, as neither will generally migrate far from the site of application. Bolander and Yamada (1999) and Heffner (1996) concluded that a vegetative buffer of 25 feet or greater reduced the influences from using dust abatement chemicals. The PNF did not propose a buffer zone for chemical dust abatement in the BA. No petroleum products are proposed for dust abatement. If used, chemical dust abatement would follow AASHTO standards, IFPA standards for road construction, the Forest Programmatic BA and NMFS Opinion for road maintenance (USDA 2007; NMFS 2008). The SPCP would be followed during dust abatement activities. Considering the above, the application of dust-abatement additives and stabilization chemicals at low concentrations, and the proposed spill containment measures reduces the potential for run-off applied dust abatement solutions affecting ESA-listed fish.

Due to the small scale of the project and the short duration it is expected that water withdrawals would be adequate for dust abatement. When water is used for dust abatement, water would be drawn from the Secesh River or one of its tributaries in the vicinity of the project area. Water drafting locations with suitable flow would be approved prior to use and intake hoses would be screened appropriately (i.e., with 3/32" mesh screen) to eliminate the potential for fish entrainment. Use of pumps for drafting would be required to follow spill prevention measures in the SPCP (BA Appendix F) to prevent any fuel or lubricant leakage into the stream. Streams would not be dewatered.

Summary. The overall viability ratings for the Snake River Chinook salmon and Snake River Basin steelhead populations present in the action area are not currently viable due to current risk ratings for abundance/productivity and spatial structure/diversity (Tables 5 and 7). Increased exposure of juveniles to predation from avoidance of sediment and seeking alternate cover, in addition to reduced foraging success due to sedimentation is expected to have a minor negative effect on abundance and productivity. The effect is expected to be minor, considering application of mitigation measures designed to keep sediment out of streams. The limited amount of sediment produced is not expected to result in long-term habitat degradation of spawning or rearing habitat. Blasting is likely to result in harassment of ESA-listed fish species occurring in the action area, although no lethal take is expected to occur. Conducting all blasting outside the active channel and allowing for proposed buffer widths should adequately prevent pressure, toxicity, and vibration effects that may harm ESA-listed fish in the action area. Therefore, the proposed activities are expected to have a minimal effect on spatial structure or diversity because the proposed action will not kill ESA-listed salmon and steelhead or prevent them from accessing available habitat.

2.1.3.2. Effects on Critical Habitat

Freshwater spawning

Water quality – Potential effects to water quality are described above in the species effects section. There will likely be a minor decrease in water quality associated with increased turbidity during rain events immediately following road construction activities. Turbidity is not expected to extend further than 300 feet downstream of the project area. However, any turbidity generated will be of short duration, with the proposed action not being expected to result in chronic sediment delivery to action area streams. Measures designed specifically to minimize and avoid sediment delivery are expected to render the amount of sediment delivered to very low levels. In addition, improved surface features are expected to address chronic sediment delivery associated with everyday road use and erosion, likely resulting in a long-term localized decrease in sediment delivery to action area streams from these road segments. Therefore, the proposed action should not reduce the conservation value of action area streams, and may result in a localized long-term improvement.

The potential for adverse effects to water quality from a fuel spill should be effectively minimized to a discountable level by successful implementation of the required fuel and storage restrictions, machinery inspections for potential leaks, and the PNF's SPCP.

Substrate – Potential effects to substrate are described above in the species effects section. There will be a minor increase in substrate fine sediments resulting from sediment delivery associated with the proposed action. However, mitigation measures designed specifically to minimize and avoid sediment delivery are expected to render the amount of sediment delivered to very low levels, not reducing the conservation value of action area streams.

Freshwater rearing sites

Water quality – See discussion for Freshwater Spawning.

Substrate – See discussion for Freshwater Spawning.

Riparian Vegetation – Road widening activities have the potential to affect the riparian vegetation PCE. However, clearing of riparian vegetation is expected to be limited and isolated to the upslope side of the road, with no clearing occurring between the road and river. Although possible, mortality of riparian vegetation from dust abatement application has not been widely reported on the PNF. Therefore, dust abatement application is not expected to result in significant mortality of riparian vegetation. Mitigation designed to stabilize cut and fill slopes following construction should reduce long-term effects to riparian vegetation. Therefore, the small amount of riparian vegetation expected to be affected by this project is insignificant in terms of riparian function and processes, particularly when considered in the context of the stream reach or watershed scales.

Freshwater migration corridors

Water Quality – See discussion for Freshwater Spawning.

Riparian Vegetation – See discussion for Freshwater Rearing.

Water Temperature – As discussed in the species effects section. Localized increases in stream temperature could result from tree removal associated with the project. However, based on baseline conditions and the small size of the area to be disturbed, water temperature increases are expected to be insignificant and will not reduce the conservation value of action area streams at either the stream reach or the watershed scales.

2.1.4. Cumulative Effects

'Cumulative effects' are those effects of future state or private activities, not involving Federal activities, that are reasonably certain to occur within the action area of the Federal action subject to consultation (50 CFR 402.02). Cumulative effects that reduce the ability of an ESA-listed species to meet its biological requirements may increase the likelihood that the proposed action will result in jeopardy to that ESA-listed species or in destruction or adverse modification of a designated critical habitat.

