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

NMFS Tracking No.:
2003/00291

December 8, 2003

Mr. Mark Madrid
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 Golden Hand No. 3 and No. 4 Lode Mining Claims Proposed Plan of Operation on Lower Middle Fork Salmon River - HUC 17060206 and Upper Middle Fork Salmon River - HUC 17060205, Snake River spring/summer chinook salmon and steelhead, Valley and Idaho Counties, Idaho (One Action)

Dear Mr. Madrid:

Enclosed is a biological opinion (Opinion) prepared by NOAA's National Marine Fisheries Service (NOAA Fisheries) pursuant to section 7 of the Endangered Species Act (ESA) on the effects of the proposed Golden Hand Mine Project on Lower Middle Fork Salmon River - HUC 17060206 and Upper Middle Fork Salmon River - HUC 17060205, Valley and Idaho Counties. In this Opinion, NOAA Fisheries concludes that the proposed action is not likely to jeopardize the continued existence of ESA-listed Snake River spring/summer chinook salmon and Snake River steelhead, and is not likely to destroy or adversely modify designated critical habitat. As required by section 7 of the ESA, NOAA Fisheries includes reasonable and prudent measures with non-discretionary terms and conditions that NOAA Fisheries believes are necessary to minimize the impact of incidental take associated with this action.

This document contains a consultation on essential fish habitat (EFH) pursuant to section 305(b) of the Magnuson-Stevens Fishery Conservation and Management Act (MSA) and its implementing regulations (50 CFR Part 600). NOAA Fisheries concludes that the proposed action would adversely affect designated EFH for listed salmon. As required by section 305(b)(4)(A) of the MSA, included are conservation recommendations that NOAA Fisheries believes will avoid, minimize, mitigate, or otherwise offset adverse effects on EFH resulting from the proposed action. As described in the enclosed consultation, 305(b)(4)(B) of the MSA requires that a Federal action agency must provide a detailed response in writing within 30 days of receiving EFH conservation recommendations.

If you have any questions regarding this letter, please contact Ms. Charley Rains of my staff in the Idaho Habitat Branch office at 208-378-5686.

Sincerely,

D. Robert Lohn
Regional Administrator

cc: B. Giles - USFS
J. Foss - USFW
D. Allen - IDFG
C. Colter- Shoshone-Bannock Tribes
J. Pinkham - Nez Perce Tribe
D. Burns - USFS
AIMM

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

Golden Hand #3 and #4 Lode Mining Claims Plan of Operation
Lower Middle Fork Salmon River - HUC 17060206
and Upper Middle Fork Salmon River - HUC 17060205
Valley County, Idaho
Idaho County, Idaho

Action Agency: U.S. Forest Service, Payette National Forest

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

Date Issued: December 8, 2003

Issued by: for Michael R Crouse
D. Robert Lohn
Regional Administrator

Refer to: 2003/00291

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I. INTRODUCTION

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

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

The Payette National Forest (PNF) proposes to approve a plan of operations for mining activities, enabling the use of public resources. The plan of operations of the Golden Hand Mine Project includes development of road access to a mining claim, and drilling test holes to determine mineral content. The PNF is proposing the action according to its authority under the Code of Federal Regulations at 36 CFR §228A. The administrative record for this consultation is on file at the Idaho Habitat Branch Office.

A. Background and Consultation History

The PNF coordinated with NOAA Fisheries prior to developing the draft Environmental Impact Statement (DEIS). NOAA Fisheries reviewed and commented on several draft Biological Assessments (BA), and discussed with the PNF opportunities to reduce or avoid potential adverse effects on anadromous fish by clarifying or adding certain protective measures to the proposed action. The PNF provided a complete BA and EFH assessment on the Golden Hand Mine Project to NOAA Fisheries on March 24, 2003, and consultation was initiated at that time. NOAA Fisheries transmitted a draft Opinion to PNF on June 26, 2003. In the months following that transmittal, NOAA Fisheries and PNF exchanged information via emails, meetings, conference calls, and a site visit to clarify aspects of the proposed action. The final project design reflects many of NOAA Fisheries suggestions. Significant meetings and correspondence are listed in the consultation history (Attachment A).

The action would likely affect tribal trust resources. Because the action is likely to affect tribal trust resources, NOAA Fisheries has contacted the Nez Perce Tribe and the Shoshone-Bannock Tribe pursuant to the June 5, 1997, Secretarial Order.

The Nez Perce Tribe has informed the PNF that the proposed activities located within the Big Creek drainage in the Frank Church-River of No Return Wilderness (FC-RONR Wilderness) are situated within the Tribe's territory as defined by the Treaty of 1855 and findings of the Indian Claims Commission Docket No.175. The Big Creek system was historically and still is very important to the life and culture of the Tribe. Tribal members have lived in and conducted subsistence and ceremonial activities in the Coin Creek/Beaver Creek area as well as the entire Big Creek drainage. The Tribe continues to exercise its treaty-reserved rights in these areas. The Nez Perce Tribe provided comments on the proposed Golden Hand Mine Project to NOAA Fisheries. These comments and their relevance to this Opinion are summarized in Attachment B.

The Shoshone-Bannock Tribes Fort Bridger Treaty of 1868, article 4 states "*but they shall have the right to hunt on the unoccupied lands of the United States so long as game may be found therein, and so long as peace subsists among the whites and Indians on the borders of the hunting districts.*" The Shoshone-Bannock Tribes have informed NOAA Fisheries that the proposed activities located within the Big Creek drainage in the FC-RONR Wilderness are situated within the Tribe's territories as defined by the Treaty of 1868. The Big Creek system was historically and still is very important to the life and culture of the Tribes. Tribal members have lived in and conducted subsistence and ceremonial activities in the Coin Creek/Beaver Creek area as well as the entire Big Creek drainage. The Tribes contend that they continue to exercise their treaty-reserved rights in these areas. The Shoshone-Bannock Tribes provided comments on the proposed Golden Hand Mine Project to NOAA Fisheries. These comments and their relevance to this Opinion are summarized in Attachment B.

B. Proposed Action

Proposed actions are defined in NOAA Fisheries' regulations (50 CFR §402.02) as "all activities or programs of any kind authorized, funded, or carried out, in whole or in part, by Federal agencies in the United States or upon the high seas." Additionally, U.S. Code [16 U.S.C. §1855(b)(2)] further defines a Federal action as "any action authorized, funded, or undertaken or proposed to be authorized, funded, or undertaken by a Federal agency." Because the PNF proposes to authorize mining via approval of a plan of operations, it must consult under ESA section 7(a)(2) and MSA section 305(b)(2).

The Golden Hand Mine Project involves multiple activities throughout the Upper Beaver Creek, Lower Beaver Creek, Hand Creek, Hogback-McFadden Creek, Smith Creek, Logan Creek, and Upper Big Creek watersheds, all located within the Middle Fork Salmon River Subbasin in the PNF. The activities include mining, changes to the road system, water withdrawal, and increased travel into the FC-RONR Wilderness. A detailed map of the project is provided in the BA and in attachment E of this Opinion. The mining claims are located in section 26, T22N, R9E, Boise Meridian. Proposed activities would occur over a 3-year period (with extensions up to 2 years based on unforseen circumstances such as fire, heavy snow cover, etc.), and be conducted by American Independence Mines and Minerals, Inc. (AIMM) personnel, and monitored by PNF personnel. The DEIS (United States Department of Agriculture [USDA] 2003a) for the Golden Hand Mine Project describes monitoring and reporting requirements, and design and implementation criteria to avoid or minimize potential adverse impacts on listed species. The proposed activities are described in detail in the March 24, 2003, BA (USDA 2003b) as amended, in the DEIS and final Environmental Impact Statement (EIS), and the Record of Decision (ROD) (USDA 2003d). Additional clarifications of the proposed action are contained in the project record, which includes September 2003 emails (between Dave Burns, PNF, and Charley Rains, NOAA Fisheries) and a September 24, 2003, supplemental report from PNF to NOAA Fisheries. The key clarifications of the proposed action, related to its effect on listed salmon and steelhead, are included in the Overview of Proposed Action and Additional Activity Components Sections below.

1. Overview of Proposed Action

The primary components of the proposed action and where they would occur are listed below.

a. Increase the maintenance of 16.4 miles of Forest Service (FS) roads in the Big Creek, Smith Creek, and North Fork Smith Creek watersheds, leading to the FC-RONR Wilderness; these roads would be used to the access the mineral operations (these roads are considered poorly maintained).

    (1) Install approximately 49 driveable dips.

    (2) Install six road relief culverts along North Fork Smith Creek.

    (3) Install approximately 420 cubic yards of aggregate on FS roads.

b. Increase travel on existing FS roads leading to the millsite (Logan Creek road, and Warren-Profile Gap road).

c. Reconstruct 3.3 miles of abandoned road in the FC-RONR Wilderness; this road is currently maintained as a trail, and will be recovered as a trail at the termination of the project.

d. Use of four fords across unnamed tributaries of Coin Creek.

    (1) Install cross drains immediately above, or within 5-10 feet of approaches, where these approaches drain toward the stream.

(2) Install erosion control immediately below cross drains.

(3) Install aggregate to armor approaches.

(4) Install waterbars at intervals appropriate to the grade.

e. Construct approximately 0.1 mile of new temporary road in the Coin Creek watershed, outside of the 100' interim PACFISH Riparian Habitat Conservation Area (RHCA).

f. Install a log stringer bridge over North Fork Smith Creek replacing an existing ford.

g. Install "geogrid" in an existing ford of North Fork Smith Creek.

h. Conduct mineral development mining activities in the Coin Creek watershed.

(1) Underground mining activities from two existing mine openings (adits).

(2) Drilling of a maximum of 31 drill sites (with up to 48 holes).

(3) Drilling of up to 15 drill sites within RHCAs.

(4) Install temporary pit toilet at mining claims for human waste.

(5) Water withdrawal of 2,500 gallons/day, 0.04 cfs from unnamed tributaries of Coin Creek

i. Travel to and from the mining claim will be limited to two round trips per day (pickup trucks).

j. Travel to and from the mining claim for heavy equipment (except dump trucks) will be limited to one round trip per operating season. Dump trucks will be limited to a total of 10 round trips per the 3 year project operation.

k. All equipment and vehicles will be washed prior to entering the PNF.

l. Fisheries related monitoring would occur once during spawning and incubations seasons for Snake River spring/summer chinook salmon *(Oncorhynchus tshawytscha*) and Snake River steelhead *(O. mykiss)*. If redds or adult fish are present at fords or directly downstream, NOAA Fisheries will be contacted and vehicle trips will be limited or restricted.

m. Qualified PNF personnel will monitor all project activities during implementation; road construction, reconstruction and maintenance will be monitored daily, all other activities will be monitored at least weekly if not daily.

n. At the end of the project, disturbed areas from mining and access activities will be reclaimed.

(1) New roads will be decommissioned, and reconstructed roads will be returned to trails.

(2) Sites at Werdenhoff Mine will be reclaimed after they are used to provide rock/gravel for the proposed road maintenance and road reconstruction activities associated with the Golden Hand Mine.

The PNF has incorporated measures to reduce the effects of the project. These additional measures specific to project actions are listed below. A more detailed description of the additional activity measures in place are available in the *Middle Fork Salmon River BA* (USDA 2001).

2. General Erosion Control Measures

All ground disturbance will require erosion control measures (soil movement barriers, water control devices, mulch or erosion control matting, revegetation plants and grass seed) when the construction site is within the PACFISH RHCAs or on slopes greater than 45%. Mulch, and native grass seed will be used on other areas, unless specified otherwise in the BA. These Best Management Practices are further described in Appendix 4 of Faurot and Burns (1999). Generic avoidance/minimization measures that can be used include: silt fence and filter barriers; straw-bale sediment barriers; erosion control blankets and mats; hydro-mulching; mulching; waterbars and rolling dips; temporary sediment basins; straw rolls; straw bale dikes; slash filter windrows; scattered slash; brush layering; and shrub planting. If using silt fence, fence should be considered only a temporary sediment control measure; restored vegetation would be the preferred final erosion control. Silt fences will be maintained by removing stored sediment, and fence will be removed as soon as vegetative erosion control measures have effectively reduced sediment production.

3. Additional Description of Activity Components

a. Road Maintenance

(1) Berms will not be left along the outside edge of the road.

(2) Roads will be graded and shaped to conserve existing surface material.

(3) Excess material will not be sidecast on the fill of the road; and there will be no sidecasting within one-quarter mile of perennial streams.

(4) Fuel storage areas will be located outside of RHCAs. The operator will provide facilities to contain the largest possible spill. Leaks of motor oil and hydraulic fluids from heavy equipment will be monitored and controlled to prevent water contamination.

(5) Cut-slopes will not be "undercut" when cleaning inside ditches.

(6) Road maintenance will not be attempted when surface material is saturated with water and erosion problems could result.

(7) The AIMM road maintenance crews will not excessively "brush" (cutting vegetation) along roads where the vegetation is stabilizing slopes.

(8) Any large woody debris already present on roads within this watershed's RHCAs will be moved intact to down slope of the road; this will not include tree felling.

(9) Roads will not be widened past the pre-existing condition width of 10 feet.

(10) During the installation of the approximately 49 driveable dips, the dips will be placed on the relatively flatter sections of the road and will direct water away from streams into vegetated areas that act as sediment buffers.

(11) Where appropriate, existing drain gullies on the road sites will be repaired to direct runoff away from streams.

(12) The AIMM will install approximately 420 cubic yards of aggregate on access roads in the action area; the aggregate should be coarse and well graded. Construction material needed for road improvements will be taken from the gravel site at the Werdenhoff Mine. A metals leachability test (Synthetic Precipitation Leaching Procedure or equivalent) would be completed prior to use of waste rock as aggregate. The gravel at the site is fractured, well-sorted gravel with a sand fraction; clay fines are minimal. The Werdenhoff Mine gravel site will be reclaimed at the end of the project.

b. Temporary Road Construction and Road Reconstruction; and Road Decommissioning/Trail Conversion

(1) The roads into the FC-RONR Wilderness will be gated and only AIMM personnel will be allowed access.

(2) All new roads and reconstructed roads will be limited to 10 feet in width.

(3) No sidecasting of materials.

(4) Heavy equipment will be limited to a rubber-tired backhoe/loader, bulldozer, excavator, and grader and dump truck.

(5) The bulldozer and grader will be restricted to a blade width of 10 feet or less.

(6) All heavy equipment will be limited to a front tread width of 8 feet or less.

(7) All heavy equipment (except for the dump truck) will be limited to one round trip to/from the mining claim per operation season. The dump truck will be limited to a total of ten round trips for the entire period of the project.

(8) General transport will be restricted to two vehicle trips per day, and these vehicles will be restricted to a tire tread width of less than 7 feet.

(9) The fords on the reconstructed road will be monitored by qualified PNF personnel. If down-cutting is apparent, then the bottom end of ford will be amoured with coarse rock.

(10) Any shrubs, or trees cleared off of roads will be used as slash filter windrow below the fills on both sides of fords to capture sediment.

(11) Alder thickets on the abandoned roadbed will be cleared by cutting rather than uprooting.

(12) Road maintenance crews will not blade or excavate roadbeds within 25 feet of the bank-full stream channel.

(13) Vegetation will be established on all cut-slopes and road fill on new and reconstructed roads.

(14) At the end of project (final closeout), new and reconstructed roads will be restored to approximate pre-project contours.

(15) At the end of project the FS trail (013) will be partially recontoured leaving an 18-inch wide trail.

c. Bridge Construction

(1) The bridge design and construction will meet PACFISH/INFISH standards and guidelines.

(2) Sediment entering streams will be minimized by: using silt-fence, or straw bales between abutments and stream, by avoiding abutment construction, or by using keystone blocks or native rock type material that avoid erosion/sedimentation.

(3) Stream fording will be minimized during bridge construction as much as is practicable.

(4) Bridge abutments will be installed well outside of active stream channel. A qualified fisheries biologist or hydrologist will determine the extent of active stream channel.

(5) Short approach inclines will be constructed at the ends of the bridge to prevent water movement from road onto bridge.

(6) Abutments and stringers will be made of Douglas fir logs, and decking will be made of rough sawn-planking of Douglas fir or western larch. None of these bridge materials will be removed from any RHCA.

d. Culvert Installation

(1) All new culverts will meet PACFISH/INFISH standards.

(2) During the culvert installations, the AIMM will construct a temporary channel and line it with plastic and/or geotextile, or will use some other water conduction facility (e.g., pipe) that meet NOAA Fisheries fish passage requirements, thus diverting the stream into the temporary conduction facility.

(3) Road approaches over new culverts will be reconstructed, and disturbed areas will be seeded and mulched. Sediment collected by erosion control material will be removed as specified by qualified PNF personnel.

(4) Additional site-specific measures, including modifications to avoidance/minimization measures because of site-specific conditions, may be identified and approved by qualified PNF personnel.

e. Mining Operations

To reduce potential of increased sediment delivery and chemical contamination from these ground-disturbing activities, the PNF proposed the following avoidance/minimization measures:

(1) No trenching activities will be allowed.

(2) No additives, used for drilling fluids, will be used without the prior approval of the PNF.

