UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
West Coast Region
1201 NE Lloyd Boulevard, Suite 1100
PORTLAND, OREGON 97232

Refer to NMFS No.: WCRO-2022-01267

https://doi.org/10.25923/mmmy-9c28

August 15, 2022

Richard White
Field Manager
Bureau of Land Management
Cottonwood Field Office
2 Butte Drive
Cottonwood, Idaho 83522

Lt. Col. ShaiLin KingSlack
U.S. Army Corps of Engineers
Walla Walla District
201 North Third Avenue
Walla Walla, Washington 99362-1876

Re: Endangered Species Act Section 7(a)(2) Biological Opinion, and Magnuson–Stevens Fishery Conservation and Management Act Essential Fish Habitat Response for the Eagle Creek Road and Bridges Project

Dear Mr. White and Lt. Col. KingSlack:

Thank you for the letter dated May 25, 2022, from the Bureau of Land Management (BLM), requesting reinitiation of consultation on the subject action with NOAA's National Marine Fisheries Service (NMFS) pursuant to section 7 of the Endangered Species Act of 1973 (ESA) (16 U.S.C. 1531 et seq.) for the Eagle Creek Road and Bridges Project. The BLM is the primary action agency that requested formal consultation on the project. The U.S. Army Corps of Engineers (Corps) is included in this biological opinion (opinion) due to the need for 404 permitting to complete the project.

For purposes of this consultation, we considered whether the substantive analysis and its conclusions regarding the effects of the proposed actions articulated in the biological opinion and its incidental take statement would be any different under the 50 CFR part 402 regulations as they existed prior to the 2019 Rule vacated by the order of the U.S. District Court for the Northern District of California on July 5, 2022. We have determined that our analysis and conclusions would not be any different.

This consultation is a reinitiation of the biological opinion issued by NMFS in 2020 (WCRO-2020-01150). Modifications to the proposed action included an increase in riprap that would have exceeded the take surrogate (length of riprapped streambank). The BLM determined that the proposed action "may affect, likely to adversely affect" Snake River spring/summer Chinook salmon, Snake River Basin steelhead, and designated critical habitat for those species.

In this opinion, NMFS concludes that the action, as proposed, is not likely to jeopardize the continued existence of Snake River spring/summer Chinook salmon or Snake River Basin steelhead. NMFS also determined the action will not destroy or adversely modify designated critical habitat for those species. Rationale for our conclusions is provided in the attached opinion.

As required by section 7 of the ESA, NMFS provides an incidental take statement (ITS) with the opinion. The ITS describes reasonable and prudent measures (RPM) NMFS considers necessary or appropriate to minimize the impact of incidental take associated with this action. The take statement sets forth terms and conditions, including reporting requirements, that the BLM, the Corps, and any permittee who performs any portion of the action must comply with to carry out the RPM. Incidental take from actions that meet these terms and conditions will be exempt from the ESA take prohibition.

Thank you also for your request for consultation, pursuant to the essential fish habitat (EFH) provisions in section 305(b) of the Magnuson–Stevens Fishery Conservation and Management Act (MSA) [16 U.S.C. 1855(b)] for this action, with NMFS. The opinion includes three conservation recommendations to help avoid, minimize, or otherwise offset potential adverse effects on EFH. These conservation recommendations are a non-identical set of the ESA Conservation Recommendations. Section 305(b)(4)(B) of the MSA requires Federal agencies provide a detailed written response to NMFS within 30 days after receiving these recommendations.

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

If you have any questions or require any additional information you may contact Todd Andersen, Northern Snake Branch, at (208) 366-9586 or todd.andersen@noaa.gov.

Sincerely,

Michael P. Tehan
Assistant Regional Administrator
Interior Columbia Basin Office

Enclosure

cc:
C. Johnson – BLM
R. Bart – USFWS
M. Lopez – Nez Perce Tribe

Endangered Species Act (ESA) Section 7(a)(2) Biological Opinion and Magnuson–Stevens Fishery Conservation and Management Act Essential Fish Habitat (EFH) Response

Eagle Creek Road and Bridges Project

NMFS Consultation Number: WCRO-2022-01267

Action Agencies: Bureau of Land Management, Cottonwood Field Office
U.S. Army Corps of Engineers, Walla Walla District

Affected Species and NMFS' Determinations:

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

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

Consultation Conducted By: National Marine Fisheries Service, West Coast Region

Issued By: Michael P. Tehan
Assistant Regional Administrator

Date: August 15, 2022

TABLE OF CONTENTS

TABLE OF FIGURES

TABLE OF TABLES

ACRONYMS

ACRONYM	DEFINITION
BA	Biological Assessment
BLM	Bureau of Land Management
BMP	Best Management Practice
cfs	Cubic Feet per Second
Corps	U.S. Army Corps of Engineers
CWA	Clean Water Act
dB	Decibel
DOI	U.S. Department of the Interior
DPS	Distinct Population Segment
DQA	Data Quality Act
EFH	Effective Fish Habitat
ESA	Endangered Species Act
ESU	Evolutionarily Significant Unit
HAPC	Habitat Area of Particular Concern
ICTRT	Interior Columbia Technical Recovery Team
IDEQ	Idaho Department of Environmental Quality
IDFG	Idaho Department of Fish and Game
ISAB	Independent Scientific Advisory Board
ITS	Incidental Take Statement
kPa	Kilopascals
lbs.	Pounds
LWD	Large Woody Debris
μPa	Micropascal
MPG	Major Population Group
MSA	Magnuson–Stevens Fishery Conservation and Management Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NTU	Nephelometric Turbidity Unit

NWFSC	Northwest Fisheries Science Center
ODFW	Oregon Department of Fish and Wildlife
OHWM	Ordinary High Water Mark
opinion	Biological Opinion
PBF	Physical and Biological Feature
PCE	Primary Constituent Element
RCH	Riparian Conservation Area
PFMC	Pacific Fishery Management Council
RPA	Reasonable Prudent Alternative
RPM	Reasonable Prudent Measure
SR	Snake River
SRB	Snake River basin
USFWS	U.S. Fish and Wildlife Service
USGCRP	U.S. Global Change Research Program
VSP	Viable Salmonid Population
WDFW	Washington Department of Fish and Wildlife
WMA	Wildlife Management Area

1. INTRODUCTION

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

1.1. Background

The National Marine Fisheries Service (NMFS) prepared the biological opinion (opinion) and incidental take statement (ITS) portions of this document in accordance with section 7(b) of the Endangered Species Act (ESA) of 1973 (16 U.S.C. 1531 et seq.), and implementing regulations at 50 CFR 402, as amended. We also completed an essential fish habitat (EFH) consultation on the proposed action, in accordance with section 305(b)(2) of the Magnuson–Stevens Fishery Conservation and Management Act (MSA) (16 U.S.C. 1801 et seq.) and implementing regulations at 50 CFR 600.

We completed pre-dissemination review of this document using standards for utility, integrity, and objectivity in compliance with applicable guidelines issued under the Data Quality Act (DQA) (section 515 of the Treasury and General Government Appropriations Act for Fiscal Year 2001, Public Law 106-554). The document will be available within 2 weeks at the NOAA Library Institutional Repository [https://repository.library.noaa.gov/welcome]. A complete record of this consultation is on file at NMFS Snake River Branch in Boise, Idaho.

1.2. Consultation History

On March 16, 2022, the BLM sent an email to NMFS requesting reinitiation of consultation on the Eagle Creek Road and Bridges Project (WCRO-2020-01150) due to changes in the proposed work plan. The original consultation was completed on September 17, 2020. In the email asking for reinitiation, the BLM also included a draft supplemental biological assessment (BA) that tiered to the original BA from 2020. The BLM presented the changes to the work plan at the March 23, 2022 level 1 meeting. A new BLM District Engineer was assigned to the project after the original consultation was completed. He identified changes for this project that would exceed the extent of take in the initial opinion. Specifically, the Incidental Take Statement (ITS) of the opinion determined that the extent of take will be exceeded if more than 180 feet of bank is armored with riprap; in the new design, 221 feet of bank will be armored.

1.3. Proposed Federal Action

Under the ESA, "action" means all activities or programs of any kind authorized, funded, or carried out, in whole or in part, by Federal agencies (see 50 CFR 402.02). Under the MSA, "Federal action" means any action authorized, funded, or undertaken, or proposed to be authorized, funded, or undertaken by a Federal agency (see 50 CFR 600.910).]

"Interrelated actions" are those that are part of a larger action and depend on the larger action for their justification. "Interdependent actions" are those that have no independent utility apart from the action under consideration (50 CFR 402.02). We determined that there are no actions that are interrelated or interdependent to the proposed action.