The action area contains Federal lands administered by the PNF, which comprise the majority of the watershed acreage. In addition, the Secesh River watershed has several parcels of private land and several undeveloped state school sections. Ongoing and future actions on state and private land that are reasonably certain to occur within the Secesh River watershed include: mining, subdivision, and residential development of private land, water diversions/withdrawals, tourist/guest ranch businesses, recreational use, and road construction, maintenance, and use. Effects could occur associated with private land from operation of the commercial hot spring and

lodging facility at Burgdorf Hot Springs, mining at Crystal Mountain, maintenance of roads by Idaho and Valley Counties, and subdivision development in Secesh Meadows (USDA 2008). Current levels of these uses are likely to continue, but detailed information on other Federal and non-Federal activities in the action area are not available.

Between 2000 and 2007, the population of Idaho County, Idaho decreased by 1.1 percent[2]. Thus, NMFS assumes that future private and state actions will continue at approximately the same rate within the action area. However, should the human population in the action area begin to grow, demand for agricultural, commercial, or residential development will also likely to grow. The effects of new development caused by that demand are likely to reduce the conservation value of the habitat within the action area.

2.1.5. Conclusion

After reviewing the status of the affected species and their designated critical habitats, the environmental baseline for the action area, the effects of the proposed action, and cumulative effects, NMFS concludes that the action as proposed is not likely to jeopardize the continued existence of Snake River Basin steelhead or Snake River spring/summer Chinook salmon. NMFS has also determined that the action is not likely to result in the adverse modification or destruction of designated critical habitat. These determinations are based upon the following considerations:

- Take is expected to occur in the form of harm and harassment only; the action is not expected result in lethal take;
- Proposed mitigation measures are designed to keep sediment and fuel/chemicals out of action area streams;
- Activities will be of short duration in any given stream segment, with project effects spread across time and distance; and
- The adverse effects of this action on critical habitat PCEs will likely result in small, localized, negative impacts on the conservation value of critical habitats. However, it is not likely that these localized effects will have a significant impact on the overall conservation value of critical habitat in the affected stream reach or watershed as a whole.

[2] U.S. Census Bureau, State and County Quickfacts, Idaho County, Idaho. Available at http://quickfacts.census.gov/qfd/states

2.1.6. Conservation Recommendations

Section 7 (a)(1) of the ESA directs Federal agencies to use their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of the threatened and endangered species. The following recommendations are discretionary measures that NMFS believes are consistent with this obligation and therefore should be carried out by the PNF:

1. Coordinate road construction/maintenance activities closely with Idaho County governments to work toward consistent and broadscale application of BMPs designed to avoid or minimize effects to ESA-listed species and designated critical habitats.

2. Review recovery plans and implement identified recovery strategies and management actions whenever possible.

3. To mitigate the effects of climate change on ESA-listed salmonids, follow recommendations by the ISAB (2007) to plan now for future climate conditions by implementing protective tributary, mainstem, and estuarine habitat measures; as well as protective hydropower mitigation measures. In particular, implement measures to protect or restore riparian buffers, wetlands, and floodplains; remove stream barriers; and to ensure late summer and fall tributary streamflows.

Please notify NMFS if the PNF carries out any of these recommendations so that we will be kept informed of actions that minimize or avoid adverse effects and those that benefit ESA-listed species or their designated critical habitats.

2.1.7. Reinitiation of Consultation

Reinitiation of formal consultation is required and shall be requested by the PNF or by NMFS where discretionary Federal involvement or control over the action has been retained or is authorized by law and if: (1) The amount or extent of taking specified in the ITS is exceeded; (2) new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered; (3) the identified action is subsequently modified in a manner that has an effect to the listed species or critical habitat that was not considered in the Opinion; or (4) a new species is listed or critical habitat designated that may be affected by the identified action (50 CFR. 402.16). If reinitiation of consultation appears warranted due to one or more of the above circumstances, contact the Idaho State Habitat Office of NMFS and refer to the NMFS Number assigned to this consultation.

2.2. Incidental Take Statement

Section 9(a)(1) of the ESA prohibits the taking of endangered species without a specific permit or exemption. Protective regulations adopted pursuant to section 4(d) extend the prohibition to threatened species. Among other things, an action that harasses, wounds, or kills an individual of a listed species or harms a species by altering habitat in a way that significantly impairs its

essential behavioral patterns is a taking (50 CFR 222.102). Incidental take refers to takings that result from, but are not the purpose of, carrying out an otherwise lawful activity conducted by the Federal agency or applicant (50 CFR 402.02). Section 7(o)(2) exempts any taking that meets the terms and conditions of a written incidental take statement from the taking prohibition.

2.2.1. Amount or Extent of Take

The proposed action is reasonably certain to result in incidental non-lethal take of steelhead and spring/summer Chinook salmon. NMFS is reasonably certain that the incidental take described here will occur because: (1) Snake River Basin steelhead and Snake River spring/summer Chinook salmon are known to occur in the action area and (2) the proposed action is likely to cause impacts to critical habitat that could impair feeding, breeding, migrating, or sheltering for the ESA-listed species during action implementation.

Despite the use of best scientific and commercial data available, NMFS cannot quantify the specific amount of incidental take of individual fish or incubating eggs for this action. The amount of take from the proposed action depends on the circumstances at the specific times and locations that proposed activities will occur, particularly when in close proximity to individual fish or redds. Due to the nature of this action, these factors are not known. Because circumstances causing take are likely to arise, but cannot be quantitatively predicted from available information, the extent of incidental take is described, pursuant to 50 CFR 402.14 [I].