(3) Drill sites on slopes greater or equal to 45% will require hand portable drills and a wooden platform.

(4) All drill pad locations must be approved and flagged by PNF staff.

(5) Settling basins at drill pads will be excavated at lowest point of pad, downslope of all potential discharge sources, and will be of a size that is sufficient to contain 120% of the maximum volume expected to be used.

(6) Prior to discharge, the drilling fluid will be checked by qualified PNF staff for hydrocarbon contamination and AIMM will clean the fluid of all contaminants. The drilling fluid will be discharged in a controlled manner to the excavated settling basin. The inspection for contamination will be repeated after all of the fluid has ponded in the settling basin and any further contamination removed. After the fluid has been infiltrated into the basin, the basin will be backfilled prior to reclamation.

(7) Liquid drilling fluid, petroleum products and other hazardous materials (anti-freeze, explosives, etc.) will be stored outside of RHCA in PNF approved spill containment systems.

(8) If open tanks are used for drilling fluids, oil absorbent pads will be floated on the surface during operations to absorb any petroleum-based contaminants.

(9) All mechanical equipment will be inspected by PNF to ensure good working condition and determination of no visible leaks.

(10) The AIMM will submit a Spill Prevention Containment and Countermeasure plan to PNF.

(11) Oil absorbent pads will be on site and placed, prior to any activities, under the drilling platform and any possible sources of fuel, oil, or hydraulic fluid leakage. Soiled pads will be disposed of properly.

(12) After completion of a drill hole, the hole must be backfilled and plugged as described in Chapter 6 of BMP's for Mining in Idaho (Idaho Department of Lands, 1991).

(13) A water quality monitoring program that includes the following will be implemented:

  (a) Monitoring by the PNF at the beginning and end of each operating season;

  (b) Samples from the adits and all drill hole discharge areas.

(14) A temporary pit toilet will be dug for human waste and will be naturalized at the end of each operating season.

(15) There will be no camping or occupancy by any of the crews at the mine site.

(16) No trees will be cut within RHCAs except when presenting a safety hazard along a road; these trees will be left on site.

(17) Tree cutting, except for road construction and reconstruction, will not be allowed on the claims in the FC-RONR Wilderness.

(18) There will be no milling or processing of timber in the FC-RONR Wilderness.

(19) The PNF regulations require the proponent to post a reclamation bond prior to the approval of a plan of operations. The bond amount would include the full cost of reclamation.

(20) Up to 15 drill sites may be located off of the roadbed and/or within RHCAs. These drill sites will be located at least 50 feet from the stream channel and will include the following additional measures:

  (a) The drill sites located off of roadbeds or up to 50 feet from live water may be approved if shown to be necessary, however, PNF will have to approve the sites prior to implementation.

(b) Only hand portable drilling rigs mounted on wooden platforms will be allowed.

(c) Waste rock from these activities will be placed outside of RHCAs on existing waste dumps.

(21) Reclamation of project area will include complete recontouring to the original slope shape and revegetation of the disturbed ground. At final close out of the mining action, the following measures will be implemented:

(a) To provide stability, all waste dumps will be recontoured.

(b) The mine portals will be caved and otherwise closed and revegetated.

(c) All disturbed areas (recontoured roads, hill slopes, drill sites, waste dumps, etc) will be seeded with a certified weed-free native seed mix and mulched.

A more detailed description of mining mitigation measures required by the state of Idaho can be found in *BMP's for Mining in Idaho* (Idaho Department of Lands 1991).

f. Water Withdrawal

(1) Water will only be diverted from the unnamed tributaries of Coin Creek and will be limited to 0.04 cfs, except as modified below.

(2) Water will be conducted from adjacent stream to the drill pads by means of a flexible plastic pipe laid slightly inclined to the land contour to avoid excess head pressure at discharge end. A shut-off valve will be installed at the shut off end. The inlet end of the pipe will be screened to exclude juvenile fish from the pipe.

(3) The PNF will approve the inlet and location of the pipe line route.

(4) There will be no mechanical excavation of the stream channel at the pipe inlet; rocks may be placed by hand to position the pipe properly.

(5) Water withdrawal will be measured by the PNF; diversion rate will be reduced by the amount necessary to prevent the diversion rate exceeding 10% of the flow of Coin Creek.

(6) Flow will be monitored in the tributaries to Coin Creek at the approved diversion sites to ensure that diversion of up to 0.04 CFS does not dewater the tributary

streams. To "not dewater" means that there is an observable flow of water in that tributary both above and below the diversion point. An observable flow is water moving continuously along the surface of the stream for the length of stream that can be seen upstream and downstream when standing at the point of diversion. If, due to natural conditions, the stream flow has been reduced to ponds, the PNF will meet with the Level One Team and the forest hydrologist to consider options for water diversion. Temporary dewatering of the channel will be allowed during initial construction of the diversion, and during any necessary maintenance. The duration of this dewatering will not exceed 12 hours. Monitoring of the observable flow, upstream and downstream of the diversion point will occur each day that the PNF inspects the mine operation. If the tributaries are observed to be dewatered, then the PNF will take appropriate measures to restore or maintain an observable flow, as for example, restricting the operation to a smaller diversion facility, or utilizing another water source.

(7) Once a month throughout project operation, during and without withdrawal of water for mine operations, PNF will monitor flow on the unnamed perennial tributary to Coin Creek at a total of four locations: (1) One directly above the water withdrawal; (2) directly below the water withdrawal; (3) directly below where the unnamed intermittent stream enters the unnamed perennial stream; and (4) directly above where the unnamed perennial tributary enters Coin Creek. Using comparisons of with and without withdrawal flow levels, evaluate the extent of effects on listed fish and critical habitat in Coin Creek, and identify options to reduce the effects. Potential options include, but are not limited to, reducing amount of time water is withdrawn daily and relocating the withdrawal point.

(8) If water use at the pad is not anticipated for more than two days in a row, the intake end of the line will be removed from the stream after each use period.

g. Instream work, Measurements and Monitoring

(1) Fisheries related monitoring will occur once during spawning and incubation season for chinook salmon and steelhead. If redds or adult fish are present at fords or directly downstream NOAA Fisheries will be contacted and vehicle trips will be limited or restricted and/or construction activities will be halted.

(2) Water quality monitoring addressed in the Fisheries Monitoring Plan (USDA 2003b), shall be conducted by Forest personnel rather than AIMM to assure that water quality monitoring technical standards are met.

C. Description of the Action Area

An action area is defined by NOAA Fisheries regulations (50 CFR Part 402) as "all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action." The action area includes the Beaver-Gold and Upper Big Creek watersheds. The Beaver-Gold watershed occurs entirely in the FC-RONR Wilderness and includes Coin Creek, Beaver Creek, and lower Big Creek. The upper Big Creek watershed contains approximately 700 acres of private land and includes Smith Creek, Logan Creek, and Upper Big Creek. The action area lies within two section 7 watersheds: Lower Middle Fork Salmon River hydrologic unit code ([HUC] 17060206) and Upper Middle Fork Salmon River (17060205). This area serves as spawning, rearing, and over-wintering habitat for the salmonid Evolutionarily Significant Unit (ESUs) listed in Table 1, and also is classified as EFH for chinook salmon.

II. ENDANGERED SPECIES ACT BIOLOGICAL OPINION

The objective of this Opinion is to determine whether the PNF approval of the Golden Hand Mine Project plan of operation is likely to jeopardize the continued existence of the Snake River spring/summer chinook salmon, Snake River steelhead, or destroy or adversely modify designated critical habitat for spring/summer chinook salmon.

A. Evaluating the Effects of the Proposed Action

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

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[1] The Habitat Approach is intended to provide guidance to NOAA Fisheries staff for conducting analyses, and to explain the analytical process to interested readers. As appropriate, the Habitat Approach may be integrated into the body of Opinions. NOAA Fisheries staff are encouraged to share the Habitat Approach document with colleagues from other agencies and private entities who are interested in the premises and analysis methods.

or adverse modification of critical habitat. If jeopardy or adverse modification is found, NOAA Fisheries may identify reasonable and prudent alternatives (RPA) for the action that avoid jeopardy and/or destruction or adverse modification of critical habitat.

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

Part of evaluating the proposed action is consideration of how it meets recovery goals. Recovery planning is underway for listed salmonids in the Northwest with technical recovery teams identified for each domain. Recovery planning will help identify measures to conserve listed species and increase their survival at each life stage. NOAA Fisheries also intends recovery planning to identify the areas/stocks most critical to species conservation and recovery and to thereby evaluate proposed actions on the basis of their effects on those factors.

1. Biological Requirements in the Action Area

The first step NOAA Fisheries uses when applying ESA section 7(a)(2) to the listed ESUs considered in this Opinion includes defining the species' biological requirements within the action area. Relevant biological requirements are those necessary for the listed ESU's to survive and recover to naturally-reproducing population sizes at which protection under the ESA would become unnecessary. This will occur when populations are large enough, and habitat is of sufficient quantity and quality, to safeguard the genetic diversity of the listed ESUs, enhance their capacity to adapt to various environmental conditions, and allow them to become self-sustaining in the natural environment.

The listed species' biological requirements may be described as a characteristics of the habitat, population, or both. Population characteristics may be expressed, for example, as a ratio of recruits to spawners, a survival rate for a given life stage (or set of life stages), a positive population trend, or a threshold population size. Biological requirements may also be described as essential habitat features and can be expressed in terms of physical, chemical, and biological parameters. The manner in which these requirements are described varies according to the nature of the action under consultation and its likely effects on the species or its critical habitat.

Population characteristics for the Snake River steelhead can be found in Attachment C; population characteristics for the Snake River spring/summer chinook salmon can be found in Attachment D. Annual population growth rate (lambda [λ]) incorporates year-to-year variability and summarizes how rapidly a population is growing or shrinking. A lambda (λ) less than($<$) 1.0

means the population is declining; a lambda (λ) greater than (>)1.0 means the population is increasing, a lambda (λ) greater than 1.0, for an undetermined number of years, is necessary for population recovery of listed species. For the Snake River spring/summer chinook salmon ESU as a whole, NOAA Fisheries estimates that the lambda (λ) over the base period ranges from 0.94 to 0.66, decreasing as the effectiveness of hatchery fish spawning in the wild increases compared to the effectiveness of fish of wild origin (Table A-5a through A-5d; Appendix B in McClure et al. 2000). There is no hatchery stocking of Snake River steelhead or chinook salmon in the Middle Fork Salmon River (Dave Burns, PNF Fisheries Biologist; personal communication); however, it is expected that there will be competition with hatchery fish during migrations and their life cycle in the ocean. The interim recovery number for Middle Fork Salmon River, Snake River spring/summer chinook salmon is 9,300 returning adult fish; the interim recovery number for Middle Fork Salmon River, Snake River steelhead is 7,400 (NMFS 2002). The survival and recovery of these species will depend on their ability to persist through periods of low natural survival.

The Golden Hand Mine Project would occur within designated critical habitat for spring/summer chinook salmon. Freshwater critical habitat includes all waterways, substrates, and adjacent riparian areas below longstanding, natural impassable barriers (i.e., natural waterfalls in existence for at least several hundred years) and dams that block access to former habitat. Riparian areas adjacent to a stream provide the following functions: shade, sediment delivery/filtering, nutrient or chemical regulation, streambank stability, and input of large woody debris or organic matter.

Essential habitat features of critical habitat for spring/summer chinook salmon are: (1) substrate, (2) water quality, (3) water quantity, (4) water temperature, (5) water velocity, (6) cover/shelter, (7) food (juvenile only), (8) riparian vegetation, (9) space, and (10) safe passage conditions. For this consultation, the essential habitat features that function to support successful adult and juvenile migration, adult holding, spawning, incubation, rearing, and growth and development to adulthood include: substrate, water quality, water quantity, water temperature, water velocity, cover/shelter, food (juvenile only), riparian vegetation, and space. All of these essential habitat features of critical habitat are included in a NMFS (1996) analysis framework called *Making Endangered Species Act Determinations of Effect for Individual or Grouped Actions at the Watershed Scale* (hereafter referred to as the "Matrix") as discussed in more detail in Section II.B.1 (below). The PNF used the Matrix to evaluate the environmental baseline condition, and effects of the action on essential habitat features for affected Snake River spring/summer chinook salmon, and Snake River steelhead.

2. Status of Species

NOAA Fisheries also considers the current status of the listed species taking into account population size, trends, distribution, and genetic diversity. To assess the current status of the listed species within the action area, NOAA Fisheries starts with the determinations made in its decision to list the species and also considers any new data that is relevant to the determination. This section summarizes the listing status, general life history, and population trends of the species, that may be affected by the proposed actions.

It should be noted that, salmonid populations are also substantially affected by variation in the freshwater and marine environments. Ocean conditions are a key factor in the productivity of Northwest salmonid populations, and they appear to have been in a low phase of the cycle for some time and therefore are probably an important contributor to the decline of many stocks. These species' survival and recovery depends on their ability to persist through periods of low natural survival due to ocean conditions and other conditions outside the action area. Therefore, it is important to maintain or restore essential habitat features in order to sustain the ESU through periods of reduced survival outside the action area. Additional details about these effects can be found in Federal Caucus (2000), NMFS (2000), and Oregon Progress Board (2000).

The Golden Hand Mine Project has been found, by the action agency (PNF), likely to adversely affect Snake River spring/summer chinook salmon, Snake River steelhead, and designated critical habitat identified below in Table 1. Based on the life histories of these ESUs, it is likely that incubating eggs, juveniles, smolts, and adults life stages of these listed species that would be adversely affected by the Golden Hand Mine Project.

Table 1. References for Additional Background on Listing Status, Protective Regulations, and Critical Habitat Elements for the ESA-Listed and Candidate Species Considered in this Consultation.

Species ESU	Status	Critical Habitat	Protective Regulations
Chinook salmon *(Oncorhynchus Tshawytscha)*			
Snake River spring/summer	Threatened; April 22, 1992; 57 FR 14653[2]	October 25, 1999; 64 FR 57399[2]	April 22, 1992; 57 FR 14653[2]
Steelhead (*O. mykiss*)			
Snake River Basin	Threatened; August 18, 1997; 62 FR 43937	February 16, 2000; 65 FR 7764	July 10, 2000; 65 FR 42422

a. Snake River steelhead

The PNF has determined that listed Snake River steelhead occur in the area affected by the proposed action. The Snake River steelhead ESU was listed as threatened on August 18, 1997, (62 FR 43937), and protective regulations for Snake River steelhead were issued under section 4(d) of the ESA on July 10, 2000, (65 FR 42422). In listing the Snake River steelhead as threatened, NOAA Fisheries determined that the ESU is not presently in danger of extinction, but is likely to become endangered in the foreseeable future. This is due largely to the declining abundance of natural runs over the past decades. Some of the significant factors in the declining populations are mortality associated with the many dams along the Columbia and Snake Rivers, losses from harvest, loss of access to more than 50% of their historic range, and degradation of habitat used for spawning and rearing. Possible genetic introgression from hatchery stocks is another threat to Snake River steelhead since wild fish comprise a small proportion of the population. The Middle Fork Salmon River is one of three drainages which sustain steelhead unaltered by hatchery-reared stocks (Thurow 1985). Additional information on the biology, status, and habitat requirements for Snake River steelhead are described in Busby et al. (1996).

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[2] This corrects the original designation of December 28, 1993, (58 FR 68543) by excluding areas above Napias Creek Falls, a naturally impassable barrier.

Two distinct groups of steelhead (A-run and B-run) occur in the Snake River basin, based on the timing of passage over Bonneville Dam (Busby et al. 1996). Steelhead in the project area are believed to be mostly B-run steelhead. B-run steelhead pass Bonneville Dam after August 25; the geographic distribution of B-run steelhead is restricted to particular watersheds within the Snake River basin (areas of the mainstem Clearwater, Selway, and Lochsa Rivers and the South and Middle Forks of the Salmon River). Genetic data are lacking for steelhead populations in South and Middle Forks of the Salmon River (Kiefer et al. 1992).

Stock status for Snake River steelhead is discussed in Attachment C. In short, the abundance of natural-origin Snake River steelhead counted at the uppermost dam on the Snake River has fluctuated from a 4-year average of 58,300 in 1964, to a 4-year average of 8,300 ending in 1998; the most recent 4-year average (1999-2002) showed an increase, with an estimate of approximate 34,300 natural origin steelhead (Fish Passage Center 2003). In general, steelhead abundance declined sharply in the early 1970s, rebuilt modestly from the mid-1970s through the 1980s, and declined again during the 1990s. Estimates of adult steelhead returning to the action area are not available. Redd counts and estimates of parr and smolt densities at index areas (discussed in Attachment C) generally indicate that fish production is well-below the potential, and below historical numbers.

The Snake River steelhead ESU consists of hatchery fish, considered non-essential for recovery, and wild fish, which form the core population for recovery. Range-wide, wild Snake River steelhead are far below historical numbers, and they comprise less than 20% of the adult returns. Much of the historic habitat is inaccessible due to Hell's Canyon and Dworshak Dams. The biological requirements of Snake River steelhead are currently not being met under the environmental baseline, as indicated by mostly downward trends in numbers of wild adults. Any changes in the environmental baseline in an area as large as the Big Creek drainage could have a significant impact on steelhead recovery due to the importance of the drainage for steelhead production, and the heightened risk from a declining population trend across the ESU.