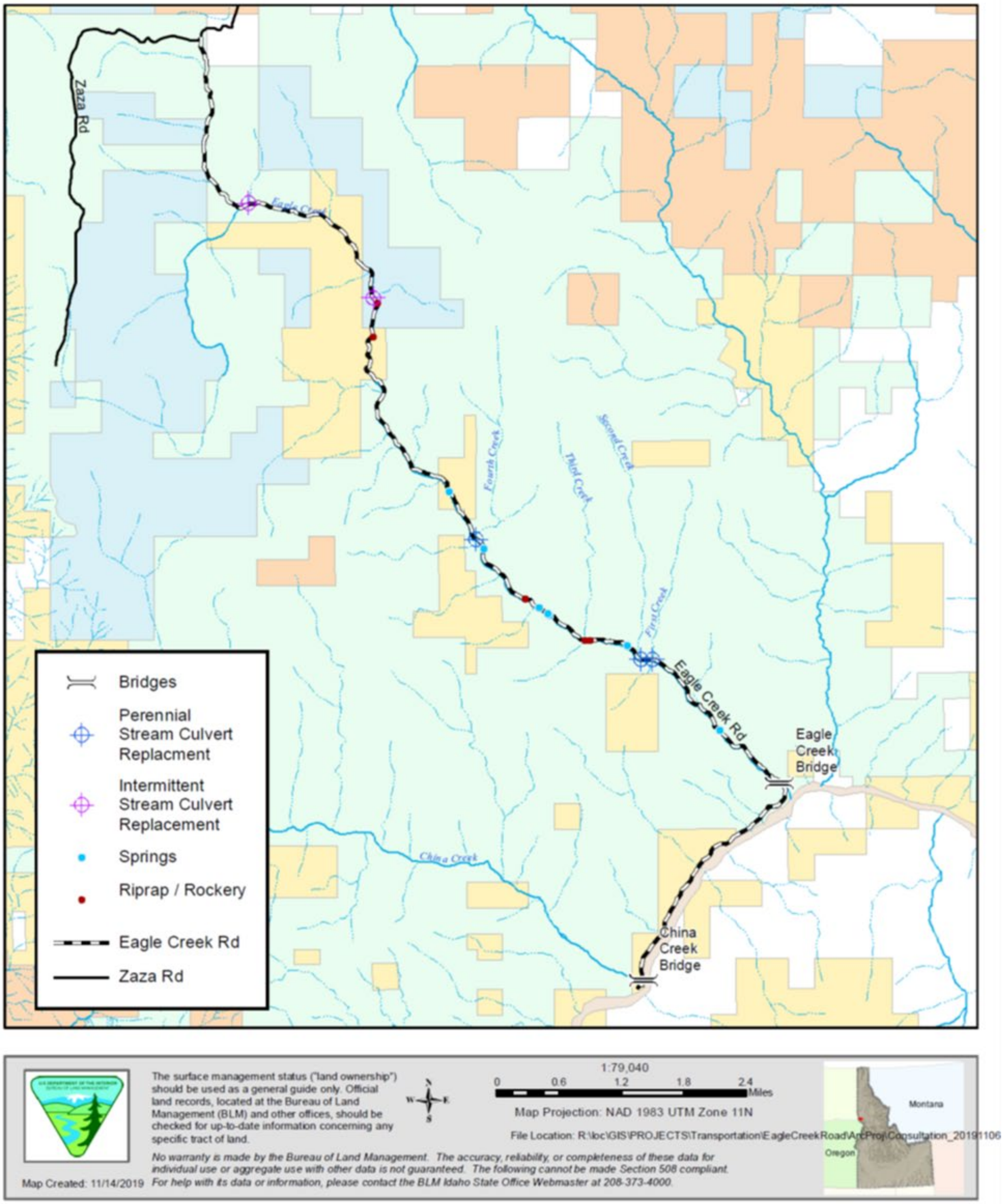
The purpose of the Eagle Creek Road and Bridges Project is to address the goal for Transportation and Travel Management for road management from the Cottonwood Resource Management Plan (DOI–BLM 2009), which states, “Manage travel, roads, and trails to provide access and recreational opportunities, while minimizing resource impacts and user conflicts.” To accomplish this goal, the proposed action would include road and bridge maintenance, and improvement actions to provide long-term reliable vehicle access to public lands in the Eagle Creek drainage and along the Salmon River. The proposed action was designed to minimize short-term adverse impacts to high value resources, while providing long-term benefits for public access, water quality, aquatic habitats, and cultural resources.

Within the lower 53 miles of the Salmon River, public motorized access only includes two public access roads. The Eagle Creek road provides public motorized access in this segment of the Lower Salmon River. This primitive road occurs within the Craig Mountain Wildlife Management Area (WMA), the largest WMA in the state, and it is a very popular access road for recreationists. This road has experienced severe erosion and flood damage from past events, and has been periodically closed due to road washouts and gullying. Snow in the upper elevation sections of the road generally closes the Eagle Creek Road to vehicle passage from December through March.

The BLM proposes to conduct maintenance and improvements on the Eagle Creek Road, and maintenance on the Eagle Creek and China Creek Bridges (Figure 1). The project area occurs within the Lower Salmon River subbasin and occurs in the Eagle and China Creeks drainages, and the Salmon River face drainages (Figure 1). The majority of project work will occur within the Eagle Creek drainage on the Eagle Creek Road. Minor work would occur on the road paralleling the Salmon River, and riprap placed at the abutments of the China Creek Bridge.

The BLM is proposing to implement road maintenance and improvements on 10.9 miles of the Eagle Creek road and conduct maintenance on the Eagle Creek and China Creek Bridges from April 1, 2021 to October 1, 2022. (Figure 1). Eagle Creek Road would be left open during weekends for the duration of the project.

Figure 1. Map of Eagle Creek road and the location of the proposed action.



Specific road improvements and maintenance actions include the following:

1. Improve road drainage and conduct road reconditioning on 10.9 miles of the Eagle Creek Road (Zaza Road Junction to Eagle Creek Bridge), which includes: blading; ditch cleaning; cleaning inlets and outlets of culverts; replacing stream culverts, installing relief culverts, ditch construction; constructing drivable water-bars; removing road berms; selective graveling at specific sites; adding fill material at specific locations to raise the elevation of the road; and reshaping the road, as needed, to provide proper drainage (outsloping and insloping) (Table 1).

2. At three locations, between Eagle Creek and China Creek Bridges, rock (3-inch minus) would be placed on existing roadbed to protect cultural resources. These cultural resources are Nez Perce Tribal artifacts that were exposed during road construction in the 1950s–1960s. The added gravel will help protect the artifact from future erosion. No ground disturbing activity is required prior to placement of rock. This would only involve the placement of rock (3-inch minus) on existing road at three locations to protect cultural resources.

3. Replace culverts at road crossings for two perennial, and three intermittent, non-fish bearing streams. Riprap material would be placed at inlets and outlets of culverts (Figure 1).

4. Provide road drainage for six springs/seeps. As needed, improved spring/seep drainage would include construction of armored drivable water bars or constructing ditching with relief culverts (Figure 1).

5. Armor/Gabion construction/riprap placement at six locations of eroding fill slope with riprap material (Tables 1 and 2).

6. Construct gabion and riprap embankment at three locations where the road is sloughing off. These three locations are above the ordinary high water mark (OHWM) and not associated with the creek.

7. Place riprap material to protect Eagle Creek and China Creek bridge abutments from high flow erosion events. Minor repairs would occur to the bridges; including the removal and replacement of bridge running boards, adding weld plates at decking ends, and replacing signage (Tables 1 and 2).

8. Selectively remove pieces of an Eagle Creek high flow woody debris jam to prevent road erosion and diversion of water onto the road (stream mile 6.7).

9. Cut down five white alder snags that are located immediately upstream from Eagle Creek Bridge, which may cause a logjam, fall on the bridge, or potentially divert water towards abutments. These snags would be cut and removed leaving high stumps (3–4 feet) to secure and maintain the integrity of large woody debris that occurs at the base of these trees and occurs in the stream channel.

10. As needed, brushing would occur the entire length of the Eagle Creek Road (Zaza Road Junction to Eagle Creek Bridge). Brushing would occur 5 feet horizontally from the existing edge of the road.

11. Dynamite/blasting may be used in areas where excavation is needed in bedrock areas for construction purposes such as culvert installation, ditching, or road re-shaping. Use of dynamite would only occur in very few specific locations if needed at all. For this action and ESA consultation, the BLM assumed and specified in the BA that dynamite will be used at no more than 10 sites total, up to five of these may be within spring/summer Chinook salmon designated critical habitat.

12. There would be no dispersed camping authorized between Zaza Road and Eagle Creek Bridge for the duration of the project.

13. A gate would be installed near the top of Eagle Creek Road (Zaza Road Junction) to help prevent the public from accessing the road during active construction periods and to prevent potential theft and vandalism of equipment and materials.

14. Implement Best Management Practices (BMPs) and project design measures to minimize or avoid erosion and sediment (e.g., erosion control barriers, mulching, seeding, etc.), minimize adverse impacts to aquatic and riparian habitats, minimize potential impact to special status fish, and avoid impacts to cultural sites.

Table 1. List of activities, number, and location of each activity.