In this case, part of the extent of take will be described as the extent of turbidity caused by the proposed action. As noted above, as turbidity increases, the potential for and intensity of adverse impacts to ESA-listed species increases. Periodic, brief, low intensity sediment plumes are expected to extend up to 300 feet downstream of operations. NMFS expects that any exposed fish would volitionally seek out adjacent, less turbid habitats, thus avoiding direct sediment exposure. This movement is expected to be of short duration (minutes to several hours) and extent (less than 300 feet) for each occurrence. Any take associated with project generated sediment is expected to be sublethal in nature and in the form of harassment or harm, but is not expected to reach levels resulting in mortality. For each treatment site, the extent of take will be exceeded if turbidity is visible above background levels at more than 300 feet downstream of each project area.

Similarly, any take associated with blasting is expected to be sublethal in nature and in the form of harassment or harm, but is not expected to reach levels resulting in mortality. For each treatment site, the extent of take will be exceeded if any dead fish are observed in the Secesh River within a distance 300 feet of blasting activities.

If at any time the level or method of take exempted from take prohibitions and quantified in this Opinion is exceeded, reinitiation of consultation will be required.

2.2.2. Reasonable and Prudent Measures

The RPMs are nondiscretionary measures to avoid or minimize take that must be carried out by cooperators for the exemption in section 7(o)(2) to apply. The PNF has the continuing duty to regulate the activities covered in this incidental take statement where discretionary Federal involvement or control over the action has been retained or is authorized by law. The protective coverage of section 7(o)(2) will lapse if the PNF fails to exercise its discretion to require adherence to terms and conditions of the incidental take statement, or to exercise that discretion as necessary to retain the oversight to ensure compliance with these terms and conditions. Similarly, if any applicant fails to act in accordance with the terms and conditions of the incidental take statement, protective coverage will lapse.

NMFS believes that full application of conservation measures included as part of the proposed action, together with use of the RPMs and terms and conditions described below, are necessary and appropriate to minimize the likelihood of incidental take of listed species due to completion of the proposed action.

The PNF shall minimize incidental take by:

1. Minimizing the amount and extent of incidental take from road widening activities by implementing additional minimization/avoidance measures.

2. Ensure completion of a monitoring and reporting program to confirm that the extent of take anticipated in this Opinion is not exceeded and that the project is implemented as proposed.

2.2.3. Terms and Conditions

To be exempt from the prohibitions of section 9 of the ESA, the PNF and its cooperators, including the applicant, if any, must fully comply with conservation measures described as part of the proposed action and the following terms and conditions that implement the RPMs described above. Partial compliance with these terms and conditions may invalidate this take exemption, result in more take than anticipated, and lead NMFS to a different conclusion regarding whether the proposed action will result in jeopardy or the destruction or adverse modification of designated critical habitats.

1. To implement RPM #1, the PNF shall:

    a. Restrict mechanized equipment operation to streambanks or the road prism; not entering streams or other waterways during proposed actions.

    b. Ensure that when using the proposed exception to refuel lugged vehicles or heavy equipment within the RCA, that it occurs within a containment structure (e.g., dikes, berms, or embankments) sufficient in size to contain 125% of the volume of the storage container.

c. Ensure that a minimum 25-foot buffer is applied between roads and streams where dust abatement chemicals are applied.

d. Mulch and seed, with a native seed mix approved by the PNF, all cuts and fill slopes of roads, and disturbed areas from road widening activities. All disturbed areas shall be treated during the year of disturbance, prior to the fall rainy season. If vegetation is not adequately established for erosion control, the mulch and seed shall be applied in subsequent years until natural vegetation is reestablished.

2. To implement RPM #2, above, the PNF shall:

a. Ensure that visual turbidity monitoring will be completed during project implementation activities by observing any sediment plumes that might be caused by project activities. If the sediment plumes are visible more than 300 feet downstream, the PNF shall immediately notify NMFS to determine if reinitiation of consultation is necessary.

b. Ensure that a journey-level Fishery Biologist is present on-site during blasting operations, conducting visual monitoring for any fish mortality associated with blasting efforts. If mortally wounded salmonids are noted within 300 feet of the blasting operations, the PNF shall cease blasting immediately and notify NMFS to determine if reinitiation of consultation is necessary.

c. NOTICE. If a steelhead or salmon becomes sick, injured or killed as a result of project-related activities, and if the fish would not benefit from rescue, the finder should leave the fish alone, make note of any circumstances likely causing the death or injury, location and number of fish involved, and take photographs, if possible. If the fish in question appears capable of recovering if rescued, photograph the fish (if possible), transport the fish to a suitable location, and record the information described above. Adult fish should generally not be disturbed unless circumstances arise where an adult fish is obviously injured or killed by proposed activities, or some unnatural cause. The finder must contact the Boise Field Office of NMFS Law Enforcement at (208) 321-2956 as soon as possible. The finder may be asked to carry out instructions provided by Law Enforcement to collect specimens or take other measures to ensure that evidence intrinsic to the specimen is preserved.

3. MAGNUSON-STEVENS FISHERY CONSERVATION AND MANAGEMENT ACT

The consultation requirement of section 305(b) of the MSA directs Federal agencies to consult with NMFS on all actions, or proposed actions that may adversely affect EFH. Adverse effects include the direct or indirect physical, chemical, or biological alterations of the waters or substrate and loss of, or injury to, benthic organisms, prey species and their habitat, and other ecosystem components, if such modifications reduce the quality or quantity of EFH. Adverse

effects to EFH may result from actions occurring within EFH or outside EFH, and may include site-specific or EFH-wide impacts, including individual, cumulative, or synergistic consequences of actions (50 CFR 600.810). Section 305(b) also requires NMFS to recommend measures that may be taken by the action agency to conserve EFH.