The returning numbers of Snake River steelhead have increased since the mid-1970s, however, this increase is mostly the result of hatchery stocks, while wild stocks are slower to recover. Wild fish populations began declining in the mid-1970s and continued through 1998, and then increased from 1999 through 2002 (Fish Passage Center 2001). Current wild populations even with recent increases are still substantially below historic levels, and parr densities in natural production areas are estimated to be below estimated capacity (Hall-Griswold and Petrosky 1996). The slow recovery rate and low parr densities are particularly severe for B-run steelhead, which are the dominant form in the Middle Fork Salmon River drainage.

NOAA Fisheries estimates that the median population growth rate (lambda [λ]) for the Snake River steelhead ESU as a whole, from 1980-1997, ranges from 0.91, assuming no reproduction by hatchery fish in the wild, to 0.70, assuming that hatchery fish reproduce in the river at the same rate as wild fish (Tables B-2a and B-2b in McClure et al. 2000). The proportion of hatchery fish in the Snake River steelhead population has been increasing with time;

consequently, growth rates for the wild steelhead population are overestimated unless corrected for hatchery influence. The degree of hatchery influence is unknown; however, there are no steelhead hatchery stocking in the Middle Fork Salmon River. NOAA Fisheries estimated the risk of absolute extinction for the A- and B-runs, using the same range of assumptions about the relative effectiveness of hatchery fish. At the low end, assuming that hatchery fish spawning in the wild have not reproduced (i.e., hatchery effectiveness = 0), the risk of absolute extinction within 100 years is 0.01 for A-run steelhead and 0.93 for B-run fish (Table B-5 in McClure et al. 2000). At the high end, assuming that the hatchery fish spawning in the wild have been as productive as wild-origin fish (hatchery effectiveness = 100%), the risk of absolute extinction within 100 years is 1.00 for both runs (Table B-6 in McClure et al. 2000).

The 2000 and 2001 counts of returning Snake River steelhead at Lower Granite Dam indicate a short-term increase in returning adult spawners. Adult returns (hatchery and wild) in 2001 were the highest in 25 years and 2000 counts were the sixth highest on record (Fish Passage Center 2001). Increased levels of adult returns are likely a result of favorable ocean and instream flow conditions for these cohorts. Although steelhead numbers have dramatically increased, wild steelhead comprise only 10% to 20% of the total returns since 1994. These small percentages continue into the 1999-2001. The wild steelhead percentages increased to 26% for 2002 (Fish Passage Center 2003). The large increase in fish numbers, while encouraging, does not reflect a sustained change in steelhead status. Recent increases in the population are not expected to continue, and the long-term trend for this species indicates a decline. Detailed information on the current range-wide status of Snake River steelhead, under the environmental baseline, is described in a steelhead status review (Busby et al. 1996), status review update (BRT 1997), and the Middle Fork Salmon River 2001 BA (USDA 2001).

Survival of downstream migrants in 2001 was the lowest 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 2001). The average downstream travel time for steelhead nearly doubled and was 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.

Streams in the Big Creek watershed provide habitat for adult spawning, juvenile rearing, overwintering, and migration (USDA 2001). Watersheds within the action area are tributaries of the Middle Fork Salmon River. The Middle Fork Salmon River is designated a Priority Watershed on Federal lands (NMFS 1995). Priority watersheds are intended to protect important habitats and population strongholds of anadromous fish, and are managed to maintain or improve fish habitat. The Middle Fork Salmon River is also designated a Special Emphasis subbasin (NMFS 1998) as it has a genetically and ecologically unique population of steelhead. Juvenile steelhead are more abundant in the tributaries than in the Middle Fork Salmon River; tributaries provide the principal rearing habitat for steelhead in the drainage (Thurow 1985). Steelhead numbers in the Middle Fork Salmon River drainage, including the project area, are dramatically reduced from historic levels due to extensive alteration of fish habitat from past mining, roads, diversions, grazing, and downstream migration and rearing impacts common to all Snake River salmon and steelhead.

b. Snake River spring/summer chinook salmon

The PNF has determined that listed Snake River spring/summer chinook salmon occur in the area affected by the proposed action. The present range of spawning and rearing habitat for naturally-spawned ESA listed Snake River spring/summer chinook salmon is primarily limited to the Salmon, Grande Ronde, Imnaha and Tucannon River subbasins. Most adult Snake River spring/summer chinook salmon enter individual subbasins from May through September. Juvenile Snake River spring/summer chinook salmon emerge from spawning gravels from February through June (Perry and Bjornn 1991). Typically, after rearing in their nursery streams for about one year, smolts begin migrating seaward in April and May (Bugert et al. 1990; Cannamela 1992). After reaching the mouth of the Columbia River, spring/summer chinook salmon probably inhabit near-shore areas before beginning their northeast Pacific Ocean migration, which lasts 2 to 3 years. For detailed information on the life history and stock status of Snake River spring/summer chinook salmon, see Matthews and Waples (1991), National Marine Fisheries Services (NMFS 1991a), and 56 FR 29542 (June 27, 1991).

Bevan et al. (1994) estimated the number of wild adult Snake River spring/summer chinook salmon in the late 1800s to be more than 1.5 million fish annually. By the 1950s, the population had declined to an estimated 125,000 adults. Escapement estimates indicate that the population continued to decline through the 1970s. Redd count data also show that the populations continued to decline through about 1980.

Snake River wild spring/summer chinook salmon runs, as counted at the Lower Granite dam, have dwindled from an average of about 60,000 adults in the early to mid-1960s to a few thousand in recent years. Over the last 10 years (1992-2001), 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. The estimated smolt production capacity of 10 million smolts for rivers in Idaho, coupled with historic smolt to adult return rates of two percent to six percent, indicate Idaho could produce wild/natural runs of 200,000 to 600,000 adults (Fish Passage Center 2002). The recent low numbers are reflected throughout the entire distribution of the chinook salmon subpopulations scattered throughout the Grande Ronde, Imnaha, Tucannon, and Salmon River Basins. Redd counts and estimates of parr and smolt densities at index areas (discussed in Attachment D) generally indicate that fish production is well-below the potential, and continuing to decline.

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

The Snake River spring/summer chinook salmon ESU, listed as threatened on April 22, 1992, (67 FR 14653), includes all natural-origin populations in the Tucannon, Grande Ronde, Imnaha, and Salmon Rivers. Some or all of the hatchery-origin fish are also part of the listed ESU including those returning to the Tucannon River, Imnaha, and Grande Ronde hatcheries, and to the Sawtooth, Pahsimeroi, and McCall hatcheries on the Salmon River. Critical habitat was designated for Snake River spring/summer chinook salmon on December 28, 1993, (58 FR 68543) and was revised on October 25, 1999, (64 FR 57399). Habitat improvements would not necessarily correspond to increased salmon productivity because myriad other factors can still depress populations, but diminished quality would probably correspond to reduced productivity (Regetz 2003).

3. Environmental Baseline in the Action Area

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

In general, the environment for listed species in the Columbia River Basin, including those that migrate past or spawn downstream from the action area, has been dramatically affected by the development and operation of the Federal Columbia River Power System. Forestry, farming, grazing, road construction, mining, and urbanization have also radically reduced the quantity and quality of historic habitat conditions in much of the basin. To address problems inhibiting salmonid recovery in Columbia River Basin tributaries, Federal agencies developed the All H Strategy (Federal Caucus 2000). A component of the All H Strategy is a habitat conservation approach that commits Federal agencies to increased coordination, a fast start on habitat protection and restoration, and lays a foundation for long-term habitat strategies geared to the unique conditions of each subbasin and watershed.

NOAA Fisheries considers the environmental baseline conditions particularly with respect to the species' essential habitat features. For proposed actions that affect habitat, NOAA Fisheries often characterizes essential habitat features in terms of a concept called properly functioning condition (PFC) using the Matrix described in NMFS (1996). The PFC is the sustained presence of natural habitat-forming processes in a watershed (*e.g.*, riparian community succession, bedload transport, precipitation runoff pattern, channel migration) that are necessary for the long-term survival of the species through the full range of environmental variation.

The action area includes streams and tributaries where the project may cause changes in sediment or water yield that affect steelhead and chinook salmon habitat in Big Creek; see map (Attachment E). Environmental baseline conditions in the action area were evaluated in the BA at the project site and watershed scales, using the matrix. The matrix provides an assessment tool of the current condition of instream, riparian, and watershed factors that collectively represent habitat components essential for the survival and recovery of the species.

Salmon and steelhead habitat conditions, within the Big Creek watershed, are generally considered to be functioning; however, some areas, including several headwater tributaries and upper Monumental Creek, are rated as "functioning at risk" due to past impacts from mining and other activities. The action area (in Big Creek watershed) includes the Beaver-Gold and Upper Big Creek watersheds.

The Beaver-Gold watershed occurs entirely in the FC-RONR Wilderness and includes Coin Creek, and Upper and Lower Beaver Creek subwatersheds. The Golden Hand Mine is one of a few claims that have had mining activity in this watershed. Habitat conditions for steelhead and chinook salmon in this area are generally considered to be at or near PFC; however, a few habitat indicators were rated 'functioning at risk". Substrate Embeddedness, Pool Frequency and Quality, and Road Density and Location were deemed "functioning at risk" for the three subwatersheds combined.

The Upper Big Creek watershed portion of this project area has habitat elements that are "functioning" or "functioning at risk", these elements have been impacted by mining and other activities. The remainder of the discussion of the Environmental Baseline for the action area will focus on Upper Big Creek watershed. The Upper Big Creek watershed contains approximately 700 acres of private land and includes Smith Creek, Logan Creek, Hogback-McFadden, and Upper Big Creek subwatersheds. The analysis area includes an outfitter lodge, private summer residences, historical and active mining sites, water diversions, hydropower sites, an airstrip, and a PNF guard station. Grazing by livestock occurs on private lands and localized grazing by pack/saddle stock occurs on PNF lands. The area supports recreational use from activities such as fishing, hunting and hiking.

The portion of Upper Big Creek that is above Smith Creek was surveyed in 1993 (Raleigh 1993-94). Most habitat indicators were found to be functioning properly at that time. Sediment, substrate conditions, pool frequencies and quality, and width/depth ratios were considered to be functioning at risk, because of past localized, site-specific areas of impact from past disturbances such as mining, water diversions, grazing, and road building. The surveyed area is outside the FC-RONR Wilderness and contains some private land. Overall, this area was assessed as having good spawning and juvenile rearing habitat. Spawning gravels were clean and abundant, and all reaches contained winter habitat in the form of rubble/cobble substrate. Deep pool winter habitat was in short supply in all surveyed reaches. Raleigh noted fish passage barriers in the top 5 miles (roughly) of Big Creek. Available data indicates there are not other fish passage barriers on the mainstem of Big Creek.

Because the watersheds lie in part within the FC-RONR Wilderness, road densities in the project area watersheds are generally low, but long sections of road are located in RHCAs. The PNF has determined that all of the watersheds in the project area are “functioning at risk” for Road Density and Location. The highest road densities are located in Logan Creek subwatershed 1.32 miles per square mile, which also has the highest densities of roads located in the RHCAs, 3.86 miles per square mile. These are native-surfaced roads, only occasionally maintained, and receive use by miners, hunters, and the general public. Cut and fillslopes are unstable and road surface drainage is not controlled, resulting in altered hydrological patterns that have increased sedimentation (Wagoner 2001). Fine sediment levels within Logan Creek are above desired conditions for fish at 21.8% and considered to be “functioning at risk”. Rhodes et al. (1994) concluded that survival to emergence for chinook salmon in the Snake River Basin is probably substantially reduced when fine sediment concentrations (< 6.4 mm in size) in spawning gravel exceed 20%.

Smith Creek subwatershed (which includes North Fork of Smith Creek) road densities were determined to be 1.19 miles of road per square mile. Two miles of road per square mile is an approximate indicator threshold between properly functioning and “at risk” stream conditions (NMFS 1996). The Smith Creek roads are primarily located within the riparian zones. They are native-surfaced roads and minimally maintained, but receive use by miners, hunters, and the general public. The Smith Creek Road fords Smith Creek and its tributaries several times. Cut and fill slopes are unstable and road surface drainage is not well controlled on the Smith Creek and the North Fork Smith Creek roads, resulting in altered hydrological patterns that have increased sedimentation. Non-system roads (primarily into active or inactive mining areas) also exist in the upper Big Creek area and most are not used or maintained on a regular basis. There may be more sediment delivery to streams from non-system roads than from system roads because there are more miles of non-system roads, non-system roads are not typically designed with resource protection standards, and most non-system roads are not maintained. In 1998, an area disturbed by mining activity in the headwaters of Smith Creek was reclaimed (See McCrae Mine BA, Wagoner 1998b). This reclamation removed a chronic source of sediment and contaminants.

Water diversions for irrigation and domestic use occur in the upper Big Creek area. Previous consultations identified screening of intakes and other measures in order for these facilities to not have adverse effects to listed fish and habitat. These measures have not been fully implemented, leaving a potential for adverse effects. At least one unauthorized (i.e., without a permit) diversion structure piping water to several users is known to exist in Lick Creek. Potential effects include reduced flows from the combined water withdrawals from permitted and unauthorized diversions and the diversion of fish through unscreened intakes.

Scattered mining disturbance in the Upper Big Creek Watershed dates back almost a century and is described in Cater et al. (1973). Numerous placer and lode deposits were prospected and worked in the area, but most are abandoned now with the exception of the Velvet Quartz, Fourth of July, and Camp Bird Mines. An analysis by Nelson et al. (1996) found upper Big Creek to have higher cobble embeddedness in the range of 15% to 25%, with a stable or decreasing trend.

Other impacts to be considered in the baseline of the area include recreational uses. For example, the Big Creek, Smith Creek, and Mosquito Ridge Trailheads are located within the riparian zones of Smith Creek and the North Fork of Smith Creek. Sedimentation, removal of riparian vegetation and animal waste are documented effects relating to the overuse of these areas by extended camping, and pack animals brought in for fall hunting in these areas.

a. Snake River steelhead

Streams in the Big Creek watershed provide habitat for adult spawning, juvenile rearing, overwintering, and migration (USDA 2001). Watersheds within the action area are tributaries of the Middle Fork Salmon River. The Middle Fork Salmon River is designated a Priority Watershed and Special Emphasis Subbasin (NMFS 1995, 1998). Priority Watersheds and Special Emphasis Subbasins are important habitats and population strongholds of anadromous fish, and are managed to maintain or improve fish habitat. The Middle Fork Salmon River has a genetically and ecologically unique sub-population of steelhead (USDA and USDI 1995). Steelhead numbers in the Middle Fork Salmon River drainage, including the project area, are dramatically reduced from historic levels due to extensive alteration of fish habitat from past mining, roads, diversions, grazing, and downstream migration and rearing impacts common to all Snake River salmon and steelhead.

In the action area, steelhead spawn and rear throughout Big Creek. Habitat exists to the headwaters of the subwatershed. Thurow (1985) describes steelhead and their distribution in the Middle Fork Salmon River in detail. Steelhead life history and movements within the Middle Fork Salmon River are complex and variable. Differences occur in time of entry to the upper Salmon River, migration, staging, etc. Tributaries of the Middle Fork provide the principal rearing habitat for Middle Fork steelhead. In 1980 and 1981, most of the available spawning area was found from Rush Creek to Cave Creek, near Bull Creek, near Copper Camp, near Beaver Creek, and from the Big Creek Guard Station to the confluence with Jacobs Ladder Creek (Thurow 1982). All of the perennial streams in the area could be potentially used for juvenile rearing, particularly in lower stream reaches near their confluence with Big Creek.

b. Snake River spring/summer chinook salmon

Current chinook salmon use of Big Creek and its tributaries is depressed, averaging 10% of historic numbers (USDA 2001). This decline has followed the same trend as chinook salmon populations throughout the ESU. Snake River spring/summer chinook salmon spawn throughout the mainstem of Big Creek. Upstream limits of spawning distribution are largely unknown for most Big Creek tributaries, except Monumental Creek. Mallet (1974) reported chinook salmon spawning and rearing in Rush Creek (lower 12 miles), Cabin Creek (lower 2 miles), Crooked Creek, and Beaver Creek. Redd counts in upper Big Creek for 1957-1993 are in Faurot (1994) and show a declining trend. For example, five rear average redd counts for 1957-1960 were 195; 5 year average counts 1992-1996 were 17. Redd counts for three recent years (1997-1999) were 33, 15, and 10 respectively (Idaho Department of Fish and Game 2001). All of the perennial streams in the area could be potentially used for juvenile rearing, particularly in lower stream reaches near their confluence with Big Creek.