Activity	Eagle Creek	China Creek	Salmon River	Comments
Road Improvements and Maintenance	10.9 miles	0	0	With the exception of 0.2 mile of road, a total of 10.7 miles of road maintenance activities would occur within riparian conservation areas (RCHs). A total of 9.1 miles of road occurs within 200 feet of designated critical habitat for steelhead. A total of 6.35 miles occurs within 200 feet of designated habitat for spring/summer Chinook salmon.
Perennial Tributary Culverts	replacement of 2 culverts	0	0	All culvert replacements occur within 100 feet of Eagle Creek and designated critical habitat for spring/summer Chinook salmon and steelhead.
Intermittent Tributary Culvert Replacement	3 culverts	0	0	All culvert replacements occur within 100 feet of Eagle Creek and designated critical habitat for steelhead.
Provide road drainage for 6 springs/seeps	6 spring/seep drainage structures	0	0	All spring/seep drainage structures would occur within 50–100 feet of Eagle Creek. Eagle Creek provides designated critical habitat for spring/summer Chinook salmon and steelhead.

Activity	Eagle Creek	China Creek	Salmon River	Comments
Bridge riprap placement and streambank stabilization	1 bridge	1 bridge	0	Eagle Creek bridge approx. 0.25 mile from Salmon River. China Creek bridge approx. 75–100 feet from the Salmon River. China Creek and Eagle Creek provide designated critical habitat for spring/summer Chinook salmon and steelhead.
Selective removal of large woody debris in Eagle Creek	2 sites	0	0	At stream mile 0.25, five dead white alder would be removed (potential impacts to bridge). At stream mile 6.7, selective removal of large woody debris jam would occur to prevent stream diversion onto road. Designated critical habitat for steelhead.
At three locations, between Eagle Creek and China Creek Bridges, rock (3-inch minus) would be placed on existing roadbed to protect cultural resources from further erosion	0	0	3 sites	Three sites occur within the Salmon River RCH.
Riprap placement for bank stabilization	6 riprap placements	0	0	Riprap placement would occur below the ordinary high water mark for Eagle Creek. Steelhead designated critical habitat (4 sites) and Chinook salmon designated critical habitat (3 sites).

Table 2. Riprap (Rockery) Placement for Eagle and China Creeks Streambank Stabilization

Approximate Stream Mile	Length of site (feet)	Cubic Yards of Riprap Below Ordinary High Water Mark
Eagle Creek		
3.3	50	13.1
6.8	45	7.5
7.1	35	9.4
Unnamed Tributary 0.18	25	4.5
Unnamed Tributary 0.22	21	3.8
Eagle Creek Bridge 0.05	20	No new riprap, just relocating existing riprap that has sloughed.
China Creek		
China Creek Bridge 0.05	15	5

There will be riprap placements at: (1) two culverts on small perennial streams; (2) three culverts on intermittent streams; (3) four locations on Eagle Creek below the OHWM for bank stabilization; (4) two perennial tributaries to Eagle Creek below the OHWM for bank stabilization; (5) Eagle Creek Bridge; and (5) at China Creek Bridge. Riprap placement will affect a total of approximately 221 feet of stream below OHWM. There will not be any new riprap added to the Eagle Creek Bridge, the riprap will be relocated due to the sloughing of the existing riprap.

1.3.1. Project Design Measures and Best Management Practices

The proposed action would incorporate best management practices (BMPs) and design measures, as needed, to protect and conserve aquatic and riparian habitat, avoid or minimize adverse impacts to special status species (ESA-listed species and BLM-sensitive species), prevent erosion, conserve watershed resources, and avoid adverse impacts to cultural resources. Project design measures and BMPs would include:

1. Construction work below mean high water level in Eagle Creek or China Creek would only occur between July 15–October 1 (DOI–BLM 2009). All heavy equipment would operate from areas above mean high water level.

2. The use of dynamite/blasting is not authorized between October 1–July 15. The use of dynamite/blasting would require pre-project site inspection regarding distance from Eagle Creek, charge weight, and setback distance. Individual dynamite charge weight would not exceed 25 pounds per charge (charges will be separated by at least eight milliseconds). The setback distance is the distance from the blasting site that will be required to prevent harm or death to fish. All areas of the stream within the setback distance will require fish salvage/removal to prevent injury or mortality. The setback distance is dependent on dynamite charge weight (Table 3). If the blasting site were more than 100 feet from Eagle Creek then fish salvage would not be required.

   Upstream and downstream bounds at each site identified for block netting and fish removal would be based on a 100-foot radius from the blasting source. The 100 feet is based on the 86 feet (plus 14 feet additional buffering distance) for the 25-lb. charge as determined in the study summarized in Table 3. For any blasting site within a 100-foot radius of the stream, block nets would be installed and fish would be removed by electro-fishing. The maximum length of a block netted/fish salvaged reach would be 200 feet, i.e., if the blasting site is directly adjacent to the stream. Block nets would be placed in Eagle Creek the day blasting is scheduled to occur and would be removed immediately after all blasting is completed, generally the same day. If block nets need to be in place longer than one day, they would be inspected daily to ensure they are not full of debris and they are still functioning as a barrier to fish movement. Block nets would never be in place longer than 2 days at each site.

   Table 3. Charge weight and setback distance for a 50 kPa pressure threshold (Wright and Hopkey 1998).

Charge weight (lbs.)	25	50	75	100	125	150	200	500	1000
Setback Distance (ft.)	86	122	149	172	193	211	285	385	545

3. All electro-fishing would be conducted in accordance with the National Marine Fisheries Service Guidelines for Electrofishing Water Containing Salmonids Listed under the Endangered Species Act (NMFS 2000) and in accordance with the Idaho Department of Fish and Game (IDFG) provisions for this activity. Electrofishing will be supervised by a

qualified fisheries biologist. Captured fish would be placed upstream and downstream of block nets prior to blasting.

4. As needed, project design measures would be implemented to avoid or minimize erosion or sediment delivery to streams. This would include a combination of the following:

    a. installation of sediment barriers or traps (i.e., sediment fences, straw waddles, straw bales, etc.)

    b. seeding with desired plant species (see Table 4)

    c. mulching with certified weed-free straw mulch

Table 4. Rehabilitation Seed Mixture

Species	Percentage	Pounds per Acre
Streambank Wheatgrass	35%	7 lbs.
Mountain Brome	35%	7 lbs.
Hard Fescue or Sheep Fescue	10%	2 lbs.
Tufted Hairgrass	10%	2 lbs.
Annual Ryegrass	10%	2 lbs.
TOTAL	**100%**	**20 lbs.**

5. Vegetation and soil disturbance on road cuts, fills, turnouts, staging areas, drainage structures, or material source sites would be rehabilitated to avoid or minimize erosion. All erosion/sediment rehabilitation would occur prior to the end of the current field season that construction took place and where practical should be concurrent with construction activity.

6. All new soil/vegetation construction activities outside of existing road prism (e.g., material sources, new turnouts, staging areas, etc.) would have site evaluations and clearances for cultural, historical, special status species, and other resources of concern prior to any ground disturbance. The road prism is defined as the existing soil disturbance from road construction including road surface, fill, and cut areas.

7. Where practical and feasible, drivable water bars will be constructed in areas that divert runoff into upland or riparian vegetation rather than directly into the stream.

8. During improved drainage construction at spring/seep sites, sediment traps or barriers will be installed below outlets (e.g., of culvert or armored crossing) to prevent erosion/sediment from reaching Eagle Creek. Placement of riprap below outlets will be installed to prevent gullying or erosion of fill slope.

9. All construction activity will be in accord with State and Federal permits and authorizations (U.S. Army Corps of Engineers, Idaho Department of Water Resources, and Idaho Department of Environmental Quality).

10. All authorized actions would be in accord with Federal, State, and County laws, and authorized uses and restrictions.

11. Culvert inlets and outlets would be armored with riprap to minimize erosion and sediment.

12. Water will be needed for compaction of culvert trenches, and other work requiring compaction (road grading, backfilling of retaining walls, etc.) Water will not be needed for dust abatement. Any project water withdrawals from fish-bearing streams would be properly screened, and screen openings would not exceed 3/32-inch, and approach velocity would not exceed 0.33 feet per second. NMFS fish screen criteria (NMFS 2011) will be utilized for all water pumping activities. Undercut banks shall not be exposed and connected flow at and below pump location shall be maintained. No more than 20 percent of stream flow shall be pumped. No instream coffer dam construction for water withdrawal would be authorized that would impair juvenile and adult fish upstream or downstream fish passage. Prior to any water withdrawal occurring in a fish-bearing stream, the site would be approved by a Fisheries Biologist. No temporary road construction would be authorized to provide vehicle access to a stream for water withdrawals. Temporary water rights would be required for water withdrawals from streams (Idaho Department of Water Resources).

13. No brushing would occur on streambanks or any area below mean high water level. Riparian vegetation at construction sites will be retained unless removal is absolutely necessary for construction purposes. No brushing activity would occur in areas where shrubs occur on streambanks, provide overhead stream shade, or provide streambank stability. Brushing activity would primarily only occur in road fill, cut, ditches, or branches cut that extend into the road.