The Pacific Fishery Management Council (PFMC) designated EFH for groundfish (PFMC 1998a), coastal pelagic species (PFMC 1998b), and Chinook salmon, coho salmon, and Puget Sound pink salmon (PFMC 1999). The proposed action and action area for this consultation are described in the Introduction to this document. The action area includes areas designated as EFH for various life-history stages of Chinook salmon.

3.1. EFH Conservation Recommendations

The effects of the proposed PNF road widening activities on anadromous fish habitat is described in the habitat effects section of the Opinion. Based on information provided in the BA and the analysis of effects presented in the ESA portion of this document, NMFS concludes that proposed action will have the following potential adverse effects on EFH designated for Pacific Coast salmon:

1. Localized effects to water quality – increased turbidity, water temperature, and/or potential chemical contamination as described in sections 2.1.3.1 and 2.1.3.2 of this Opinion;

2. Localized effects to instream habitat – increased sediment deposition as described in sections 2.1.3.1 and 2.1.3.2 of this Opinion; and

3. Localized effects to riparian vegetation – short-term effects to riparian vegetation as described in section 2.1.3.2 of this Opinion.

NMFS believes that the following conservation measures are necessary to avoid, mitigate, or offset the impact that the proposed action has on EFH. This Conservation Recommendation is a non-identical set of the ESA Terms and Conditions.

1. RPM # 1, and associated terms and conditions 1a. to 1d. in the Opinion above.

2. RPM # 2, and associated term and condition 2a. in the Opinion above.

3.2. Statutory Response Requirement

Federal agencies are required to provide a detailed written response to NMFS' EFH conservation recommendations within 30 days of receipt of these recommendations [50 CFR 600.920(k)(1)]. The response must include a description of measures proposed to avoid, mitigate, or offset the adverse affects of the activity on EFH. If the response is inconsistent with the EFH conservation recommendations, the response must explain the reasons for not following the recommendations.

The reasons must include the scientific justification for any disagreements over the anticipated effects of the proposed action and the measures needed to avoid, minimize, mitigate, or offset such effects.

In response to increased oversight of overall EFH program effectiveness by the Office of Management and Budget, NMFS established a quarterly reporting requirement to determine how many conservation recommendations are provided as part of each EFH consultation and how many are adopted by the action agency. Therefore, in your statutory reply to the EFH portion of this consultation, we ask that you clearly identify the number of conservation recommendations accepted.

3.3. Supplemental Consultation

The PNF must reinitiate EFH consultation with NMFS if the proposed action is substantially revised in a way that may adversely affect EFH, or if new information becomes available that affects the basis for NMFS' EFH conservation recommendations [50 CFR 600.920(l)(1)].

4. DATA QUALITY ACT DOCUMENTATION AND PRE-DISSEMINATION REVIEW

Section 515 of the Treasury and General Government Appropriations Act of 2001 (Public Law 106-554) (Data Quality Act [DQA]) specifies three components contributing to the quality of a document. They are utility, integrity, and objectivity. This section of the Opinion addresses these DQA components, documents compliance with the DQA, and certifies that this Opinion has undergone pre-dissemination review.

Utility: Utility principally refers to ensuring that the information contained in this consultation is helpful, serviceable, and beneficial to the intended users. This ESA section 7 Consultation and Magnuson-Stevens Fishery Conservation and Management Act EFH Consultation on proposed road widening activities by the PNF, concluded that the action is not likely to jeopardize the continued existence of Snake River Basin steelhead, Snake River spring/summer Chinook salmon, or result in the adverse modification or destruction of designated critical habitat. Pursuant to the MSA, NMFS provided the PNF with conservation recommendations to conserve EFH for Chinook salmon. The intended user of this consultation is the PNF. The American public will benefit from the consultation.

Individual copies were provided to the above-listed entities. This consultation will be posted on NMFS Northwest Region website (http://www.nwr.noaa.gov). The format and naming adheres to conventional standards for style.

Integrity: This consultation was completed on a computer system managed by NMFS in accordance with relevant information technology security policies and standards set out in

Appendix III, 'Security of Automated Information Resources,' Office of Management and Budget Circular A-130; the Computer Security Act; and the Government Information Security Reform Act.

Objectivity:

Information Product Category: Natural Resource Plan.

Standards: This consultation and supporting documents are clear, concise, complete, and unbiased; and were developed using commonly accepted scientific research methods. They adhere to published standards including NMFS ESA Consultation Handbook, ESA Regulations, 50 CFR 402.01, *et seq.,* and the MSA implementing regulations regarding EFH, 50 CFR 600.920(j).

Best Available Information: This consultation and supporting documents use the best available information, as referenced in the Literature Cited section. The analyses in this Opinion/EFH consultation contain more background on information sources and quality.

Referencing: All supporting materials, information, data and analyses are properly referenced, consistent with standard scientific referencing style.

Review Process: This consultation was drafted by NMFS staff with training in ESA and MSA implementation, and reviewed in accordance with Northwest Region ESA quality control and assurance processes.

5. LITERATURE CITED

Adult Technical Team. 2007. Nez Perce Tribe Chinook salmon and steelhead adult escapement and spawning grounds 2006 summary report. Nez Perce Tribe Department of Fisheries Resources Management. Lapwai, ID. January.

Alaska DNR. 1991. Rationale for Blasting Standards (11 AAC 95) Developed to Prevent Explosive Injury to Fish.

Bash, J., C. Cerman, and S. Bolton. 2001. Effects of Turbidity and Suspended Solids on Salmonids. Center for Streamside Studies, University of Washington. 74 pgs.