B. Analysis of Effects of Proposed Action

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

1. Effects of Proposed Action

The Golden Hand Mine Project BA provides a detailed analysis of the effects of the proposed action on Snake River spring/summer chinook salmon, and Snake River steelhead and designated critical habitat in the action area. The analysis uses NOAA Fisheries’ Matrices and the information in the BA as the primary means to evaluate elements of the proposed action that have the potential to affect the listed fish or essential habitat features of their critical habitat.

a. Overview of Sedimentation Effects on Snake River spring/summer chinook salmon and Snake River steelhead

Potential effects of the Golden Hand Mine Project on listed fish and their habitats are principally related to increased sedimentation from land disturbance and alteration of riparian communities. When sediment delivery exceeds a stream's sediment transport capabilities, the amount of fine sediments increase on and within stream substrates. Salmonid population size is typically negatively correlated with the amount of fine sediment in stream substrate (Chapman and McLeod 1987). Excessive concentrations of fine sediments in spawning and rearing habitats can reduce survival of embryos and alevins by entombing embryos and reducing flow of dissolved oxygen, decrease the availability of interstitial hiding places, alter production of macroinvertebrates, and reduce total pool volume (various studies summarized in Spence et al. 1996). Egg deposition and survival are reduced when sediment fills the interstitial spaces between gravels and prevents the flow of oxygen and the flushing of metabolic wastes. Fine sediment deposited in stream substrates is directly related to chinook salmon egg-to-fry survival. As fine sediment increases above approximately 19%, chinook salmon egg-to-fry survival declines rapidly (Tappel and Bjornn1983; Chapman and McLeod 1987; Burton et al. 1993). Rhodes et al. (1994) concluded that survival to emergence for chinook salmon in the Snake River Basin is probably substantially reduced when fine sediment concentrations (< 6.4 mm in size) in spawning gravel exceed 20%. They recommended suspension of ongoing activities and prohibition of new activities where this standard is exceeded.

Emerging fry can also be trapped and smothered by sediment deposition in the gravels. As sediment becomes deposited in interstitial spaces, rearing habitat for juvenile salmonids is also reduced. Rearing areas are diminished as sediment fills pools and other areas. Sedimentation of deep pools and coarse substrate used for rearing and overwintering limits the space available for fish. Increased sediment load can be detrimental to juvenile salmon not only by causing siltation, but also by introducing suspended particulate matter that interferes with feeding and territorial behavior (Berg and Northcote 1985). Bell (1986) cited a study in which salmonids did not move in streams where the suspended sediment concentration exceeded 4,000 mg/L because of a landslide. Newly emerged fry appear to be more susceptible to even moderate turbidity than older fish. Turbidity in the 25-50 NTU range (equivalent to 125-275 mg/L of bentonite clay) reduced growth and caused more young salmon and steelhead to emigrate from laboratory streams than did clear water (Sigler, et al. 1984). Sedimentation also can adversely affect benthic invertebrates and thereby reduce food supply for juvenile salmon and steelhead. Sediment can interfere with respiration, and food filtering by insects such as some caddisfly larvae that employ fine-meshed catchnets for obtaining drifting food particles. However, the major effect upon benthic invertebrates is the smothering of physical habitat by heavy sediment deposition on the stream-bed, including the loss of interstitial space occupied by burrowing or hyporheic animals (Waters 1995).

Using the water erosion production project (WEPP model) the PNF originally predicted that the road construction, road reconstruction, and road decommissioning activities would increase baseline sediment delivery to Coin Creek/Beaver Creek by approximately 1 ton/year. The PNF subsequently revised the sediment delivery prediction to approximately 0.1 ton/year, adjusting for a modeling error and accounting for graveling of the approaches at the four stream crossings (USDA 2003c). In addition, the PNF will install cross drains (with silt fence below drain outfalls) in or just above the approaches. The PNF did not have a basis for a specific quantification of how much more cross drains/silt fences would reduce the sediment delivery (below the estimated 0.1 ton/year). NOAA Fisheries and PNF found, however, based on inspection of the four crossing sites, that cross drains/silt fences can be effective in keeping most of the sediment generated from actually being delivered to the creeks. In summary, total sediment delivery in the Coin Creek/Beaver Creek watershed due to the proposed action is expected to be substantially less than 0.1 ton/year.

In North Fork Smith and Smith Creeks, new road maintenance activities, including culvert and bridge installation, and a ford improvement are likely to generate a temporary increase in sediment production, followed by a decrease in sediment delivery. The PNF predicts that with the proposed road maintenance and the removal of all but one ford, sediment delivery will decrease from 19 tons/year to approximately 1.5 tons/year. The modeled reduction is based on drainage and erosion control improvements from the road maintenance. Road maintenance activities will continue for the length of the project; and future road maintenance will be addressed in the upcoming forest travel plan (scheduled to be completed in 2006). The sediment reduction in Smith Creek and Big Creek from improved road maintenance on the Smith Creek and North Fork Smith Creek roads is therefore expected to occur for at least the life of the project, and the level of maintenance beyond that will be determined through the 2006 Travel Plan and Section 7 Consultation on that plan. Steelhead or chinook salmon have not been found in the North Fork Smith Creek; however, PNF found steelhead in Smith Creek, and Raleigh (1994) determined that the stream appears to provide good habitat for chinook salmon.

Increased traffic on the Logan Creek road increases the potential for sediment delivery to Logan Creek, which flows into Big Creek. The PNF determined both steelhead and chinook salmon are present in Logan Creek. Added sediment inputs from this road could alter the baseline conditions of Big Creek, an important watershed for Snake River steelhead and spawning habitat for Snake River spring/summer chinook salmon. It is expected, however, that there will be very little additional sediment delivery from use of this road, because the road does not have fords, existing drainage problems, or maintenance deficiencies (Mary Faurot, PNF Fishery Biologist, personal communication November 6, 2003).

The effects of the activities associated with the Golden Hand Mine Project that have the potential to generate sediment are further described below.

(1) Road Maintenance. Road maintenance can have both short-term and long-term effects on Snake River steelhead and spring/summer chinook salmon. 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 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. Maintenance can also correct problems with the road surface and drainage and thereby reduce levels of sediment delivery from an existing road (baseline condition). Beneficial effects of maintenance typically persist for one or more seasons, depending on a variety of factors such as: amount of traffic, precipitation, and physical properties of the road surface. Benefits of proper maintenance include minimization of erosion or sediment delivery from ditches and road surfaces; however, improper maintenance can exacerbate erosion or sediment delivery to streams. Placement of dips (road drains) if installed properly, will reduce ruts and gullies along the roadbed and direct water flow and sediment for roads away from streams. In contrast, removal of the material deposited at the base of the road-cut during maintenance operations interferes with the natural slope-forming process, removes a favorable site for vegetation growth, and initiates slope erosion processes (Megahan and Kidd 1972). Road maintenance also includes removal of roadside vegetation and can impair stream functions by decreasing shade and reducing recruitment of woody debris along streamside roads.

Although the roads (FS 371, FS 373) associated with this road maintenance were mentioned previously in a programmatic consultation (Wagoner 1998), the proposed work was not covered under consultation. Therefore, the proposed road maintenance is not part of the baseline and change is expected to occur. Many of the effects of the road maintenance associated with this project have been reduced by the measures summarized in the proposed project section of this Opinion (Section IA). For instance driveable dips will be installed to divert water and sediments into the roadside vegetation, and clean aggregate will be added to the roadbed to reduce erosion. A four-fold increase in road use in the project area, on roads that are native-surface, poorly maintained, and improperly drained would probably increase surface erosion beyond baseline levels. However, the PNF predicts with the new proposed maintenance and the removal of all but one ford, the baseline sediment load will decrease from 19 tons/year to approximately 1.5 tons/year. Thus, after the proposed road maintenance, including culvert placement, bridge construction, and ford improvement, the Big Creek watershed should show a net decrease in sediment delivery compared to baseline condition.

(2) Temporary Road Construction and Road Reconstruction; and Road Decommissioning/Trail Conversion. Approximately 0.1 miles of road will be constructed and 3.3 miles reconstructed in the Coin Creek/Beaver Creek watershed. The FS trail 013 has not had vehicle traffic for many years; approximately 3.3 miles of this trail (on abandoned road bed) will be opened up as a temporary road in this project. Approximately 0.2 miles of this reconstructed road lies within RHCAs and will include four fords of unnamed tributaries to Coin Creek. There are two road segments that each ford the unnamed perennial stream and the unnamed intermittent stream.

About 50% to 90% of excess sediment from forest activities originates on road systems (Elliot et al. 1994). The largest soil loss occurs in the first two or three years after construction or reconstruction. Soil loss usually decreases substantially after those initial few years, as the cut and fill slopes stabilize and become revegetated (Burroughs and King 1989, Ketcheson and Megahan 1990). Rates of sediment delivery from unpaved roads are highest in the first years after building (Megahan and Kidd 1972) and are closely correlated to traffic volume (Reid and Dunne 1984). The greatest percentage of erosion occurs in the first and second years after construction; the first year erosion rate is approximately 1,000 times greater than on undisturbed lands (Seyedbagheri 1996). Surface erosion from forest roads affects the fine sediment budget and may impose a chronic condition of sediment inputs to streams, directly affecting the stream substrate and the health of aquatic life (Luce et al. 2001). Observations also suggest that most of the high initial surface erosion following road construction is the result of erosion on exposed road fills (Megahan and Kidd 1972).

The 0.1 miles of proposed new road in the Coin Creek watershed will be outside of RHCAs and landslide-prone areas. The proposed roads would be constructed on slopes that exceed 35%, so cut and fill designs, and other road design components, several of which have not been specified in the BA, will influence how well surface erosion and risk of mass wasting are minimized. The downslope contour of the new road area is facing north, and located 600-800 feet from any streams. The location of the roads and sediment control measures in place minimizes the potential for sediment delivery to streams from this activity.

The BA (Page 37) indicates that sediment produced by temporary road construction, road reconstruction, road decommissioning, and trail reconstruction will degrade fish habitat for several years following the activities. The PNF, however, explained to NOAA Fisheries in several meetings and site visits that there are actually very few locations (essentially only the four stream crossings of the unnamed tributaries of Coin Creek) where sediment from the road construction/reconstruction/trail conversion is likely to enter streams. At these locations PNF further described the specific measures that will be applied (graveled approaches, cross drains and silt fences). NOAA Fisheries found, based on observation of those sites and the feasibility of those measures, that these measures can be highly effective if properly implemented, in keeping sediment delivery to a very small amount, i.e., substantially less than 0.1 tons/year.

The PNF proposed that, at the end of the Golden Hand Mine Project, the road that was re-constructed on the abandoned road bed (currently used as a trail), and the newly constructed roads within the FC-RONR Wilderness, will be closed. The newly constructed road will be decommissioned (recontoured), and the road on the abandoned road bed will be converted back to a trail. However, if the proponent decides to continue mining activities the road closures and decommissioning activities could be put on hold for an unknown number of years. In that case, the continued use of the road would be analyzed by the PNF as part of a new action (continued mining) that is subject to Section 7 consultation.

When the road decommissioning is finally implemented, the ground-disturbance activities associated with these activities and trail conversions are expected to create an additional short-term temporary increase in sediment delivery to streams at the stream crossings. Road decommissioning includes partial or complete removal of the road prism which will have a short-term effect on sediment delivery. Because the PNF proposes implementing soil stabilizing measures (Section IA), there should be, within two to three years after road decommissioning and trail conversion, a long-term reduction in erosion of the road surface. Trail conversions vary in their effectiveness, depending on the levels of use and maintenance. Roads converted to trails could still deliver sediment above natural levels; however, the sediment delivery from the trail may be reduced (in comparison to delivery from the former road), depending on the type of trail, its use, and erosion control measures.

(3) Bridge Construction and Road Relief Culvert Installations. Bridge construction has both short-term impacts and long-term positive effects. Planned activities such as excavation, abutment placement, and road realignment 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. The proposed action involves construction of one bridge to replace one ford on North Fork Smith Creek. The bridge will be constructed during a period of low flow; the water from the channel will be diverted so that the bridge abutments will be constructed in the dry. Bridge construction also includes removal of roadside vegetation. Loss of vegetation can impair stream functions by decreasing shade and reducing recruitment of woody debris along streamside roads. The PNF predicts that the proposed action will likely degrade the RHCA, but that this effect will be small and localized. Effects of this bridge construction have been reduced by the measures found in the proposed project section of this Opinion (Section IA).

Benefits of bridges, such as better passage of fish, debris, and high flows, and better maintenance of streambed structure, typically persist for many seasons, depending on a variety of factors including traffic volume, and maintenance activities. Reduced sediment delivery measures include minimization of erosion or sediment delivery from road surfaces. However, improper maintenance can exacerbate erosion or sediment delivery to streams. Future maintenance for this bridge will be determined in the 2006 travel plan. Stream channels of the North Fork Smith Creek are expected to function more naturally as a result of replacing an existing ford with the bridge. Some channel re-alignment may be needed to adjust the slopes to the new channels; the PNF plans to allow natural re-alignment to occur. Over time, bank stabilization will decrease sediment inputs and allow for additional riparian vegetation establishment to re-establish more natural channel and bank morphology.

The installation of the road-relief culvert installation in non-fish bearing waters are expected to have long-term beneficial effects on streams in the action area. Hydrologic function will be increased by re-establishing more natural patterns of bedload movement. This will accommodate the natural migration patterns of macro-invertebrates. These installations will however, require excavation of road fills and stream channel materials, and placement of structures and are likely to temporarily increase stream turbidity and rearrange substrate materials. The temporary increase in stream turbidity could temporarily diminish feeding of juvenile salmon and steelhead downstream. There will be a total of six road-relief culverts installed on the North Fork Smith Creek road system. Effects of culvert installations have been minimized by the measures found in the proposed project section of this Opinion (Section IA).

(4) Geo-grid Ford Installation. A geo-grid is a plastic honeycombed structure that is filled with gravel. A geo-grid will be installed in a ford of the North Fork Smith Creek on FS road 371. The geo-grid will keep the gravel in place while the entire structure prevents the ford from widening the stream during vehicle use. The stream gradient and the entry and exit road grades to the stream at the site are approximately four percent. The PNF determined a bridge is not economically feasible at this site. The geo-grid ford would allow passage of stream bedload and debris during high flows, and will not restrict fish passage. The roughness of the ford would approximate that of the existing stream bottom and PNF determined it would not tend to accelerate stream velocities that could cause down-cutting and bank stability problems.

Installation of the geo-grid would involve dewatering of the site (pipe or temporary channel routing water around the site), excavation of the ford, placement of the grid, and then the filling of the geo-grid with gravel. There will be a pulse in sediment delivery during installation, and after that the PNF anticipates less sediment delivery from the site than before the grid was installed. Although the improved ford should generate less sediment than before the improvements, there will be more traffic across this ford (up to four times over baseline use). With increased traffic, but decreased sediment delivery from each vehicle, it is not clear if the overall sediment delivery from this ford will increase, decrease, or remain constant. The proposed armoring of the approaches to the geogrid crossing in particular is expected to minimize sediment delivery. While most of the effects of the geogrid placement associated with this project have been reduced by the measures found in the proposed project section of this Opinion (Section IA), some of the effects, associated with continued use of this ford and aspects of the installation of the geogrid have not been fully addressed. Some sediment and possibly toxic compounds (fuel and oil from vehicles) will continue to be delivered directly to the North Fork of Smith Creek as long as this ford is in use.

Some of the potential adverse effects of ford use (e.g., collapsed streambanks, widened channel, and sediment delivery) will be diminished with the geogrid in place; however vehicle use of the fords can still displace fish, crush invertebrates prey species, and expose fish to fuels and other contaminants. Those effects will tend to be small and localized, except in the unlikely instance of a fuel spill. The geogrid also prevents spawning in the ford (albeit while eliminating a few square feed of spawning substrate) and thus prevents direct adverse effects from vehicles driving over redds. Survey data are currently insufficient to establish the presence/absence of steelhead or chinook salmon in North Fork Smith Creek.

(5) Mining Operations. The PNF expects limited potential for sediment delivery from mine-related ground disturbance. The ground disturbance (other than access roads) will be limited to the claim sites which total approximately 40 acres. The mining claim is located adjacent to two unnamed tributaries of Coin Creek. The reconstructed access road, and thus the mining equipment, will ford both of these streams twice.

Mining operations will include drilling of a maximum of 31 drill sites (with up to 48 holes). Holes will be drilled up to 500 feet deep. Cuttings from the drilling process will be used to refill the hole and/or spread out on the roadbed. Most of the drilling would occur on roadbeds outside of RHCAs (150 feet for perennial streams and 100 feet for intermittent streams) of non-fish bearing streams and would follow a sequence that would begin in the immediate area of the inferred ore deposit. A maximum of 15 drill sites would be located within RHCAs but at least 50 feet away from streams, within the project area. These sites would be drilled with a portable drill placed on wooden platforms. The extent of activities and the drill site locations may involve some tree felling and vegetation clearing; however, this is limited to trees less than 7 inches in diameter, and is expected to involve few trees as needed to install the approximately 8 foot by 8 foot platforms. Because the exact location of the platform/drill sites in the RHCAs have not been determined, specific potential sediment delivery effects at the sites are unknown; however, given the type of activities and anticipated effectiveness of erosion control, it is anticipated that these effects will be small, short-term, and localized.