14. All fuel storage would have a containment basin for a minimum of 125 percent of fuel volume being stored. All fuel storage, fueling, or maintenance sites would occur in areas that would minimize or avoid potential for any spill reaching water bodies. Slip-on tank capacity for equipment fueling would not exceed 100 gallons. An emergency spill kit would be located on site during construction, at fuel storage site, and at fueling sites. All hazardous materials spills (e.g., fuel, oils, hydraulic fluid, etc.) would be reported immediately to the BLM.

15. Prior to placement of riprap material instream for the three sites on Eagle Creek and at Eagle Creek or China Creek bridges, the work site would have fish herded with nets. Herding fish will consist of individuals wading through the area with nets to move the fish out of the area. The nets will be used only to move fish; no fish will be captured during this process. Where practical, all riprap placement at each specific site would be completed in one day, and fish would be herded immediately prior to riprap placement. Block nets would be installed immediately after fish are flushed to prevent fish from entering the area. Block nets will be placed parallel to the bank, a minimum of 2 feet from any area where riprap is placed, and would form an exclosure area. Block nets would be removed immediately after the instream work is completed.

16. At one location, where large woody debris (LWD) and debris jams are diverting water onto the road and causing erosion to the road prism (stream mile 6.7), the BLM proposes selective removal or relocation of large wood as directed by a BLM Fisheries Biologist. Such action would only occur to protect existing road template and prism and if other alternatives are not practical. Selective removal and/or relocation of LWD would maintain integrity of stream channel stability and instream fish habitat conditions where possible. Prior to removal of any instream LWD or cutting of dead trees below mean high water level (Eagle Creek bridge), the work site preparation would include herding fish out of the immediate area with nets, in a similar manner as described above, and the LWD removal and relocation would be completed within 2 hours.

17. Disturbance of cut and fill areas would be minimized and side casting of material onto fill would be avoided, unless needed for providing improved road drainage and preventing road erosion.

18. All heavy equipment or other machinery would be cleaned of external oil, grease, hydraulic fluids, or other toxic materials; and all leaks repaired prior to arriving at the project site. All machinery and equipment would be washed and cleaned of soil, plant parts, seeds, and other debris before entering the project area. All equipment would be inspected by a Contracting Officer or Representative, or project inspector before unloading. Equipment would be inspected daily for leaks or accumulations of grease, and any identified problems corrected before working near streams or areas that drain directly to streams or wetlands.

19. Existing weed infestations along access roads would be treated prior to project implementation and following project completion. All weed control activities will be conducted in accord with the BA of the BLM 2011–2022 Noxious Weed Control Program (BLM 2011) and corresponding biological opinions from NMFS (NMFS 2012) and the U.S. Fish and Wildlife Service (USFWS 2012). Any updates and amendments to referenced consultation for weed control activities would also be adhered to.

20. All rock and gravel used for road surfacing must be free of noxious weed seed. Borrow pits and stockpiles would not be used if it is determined they are infested with undesirable invasive plants. Riprap material used for bridge abutment and streambank stabilization will meet standards for required rock size. Project inspector will monitor to ensure that none or unmeasurable amounts of fine material or loose dirt occurs in riprap placements.

21. All culvert replacements or new culverts for streams would be properly sized to handle 100-year flow events. All culvert replacements would have approaches rocked/graveled for a distance of 25 feet on each side.

22. Prior to replacing culverts in perennial non-fish-bearing streams, the work site would be de-watered. Culvert replacements in intermittent streams would occur when the stream has no flowing water, if possible, or when flows are very low. If any flowing water

reaches Eagle Creek; a straw bale sediment trap will be placed and staked in the stream to trap sediment.

23. Restrict construction and maintenance activities when soils are wet, to prevent resource damage (indicators include excessive rutting, soil displacement, and erosion).

24. In the event of needing access for conducting road improvements and maintenance activities at lower elevation areas, snow plowing would maintain a minimum of 2 inches of snow on the road, and leave ditches and culverts functional. Side cast material will not include dirt and gravel, and berms would not be left on the shoulder unless drainage holes are opened and maintained. Where feasible, drainage holes would be at sites that avoid diverting runoff flows directly into Eagle Creek.

25. With the exception of snow plowing for access, no road improvement actions would occur in areas where snow cover occurs.

1.3.2. Monitoring

1. The BLM will conduct monitoring to document that environmental design measures were implemented to avoid or minimize adverse impacts to aquatic habitats, riparian areas, and water quality.

2. Monitoring of Eagle Creek and China Creek turbidity would be conducted at sites where there are instream activities such as (1) replacing culverts in the two perennial non-fish-bearing streams (including construction activities and dewatering), (2) construction activities to improve drainage for springs/seeps, (3) installation of riprap material, and (4) selective removal of large woody debris. For actions that involve instream work, turbidity monitoring would occur 150 feet downstream from work sites in Eagle Creek and 50 feet downstream from work sites in China Creek. Work would stop when turbidity levels exceed 50 nephelometric turbidity units (NTU) and work could continue when turbidity is near baseline levels. As needed, additional erosion control measures would be implemented to reduce adverse erosion/sediment during and after construction.

3. The BLM will conduct monitoring to determine effectiveness of the proposed road and bridge maintenance and improvement project in reducing road erosion and sediment in the long term.

4. For any fish salvage that occurs (i.e., for exclusion of fish from any stream reaches affected by blasting, as noted above) the following information will be recorded:

    a. Species, number, and age-class of fish electro-fished;

    b. Length and width of stream where fish salvage occurred and habitat types;

    c. Documentation of any fish injury or mortality observed; and

d. Location and date salvage occurred and personnel conducting salvage.

2. Endangered Species Act: Biological Opinion And Incidental Take Statement

The ESA establishes a national program for conserving threatened and endangered species of fish, wildlife, plants, and the habitat, upon which they depend. As required by section 7(a)(2) of the ESA, each Federal agency must ensure that its actions are not likely to jeopardize the continued existence of endangered or threatened species, or adversely modify or destroy their designated critical habitat. Per the requirements of the ESA, Federal action agencies consult with NMFS and section 7(b)(3) requires that, at the conclusion of consultation, NMFS provide an opinion stating how the agency's actions would affect listed species and their critical habitats. If incidental take is reasonably certain to occur, section 7(b)(4) requires NMFS to provide an ITS that specifies the impact of any incidental taking and includes reasonable and prudent measures (RPMs) and terms and conditions to minimize such impacts.

2.1. Analytical Approach

This opinion includes both a jeopardy analysis and an adverse modification analysis. The jeopardy analysis relies upon the regulatory definition of "jeopardize the continued existence of" a listed species, which is "to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species" (50 CFR 402.02). Therefore, the jeopardy analysis considers both survival and recovery of the species.

This biological opinion relies on the definition of "destruction or adverse modification," which "means a direct or indirect alteration that appreciably diminishes the value of critical habitat for the conservation of a listed species. Such alterations may include, but are not limited to, those that alter the physical or biological features essential to the conservation of a species or that preclude or significantly delay development of such features" (81 FR 7214).

The designations of critical habitat for Snake River Basin steelhead and Snake River Chinook salmon use the term primary constituent element (PCE) or essential features. The 2016 final rule (81 FR 7414; February 11, 2016) that revised the critical habitat regulations (50 CFR 424.12) replaced these terms with physical or biological features (PBFs). The shift in terminology does not change the approach used in conducting a "destruction or adverse modification" analysis, which is the same regardless of whether the original designation identified PCEs, PBFs, or essential features. In this opinion, we use the term PBF to mean PCE or essential feature, as appropriate for the specific critical habitat.

We use the following approach to determine whether a proposed action is likely to jeopardize listed species or destroy or adversely modify critical habitat:

- Evaluate the rangewide status of the species and critical habitat expected to be adversely affected by the proposed action.

- Evaluate the environmental baseline of the species and critical habitat.

- Evaluate the effects of the proposed action on species and their habitat using an exposure–response approach.

- Evaluate cumulative effects.

- In the integration and synthesis, add the effects of the action and cumulative effects to the environmental baseline, and, in light of the status of the species and critical habitat, analyze whether the proposed action is likely to: (1) directly or indirectly reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species; or (2) directly or indirectly result in an alteration that appreciably diminishes the value of critical habitat as a whole for the conservation of a listed species.

- If necessary, suggest a reasonable and prudent alternative (RPA) to the proposed action.

2.2. Rangewide Status of the Species and Critical Habitat

This opinion examines the status of each species that would be adversely affected by the proposed action. The status is determined by the level of extinction risk that the listed species face, based on parameters considered in documents such as recovery plans, status reviews, and listing decisions. This informs the description of the species' likelihood of both survival and recovery. The species status section also helps to inform the description of the species' "reproduction, numbers, or distribution" for the jeopardy analysis. The opinion also examines the condition of critical habitat throughout the designated area, evaluates the conservation value of the various watersheds that make up the designated area, and discusses the function of the PBFs that are essential for the conservation of the species. The Federal Register notices and notice dates for the species and critical habitat listings considered in this opinion are included in Table 5.

Table 5. Listing status, status of critical habitat designations and protective regulations, and relevant Federal Register decision notices for ESA-listed species considered in this opinion.