Behnke, R.J. 2002. Trout and Salmon of North America. The Free Press, New York. 359 pages.

Berg, L. and T. G. Northcote. 1985. Changes in territorial, gill-flaring, and feeding behavior in juvenile coho salmon (*Oncorhynchus kisutch*) following short-term pulses of suspended sediment. Canadian Journal of Fisheries and Aquatic Science 42: 1410-1417.

Beven, D., J. Harville, P. Bergman, T. Bjornn, J. Crutchfield, P. Klingeman, and J. Litchfield. 1994. Snake River Salmon Recovery Team: Final Recommendations to National Marine Fisheries Service (NMFS). National Marine Fisheries Service, Seattle, Washington. (May 1994).

Bird, F.H., and K. Roberson. 1984. Keystone Canyon Blasting Study. Alaska Department of Fish and Game. 25 p.

Bishaie, H.M. 1961. The effects of pressure on the survival and distribution of larval and young fish. Zoology Dept. Faculty of Science, Cairo University, Egypt. Pp. 292-311.

Bisson, P. A., and R. E. Bilby. 1982. Avoidance of suspended sediment by juvenile coho salmon. North American Journal Fisheries Management 4: 371-374.

Bjornn, T.C. 1991. Spawning and Development. *The Wildlife Series: Trout.* Harrisburg, PA. pp. 57-64.

Bolander, P., and A. Yamada. 1999. Dust palliative selection and application guide. USDA Forest Service, Technology and Development Program. 7700 Transportation Systems. http://www.fs.fed.us/eng/pubs/html/99771207/99771207.html

BRT (Biological Review Team). 1998. Status Review Update for West Coast Chinook Salmon (*Oncorhynchus tshawytscha*) From Puget Sound, Lower Columbia River, Upper Willamette River, and UCR Spring-Run ESUs. West Coast Chinook Salmon BRT. Seattle, Washington.

BRT. 2003. Updated status of Federally listed ESUs of West Coast salmon and steelhead. U. S. Department of Commerce, National Marine Fisheries Service, Northwest Fisheries Science Center and Southwest Fisheries Science Center, Seattle, Washington (July 2003). http://www.nwr.noaa.gov/AlseaResponse/20040528/brtusr.html

Burgess, C. and S. Blackwell. 2003. Acoustic monitoring of barrier wall installation at the former Rhône-Poulenc site, Tukwila, Washington. Greenridge Sciences, Inc. Santa Barbara, California. 2003.

Busby, P. J., T. C. Wainwright, G. J. Bryant, L. J. Lierheimer, R. S. Waples, F. W. Waknitz, and I. V. Lagomarcino. 1996. Status Review of West Coast Steelhead From Washington, Idaho, Oregon, and California. NOAA-NWFSC -27. Available from NMFS, Northwest Fisheries Science Center, Coastal Zone and Estuaries Studies Division, 2725 Montlake Blvd. E., Seattle, Washington 98112-2097. 261 pages.

CIG (Climate Impacts Group). 2004. Overview of climate change impacts in the U.S. Pacific Northwest (July 29, 2004, updated August 17, 2004). Climate Impacts Group, University of Washington, Seattle.

Coastline Environmental Studies, Ltd. 1987. Blast Monitoring of detonations near marine environment. Project ADF&G. 86.01. Prepared for: Alaska Department of Transportation and Public Facilities. Juneau, AK.

Cooney, T. 2004. Updated trend data sets for Interior Columbia basin ESUs. October. http://www.salmonrecovery.gov/remand/analysis_reports/updated_interior_brt_trend_data.pdf

Dames & Moore. 1987. Effects of linear explosive seismic energy releases on fish in Alaska's transition zones. For the Alaska Oil and Gas Association.

Faurot, M., and D.C. Burns. 1999. Biological Assessment for the potential effects of managing the Payette National Forest in the South Fork Salmon River Section 7 watershed on Snake River spring/summer and fall Chinook salmon, Snake River steelhead, and Columbia River bull trout, Volume 23: Grouped Actions: Trails End waterline special use permit, Eiguren irrigation ditch special use permit, South Fork Salmon River road reconstruction, Stibnite mine closure, Daddy Del's placer exploration.

Faurot. M. and T. Burton. 2005. Biological Assessment for Stream Crossing Structure Replacement and Removal Activities Affecting ESA-listed Species in Idaho National Forests (Payette, Boise, Sawtooth, Salmon-Challis, Cottonwood, Coeur d'Alene, Four Rivers, Jarbridge, Salmon, and Upper Snake Field Offices). June 9.

Federal Highway Administration. 2008. Effective Noise Control During Nighttime Construction – FHWA Work Zone – Mozill. December 22, 2008. http://ops.fhwa.dot.gov/wz/workshops/accessible/Schexnayder_paper.htm

Fish Passage Center (FPC). 2001. Spring Migration 2001 in response to request from Brian Allee (Memorandum from Michele DeHart). August 10. http://www.fpc.org/documents/memos/200-01.pdf

Fish Passage Center. 2002. Smolt data, current and historical. Fish Passage Center, 2501 SW First Avenue, Suite 230, Portland, Oregon 97201-4752. 52. http://www.fpc.org/smolt_home.html

Fish Passage Center. 2003. Adult data, current and historical. Fish Passage Center, 2501 SW First Avenue, Suite 230, Portland, Oregon 97201-4752. http://www.fpc.org/adultsalmon/adultqueries/Adult_Table_Submit.html