The underground mining would consist of cleaning out two existing adits, drilling, and possibly ore extraction. Waste rock would be placed outside the RHCA buffers on existing waste dumps. The nature and location of erosion control measures, and the adit locations (600-800 feet upslope from the nearest stream), indicates sediment delivery to streams is unlikely. Erosion control measures are described in the BA and summarized in the proposed project section of this Opinion (Section IA). Some of the measures likely needed to minimize sediment delivery from the mining activities, such as excavation and placement of containment basins for drill sites within the RHCA, and the amount of use of the four fords, were not fully addressed in the BA.

(6) Summary of Sediment Production/Reduction. Sediment delivery in North Fork Smith Creek, Smith Creek, Logan Creek, and Big Creek involves short-term pulses from road repairs and installations (geogrid, culverts, and bridge), followed by a net reduction for a long-term period due to improved road drainage and erosion control and more frequent road maintenance. Salmon and steelhead occupy Smith, Logan, and Big Creek and may be temporarily displaced by installation activities and habitat quality temporarily reduced by sediment pulses. Substrate conditions would, however, improve over the longer term as baseline sediment production is reduced by approximately 17.5 tons per year. How long this reduced sediment delivery rate will last depends on the development of the road maintenance program beyond the life of this project. This issue will be addressed in the proposed 2006 consultation on the road maintenance program in this watershed.

New road construction, road reconstruction, road decommissioning, and mining activities have the potential to produce sediment in the Coin Creek/Beaver Creek watershed which flows into Big Creek. However, as previously mentioned, the road from Pueblo Summit down into the mine site would be reconstructed on an existing road template, vehicle width is limited, and thus only spot treatment roadbed excavation will be necessary. Further, this road does not have sediment/water linkages to streams except at the four fords within the mine claim area. At these four fords, graveling of the uphill approaches, cross-drains placed in or near the edge of the approaches, and silt barriers will ensure sediment input is very small. These fords are also approximately 5 miles upstream from known occupied habitat (Lower Coin Creek supports Snake River steelhead, and Beaver Creek supports spawning and rearing Snake River spring/summer chinook salmon and steelhead). Overall the PNF predicts that the road construction and decommissioning activities associated with this project will deliver less than 0.1 ton of sediment per year to streams; and the small effect of these activities at the fords would be greatly attenuated downstream where listed fish occur.

Further, mining of existing adits would occur 600-800 feet upslope from streams and incorporate erosion control measures; therefore, sediment delivery to streams from that activity is unlikely. Drilling at 15 sites within RHCAs but at least 50 feet from streams involves small ground disturbance that is expected to be effectively excluded from streams by erosion control measures.

b. Overview of Toxic Effects on Snake River spring/summer chinook salmon and Snake River steelhead

(1) Mining Operations. Metals are the primary mining contaminants that potentially affect water and ESA listed fish. Ore at the mine site occurs along joints and shear planes in granite and schistose rocks of the Yellowjacket formation (Shenon and Ross 1936). Sulfides including disseminated pyrite and chalcopyrite are associated with the ore and can be found in the historic mine waste dumps. Based on field observations by project hydrologists and geologists (Project Record), sulfides exposed at the surface show considerable oxidation. Sulfides have the potential to generate acid and liberate metals to the environment when exposed. The risk of acid rock drainage and release of metals is primarily a function of the sulfide content of the disturbed rock. The actual sulfide content of the vein and wall rock in the proposed mining area is unknown. Because the sulfide content is unknown, the potential effects of acid and metal contamination on water and listed salmonids are also unknown. The action, therefore, is designed to ensure water from the mine adits and drill sites does not reach streams. Both the adits and waste rock dumps are located outside of any RHCA, and have no surface contamination pathway to streams. Ground water contamination near the waste rock dump site also appears unlikely, as water quality sampling instream below this existing waste rock site has not showed evidence of water contamination from the waste rock dump. There is the potential for drilling on the mining claim to intercept subsurface water; however, PNF asserted that oxidation and exposure of sulfides will not occur in that situation because of minimal exposure to air.

Past mining has impacted the environmental baseline condition of the action area as noted above (Section II.A.3 of this Opinion). Heavy metals, inorganic and organic chemicals, water temperature, turbidity, dissolved gases (nitrogen and oxygen), nutrients, human waste, and pH all influence water quality and the ability of surface waters to sustain fish populations. If the magnitude or concentration of any of these factors exceed the natural range for a specific location and time of year, biological processes can be altered or impaired (Spence et al. 1996).

Other chemicals of concern are the additives used for drilling fluids. Drilling fluids, which lubricate drills, seal the walls of the drill hole, and flush the cutting from the hole, are colloidal suspensions of clay in water to which a variety of chemicals are added. Many of these chemicals are toxic to fish (Nelson et al. 1991). Drilling additives can contain metals or other ingredients that are harmful to water quality and aquatic species; the effects of fish and aquatic biota from drilling additives are not well documented. The AIMM has not specified what drilling fluid additives (if any) will be used for the drilling operation. Prior to project implementation, a list of all proposed additives, including their Material Safety Data Sheets (MSDS) and any environmental testing data available will be submitted for PNF approval. When a less toxic substitute exists for a proposed additive, the PNF may require its use. Emergency containment for drilling fluids will be provided by excavating a settling basin below the drill pads, and will form a water retention basin having a volume capable of containing 120% of the maximum volume of fluid expected to be used. In addition, the operator will provide a pump and line (deployed in advance) capable of moving excess drilling fluid to a PNF-approved discharge location outside the 150’ RHCA of the non-fish bearing streams. The discharge location will be lined with an impermeable liner capable of holding 120% of the maximum volume of fluid expected to be used. After each drill site, the drilling fluid will be pumped into approved tanks, transported off the claim site, and disposed of in a PNF approved location. Fuel-related and drilling measures reduce the likelihood of uncontained spills. The possibility of drill fluids leaking into artesian water, and location and lining materials of the retention basins, have not, however, been fully addressed in the proposed action.

The access roads are located adjacent to Big Creek and its tributaries, and the possibility of a toxic fuel spill exists (Faurot 1994). Heavy equipment and vehicles can have leaks that allow contamination (fuel, oil, hydraulic fluid, antifreeze, etc.) of the soil and/or water; and vehicles passing through fords of streams can cause direct contamination. Fuels and petroleum products are moderately to highly toxic to salmonids, depending on concentrations and exposure time (Gutsell 1921). Some of the potential contamination by toxic materials by the mining operations have been minimized by the measures found in the proposed project section of this Opinion (Section IA); however, other action components, such as the location of vehicle and equipment maintenance areas, have not been specified to minimize effects on streams and listed fish.

c. Overview of Stream Flow and In-stream Disturbance Effects on Snake River spring/summer chinook salmon and Snake River steelhead

(1) Water Withdrawal. Stream flows are a fundamental essential habitat feature that supports other essential features such as cover/shelter, space, water temperature, and food supply for listed fish. Changes in flow can reduce fish habitat quality by increasing stream temperatures, resulting in reduction of productivity. Changes in flow can also limit access to habitat (i.e., pools). The stream flows for the project area are generally high in spring during snowmelt and during winter rain-on-snow floods, and generally low in late summer and during winter stream freeze-ups. Environmental factors (climate, snowfall, drought, etc.) affect annual stream flows. Minimum flow in summer can limit the carrying capacity of aquatic ecosystems and is a critical part of fisheries habitat and fish viability (Murphy 1995). The accumulating effects from multiple water quality impairments, such as flow reduction during periods of elevated sediment load, may be especially deleterious for salmon during early development stages (Reiser and White 1990). Flow rate and water depth are strongly linked to fecundity, growth and survival rates (Bjornn and Reiser 1991).

Where water is withdrawn from smaller rivers and streams, seasonal or daily flow fluctuations can adversely affect fish, macro-invertebrates, aquatic macrophytes, and periphyton (attached algae) (Pluhowski 1970). Fluctuating water levels can delay spawning migrations, impact breeding fish condition, reduce salmon spawning area (Beiningen 1976), dewater redds and expose developing embryos, strand fry, and delay downstream migration of smolts. The literature suggests that low flows from, for instance, irrigation diversions, are likely to inhibit or delay salmonid smolt migration. This delay could limit fish survival and reduce potential numbers of returning adults (Northwest Power Planning Council 1986). Where low flows are made extreme, the reduced living space, reduced cover availability, and elevated temperature can significantly reduce fish populations (Orth and White 1993).

The Golden Hand Mine Project proposed diversion is a 0.04 cfs withdrawal for mining operations from the unnamed tributaries to Coin Creek. Flow data are not available for these tributaries. The PNF plans to take flow measurements of Coin Creek upstream of known occupied fish habitat. These measurements will be used to ensure the water withdrawal in the headwater tributaries does not reduce stream flows in Coin Creek by more than 10%. The up to 10% reduction of natural stream flows in Coin Creek is not expected to appreciably diminish the function of this creek as habitat for listed salmon and steelhead. A maximum reduction of 10% would occur if the natural flow of Coin Creek were 0.4 cfs at the time water is withdrawn from the headwater tributaries. A flow of 0.4 cfs in Coin Creek would not support spawning fish and probably not rearing fish. At the higher flows that do tend to support spawning and rearing, the 0.04 cfs removed from the headwater tributaries would be a very small fraction of the available flow supporting salmon and steelhead in the downstream sections of Coin Creek and Beaver Creek.

NOAA Fisheries also considered that the 0.04cfs water withdrawal could dewater these small tributaries and thus disrupt the transport of nutrients and invertebrates to downstream areas in Coin Creek and Beaver Creek that are occupied by listed fish. The PNF addressed this concern with the clarifications that: (1) dewatering is limited to a 12-hour period to construct the diversions(s), and (2) observable, continuous flows must remain in the stream below the point(s) of water withdrawal. These measures are expected to maintain connectivity and nutrient/invertebrate transport downstream to habitat occupied by salmon and steelhead.

Roads also can affect instream flow via hillslope drainage, including changes in infiltration rates, interceptions and diversion of subsurface flow, change in the watershed area of small streams, and changes in the time distribution of water yield to channels (Furniss et al. 1991). The potential effects of the 500 feet of new road on stream flows in the action area have not been estimated. Road outsloping and drainage Best Management Practices will tend to reduce/avoid effects on flows in the Coin Creek tributary streams, which are 600-800 feet downslop from the proposed road locations.

(2) Instream Activities Associated with Culvert, Geogrid (ford) and Bridge Installation. Culvert installations, ford excavation and the geogrid installation, and the bridge installation will all involve instream work and the associated disturbances at those sites. The risk of sediment production has been discussed above; however, there are also direct risks to fish associated with instream activities. There is the possibility that instream work activities could kill juvenile chinook salmon or steelhead. Direct mortality is unlikely however, because during the work window, juvenile fish would be in at least the post-emergent life stage and juvenile fish are capable of avoiding construction equipment by moving away from the project work sites. Also, the temporary diversions allow fish to use the stream without coming into contact with equipment. Some mortality could occur from fish becoming stranded in temporarily dewatered channels. Some of the effects of instream work have been reduced by the measures found in the proposed project section of this Opinion (Section IA). Prior to instream work the PNF will survey for chinook salmon and steelhead and their redds. Work will be timed to avoid disruption of steelhead and chinook salmon redds, migration, holding, or spawning of adult salmon or steelhead.

d. Interrelated and Interdependent Actions

Effects of the action under consultation are analyzed together with the effects of other activities that are interrelated to, or interdependent with, that action. An interrelated activity is an activity that is part of the proposed action and depends on the proposed action for its justification. Interdependent are activities that have no independent utility apart from the action under consultation (50 CFR §402.02).

- Access and exploratory work on Golden Hand Mining Claims 1 and 2 may occur in the future. Claims 1 and 2 are currently active claims with no valid existing rights; these claims are adjacent to Claims 3 and 4 of this consultation. Mining activity at these claims is on hold while the question of valid rights is being resolved; therefore, this is not a federal action at this time but is likely to occur in the foreseeable future and would be subject to section 7 consultation. Improving the access to Claims 3 and 4 will improve the access to Claims 1 and 2 to a certain extent. However, the effects of access directly to the site of the Claims 1 and 2 mining operations, and those mining operations, are not considered in the Opinion.

- Ore extracted from this Golden Hand Mine drilling project will be trucked to and processed at the Walker Millsite on North Logan Creek. Ongoing actions at the Walker Millsite, which include a ball mill and gravity milling process; tailings pond, access road; a water transmission line and water diversion; an explosives storage shed; and temporary operation (until December 31, 2003) of a carbon-in-pulp cyanide vat leach plant, could add to the combined effects of Logan Creek and the Golden Hand Mine Project analysis area through possible degradation of water quality from sediment, contaminants and water withdrawal from Logan Creek. NOAA Fisheries determined the current Walker Millsite activity (moving the cyanide vat leach plant) is not likely to adversely affect Snake River steelhead and Snake River spring/summer chinook salmon. The small amount of ore added to millsite operations from the Golden Hand Mine Project is not expected to cause adverse effect on listed species or critical habitat.

- The PNF roads that access Pueblo Summit and the FC-RONR Wilderness are poorly maintained. Even so, this area receives annual recreational users. With the road maintenance associated with this project these roads are going to be more accessible, and therefore it is anticipated that the recreational uses will increase. This increased recreational use would probably cause both short-term and long-term effects related to the sediment delivery from increased road and ford usage. These effects could become greater over time if recreational use does increase as predicted and road maintenance becomes infrequent after the proposed action is completed.

e. Effects on Snake River Spring/Summer Chinook Salmon and Snake River Steelhead

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

While essential habitat features were discussed within the action area, the existing population growth rates have been calculated at the much larger ESU scale. An action that improves habitat in a watershed, and thus helps meet essential habitat feature requirements, may therefore increase lambda (λ) for Snake River steelhead and Snake River spring/summer chinook salmon.

As noted above, there will be some short-term adverse effects on chinook salmon and steelhead habitat and potentially direct effects on the fish (e.g., temporary water diversions at the geo-grid site that may strand juvenile fish) from the Golden Hand Mine Project. These adverse effects on individual fish can reduce population recruitment rates of Snake River spring/summer chinook salmon, and Snake River steelhead by a small increment. There are also some long-term beneficial effects (reduction of sediment delivery by 17.5 tons) that could potentially increase population recruitment rates. Most of the adverse effects of the project have been minimized through the extensive measures, and the potential for adverse effects on these populations is minimal. The genetically unique steelhead population in the Middle Fork Salmon River subbasin, and the Spring/Summer chinook salmon population, currently are well below their historic abundances and well below interim targets for recovery, as noted above. Therefore, it is important that reductions in these populations are avoided to ensure the likelihood of their survival over the long-term.

2. Cumulative Effects

Cumulative effects are defined in 50 CFR §402.02 as "those effects of future State or private activities, not involving Federal activities, that are reasonably certain to occur within the action area of the Federal action subject to consultation." Other activities within the watershed have the potential to adversely affect the listed species and critical habitat within the action area. Future Federal actions, including the ongoing operation of hydropower systems, hatcheries, fisheries, and land management activities have been or are being reviewed through separate section 7 consultation processes. Past Federal actions have already been added to the environmental baseline in the action area.

NOAA Fisheries is not aware of any new non-Federal activities that are reasonably certain to occur in the action area. There are, however, ongoing activities that are expected to continue to occur at current levels, or in some cases, increased levels. Ongoing actions on State and private land include: (1) mining on patented land, (2) subdivision and residential development of private land (which might include at least 2 in-holdings in the FC-RONR Wilderness), (3) water diversions/withdrawals, (4) tourist/guest ranch businesses, (5) recreational use, and (6) road construction, maintenance and use. Increased recreational activity is expected in keeping with recent trends.

These ongoing, or sporadic activities, may result in hindrance of recovery of Matrix indicators that are functioning at risk, as noted in the Environmental Baseline section of this Opinion (above). Future actions on non-Federal land could result in local, site-specific impacts to some habitat indicators of Big Creek. Because there are no known plans for habitat recovery projects in the area at this time, it is anticipated that the non-Federal activities will maintain or perhaps further degrade the existing environmental baseline conditions in stream reaches adjacent to and downstream from those activities.

3. Consistency with Listed Species ESA Recovery Strategies

Recovery is defined by NOAA Fisheries regulations (50 CFR §402) as an "improvement in the status of listed species to the point at which listing is no longer appropriate under the criteria set out in §4 (a)(1) of the Act."

Until the species-specific recovery plans are developed, the December 2000 Memorandum of Understanding Among Federal Agencies Concerning the Conservation of Threatened and Endangered Fish Species in the Columbia River Basin (Basinwide Salmon Recovery Strategy) provides the best guidance for judging the significance of an individual action relative to the species-level biological requirements. In the absence of completed recovery plans, NOAA Fisheries ascribes the appropriate significance to actions to the extent available information allows.

The PNF has specific commitments to uphold under the Basinwide Salmon Recovery Strategy. Some of those broad commitments are listed below.

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

b. Cooperate with similar basin planning processes sponsored by the Northwest Power Planning Council, BPA and other federal agencies, states and tribes to identify habitat restoration opportunities and priorities.