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

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

Status of the Species

This section describes the present condition of the Snake River spring/summer Chinook salmon evolutionarily significant unit (ESU) and the Snake River Basin steelhead distinct population segment (DPS). NMFS expresses the status of a salmonid ESU or DPS in terms of likelihood of persistence over 100 years (or risk of extinction over 100 years). NMFS uses McElhany et al.'s (2000) description of a viable salmonid population (VSP) that defines "viable" as less than a 5 percent risk of extinction within 100 years and "highly viable" as less than a 1 percent risk of extinction within 100 years. A third category, "maintained," represents a less than 25 percent risk within 100 years (moderate risk of extinction). To be considered viable, an ESU or DPS should have multiple viable populations so that a single catastrophic event is less likely to cause the ESU/DPS to become extinct, and so that the ESU/DPS may function as a metapopulation that can sustain population-level extinction and recolonization processes (ICTRT 2007). The risk level of the ESU/DPS is built up from the aggregate risk levels of the individual populations and major population groups (MPGs) that make up the ESU/DPS.

Attributes associated with a VSP are: (1) abundance (number of adult spawners in natural production areas); (2) productivity (adult progeny per parent); (3) spatial structure; and (4) diversity. A VSP needs sufficient levels of these four population attributes in order to: safeguard the genetic diversity of the listed ESU or DPS; enhance its capacity to adapt to various environmental conditions; and allow it to become self-sustaining in the natural environment (ICTRT 2007). These viability attributes are influenced by survival, behavior, and experiences throughout the entire salmonid life cycle, characteristics that are influenced in turn by habitat and other environmental and anthropogenic conditions. The present risk faced by the ESU/DPS informs NMFS' determination of whether additional risk will appreciably reduce the likelihood that the ESU/DPS will survive or recover in the wild.

The following sections summarize the status and available information on the species and designated critical habitats considered in this opinion based on the detailed information provided by the ESA Recovery Plan for Snake River Spring/Summer Chinook Salmon & Snake River Basin Steelhead (NMFS 2017a), the ESA Recovery Plan for Snake River Fall Chinook Salmon (NMFS 2017b), Biological Viability Assessment Update for Pacific Salmon and Steelhead Listed Under the Endangered Species Act: Pacific Northwest (Ford 2022); 2022 5-Year Review: Summary & Evaluation of Snake River Basin Steelhead (NMFS 2022a); and the 2022 5-Year Review: Summary & Evaluation of Snake River Fall Chinook Salmon (NMFS 2022b). These five documents are incorporated by reference here.

2.2.1. Snake River Spring/Summer Chinook Salmon

The Snake River spring/summer Chinook salmon ESU was listed as threatened on April 22, 1992 (57 FR 14653). This ESU occupies the Snake River basin, which drains portions of southeastern Washington, northeastern Oregon, and north/central Idaho. Large portions of historical habitat were blocked in 1901 by the construction of Swan Falls Dam, on the Snake River, and later by construction of the three-dam Hells Canyon Complex from 1955 to 1967. Dam construction also blocked and/or hindered fish access to historical habitat in the Clearwater River basin as a result of the construction of Lewiston Dam (removed in 1973 but believed to have caused the extirpation of native Chinook salmon in that subbasin). The loss of this historical habitat substantially reduced the spatial structure of this species. The production of (SR) Snake River spring/summer Chinook salmon was further affected by the development of the eight

Federal dams and reservoirs in the mainstem lower Columbia/Snake River migration corridor between the late 1930s and early 1970s (NMFS 2017a).

Several factors led to NMFS' 1992 conclusion that Snake River spring/summer Chinook salmon were threatened: (1) abundance of naturally produced Snake River spring and summer Chinook runs had dropped to a small fraction of historical levels; (2) short-term projections were for a continued downward trend in abundance; (3) hydroelectric development on the Snake and Columbia Rivers continued to disrupt Chinook runs through altered flow regimes and impacts on estuarine habitats; and (4) habitat degradation and reduced streamflows existed throughout the region, along with risks associated with the use of outside hatchery stocks in particular areas (Good et al. 2005). On May 26, 2016, in the agency's 5-year review for Pacific salmon and steelhead, NMFS concluded that the species should remain listed as threatened (81 FR 33468).

Life history. Snake River spring/summer Chinook salmon are characterized by their return times. Runs classified as spring Chinook salmon are counted at Bonneville Dam beginning in early March and ending the first week of June; summer runs are those Chinook salmon adults that pass Bonneville Dam from June through August. Returning adults will hold in deep mainstem and tributary pools until late summer, when they move up into tributary areas and spawn. In general, spring-run type Chinook salmon tend to spawn in higher-elevation reaches of major Snake River tributaries in mid through late August, and summer-run Chinook salmon tend to spawn lower in Snake River tributaries in late August and September (although the spawning areas of the two runs may overlap).

Spring/summer Chinook spawn typically follow a "stream-type" life history characterized by rearing for a full year in the spawning habitat and migrating in early to mid-spring as age-1 smolts (Healey 1991). Eggs are deposited in late summer and early fall, incubate over the following winter, and hatch in late winter and early spring of the following year. Juveniles rear through the summer, and most overwinter and migrate to sea in the spring of their second year of life. Depending on the tributary and the specific habitat conditions, juveniles may migrate extensively from natal reaches into alternative summer-rearing or overwintering areas. Portions of some populations also exhibit "ocean-type" life history, migrating to the ocean during the spring of emergence (Connor et al. 2001; Copeland and Venditti 2009). Snake River spring/summer Chinook salmon return from the ocean to spawn primarily as 4- and 5-year-old fish, after 2 to 3 years in the ocean. A small fraction of the fish return as 3-year-old "jacks," heavily predominated by males (Good et al. 2005).

Spatial structure and diversity. The Snake River ESU includes all naturally spawning populations of spring/summer Chinook in the mainstem Snake River (below Hells Canyon Dam) and in the Tucannon River, Grande Ronde River, Imnaha River, and Salmon River subbasins (57 FR 23458), as well as the progeny of 13 artificial propagation programs (85 FR 81822). The hatchery programs include the McCall Hatchery (South Fork Salmon River), South Fork Salmon River Eggbox, Johnson Creek, Pahsimeroi River, Yankee Fork Salmon River, Panther Creek, Sawtooth Hatchery, Tucannon River, Lostine River, Catherine Creek, Lookingglass Creek, Upper Grande Ronde River, and Imnaha River programs. The historical Snake River ESU also included populations in the Clearwater River drainage and extended above the Hells Canyon Dam complex.

Within the Snake River ESU, the Interior Columbia Technical Recovery Team (ICTRT) identified 28 extant and 4 extirpated or functionally extirpated populations of spring/summer-run Chinook salmon, listed in Table 2 (ICTRT 2003; McClure et al. 2005). The ICTRT aggregated these populations into five MPGs: Lower Snake River, Grande Ronde/Imnaha Rivers, South Fork Salmon River, Middle Fork Salmon River, and Upper Salmon River. For each population, Table 2 shows the current risk ratings for the abundance/productivity and spatial structure/diversity VSP risk parameters.

Spatial structure risk is low to moderate for most populations in this ESU (Ford 2022) and is generally not preventing the recovery of the species. Spring/summer Chinook salmon spawners are distributed throughout the ESU albeit at very low numbers. Diversity risk, on the other hand, is somewhat higher, driving the moderate and high combined spatial structure/diversity risks shown in Table 2 for some populations. Several populations have a high proportion of hatchery-origin spawners—particularly in the Grande Ronde, Lower Snake, and South Fork Salmon MPGs—and diversity risk will need to be lowered in multiple populations in order for the ESU to recover (ICTRT 2007; ICTRT 2010; Ford 2022).

Table 6. Summary of viable salmonid population (VSP) parameter risks, current status, and proposed recovery goal for each population in the Snake River spring/summer Chinook salmon evolutionarily significant unit (Ford 2022; NMFS 2017a).