Fish Passage Center. 2004. Adult salmon passage at Lower Granite Dam. Fish Passage Center, 2501 SW First Avenue, Suite 230, Portland, Oregon 97201-4752. http://www.fpc.org/adultsalmon/adulthistory/YTD-LGR.html

Fish Passage Center. 2005. 2004 Annual Report. Fish Passage Center, 2501 SW First Avenue, Suite 230, Portland, Oregon 97201-4752. http://www.fpc.org/documents/annual_FPC_report/FPC2004_Annual_Report.pdf

Fish Passage Center. 2008. 2005 Annual Report. Fish Passage Center, 2501 SW First Avenue, Suite 230, Portland, Oregon 97201-4752. http://www.fpc.org/documents/annual_FPC_report/FPC%202005%20Annual%20Report-FINAL.pdf

Furniss, M.J., T.D. Roelofs, and C.S. Yee. 1991. Road construction and maintenance. *In:* W.R. Meehan (editor) Influences of forest and rangeland management on salmonid fishes and their habitats. Special Publication 19. American Fisheries Society, Bethesda, Maryland.

Good, T.P., R.S. Waples, and P. Adams (editors). 2005. Updated status of federally listed ESUs of West Coast salmon and steelhead. U.S. Dept. Commer., NOAA Tech. Memo. NMFS-NWFSC-66, 598 p. http://santacruz.nmfs.noaa.gov/files/pubs/00749.pdf

Hart, J.L. 1973. Pacific Fishes of Canada. Bulletin of the Fisheries Research Board of Canada 180: 730 pages.

Hartt, A.C. and M.B. Dell. 1986. Early ocean migrations and growth of juvenile Pacific salmon and steelhead trout. Bulletin of the International North Pacific Fisheries Commission. 46.105 pages.

Hastings, M.C. and A.N. Popper. 2005. Effects of sound on fish. California Department of Transportation Contract No. 43A0139, Task Order 1. Sacramento, California. 82 pages.

Heffner, K. 1996. Water quality effects of three dust abatement compounds. U.S. Forest Service. Idaho Panhandle National Forest. May. 7p.

ISAB (Independent Scientific Advisory Board). 2007. Climate change impacts on Columbia River Basin fish and wildlife. ISAB Climate Change Report, ISAB 2007-2, Northwest Power and Conservation Council, Portland, Oregon.

Interior Columbia Basin Technical Recovery Team (ICBTRT). 2005. Interior Columbia Basin TRT: Viability Criteria for Application to Interior Columbia Basin Salmonid ESUs.

Kearns, R. K. and F. C. Boyd. 1965. The Effect of a Marine Seismic Exploration on Fish Populations in British Columbia Coastal Waters. Canadian Fish Culturist.

Keevin, T.M. and G.L. Hempen. 1997. The environmental effects of underwater explosions: fish. Chapter 6 *In:* The environmental effects of underwater explosions with methods to mitigation impacts. U.S. Army Corps of Engineers. St. Louis, Missouri. August.

Kucera, P.A. and R.W. Orme. 2007. Chinook salmon (*Oncorhynchus tshawytscha*) adult escapement monitoring in Lake Creek and Secesh River, Idaho in 2006. Nez Perce Tribe Department of Fisheries Resources Management. Lapwai, ID. July.

Logerwell, E.A., N. Mantua, P.W. Larson, R.C. Francis, and V.N. Agostini. 2003. Tracking environmental processes in the coastal zone for understanding and predicting Oregon coho (*Oncorhynchus kisutch*) marine survival. *Fisheries Oceanography* 12:554-568.

Luce, C.H., B.E. Rieman, J.B. Dunham, J.L. Clayton, J.G. King, and T.A. Black. 2001. Incorporating Aquatic Ecology into Decisions on Prioritization of Road Decommissioning. Water Resources IMPACT Vol.3, Number 3, pp 8-14.

Matthews, G. M. and R. S. Waples. 1991. Status Review for Snake River Spring and Summer Chinook Salmon. NMFS F/NWC-200. Available from NMFS, Northwest Fisheries Science Center, Coastal Zone and Estuaries Studies Division, 2725 Montlake Blvd. E., Seattle, Washington 98112-2097. 75 pages. http://www.nwfsc.noaa.gov/publications/techmemos/tm200/tm200.htm

McClure, M.B., E.E. Holmes, B.L. Sanderson, and C.E. Jordan. 2003. A large-scale multispecies status assessment: anadromous salmonids in the Columbia River Basin. *Ecological Applications* 13(4):964-989.

McElhany, P., M. Ruckleshaus, M.J. Ford, T. Wainwright, and E. Bjorkstedt. 2000. Viable salmon populations and the recovery of evolutionarily significant units. National Marine Fisheries Service, Northwest Fisheries Science Center, NOAA Technical Memorandum NMFS-NWFSC-42. 156 pages. http://www.nwfsc.noaa.gov/publications/techmemos/tm42/tm42.pdf

Meeings, C.C. and R.T. Lackey. 2005. Estimating the size of historic Oregon salmon runs. Reviews in Fisheries Science 13:51-66.

Munday, J.R., G.L. Ennis, D.G. Wright, D.C. Jeffries, E.R. McGreer, and J.S. Mathers. 1986. Development and evaluation of a model to predict effects of buried underwater blasting charges on fish populations in shallow water areas. Can. Tech. Rpt. of Fisheries and Aquatic Sci. 1418.