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

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

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

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

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

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

When completed, the proposed road maintenance measures will result in a net reduction in sediment delivery to the Big Creek watershed for the duration of the project. Road construction and road use are likely to slightly increase substrate sedimentation in the headwaters of the Coin Creek/Beaver Creek watershed: however, these localized sediment inputs are expected to be attenuated downstream in habitat occupied by listed salmon and steelhead. Longer term maintenance of these roads will be addressed in the upcoming travel plan consultation scheduled for 2006. In summary, NOAA Fisheries finds that the proposed Golden Hand Mine Project is consistent with the Basinwide Salmon Recovery Strategy.

C. Conclusions

After reviewing the current status of the Snake River spring/summer chinook salmon, and Snake River steelhead, the environmental baseline for the action area, the effects of the proposed actions, and cumulative effects in the action area, it is NOAA Fisheries' biological opinion that the Golden Hand Mine Project is not likely to jeopardize the continued existence of Snake River spring/summer chinook salmon and Snake River steelhead, nor destroy or adversely modify designated critical habitat for spring/summer chinook salmon. In reaching these determinations, NOAA Fisheries used the best scientific and commercial data available.

NOAA Fisheries' determinations are based primarily on the: (1) net reduction in sediment delivery in Smith Creek/Big Creek of 17.5 tons/year, and mitigation measures in place that are expected to minimize the effect of road maintenance and installations in that watershed; (2) the extensive mitigation measures in place that are expected to minimize to a very small amount the sedimentation effects of the action on the Coin Creek and Beaver Creek watersheds, as summarized above; and (3) the measures in place to ensure Coin Creeks' flows are not appreciably reduced and connectivity with the headwater streams is maintained.

D. Reinitiation of Consultation

As provided in 50 CFR §402.16, reinitiation of formal consultation is required where discretionary Federal agency 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 Incidental Take Statement is exceeded, or is expected to be exceeded; (2) new information reveals effects of the action may affect listed species in a way not previously considered; (3) the action is modified in a way that causes an effect on listed species that was not previously considered (e.g., water quality monitoring reveals metal contamination in a stream on the action area that may be related to the action; or when the geogrid in the ford of NF Smith Creek needs to be removed and/or replaced; or if the PNF fails to submit the project reclamation plan to NOAA Fisheries for approval, or if the PNF determines that the proposed project is not consistent with the 2003 LRMP or NOAA's associated Opinion); or (4) a new species is listed or critical habitat is designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending conclusion of the reinitiated consultation.

G. Conservation Recommendations

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

1. At least seven water diversions for irrigation and domestic use are located in the upper Big Creek area. Previous BAs identified screening of intakes and other measures to avoid adverse effects on listed fish and their habitat. These measures have not been fully implemented, leaving a potential for adverse effects. At least one unauthorized diversion structure piping water to several users is known to exist in Lick Creek, near the proposed Vita diversion (pers. comm., J. Kemp, McCall District Special Uses assistant,). Potential effects relate to reduced flows from the combined water withdrawals from permitted and unauthorized diversions and diversion of fish through unscreened intakes. NOAA Fisheries recommends that the PNF implement the measures that have already been identified to minimize the effects of existing water diversions. It is also recommended that diversions that are unauthorized be addressed to meet existing legal requirements.

2. A native-surface non-system road accesses private property and the Lick Creek/Cougar Basin trailhead from Road 340 in upper Big Creek, and fords Big Creek. Listed fish occur in the vicinity of the ford, and use of the ford causes adverse effects on spawning and rearing chinook salmon and critical habitat by disturbing and displacing spawning

fish, altering hydrological patterns, widening the stream channel, destroying the streambank, and adding sediment to spawning gravels (M. Faurot, Payette National Forest, personal observation, field visit on July 30, 1993 and L. Wagoner, Payette National Forest, personal observation August 10, 1998). Eliminating/terminating fording at this site is identified as a needed mitigation item in previous chinook salmon and steelhead BAs (Faurot 1994, and Wagoner 1998a). To date no action has occurred on the ground to eliminate this source of adverse effects, nor has a definite plan emerged that is fiscally viable and addresses the resource concerns. Until fording at is eliminated at this site, adverse effects on salmon and steelhead can occur. NOAA Fisheries recommends that the PNF plan and implement changes to the fording of Big Creek.

3. The Big Creek, Smith Creek, and Mosquito Ridge Trailheads are located within the RHCAs of Smith Creek and the North Fork of Smith Creek. Sedimentation, removal of riparian vegetation and animal waste are documented effects relating to the overuse of these areas by extended camping, horses, and pack animals brought in for fall hunting in these areas. The PNF should initiate efforts either to reduce the number of pack animals allowed in a given area and/or restrict the use of RHCAs.

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

H. Incidental Take Statement

The ESA at section 9 (16 USC 1538) prohibits take of endangered species. The prohibition of take is extended to threatened anadromous salmonids by section 4(d) rule (50 CFR 223.203). Take is defined by the statute as Ito harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct.@ (16 USC 1532[19]). Harm is defined by regulation as Aan act which actually kills or injures fish or wildlife. Such an act may include significant habitat modification or degradation which actually kills or injures fish or wildlife by significantly impairing essential behavior patterns, including, breeding, spawning, rearing, migrating, feeding or sheltering.@ (50 CFR 222.102) Harass is defined as Aan intentional or negligent act or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding, or sheltering.@ (50 CFR 17.3) Incidental take is defined as Atakings 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) The ESA at section 7(o)(2) removes the prohibition from any incidental taking that is in compliance with the terms and conditions specified in a section 7(b)(4) incidental take statement (16 USC 1536).

1. Amount or Extent of Take

The proposed action is reasonably certain to result in incidental take of the listed species. NOAA Fisheries is reasonably certain the incidental take described here will occur because: (1) recent, and historical surveys indicate the listed species are known to occur in the action area; (2) the proposed action would adversely affect essential habitat features, primarily through at least temporary increase in sediment delivery which could result in the harm or death of spring/summer chinook salmon or steelhead eggs or fry; and (3) the proposed action includes instream work activities that could harm or kill juvenile chinook salmon or steelhead through stranding of fish when dewatering, crushing fish with construction equipment, or injuring fish when moving them out of a construction area.

Despite the use of best scientific and commercial data available, NOAA Fisheries cannot quantify a specific amount of incidental take of individual fish or incubating eggs for this action. The number of juvenile fish killed or injured during instream work is expected to be low because juvenile and adult lifestages of salmon and steelhead are typically able to move away from disturbances such as those proposed.

The extent of take is anticipated to be restricted to the North Fork Smith Creek for any and all instream work and short-term increase in sediment delivery due to the road maintenance activities, and Coin Creek and Beaver Creek for short-term increase in sediment delivery due to road construction, reconstruction, and use. All take will be limited to the three years of project operation. The authorized take includes only take caused by the instream work and increased sediment associated with the proposed action as described in the BA and this Opinion.

2. Reasonable and Prudent Measures

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

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

The PNF shall:

a. Implement additional avoidance/minimization measures to minimize adverse effects in the riparian area and stream channel.

b. Implement additional avoidance/minimization measures to minimize adverse effects of mining activities on listed fish and their habitat;

c. Exclude fish from instream work areas and ensure that instream work avoids spawning areas and spawning periods;

d. Monitor the implementation of the RPMs, and the Terms and Conditions, and report any take that occurs from the Golden Hand Mine Project. Monitor fisheries and work activities associated with the project. Prepare an annual monitoring report, and use the report as an adaptive management strategy to adjust activities based on monitoring results and new information regarding the effects of the Golden Hand Mine Project on chinook salmon and steelhead. NOAA Fisheries shall work with the PNF to determine any corrective actions.

3. Terms and Conditions

To be exempt from the prohibitions of section 9 of the ESA, the PNF must comply with the following terms and conditions, which implement the RPM described above for each category of activity. These terms and conditions are non-discretionary.

a. To implement RPM a., implement additional avoidance/minimization measures, the PNF shall conduct or oversee the measures listed below.

    (1) Present soil amendments and/or fertilizers to be used as part of the reclamation process to the PNF Level 1 Team for agreement.

    (2) Remove fuel and other hazardous materials from the project area by September 15^{th} of every operating season.

    (3) Ensure that all erosion control, water management, and fuel storage will be in place by September 15^{th} to minimize sedimentation and other effects on chinook salmon and steelhead and their habitat.

    (4) Survey for redds, and/or spawning chinook salmon or steelhead prior to the installation of the geogrid, bridge and culverts; surveys will be completed by a

PNF Fisheries Biologist. If there are any redds or spawning fish observed in the immediate area (upstream and downstream) construction will not be allowed, and the PNF Fisheries Biologist would need to approve when work could begin.

(5) Perform equipment maintenance, at least 200 feet from live water, in an area designated by the qualified PNF personnel.

(6) Avoid or minimize the removal of the material deposited at the base of existing road-cuts during road maintenance activities.

(7) Mulch and seed, with a native seed mix approved by the PNF, all cuts and fills of roads, and disturbed areas from road maintenance. All disturbed areas will be treated during first year disturbance, prior to rainy season. If vegetation is not adequately established for erosion control the mulch and seed will be applied in subsequent years until natural vegetation is established.

(8) Have qualified PNF personnel locate water withdrawal points to prevent streambank degradation and sedimentation.

(9) Require that water piping is designed to avoid leaks and is inspected.

(10) Ensure that, with the exception of safety hazard trees along the road within the RHCA, trees greater than 7 inches dbh will not be cut in the RHCA.

(11) Ensure that sediment reduction measures on the North Fork Smith Creek and Smith Creek roads are sustained by: inspection of road improvements and stream crossings annually during life of the project; submitting the completed RAP by December 31, 2004, to NOAA Fisheries; and specifically including these roads in the new LRMP travel plan to be completed by 2006.

(12) Determine the distances for lifting the blading equipment, prior to the work, to protect wet areas on the road (i.e. stream crossings and seeps); these distances will be determined by PNF qualified personnel.

(13) Ensure that measures to control surface erosion on cut banks and fills of new road construction, and road reconstruction are applied immediately after construction.

(14) Place slash filter windrows along the slope of the fill, where appropriate, and at the toe of the fill.

(15) Install erosion and sediment control measures downslope of road construction/reconstruction areas after first ground disturbance activity, and before completing the finish grade of the sloped road.

(16) Ensure that the waste from the new road construction will be hauled out of the Coin Creek/ Beaver Creek watershed to a PNF approved waste site.

(17) Employ seasonal controls and timing, and contract requirements, of decommissioning activities, to minimize potential for sediment production. Qualified PNF personnel will review the proposed decommissioning activities and contract requirements before and during decommissioning activities.

b. To implement RPM b, implement mining avoidance/minimization measures, the PNF shall conduct or oversee the measures listed below.

(1) Submit the final Golden Hand Mining Project Reclamation Plan to NOAA Fisheries for approval.

(2) Ensure that any water that runs off the surface of the active waste dumps will be contained by vegetation, if vegetation is not sufficient, then the water will be diverted behind siltation berms, into catch basins, or into sediment ponds.

(3) Ensure that each drill hole will be properly plugged and abandoned within the same operating season.

(4) Ensure that if a drill hole encounters artesian water, puddling clay or bentonite must be used to seal the water flow, thereby preventing crossflow erosion, waste, and contamination of the ground water. The PNF will notify NOAA Fisheries of any such artesian water encounters, and sealing work will be monitored by qualified PNF personnel.

(5) Ensure that all cuttings which have been deposited around the hole will be raked or spread out so that growth of natural grasses and foliage will not be impaired.

(6) Locate drilling pads on the roadbed in a manner that will allow room to locate the excavated settling basin completely on the roadbed to limit ground disturbance.

(7) Ensure that petroleum products and drill additives will be stored in a berm containment structure with impermeable materials.

(8) Provide the MSDS sheets of proposed drilling additives to NOAA Fisheries for approval, prior to any drilling activities.

c. To implement RPM c, exclude fish from instream work areas, as identified below, and ensure that instream work avoids spawning areas and spawning periods, the PNF shall conduct or oversee the measures listed below.

(1) Time all instream work to occur outside of spawning and incubation time periods for spring/summer chinook salmon and steelhead in streams containing those lifestages of the species.

(2) Survey, by PNF Fisheries Biologists, for redds or spawning fish prior to any instream work.

(3) Restrict construction (culverts, geo-grid, or bridge) if there are any redds or spawning fish observed at the site, within 100 feet upstream of the site, or within 300 feet downstream from the site.

(4) Maintain fish passage for Snake River steelhead and Snake River spring/summer chinook salmon during all instream installations.

d. To implement RPM d, monitoring and reporting, the PNF shall conduct or oversee the measures listed below.

(1) Annually report on the compliance with and implementation of the RPA and Terms and Conditions.

(2) Adhere to the proposed monitoring as described in the Golden Hand Mine Project BA, ROD, and Supplemental Reports.

(3) Inspect the geo-grid monthly after installation, and in conjunction with the scheduled daily/weekly project monitoring, after each runoff-producing storm during the first year of installation. To assure proper functioning, complete one inspection during the first runoff-producing event after installation.

(4) Conduct additional fish surveys during July of the first year of project operation. These fish surveys should be implemented to determine upstream distribution of spring/summer chinook salmon and steelhead and their habitat.

(5) Monitor for steelhead redds once in early June, during the first year of project operations, prior to any instream work, in addition to the monitoring described in the BA. Monitoring for steelhead and chinook salmon redds will also take place once within 3-5 days of the beginning of mining operations (after the road maintenance has taken place) to monitor for redds in the ford area. Monitoring for redds in or near fords (Smith Creek and North Fork Smith Creek) will also be conducted prior to reclamation activities. All fisheries related monitoring will be implemented by qualified fisheries biologists.

(6) Monitor for sediment in Smith Creek and Coin Creek at the beginning and end of each operating season. In addition, water quality measurements will be conducted at least

monthly during the operating season, and continue through reclamation of the action area. Water quality samples will be obtained from Coin Creek above and below the project action area. Samples will be tested for heavy metals, hydrocarbons, sediment, particulates, pH and other water quality measures.

(7) Annually report monitoring results as described in the Golden Hand Mine Project BA. The report shall identify in separate sections: (1) any results indicating adverse habitat modification or other adverse effects of the action on spring/summer chinook salmon or steelhead; (2) persistence of adverse conditions that could be improved through modification of the proposed action, or through additional actions; and (3) recommended remedies to address the problems identified in items 1 and 2. NOAA Fisheries shall work with the PNF to determine any corrective actions, which the applicant must implement.

(8) Submit the report that includes annual results of monitoring noted in the BA and this Opinion to: NOAA Fisheries, 10215 Emerald Street, Suite 180, Boise, Idaho 83704.

III. MAGNUSON-STEVENS FISHERY CONSERVATION AND MANAGEMENT ACT

A. Background

Pursuant to the MSA:

1. NOAA Fisheries must provide conservation recommendations for any Federal or state action that would adversely affect EFH (§305[b][4][A]);

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

The EFH means those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity (MSA §3). For the purpose of interpreting this definition of EFH: Waters include aquatic areas and their associated physical, chemical, and biological properties that are used by fish and may include aquatic areas historically used by fish where appropriate; substrate includes sediment, hard bottom, structures underlying the waters, and associated biological communities; necessary means the habitat required to support a sustainable fishery and the managed species contribution to a healthy ecosystem; and “spawning, breeding, feeding, or growth to maturity” covers a species' full life cycle (50 CFR §600.10).

Adverse effect means any impact which reduces quality and/or quantity of EFH, and may include direct (*e.g.*, contamination or physical disruption), indirect (*e.g*., loss of prey or reduction in species fecundity), site-specific or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions (50 CFR §600.810).

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

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

B. Identification of EFH

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

C. Proposed Actions

The proposed action and action area are detailed above in Sections I.B. and II.A.1.a. of this document. The action area includes habitats that have been designated as EFH for various life-history stages of Snake River spring/summer chinook salmon.

D. Effects of Proposed Action on EFH

This Opinion discusses in Section III. C.1, *Effects of the Proposed Action on Snake River spring/summer chinook salmon, and Snake River Steelhead,* the direct, indirect, and cumulative effects of the proposed action on anadromous fish habitat in the action area. The habitat potentially used by Snake River chinook salmon encompasses chinook salmon EFH in the Big Creek drainage, therefore the effects of the proposed action on chinook salmon and steelhead habitat and chinook salmon EFH are virtually identical.

The effects of the proposed action on EFH for chinook salmon include both short-term and long-term effects. The principal short-term effects include increased turbidity and sedimentation during ground-disturbing activities, and for a few years following the disturbance. Long-term effects would persist for decades or longer, and include increased fish passage, improved riparian and watershed functions, and reductions in sediment. Refer to Section III. C. above for a more detailed discussion of effects.

E. Conclusion

NOAA Fisheries concludes that the proposed action may adversely affect designated EFH for Snake River spring/summer chinook salmon.

F. EFH Conservation Recommendations

Pursuant to Section 305(b)(4)(A) of the MSA, NOAA Fisheries is required to provide EFH conservation recommendations to Federal agencies regarding actions that would adversely affect EFH. NOAA Fisheries understands that the conservation measures described in the BA will be implemented by the PNF and believes that these measures substantially minimize the various effects of the action on EFH. Although these conservation measures are not sufficient to fully address adverse effects on EFH, the RPA and the Terms and Conditions identified in Section I.F are generally applicable to designated EFH for Snake River spring/summer chinook salmon, and do address these adverse effects. Consequently, NOAA Fisheries recommends that the RPMs and Terms and Conditions be implemented as EFH conservation measures.