Major Population Group	Population[2]	VSP Risk Rating[1]		Viability Rating	
		Abundance/ Productivity	Spatial Structure/ Diversity	2022 Assessment	Proposed Recovery Goal[3]
South Fork Salmon River (Idaho)	Little Salmon River	*Insuf. data*	Low	High Risk	Maintained
	South Fork Salmon River mainstem	High	Moderate	High Risk	Viable
	Secesh River	High	Low	High Risk	Highly Viable
	East Fork South Fork Salmon River	High	Low	High Risk	Maintained
Middle Fork Salmon River (Idaho)	Chamberlain Creek	High	Low	High Risk	Viable
	Middle Fork Salmon River below Indian Creek	High	Moderate	High Risk	Maintained
	Big Creek	High	Moderate	High Risk	Highly Viable
	Camas Creek	High	Moderate	High Risk	Maintained
	Loon Creek	*Insuf. data*	Moderate	High Risk	Viable
	Middle Fork Salmon River above Indian Creek	High	Moderate	High Risk	Maintained
	Sulphur Creek	High	Moderate	High Risk	Maintained
	Bear Valley Creek	Moderate	Low	Maintained	Viable
	Marsh Creek	Moderate	Low	Maintained	Viable
Upper Salmon River (Idaho)	North Fork Salmon River	*Insuf. data*	Low	High Risk	Maintained
	Lemhi River	High	High	High Risk	Viable
	Salmon River Lower Mainstem	High	Low	High Risk	Maintained
	Pahsimeroi River	High	High	High Risk	Viable

Major Population Group	Population[2]	VSP Risk Rating[1]		Viability Rating	
		Abundance/ Productivity	Spatial Structure/ Diversity	2022 Assessment	Proposed Recovery Goal[3]
	East Fork Salmon River	High	High	High Risk	Viable
	Yankee Fork Salmon River	High	High	High Risk	Maintained
	Valley Creek	High	Moderate	High Risk	Viable
	Salmon River Upper Mainstem	High	Low	High Risk	Highly Viable
	Panther Creek[4]	*Insuf. data*	High	High Risk	***Reintroduction***
Lower Snake (Washington)	Tucannon River	High	Moderate	High Risk	Highly Viable
	Asotin Creek			***Extirpated***	***Consider Reintroduction***
Grande Ronde and Imnaha Rivers (Oregon/ Washington)[5]	Wenaha River	High	Moderate	High Risk	Highly Viable or Viable
	Lostine/Wallowa River	High	Moderate	High Risk	Highly Viable or Viable
	Minam River	Moderate	Moderate	Maintained	Highly Viable or Viable
	Catherine Creek	High	Moderate	High Risk	Highly Viable or Viable
	Upper Grande Ronde River	High	High	High Risk	Maintained
	Imnaha River	High	Moderate	High Risk	Highly Viable or Viable
	Lookingglass Creek			***Extirpated***	***Consider Reintroduction***
	Big Sheep Creek			***Extirpated***	***Consider Reintroduction***

[1]Risk ratings are defined based on the risk of extinction within 100 years: High = greater than or equal to 25 percent; Moderate = less than 25 percent; Low = less than 5 percent; and Very Low = less than 1 percent.
[2]Populations shaded in gray are those that occupy the action area.
[3]There are several scenarios that could meet the requirements for ESU recovery (as reflected in the proposed goals for populations in Oregon and Washington). What is reflected here for populations in Idaho are the proposed status goals selected by NMFS and the State of Idaho.
[4]Although considered functionally extirpated in the late 1960s, redds have been documented in Panther Creek every year since 2005. Considering the natural spawning that has occured, the role of the Panther Creek population in the MPG recovery scenario may be reevaluated (NMFS 2022a).
[5]At least one of the populations must achieve a very low viability risk rating.

Abundance and productivity. Historically, the Snake River drainage is thought to have produced more than 1.5 million adult spring/summer Chinook salmon in some years (Matthews and Waples 1991), yet in 1994 and 1995, fewer than 2,000 naturally produced adults returned to the Snake River (ODFW and WDFW 2022). From the mid-1990s and the early 2000s, the population increased dramatically and peaked in 2001 at 45,273 naturally produced adult returns. Since 2001, the numbers have fluctuated between 32,324 (2003) and 4,183 (2019) (ODFW and WDFW 2022). Productivity is below recovery objectives for all of the populations (NMFS 2017a) and has been below replacement for nearly all populations in the ESU since 2012 (Nau et al. 2021).

As reported in the most recent viability assessment (Ford 2022), the 5-year (2015–2019) geometric mean abundance estimates for 26 of the 27 evaluated populations are lower than the corresponding estimates for the previous 5-year period by varying degrees, with an average decline of 55 percent. The consistent and sharp declines in 15-year population trends for all populations in the ESU are concerning, with the abundance levels for some populations approaching similar levels to those of the early 1990s when the ESU was listed (NMFS 2022a). No populations within the ESU meet the minimum abundance threshold designated by the ICTRT (NMFS 2022a), and the vast majority of the extant populations are considered to be at high risk of extinction due to low abundance/productivity (Ford 2022). Therefore, all currently extant populations of Snake River spring/summer Chinook salmon will likely have to increase in abundance and productivity in order for the ESU to recover (Table 2). Information specific to populations within the action area is described in the environmental baseline section.

Summary. Overall, this ESU is at a moderate-to-high risk of extinction. While there have been improvements in abundance/productivity in several populations since the time of listing, the majority of populations experienced sharp declines in abundance in recent years. If productivity remains low, the ESU's viability will become more tenuous. If productivity improves, populations could increase again, similar to what was observed in the early 2000s. This ESU continues to face threats from disease; predation; harvest; habitat loss, alteration, and degradation; and climate change.

Snake River Basin Steelhead

The Snake River Basin steelhead was listed as a threatened ESU on August 18, 1997 (62 FR 43937), with a revised listing as a DPS on January 5, 2006 (71 FR 834). This DPS occupies the Snake River basin, which drains portions of southeastern Washington, northeastern Oregon, and north/central Idaho. Reasons for the decline of this species include substantial modification of the seaward migration corridor by hydroelectric power development on the mainstem Snake and Columbia Rivers, loss of habitat above the Hells Canyon Dam complex on the mainstem Snake River, and widespread habitat degradation and reduced streamflows throughout the Snake River basin (Good et al. 2005). Another major concern for the species is the threat to genetic integrity from past and present hatchery practices, and the high proportion of hatchery fish in the aggregate run of Snake River Basin steelhead over Lower Granite Dam (Good et al. 2005; Ford 2011). On May 26, 2016, in the agency's 5-year status review for Pacific salmon and steelhead, NMFS concluded that the species should remain listed as threatened (81 FR 33468).

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

Spatial structure and diversity. This species includes all naturally-spawning steelhead populations below natural and manmade impassable barriers in streams in the Snake River basin of southeast Washington, northeast Oregon, and Idaho, as well as the progeny of six artificial propagation programs (85 FR 81822). The artificial propagation programs include the Dworshak National Fish Hatchery, Salmon River B-run, South Fork Clearwater B-run, East Fork Salmon River Natural, Tucannon River, and the Little Sheep Creek/Imnaha River programs. The Snake River Basin steelhead listing does not include resident forms of *Oncorhynchus mykiss* (rainbow trout) co-occurring with steelhead.

The ICTRT identified 24 extant populations within this DPS, organized into five MPGs (ICTRT 2003). The ICTRT also identified a number of potential historical populations associated with watersheds above the Hells Canyon Dam complex on the mainstem Snake River, a barrier to anadromous migration. The five MPGs with extant populations are the Clearwater River, Salmon River, Grande Ronde River, Imnaha River, and Lower Snake River. In the Clearwater River, the historic North Fork population was blocked from accessing spawning and rearing habitat by Dworshak Dam. Current steelhead distribution extends throughout the DPS, such that spatial structure risk is generally low. For each population in the DPS, Table 3 shows the current risk ratings for the parameters of a VSP (spatial structure, diversity, abundance, and productivity).

Snake River Basin steelhead exhibit a diversity of life-history strategies, including variations in fresh water and ocean residence times. Traditionally, fisheries managers have classified these steelhead into two groups, A-run and B-run, based on ocean age at return, adult size at return, and migration timing. A-run steelhead predominantly spend 1 year in the ocean; B-run steelhead are larger with most individuals returning after 2 years in the ocean. Most Snake River populations support a mixture of the two run types, with the highest percentage of B-run fish in the upper Clearwater River and the South Fork Salmon River; moderate percentages of B-run fish in the Middle Fork Salmon River; and very low percentages of B-run fish in the Upper Salmon River, Grande Ronde River, and Lower Snake River (NWFSC 2015). Maintaining life history diversity is important for the recovery of the species.

The spatial structure risk is considered to be low or very low for the vast majority of populations in this DPS. This is because juvenile steelhead (age-1 parr) were detected in 97 of the 112 spawning areas (major and minor) that are accessible by spawning adults. Diversity risk for populations in the DPS is either moderate or low. Large numbers of hatchery steelhead are released in the Snake River, and while new information about the relative abundance of natural-origin spawners is available, the relative proportion of hatchery adults in natural spawning areas near major hatchery release sites remains uncertain (Ford 2022). Reductions in hatchery-related diversity risks would increase the likelihood of these populations reaching viable status.

Table 7. Summary of viable salmonid population (VSP) parameter risks and overall current status and proposed recovery goals for each population in the Snake River Basin steelhead distinct population segment (Ford 2022; NMFS 2017a; NMFS 2022b). Steelhead from the Little Salmon Population (shaded in grey) could be affected by the proposed action.