Myers, J. M., R. G. Kope, G. J. Bryant, D. Teel, L. J. Lierheimer, T. C. Wainwright, W. S. Grant, F. W. Waknitz, K. Neely, S. T. Lindley, and R. S. Waples. 1998. Status Review of Chinook Salmon From Washington, Idaho, Oregon, and California. NMFS-NWFSC-35. Available from National Marine Fisheries Service, Northwest Fisheries Science Center, Coastal Zone and Estuaries Studies Division, 2725 Montlake Blvd. E., Seattle, Washington 98112-2097. 443 p. http://www.nwfsc.noaa.gov/publications/techmemos/tm35/index.htm

Neff, J.M. 1985. Polycyclic aromatic hydrocarbons. *In*: Fundamentals of aquatic toxicology, G.M. Rand, and S.R. Petrocelli (eds.), pp. 416-454. Hemisphere Publishing, Washington, D.C.

Newcombe, C. P., and J. O. Jensen. 1996. Channel Suspended Sediment and Fisheries: A Synthesis for Quantitative Assessment of Risk and Impact. North American Journal of Fisheries Management 16(4): 693-727.

NMFS (National Marine Fisheries Service). 1996. Making Endangered Species Act Determinations of Effect for Individual and Grouped Actions at the Watershed Scale. Habitat Conservation Program, Portland, OR.

NMFS. 2000. Endangered Species Act – Section 7 Consultation, Biological Opinion; Reinitiation of consultation on operation of the Federal Columbia River Power System, including the juvenile fish transportation program, and 19 Bureau of Reclamation projects in the Columbia basin. National Marine Fisheries Service, Northwest Region, Portland, Oregon. December 21. http://www.nwr.noaa.gov/1hydrop/hydroweb/docs/Final/2000Biop.html

NMFS. 2004. Endangered and Threatened Species; Designation of Critical Habitat for 13 Evolutionarily Significant Units of Pacific Salmon (*Oncorhynchus* spp.) and Steelhead (*O. mykiss*) in Washington, Oregon, and Idaho. Federal Register, 69 (74572). (December 14, 2004). http://www.nwr.noaa.gov/1salmon/salmesa/crithab/NWRproposedCHD-FR1of6.pdf

NMFS. 2005a. Endangered Species Act – Section 7 Consultation Biological and Conference Opinion and Magnuson-Steven Fishery Conservation and Management Act Essential Fish Habitat Consultation the Pacific Northwest Region Invasive Plant Program, Oregon and Washington. September 8, 2005. http://seahorse.nmfs.noaa.gov/pls/pcts-pub/sxn7.pcts_upload.download?p_file=F11580/200503140_invasive_plant_09-08-2005.pdf

NMFS. 2005b. Appendix I: CHART assessment for the Snake River Basin steelhead. August. http://www.nwr.noaa.gov/Salmon-Habitat/Critical-Habitat/2005-Biological-Teams-Report.cfm.

NMFS. 2006a. Snake River Salmon and Steelhead Recovery Plan (Draft): Snake River spring/summer Chinook salmon (Chapters 4 and 5). National Marine Fisheries Service, Idaho State Habitat Office, Boise, Idaho (May 2006). http://www.idahosalmonrecovery.net/recoverplans/spsumchinook.html

NMFS. 2006b. Snake River Salmon and Steelhead Recovery Plan (Draft): Snake River Basin steelhead (Chapters 6 and 7). National Marine Fisheries Service, Idaho State Habitat Office, Boise, Idaho (May 2006). http://www.idahosalmonrecovery.net/recoverplans/srsteelhead.html

NMFS. 2006c. Endangered Species Act-Section 7 Formal Consultation Biological and Conference Opinion Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Consultation, Stream Crossing Structure Replacement and Removal Activities**,** Snake and Clearwater River Basins, 170601 & 170603, Idaho. NMFS Tracking Nos: 2005/06396, 2005/07365, 2005/07366.

NMFS. 2008. Endangered Species Act – Section 7 Consultation Biological Opinion and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Consultation. Payette National Forest Road Maintenance/Management Program Hells Canyon, Little Salmon River, Lower Salmon, South Fork Salmon, Middle Salmon-Chamberlain, Lower Middle Fork Salmon, and Upper Middle Fork Salmon, 4th HUC#s 17060101, 17060210, 17060209, 17060208, 17060207, 17060206, and 17060205 Idaho, Valley, Adams, and Custer Counties, Idaho. NMFS Tracking No: 2008/04131.

Norris, K.S. and B. Møhl. 1983. Can odontocetes debilitate prey with sound? American Naturalist 122:85–104.

PFMC (Pacific Fishery Management Council). 1998a. Final Environmental Assessment/ Regulatory Review for Amendment 11 to the Pacific Coast Groundfish Fishery Management Plan. Pacific Fishery Management Council, Portland, Oregon (October 1998). http://www.pcouncil.org/groundfish/gffmp/gfa11.html

PFMC (Pacific Fishery Management Council). 1998b. The Coastal Pelagic Species Fishery Management Plan: Amendment 8. Pacific Fishery Management Council, Portland, Oregon (December 1998). http://www.pcouncil.org/cps/cpsfmp.html

PFMC (Pacific Fishery Management Council). 1999. Amendment 14 to the Pacific Coast Salmon Plan. Appendix A: Description and Identification of Essential Fish Habitat, Adverse Impacts and Recommended Conservation Measures for Salmon. Pacific Fishery Management Council, Portland, Oregon (March 1999). http://www.pcouncil.org/salmon/salfmp/a14.html

Popper, A.N., Fewtrell, J., Smith, M.E., McCauley, R.D. 2003. Anthropogenic Sound: Effects on the Behavior and Physiology of Fishes. Marine Technology Society Journal Vol. 37, no. 4, pp. 35-40. 2003-2004.