G. Supplemental Consultation

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

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ATTACHMENT A - BACKGROUND AND CONSULTATION HISTORY

GOLDEN HAND MINE PROJECT
BACKGROUND AND CONSULTATION HISTORY

Golden Hand Mine Project Consultation History

- May 28- 30, 2002 - Payette National Forest (PNF) Level One meeting reviewed Notice of Intent.
- August 19, 2002- PNF Level One Team met with Jack Walker, American Independence Mines and Minerals, Inc. at Big Creek Lodge.
- August 20, 2002 - Field review of proposed mining action in the Frank Church- River of No Return Wilderness (FC-RONR Wilderness).
- August 27, 2002 - Requested and received copy of the draft road analysis from Michael Dixon, PNF.
- October 31, 2002 - NOAA's National Marine Fisheries Service (NOAA Fisheries) received draft biological assessment (BA) from PNF.
- November 15, 2002- NOAA Fisheries received Fish Distribution maps from PNF.
- December 11, 2002 - Meeting with NOAA Fisheries and PNF staff to discuss proposed project.
- December 20, 2002 - Conference call with NOAA Fisheries and PNF staff to discuss proposed project.
- January 2, 2003 - Meeting with NOAA Fisheries and PNF staff to discuss proposed project.
- January 22, 2003 - Meeting with NOAA Fisheries and PNF staff to discuss proposed project.
- February 26, 2003 - NOAA Fisheries received a final draft BA from PNF.
- March 6, 2003 - NOAA Fisheries and PNF met to discuss potential ESA terms and conditions to balance aquatic restoration with other activities.
- March 14, 2003 - NOAA Fisheries tribal liaison (Gary Simms) contacted on proposed project.
- March 18, 2003 - NOAA Fisheries tribal liaison contacted the Nez Perce Tribe on the proposed project.

- March 18, 2003 - NOAA Fisheries tribal liaison contacted the Shoshone-Bannock Tribe on the proposed project.

- March 24, 2003 - NOAA Fisheries received a final BA from PNF.

- March 31, 2003 - NOAA Fisheries met with the Shoshone-Bannock Tribe to discuss proposed project and potential impacts to tribal resources.

- April 17, 2003 - NOAA Fisheries provided draft BO to PNF

- April 24, 2003 - NOAA Fisheries met with the PNF Level One team to discuss PNF comments on the draft BO.

- April 25, 2003 - Received comments from NOAA Fisheries General Counsel (Melanie Rowland).

- April 28, 2003 - Received comments from NOAA Fisheries Policy (Russ Strach).

- April 30, 2003 - NOAA Fisheries (Ken Troyer) sent email to PNF (Mark Madrid) indicating the decision to draft the BO Jeopardy Opinion for the Golden Hand Mine Project.

- May 1, 2003 - NOAA Fisheries received comments from the Shoshone-Bannock Tribes.

- May 5, 2003 - NOAA Fisheries received comments from the Nez Perce Tribe.

- May 6, 2003 - NOAA Fisheries received the final EIS and ROD from PNF.

- June 26, 2003 - NOAA Fisheries provided the Draft Opinion to the PNF.

- July 9, 2003 - NOAA Fisheries received letter from PNF (Mark Madrid) indicating they were elevating the issue to the Regional Forester.

- August 20, 2003 - Conference call with PNF.

- August 27, 2003 - NOAA Fisheries provided 2 reports to PNF 1. Initial screening of the proposed project for consistency with the new LRMP, 2. Summary of outstanding technical issues.

- September 8, 2003 - NOAA Fisheries received comments from the PNF on the above 2 reports.

- September 11, 2003 - NOAA Fisheries (level 1 & 2) met with PNF to discuss outstanding issues to determine if the Jeopardy Opinion was still warranted.

- September 18, 2003 - NOAA Fisheries and PNF visited the sites of the proposed Golden Hand Mine activities and discussed specific mitigation measures that PNF or the applicant would implement.

- September 24, 2003 - NOAA Fisheries received supplemental report from PNF that clarified sediment delivery impacts on road construction/reconstruction to Coin Creek.

- November 7, 2003 - NOAA Fisheries provided the revised Draft Biological Opinion to PNF and NOAA Fisheries General Counsel.

- November 21, 2003- NOAA Fisheries received comments from the PNF on the revised Draft Biological Opinion.

ATTACHMENT B - TRIBAL RESOURCES

GOLDEN HAND MINE PROJECT AND TRIBAL RESOURCES

A. Nez Perce Tribe

The Nez Perce Tribe sent their comments to the Payette National Forest (PNF); these comments were included in the Final Environmental Impact Statement (EIS) pages H-11 - H13. In general, the Tribe is concerned about the PNFs' selection of a preferred alternative that allows motorized access into the Frank Church - River of No Return (FC-RONR)Wilderness Area in a manner that degrades threatened fish habitat. The Tribe preferred Alternative A (no action), and alternatively Alternative D.

NOAA's National Marine Fisheries Service (NOAA Fisheries) found that, although alternative C does allow limited motorized access into the FC-RONR Wilderness, impacts from this access to any Riparian Habitat Conservation Areas has been minimized through PNF's project design, Reasonable and Prudent Measures (RPMs), and Terms and Conditions in this Opinion. NOAA Fisheries has considered all of the Nez Perce Tribes comments; and believes many of their concerns have been addressed within this Opinion.

B. Shoshone-Bannock Tribes

The Nez Perce Tribe sent their comments to NOAA Fisheries; these comments were forwarded to PNF, however, it does not appear that these comments were included in the Final EIS. In general, the Tribes asserted that no reasonable and prudent alternatives for the Golden Hand Mine Project have been identified that would prevent jeopardy to listed species in the FC-RONR Wilderness Area. The Tribes do not support the proposed action which they believe infringe on their Indian Trust Assets. The Tribes preferred Alternative A (no action). The Shoshone-Bannock specific comments were directed to the Golden Hand Mine Project biological assessment; and many of these comments were addressed in the final EIS. NOAA Fisheries has considered all of the Shoshone-Bannock Tribe's comments. Some of the outstanding concerns (not addressed in the EIS) have been addressed in the RPMs and Terms and Conditions in this Opinion.

ATTACHMENT C - SNAKE RIVER STEELHEAD
May 14, 2003

BIOLOGICAL REQUIREMENTS, CURRENT STATUS, AND TRENDS:

SNAKE RIVER STEELHEAD

A. General Life History

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

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

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

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

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

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

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

B. Population Dynamics and Distribution

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

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

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

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

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

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

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

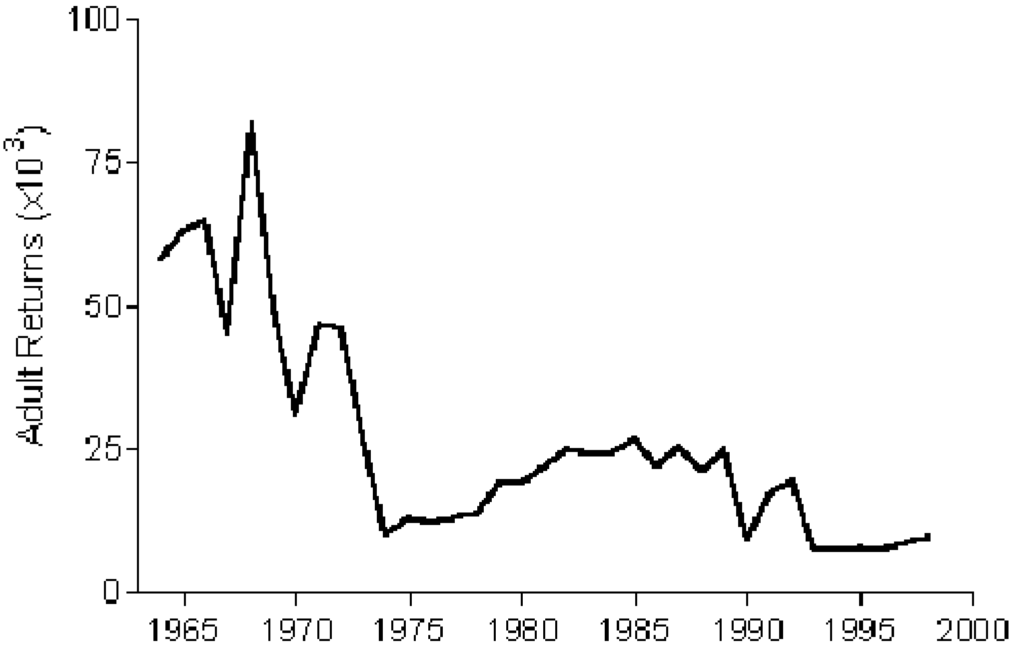
Comparison of recent dam counts with escapement objectives provides perspective regarding the status of the ESU. The management objective for Snake River steelhead stated in the Columbia River Fisheries Management Plan was to return 30,000 natural/wild steelhead to Lower Granite Dam. The All Species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

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

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

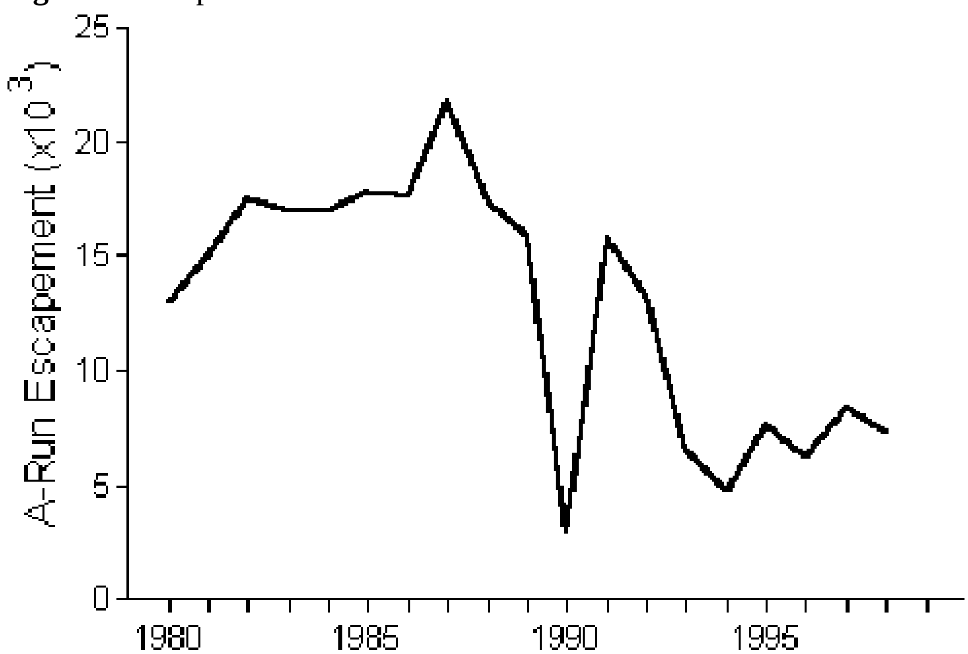
It is apparent from the available data that B-run steelhead are much more depressed than the A-run component. In evaluating the status of the Snake River Basin steelhead ESU, it is pertinent to consider if B-run steelhead represent a "significant portion" of the ESU. This is particularly relevant because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

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



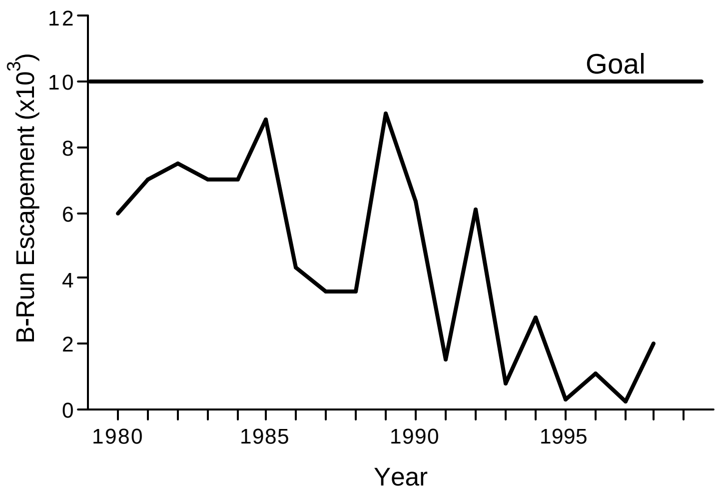
Source: Escapement through 1995 from TAC (1997); escapement for 1996–1998 from pers. comm. G. Mauser (IDFG).

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



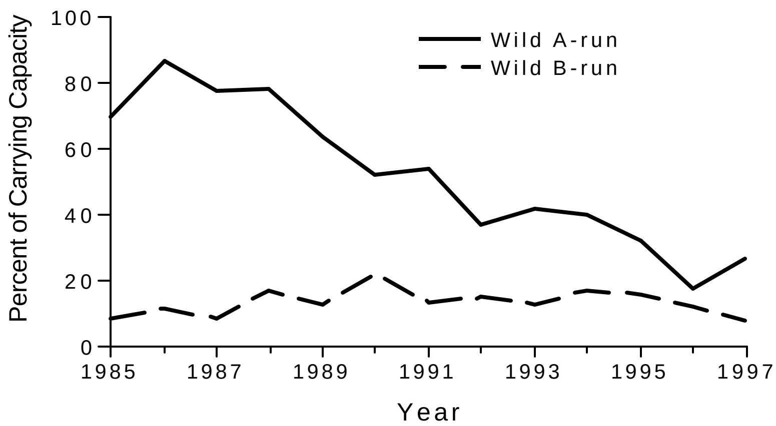
Source: Data for 1980 through 1984 from Figures 1 and 2 of Section 8 in TAC (1997). Data for 1985 through 1998 from Table 2 of Section 8
(TAC 1997) and pers. comm . G. Mauser, (IDFG).

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



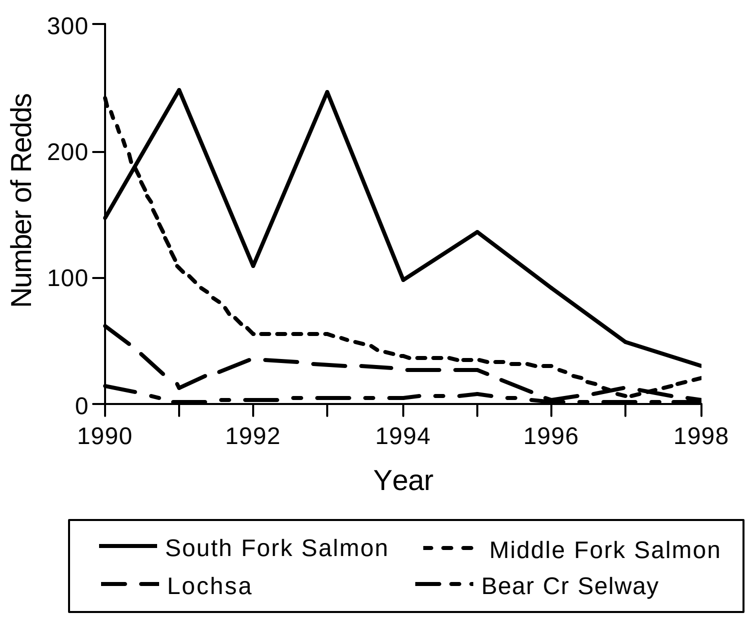
Source: Data for 1980 through 1984 from Figures 1 and 2 of Section 8 in TAC (1997). Data for 1985 through 1998 from Table 2 of Section 8
(TAC 1997) and pers. comm. G. Mauser (IDFG).

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



Data for the Lochsa exclude Fish Creek and Crooked Fork.
Sources: memo from T. Holubetz (IDFG), "1997 Steelhead Redd Counts", dated May 16, 1997, and IDFG (unpublished).