Major Population Group	Population[2]	VSP Risk Rating[1]		Viability Rating	
		Abundance/ Productivity	Spatial Structure/ Diversity	2022 Assessment	Proposed Recovery Goal[3]
Lower Snake River[4]	Tucannon River	High	Moderate	High Risk	Highly Viable or Viable
	Asotin Creek	Low	Moderate	Viable	Highly Viable or Viable
Grande Ronde River	Lower Grande Ronde	High	Moderate	High Risk	Viable or Maintained
	Joseph Creek	Low	Low	Viable	Highly Viable, Viable, or Maintained
	Wallowa River	High	Low	High Risk	Viable or Maintained
	Upper Grande Ronde	Very Low	Moderate	Viable	Highly Viable or Viable
Imnaha River	Imnaha River	Very Low	Moderate	Viable	Highly Viable
Clearwater River (Idaho)	Lower Mainstem Clearwater River	Very Low	Low	Highly Viable	Viable
	South Fork Clearwater River	Very Low	Moderate	Viable	Maintained
	Lolo Creek	High	Moderate	High Risk	Maintained
	Selway River	Moderate	Low	Maintained	Viable
	Lochsa River	Moderate	Low	Maintained	Highly Viable
	North Fork Clearwater River			*Extirpated*	*N/A*
Salmon River (Idaho)	Little Salmon River	Very Low	Moderate	Viable	Maintained
	South Fork Salmon River	Moderate	Low	Maintained	Viable
	Secesh River	Moderate	Low	Maintained	Maintained
	Chamberlain Creek	Moderate	Low	Maintained	Viable
	Lower Middle Fork Salmon River	Moderate	Low	Maintained	Highly Viable
	Upper Middle Fork Salmon River	Moderate	Low	Maintained	Viable
	Panther Creek	Moderate	High	High Risk	Viable
	North Fork Salmon River	Moderate	Moderate	Maintained	Maintained
	Lemhi River	Moderate	Moderate	Maintained	Viable
	Pahsimeroi River	Moderate	Moderate	Maintained	Maintained

Major Population Group	Population[2]	VSP Risk Rating[1]		Viability Rating	
		Abundance/ Productivity	Spatial Structure/ Diversity	2022 Assessment	Proposed Recovery Goal[3]
	East Fork Salmon River	Moderate	Moderate	Maintained	Maintained
Salmon River (Idaho)	Upper Mainstem Salmon River	Moderate	Moderate	Maintained	Maintained
Hells Canyon	Hells Canyon Tributaries			*Extirpated*	

[1]Risk ratings are defined based on the risk of extinction within 100 years: High = greater than or equal to 25 percent; Moderate = less than 25 percent; Low = less than 5 percent; and Very Low = less than 1 percent.
[2]Populations shaded in gray are those that occupy the action area.
[3]There are several scenarios that could meet the requirements for ESU recovery (as reflected in the proposed goals for populations in Oregon and Washington). What is reflected here for populations in Idaho are the proposed status goals selected by NMFS and the State of Idaho.
[4]At least one of the populations must achieve a very low viability risk rating.

Abundance and productivity. Historical estimates of steelhead production for the entire Snake River basin are not available, but the basin is believed to have supported more than half the total steelhead production from the Columbia River basin (Mallet 1974, as cited in Good et al. 2005). The Clearwater River drainage alone may have historically produced 40,000 to 60,000 adults (Ecovista et al. 2003), and historical harvest data suggests that steelhead production in the Salmon River was likely higher than in the Clearwater (Hauck 1953). In contrast, at the time of listing in 1997, the 5-year geometric mean abundance for natural-origin steelhead passing Lower Granite Dam, which includes all but one population in the DPS, was 11,462 adults (Ford 2011). Abundance began to increase in the early 2000s, with the single year count and the 5-year geometric mean both peaking in 2015 at 45,789 and 34,179, respectively (ODFW and WDFW 2022). Since 2015, the 5-year geometric means have declined steadily with only 11,557 natural-origin adult returns for the most recent 5-year geometric mean (ODFW and WDFW 2022).

Summary. Based on information available for the 2022 viability assessment, none of the five MPGs are meeting their recovery plan objectives and the viability of many populations remains uncertain. The recent, sharp declines in abundance are of concern and are expected to negatively affect productivity in the coming years. Overall, available information suggests that Snake River Basin steelhead continue to be at a moderate risk of extinction within the next 100 years. This DPS continues to face threats from tributary and mainstem habitat loss, degradation, or modification; predation; harvest; hatcheries; and climate change (NMFS 2022b).

The Little Salmon River steelhead population is made up of A-run steelhead, and includes the Little Salmon River and its tributaries, as well as steelhead-supporting tributaries to the lower Salmon River. Although only one major spawning area was identified within the population, there is a large amount of branched intrinsic potential habitat available for spawning and rearing. The recent 10-year geometric mean natural-origin returns at Lower Granite Dam allocated to this stock group, and the productivity based on the run reconstruction indicate that this population is at "very low" demographic risk. However, this population suffers from a lack of diversity because a large portion of the natural spawning fish are of hatchery origin. Steelhead use the lower 5.1 miles of China Creek and 11 miles of Eagle Creek for Spawning and rearing habitat. Densities in both creeks are relatively low due to degraded habitat.

2.2.2. Status of Critical Habitat

In evaluating the condition of designated critical habitat, NMFS examines the condition and trends of PBFs, which are essential to the conservation of the ESA-listed species because they support one or more life stages of the species. Proper function of these PBFs is necessary to support successful adult and juvenile migration, adult holding, spawning, incubation, rearing, and the growth and development of juvenile fish. Modification of PBFs may affect freshwater spawning, rearing or migration in the action area. Generally speaking, sites required to support one or more life stages of the ESA-listed species (i.e., sites for spawning, rearing, migration, and foraging) contain PBFs essential to the conservation of the listed species (e.g., spawning gravels, water quality and quantity, side channels, or food) (Table 8).

Table 8. Types of sites, essential physical and biological features (PBF), and the species life stage each PBF supports.

Site	Essential PBFs	Species Life Stage
Snake River basin steelhead[a]		
Freshwater spawning	Water quality, water quantity, and substrate	Spawning, incubation, and larval development
Freshwater rearing	Water quantity and floodplain connectivity to form and maintain physical habitat conditions	Juvenile growth and mobility
	Water quality and forage[b]	Juvenile development
	Natural cover[c]	Juvenile mobility and survival
Freshwater migration	Free of artificial obstructions, water quality and quantity, and natural cover[c]	Juvenile and adult mobility and survival
Snake River spring/summer Chinook salmon		
Spawning and juvenile rearing	Spawning gravel, water quality and quantity, cover/shelter (Chinook only), food, riparian vegetation, space (Chinook only), water temperature and access (sockeye only)	Juvenile and adult
Migration	Substrate, water quality and quantity, water temperature, water velocity, cover/shelter, food[d], riparian vegetation, space, safe passage	Juvenile and adult

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

Table 9 describes the geographical extent within the Snake River basin of critical habitat for steelhead and spring/summer Chinook salmon. Critical habitat includes the stream channel and water column with the lateral extent defined by the ordinary high water line, or the bankfull elevation where the ordinary high water line is not defined. For spring/summer Chinook salmon, critical habitat also includes the adjacent riparian zone, which is defined as the area within 300 feet of the line of high water of a stream channel or from the shoreline of standing body of water (58 FR 68543). The riparian zone is critical because it provides shade, streambank stability, organic matter input, and regulation of sediment, nutrients, and chemicals.

Table 9. Geographical extent of designated critical habitat within the Snake River for ESA-listed spring/summer Chinook salmon and steelhead.

ESU/DPS	Designation	Geographical Extent of Critical Habitat
Snake River spring/summer Chinook salmon	58 FR 68543; December 28, 1993 64 FR 57399; October 25, 1999	All Snake River reaches upstream to Hells Canyon Dam; all river reaches presently or historically accessible to Snake River spring/summer Chinook salmon within the Salmon River basin; and all river reaches presently or historically accessible to Snake River spring/summer Chinook salmon within the Hells Canyon, Imnaha, Lower Grande Ronde, Upper Grande Ronde, Lower Snake–Asotin, Lower Snake–Tucannon, and Wallowa subbasins.
Snake River Basin steelhead	70 FR 52630; September 2, 2005	Specific stream reaches are designated within the Lower Snake, Salmon, and Clearwater River basins. Table 21 in the Federal Register details habitat areas within the DPS's geographical range that are excluded from critical habitat designation.

Spawning and rearing habitat quality in tributary streams in the Snake River varies from excellent in wilderness and roadless areas to poor in areas subject to intensive human land uses (NMFS 2015; NMFS 2017a). Critical habitat throughout much of the Interior Columbia, (which includes the Snake River and the Middle Columbia River) has been degraded by intensive agriculture, alteration of stream morphology (i.e., channel modifications and diking), riparian vegetation disturbance, wetland draining and conversion, livestock grazing, dredging, road construction and maintenance, logging, mining, and urbanization. Reduced summer streamflows, impaired water quality, and reduction of habitat complexity are common problems for critical habitat in non-wilderness areas. Human land use practices throughout the basin have caused streams to become straighter, wider, and shallower, thereby reducing rearing habitat and increasing water temperature fluctuations.

In many stream reaches designated as critical habitat in the Snake River basin, streamflows are substantially reduced by water diversions (NMFS 2015; NMFS 2017a). Withdrawal of water, particularly during low-flow periods that commonly overlap with agricultural withdrawals, often increases summer stream temperatures, blocks fish migration, strands fish, and alters sediment transport (Spence et al. 1996). Reduced tributary streamflow has been identified as a major limiting factor for Snake River spring/summer Chinook salmon and Snake River Basin steelhead in particular (NMFS 2017a).