Rasmussen, B. 1967. The effects of underwater explosions on marine life. Bergen, Norway. 17p.

Raymond, H.L. 1979. Effects of dams and impoundments on migrations of juvenile Chinook salmon and steelhead from the Snake River, 1966 to 1975. *Transactions of the American Fisheries Society* 108:505-529.

Raymond, H.L. 1988. Effects of hydroelectric development and fisheries enhancement on spring and summer Chinook salmon and steelhead in the Columbia River basin. *North American Journal of Fisheries Management* 8:1-24.

Regetz, J. 2003. Landscape-Level Restraints on Recruitment of Chinook Salmon (*Oncorhynchus tshawytscha*) in the Columbia River Basin, USA. Aquatic Conservation: Marine and Freshwater Ecosystems. 13:35-49.

Scheuerell, M.D., and J.G. Williams. 2005. Forecasting climate-induced changes in the survival of Snake River spring/summer Chinook salmon (*Oncorhynchus tshawytscha*). Fisheries Oceanography 14:448-457.

Schwendeman, T. 1981. Dust control study. U.S. Forest Service. Gallatin National Forest. Report USGS/BRD/ITR-2003-0002. U.S. Government Printing Office, Denver, CO.

Servizi, J. A., and D. W. Martens. 1987. Some effects of suspended Fraser River sediments on sockeye salmon (*Oncorhynchus nerka*), pp. 254-264. *In* H. D. Smith, L. Margolis, and C. C. Wood *eds*. Sockeye salmon (*Oncorhynchus nerka*) population biology and future management. Canadian Special Publications of Fisheries and Aquatic Sciences 96.

Servizi, J.A. and D.W. Martens. 1991. Effect of temperature, season, and fish size on acute lethality of suspended sediments to coho salmon (Oncorhynchus kisutch). Can. J. Fish. Aquat. Sci. 48: 493-497.

Sigler, J., T.C. Bjornn, and F.H. Everest. 1984. Effects of chronic turbidity on density and growth of steelhead and coho salmon. Transactions of the American Fisheries Society 113:142-150.

Smirnov, A.I. 1955. The effect of mechanical agitation at different periods of development on the eggs of autumn chum salmon. Dokl. Adad. Nauk. SSSR, 105(4): 873-876.

Spence, B.C, G.A. Lomnicky, R.M. Hughes, R.P. Novitzki. 1996. An Ecosystem Approach to Salmonid Conservation. TR-4501-96-6057. ManTech Environmental Research Services Corp., Corvallis, Oregon. (December 1996). http://www.nwr.noaa.gov/Publications/Reference-Documents/upload/mantech-partI.pdf

Staples, C.A, Williams J.B., Craig G.R., Roberts K.M. 2001. Fate, effects and potential environmental risks of ethylene glycol: a review. Chemosphere. Volume 43, Number 3, April 2001, pp. 377-383(7).

USDA (U. S. Department of Agriculture). 2007. Biological Assessment for the Potential Effects of Managing the Payette National Forest in the South Fork Salmon River Section 7 Watershed on Snake River Spring/Summer Chinook Salmon, Snake River Steelhead, and Columbia River Bull Trout and Biological Evaluation for Westslope Cutthroat Trout. Volume 28, Ongoing and New Actions. Payette National Forest. McCall, Idaho.

USDA. 2008. Biological Assessment for the Potential Effects of Managing the Payette National Forest in the South Fork Salmon River Section 7 Watershed on Snake River Spring/Summer Chinook Salmon, Snake River Steelhead, and Columbia River Bull Trout and Biological Evaluation for Westslope Cutthroat Trout. Volume 30, Warren Wagon Road Improvement Project, Payette National Forest, McCall, Idaho

USDOT (U.S. Department of Transportation). 1995. Highway Traffic Noise Analysis and Abatement; Policy and Guidance. U.S. Department of Transportation, Federal Highway Administration , Office of Environmental and Planning, Noise and Air Quality Branch, Washington, D.C.

Waples, R.S. 1991. Definition of 'Species' Under the Endangered Species Act: Application to Pacific Salmon. U.S. Department of Commerce, National Marine Fisheries Service, Northwest Fisheries Science Center, NOAA Technical Memorandum NMFS- F/NWC-194. http://www.nwfsc.noaa.gov/publications/techmemos/tm194/waples.htm

Wright, D.G. 1982. A discussion paper on the use of explosives in the marine waters of the Northwest Territories. Dept. of Fisheries and Oceans, Winnipeg. 48p.

Wright, D.G., and G.E. Hopky. 1998. Guidelines for the Use of Explosives in or near Canadian Fisheries Waters. Canadian Tech. Report of Fisheries and Aquatic Sciences, 2107.

WSDOT (Washington Department of Transportation). 2006. Biological assessment preparation: advanced training manual. Washington State Department of Transportation, Environmental Affairs Office. Olympia, Washington. April 2006.

Wysocki, L. E., J.W. Davidson III, M.E. Smith, S.S. Frankel, W.T. Ellison, P. M. Mazik, A.N. Popper, J. Bebak. 2007. Effects of aquaculture production noise on hearing, growth, and disease resistance of rainbow trout Oncorhynchus mykiss. Aquaculture 272: 687-697.

Zabel, R.W., M.D. Scheuerell, M./M. McClure, and J.G. Williams. 2006. The interplay between climate variability and density dependence in the population viability of Chinook salmon. Conservation Biology 20:190-200.