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



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

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

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

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

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

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

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

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

1. Lower Snake River Subbasin

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

a. Species Distribution:

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

b. Location of Important Spawning and Rearing Areas:

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

c. Conditions and Trends of Populations:

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

<u>2. Clearwater River, North Fork Clearwater River, and Middle Fork Clearwater River Subbasins</u>

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

a. Species Distribution:

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

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

b. Location of Important Spawning and Rearing Areas:

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

c. Conditions and Trends of Populations:

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

3. South Fork Clearwater River Subbasin

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

a. Species Distribution:

Within the South Fork Clearwater River Subbasin, steelhead use is widespread, and most accessible tributaries are used year-long or seasonally. In the South Fork drainage, the primary steelhead producing drainages include Newsome Creek, American River, Red River, and Crooked River. Other South Fork Clearwater River mainstem tributary streams providing spawning and/or rearing habitat for steelhead include Tenmile, Johns, Meadow, and Mill

Creeks (Jody Brostrom, IDFG, pers. comm. March 30, 2001). Low order streams and accessible headwater portions of high order streams provide early rearing habitat (Nez Perce National Forest 1998).

b. Location of Important Spawning and Rearing Areas:

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

c. Conditions and Trends of Populations:

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

4. Selway River Subbasin

Information on steelhead distribution, important watersheds, and conditions and trends in the Selway River is summarized from the Lower Selway BA (USFS 1999a), the Biological Opinion (Opinion) on Culvert Replacements on Lolo Creek and Lochsa River (NMFS 2002a), and the Opinion on Recreational Suction Dredge Mining in Lolo Creek (NOAA Fisheries 2003), except where noted.

a. Species Distribution:

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

b. Location of Important Spawning and Rearing Areas:

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

c. Conditions and Trends of Populations:

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

5. Lochsa River Subbasin

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

a. Species Distribution:

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

b. Location of Important Spawning and Rearing Areas:

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

c. Conditions and Trends of Populations:

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

6. Lower Salmon River Subbasin

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

a. Species Distribution:

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

b. Location of Important Spawning and Rearing Areas:

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

c. Conditions and Trends of Populations:

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

The Nez Perce National Forest conducted an ecosystem analysis at the watershed scale for Slate Creek (USFS 2000) and concluded that the distribution of fish species assessed is relatively consistent with historic distribution. Steelhead populations are thought to have experienced a great decline from historic levels although the data to describe the extent of this reduction is not available (USFS 2000). The BLM has conducted trend monitoring of fish populations in lower Partridge Creek and French Creek. Partridge Creek densities of age 0 rainbow/steelhead in 1988 were 0.30 fish/m^2 and age 1 rainbow/steelhead densities were 0.19 fish/m2. In 1997, age 0 densities were 0.003 fish/m2 and age 1 densities were 0.01 fish/m2. French Creek densities of age 0 rainbow/steelhead in 1991 were 0.07 fish/m2 and age 1 rainbow/steelhead densities were 0.07 fish/m2. In 1997, age 0 densities were 0.0075 fish/m2 and age 1 densities were 0.02 fish/m2. Densities of steelhead have significantly declined from the 1980s through the late 1990s.

7. Little Salmon River Subbasin

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

a. Species Distribution:

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

b. Location of Important Spawning and Rearing Areas:

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

c. Conditions and Trends of Populations:

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

8. Middle Salmon River Subbasin

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

a. Species Distribution:

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

b. Location of Important Spawning and Rearing Areas:

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

c. Conditions and Trend of Populations:

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

9. South Fork Salmon River Subbasin

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

a. Species Distribution:

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

b. Location of Important Spawning and Rearing Areas:

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

c. Conditions and Trends of Populations:

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

10. Upper Salmon River Subbasin

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

a. Species Distribution:

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

b. Location of Important Spawning and Rearing Areas:

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

c. Conditions and Trends of Populations:

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

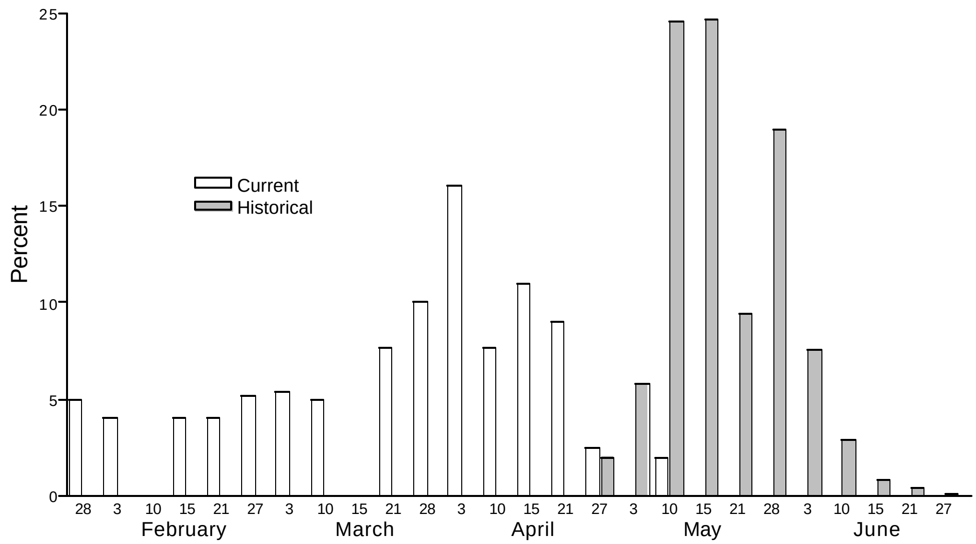
C. Hatchery Populations

Hatchery populations, if genetically similar to their natural-origin counterparts, provide a hedge against extinction of the ESU or of the gene pool. The Imnaha and Oxbow hatcheries produce

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

The Dworshak NFH is unique in the Snake River Basin in producing a B-run hatchery stock. The Dworshak stock was developed from natural-origin steelhead from the North Fork Clearwater River, is largely free of other hatchery introductions, and was therefore included in the ESU, although not as part of the listed population. However, past hatchery practices and possibly changes in flow and temperature conditions related to Dworshak Dam have lead to substantial divergence in spawn timing of the hatchery stock compared to historical timing in the North Fork Clearwater River, and compared to natural-origin populations in other parts of the Clearwater Basin. Because the spawn timing of the hatchery stock is much earlier than historically (Figure 6), the success of supplementation efforts using these stocks may be limited. In fact, past supplementation efforts in the South Fork Clearwater River using Dworshak NFH stock have been largely unsuccessful, although improvements in out-planting practices have the potential to yield different results. In addition, the unique genetic character of Dworshak NFH steelhead will limit the degree to which the stock can be used for supplementation in other parts of the Clearwater Subbasin, and particularly in the Salmon River B-run basins. Supplementation efforts in those areas, if undertaken, will more likely have to rely on the future development of local broodstocks. Supplementation opportunities in many of the B-run production areas may be limited because of logistical difficulties associated with high mountain, wilderness areas. Because opportunities to accelerate the recovery of B-run steelhead through supplementation, even if successful, are expected to be limited, it is essential to maximize the escapement of natural-origin steelhead in the near term.

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



D. Conclusion

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

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

> "There has been no progress toward rebuilding upriver runs since 1987. Throughout the Columbia River basin, dam counts, weir counts, spawning surveys, and rearing densities indicate natural-origin steelhead abundance is declining, culminating in the proposed listing of upriver stocks in 1996. Escapements have reached critically low levels despite the relatively high productivity of natural and hatchery rearing environments. Improved flows and ocean conditions should increase smolt-adult survival rates for upriver summer steelhead. However, reduced returns in recent years are likely to produce fewer progeny and lead to continued low abundance."

> “Although steelhead escapements would have increased (some years substantially) in the absence of mainstem fisheries, data analyzed by the TAC indicate that effects other than mainstem Columbia River fishery harvest are primarily responsible for the currently depressed status and the long term health and productivity of wild steelhead populations in the Columbia River.”
>
> “Though harvest is not the primary cause of declining summer steelhead stocks, and harvest rates have been below guidelines, harvest has further reduced escapements. Prior to 1990, the aggregate of upriver summer steelhead in the mainstem Columbia River appears at times to have led to the failure to achieve escapement goals at Lower Granite Dam. Wild Group B steelhead are presently more sensitive to harvest than other salmon stocks, including the rest of the steelhead run, due to their depressed status and because they are caught at higher rates in the Zone 6 fishery.”

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

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

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

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

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

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ATTACHMENT D - SNAKE RIVER SPRING/SUMMER CHINOOK SALMON

BIOLOGICAL REQUIREMENTS, CURRENT STATUS, AND TRENDS:

SNAKE RIVER SPRING/SUMMER CHINOOK SALMON

A. Chinook Salmon Life History

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

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

B. Population Dynamics, Distribution, Status and Trends

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

1. Snake River Spring/Summer Chinook Salmon

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

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

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

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

NOAA's National Marine Fisheries Service (NOAA Fisheries) set an interim recovery level for Snake River spring/summer chinook salmon (31,400 adults at Ice Harbor Dam) in its proposed recovery plan (NMFS 1995). The Snake River spring/summer chinook salmon ESU consists of 39 local spawning populations (subpopulations) spread over a large geographic area (Lichatowich et al. 1993). The number of fish returning to Lower Granite Dam is therefore divided among these subpopulations. The relationships between these subpopulations, and particularly the degree to which individuals may intermix is unknown. It is unlikely that all 39 are independent populations per the definition in McElhany et al. (2000), which requires that each be isolated such that the exchange of individuals between populations does not substantially affect population dynamics or extinction risk over a 100-year time frame. Nonetheless, monitoring the status of subpopulations provides more detailed information on the status of the species than would an aggregate measure of abundance.

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

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

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

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

As of June 1, 2000, the preliminary final aggregate count for upriver spring chinook salmon at Bonneville Dam was 178,000, substantially higher than the 2000 forecast of 134,000[3]. This is the second highest return in 30 years (after the 1972 return of 179,300 adults). Only a small portion of these are expected to be natural-origin spring chinook destined for the Snake River (5,800). However, the aggregate estimate for natural-origin Snake River spring chinook salmon is substantially higher than the contributing brood year escapements. Comparable returns to the Columbia River mouth in 1995 and 1996 were 1,829 and 3,903, respectively. The expected returns to the index areas were estimated by multiplying the anticipated return to the river mouth by factors that accounted for anticipated harvest (approximately 9%), interdam loss (50%), prespawning mortality (10%), and the average proportion of total natural-origin spring chinook salmon expected to return to the index areas (14.3%). This rough calculation suggests that the returns to each index area would just replace the primary contributing brood year escapement (1996) (Table 2). These results also suggest that other areas may benefit more than the index areas in terms of brood year return rates. The index areas, on average, account for about 14% of the return of natural-origin spring chinook stocks to the Snake River. The substantial return of hatchery fish will also provide opportunities to pursue supplementation options designed to help rebuild natural-origin populations subject to constraints related to population diversity and integrity. For example, expected returns of the Tucannon River (500 listed hatchery and wild fish), Imnaha River (800 wild and 1,600 listed hatchery fish), and Sawtooth Hatchery (368 listed hatchery fish) all represent substantial increases over past years and provide opportunities for supplementation in the local basins designed to help rebuild the natural-origin stocks.

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

The probability of meeting survival and recovery objectives for Snake River spring/summer chinook under various future operation scenarios for the hydrosystem was analyzed through a process referred to as PATH (Plan for Analyzing and Testing Hypotheses). The scenarios analyzed focused on status quo management, and options that emphasized either juvenile transportation or hydro-project drawdown. The PATH also included sensitivity analyses to

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

alternative harvest rates and habitat effects. The PATH estimated the probability of survival and recovery for the seven index stocks using the recovery and escapement threshold levels as abundance indicators. The forward simulations estimated the probability of meeting the survival thresholds after 24 and 100 years.

A 70% probability of exceeding the threshold escapement levels was used to assess survival. Recovery potential was assessed by comparing the projected abundance to the recovery abundance levels after 48 years. A 50% probability of exceeding the recovery abundance levels was used to evaluate recovery by comparing the 8-year mean projected abundance. In general, the survival and recovery standards were met for operational scenarios involving drawdown, but were not met under status quo management or for the scenarios that relied on juvenile transportation (Marmorek et al. 1998). If the most conservative harvest rate schedule was assumed, transportation scenarios came very close to meeting the survival and recovery standards.

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

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

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

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

2. Lower Snake River Subbasin

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

a. Species Distribution:

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

b. Location of Important Spawning and Rearing Areas:

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

c. Conditions and Trend of Populations:

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

3. Lower Salmon River Subbasin

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

a. Species Distribution:

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

b. Location of Important Spawning and Rearing Areas:

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

c. Conditions and Trend of Populations:

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

3. Little Salmon River Subbasin

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

a. Species Distribution:

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

b. Location of Important Spawning and Rearing Areas:

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

c. Conditions and Trend of Populations:

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

4. Middle Salmon River Subbasin

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

a. Species Distribution:

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

b. Location of Important Spawning and Rearing Areas:

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

c. Conditions and Trend of Populations:

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

6. South Fork Salmon River Subbasin

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

a. Species Distribution:

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

b. Location of Important Spawning and Rearing Areas:

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

c. Conditions and Trend of Populations:

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

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

7. Upper Salmon River Subbasin

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

a. Species Distribution:

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

b. Location of Important Spawning and Rearing Areas:

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

c. Conditions and Trend of Populations:

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

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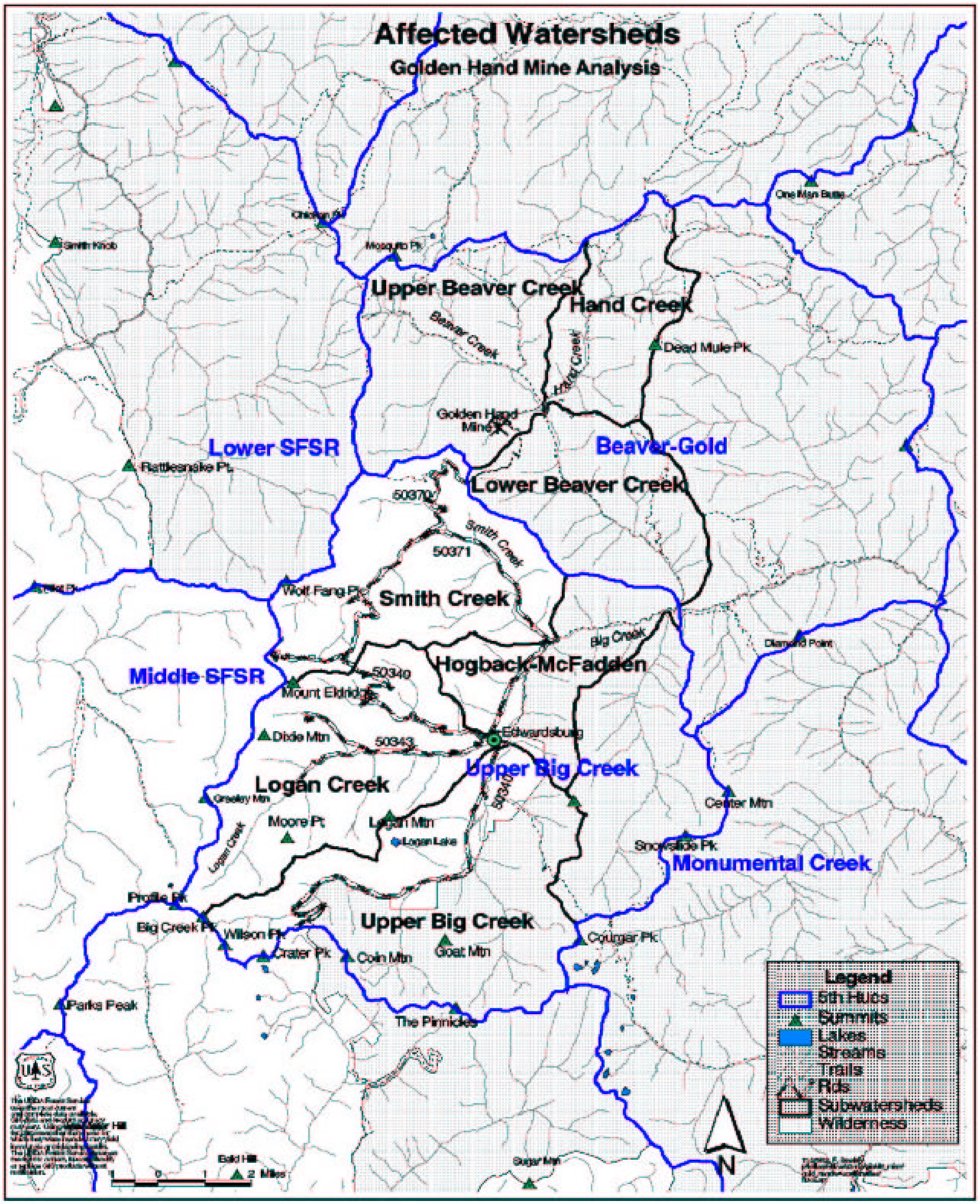
ATTACHMENT E - GOLDEN HAND MINE ANALYSIS AREA AND AFFECTED WATERSHEDS MAP


Affected Watersheds
Golden Hand Mine Analysis
Upper Beaver Creek
Hand Creek
Beaver Creek
Dead Mule Pk
Golden Hand Mine
Lower SFSR
Beaver-Gold
Rattlesnake Pt.
Lower Beaver Creek
50370
Smith Creek
50371
Wolf Fang Pk
Smith Creek
Big Creek
Diamond Point
Hogback-McFadden
Middle SFSR
50340
Mount Eldridge
Dixie Mtn
50343
Edwardsburg
Upper Big Creek
Logan Creek
Center Mtn
Moore Pt.
Logan Mtn
Logan Lake
Snowslide Pk
Monumental Creek
Logan Creek
Profile Pk
Big Creek Pk
Wilson Pk
Upper Big Creek
Cougar Pk
Crater Pk
Coin Mtn
Goat Mtn
Parks Peak
The Pinnicles
Legend
5th Hucs
Summits
Lakes
Streams
Trails
Rds
Subwatersheds
Wilderness
N
Bald Hill
Sugar Mtn
Miles
One Man Butte
Smith Knob
Mosquito Pk