Many stream reaches designated as critical habitat for these species are listed on the Clean Water Act 303(d) list for impaired water quality, such as elevated water temperature (IDEQ 2011). Many areas that were historically suitable rearing and spawning habitat are now unsuitable due to high summer stream temperatures, such as some stream reaches in the upper Grande Ronde River. Removal of riparian vegetation, alteration of natural stream morphology, and withdrawal of water for agricultural or municipal use all contribute to elevated stream temperatures. Water quality in spawning and rearing areas in the Snake River has also been impaired by high levels of sedimentation and, in some areas, also by heavy metal contamination from mine waste (e.g., IDEQ and EPA 2003; IDEQ 2001).

The construction and operation of water storage and hydropower projects in the Columbia River basin, including the run-of-river dams on the mainstem lower Snake and lower Columbia Rivers, have altered biological and physical attributes of the mainstem migration corridor. These alterations have affected juvenile migrants to a much larger extent than adult migrants. However, changing temperature patterns have created passage challenges for summer migrating adults in recent years, requiring new structural and operational solutions (i.e., cold-water pumps and exit "showers" for ladders at Lower Granite and Lower Monumental dams). Actions taken since 1995 that have reduced negative effects of the hydrosystem on juvenile and adult migrants include:

- Minimizing winter drafts (for flood risk management and power generation) to increase flows during peak spring passage;
- Releasing water from storage to increase summer flows;
- Releasing water from Dworshak Dam to reduce peak summer temperatures in the lower Snake River;
- Constructing juvenile bypass systems to divert smolts, steelhead kelts, and adults that fall back over the projects away from turbine units;
- Providing spill at each of the mainstem dams for smolts, steelhead kelts, and adults that fall back over the projects;
- Constructing "surface passage" structures to improve passage for smolts, steelhead kelts, and adults falling back over the projects; and
- Maintaining and improving adult fishway facilities to improve migration passage for adult salmon and steelhead.

Land ownership within the watersheds containing spawning and rearing habitat for the Little Salmon River steelhead population is primarily U.S. Forest Service (41%) and private lands (40%). The BLM, state of Idaho, and other ownerships make up the remaining 19 percent. Land uses on non-Federal lands include agriculture, logging, roads, livestock grazing, recreation, development, road construction, and water development uses. Mining was historically a major land use along the lower Salmon River. Land uses that occur on Federal lands include timber harvest, roads, livestock grazing, mining, and recreation. These land uses have had varying levels of effects on riparian areas, water quality, stream channels, and other critical habitat PBFs. Increased sedimentation and stream channelization have occurred in areas with logging and road building, and many of the large tributaries to the lower Salmon River have been altered by riparian degradation due to grazing, road construction, and development.

Historic and current land uses have caused detrimental effects to the substrate, water temperature, water quality and riparian habitat. Sediment input from land use practices have caused an increase in the deposited sediment in spawning areas. The loss of riparian vegetation has caused an increase in water temperature in many of the tributaries within the Lower Salmon

River. All of these effects are limiting factors for the habitat quality in the Lower Salmon River. The critical habitat within the action area suffers from historic land uses that have degraded water temperature and water quality.

2.2.3. Climate Change Implications for ESA-listed Species and their Critical Habitat

One factor affecting the rangewide status of Snake River salmon and steelhead, and aquatic habitat at large is climate change. As observed by Siegel and Crozier in 2019, long-term trends in warming have continued at global, national, and regional scales. The five warmest years in the 1880 to 2019 record have all occurred since 2015, while 9 of the 10 warmest years have occurred since 2005 (Lindsey and Dahlman 2020). The year 2020 was another hot year in national and global temperatures; it was the second hottest year in the 141-year record of global land and sea measurements and capped off the warmest decade on record (https://www.ncdc.noaa.gov/sotc/global202013). Events such as the 2013–2016 marine heatwave (Jacox et al. 2018) have been attributed directly to anthropogenic warming, as noted in the annual special issue of Bulletin of the American Meteorological Society on extreme events (Herring et al. 2018). The U.S. Global Change Research Program (USGCRP) reports average warming in the Pacific Northwest of about 1.3º F from 1895 to 2011, and projects an increase in average annual temperature of 3.3º F to 9.7º F by 2070 to 2099 (compared to the period 1970 to 1999), depending largely on total global emissions of heat-trapping gases (predictions based on a variety of emission scenarios including B1, RCP4.5, A1B, A2, A1FI, and RCP8.5 scenarios). The increases are projected to be largest in summer (Melillo et al. 2014; USGCRP 2018).

Climate change is expected to alter freshwater, estuarine, and marine habitats. Salmon and steelhead rely on these habitats, making these species particularly vulnerable to climate change. In the marine environment, climate change will impact the physiochemical characteristics, including but not limited to increased sea surface temperatures, increased salinity, acidification, and decreased dissolved oxygen. Not only will these changes have physiological consequence on fish themselves, but they will also alter food webs, reducing ocean productivity for salmonids (Crozier et al. 2020; Siegel and Crozier 2020). Climate change is likely to lead to a preponderance of low productivity years (Crozier et al. 2020). Climate change will have similar impacts on estuarine environments, including sea level rise, increased water temperature, and increased salinity (Wainwright and Weitkamp 2013; Limburg et al. 2016; Kennedy 1990). Like the marine environment, these physiochemical changes will influence biological communities and salmonid productivity.

Several studies have revealed that climate change has the potential to affect ecosystems in nearly all tributaries throughout the Snake River (Battin et al. 2007; ISAB 2007). While the intensity of effects will vary by region (ISAB 2007), climate change is generally expected to alter aquatic habitat as follows:

- Warmer air temperatures will result in diminished snowpack and a shift to more winter/spring rain and runoff, rather than snow that is stored until the spring/summer melt season.
- With a smaller snowpack, watersheds will see their runoff diminished earlier in the season, resulting in lower stream flows in June through September. Peak river flows, and

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

- Water temperatures are expected to rise, especially during the summer months when lower stream flows co-occur with warmer air temperatures. Islam et al. (2019) found that air temperature accounted for about 80 percent of the variation in stream temperatures in the Fraser River, thus tightening the link between increased air and water temperatures.

Higher water temperatures, lower flows during summer and fall, and increased magnitude of winter peak flows are all likely to increase salmon mortality or reduce fitness of surviving fish (Mantua et al. 2009; Battin et al. 2007; Beechie et al. 2013; Wainwright and Weitkamp 2013; Whitney et al. 2016). For example, winter flooding may lead to scouring of redds, reducing egg survival. Altered hydrographs may alter the timing of smolt migration, and lower summer flows will increase competition for limited space and resources. Elevated water temperatures could increase metabolic rates (and therefore food demand), impede migration, decrease disease resistance, increase physiological stress, and reduce reproductive success. As climate change progresses and stream temperatures warm, thermal refugia will be essential to persistence of many salmonid populations (Mantua et al. 2009).

In summary, climate change is expected to make recovery targets for salmon and steelhead populations more difficult to achieve as a result of its impacts on freshwater, estuarine, and ocean conditions. Climate change is expected to alter critical habitat within the Snake River basin by generally increasing water temperature and peak flows, and decreasing base flows. Although these changes will not be spatially homogenous, effects of climate change are expected to decrease the capacity of freshwater critical habitat to support successful spawning, rearing, and migration. Climate will also impact ocean productivity, and is likely to lead to a preponderance of low productivity years (Crozier et al. 2020). Reductions in ocean productivity can reduce the abundance and productivity of salmon and steelhead. Habitat restoration actions can help ameliorate some of the adverse impacts of climate change on salmon. Examples include restoring connections to historical floodplains and freshwater and estuarine habitats to provide fish refugia and areas to store excess floodwaters, protecting and restoring riparian vegetation to ameliorate stream temperature increases, and purchasing or applying easements to lands that provide important cold water or refuge habitat (Battin et al. 2007; ISAB 2007).

2.3. Action Area

“Action area” means all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action (50 CFR 402.02).

The action area consists of 1.8 miles of an unnamed tributary paralleling Eagle Creek Road, 9.1 miles of Eagle Creek to the confluence with the Salmon River, and China Creek from stream mile 0.25 (location of the 5 white alder that will be cut) to the confluence with the Salmon River.

The action area is used by all freshwater life history stages and migration of threatened steelhead and for juvenile rearing of threatened Chinook salmon. Streams within the action area are designated critical habitat and EFH for Chinook salmon, and designated critical habitat for steelhead.

2.4. Environmental Baseline

The "environmental baseline" includes the past and present impacts of all Federal, State, or private actions and other human activities in the action area, the anticipated impacts of all proposed Federal projects in the action area that have already undergone formal or early section 7 consultation, and the impact of State or private actions, which are contemporaneous with the consultation in process (50 CFR 402.02).

The Cottonwood Resource Management Plan designated Eagle Creek and China Creek as Restoration Watersheds (DOI–BLM 2009). Restoration watersheds were identified because biological and physical processes and function do not reflect natural conditions because of past and long-term disturbances. The common effects of these human caused disturbances, which include a variety of land uses (e.g., roads, livestock grazing, timber harvest, recreation, etc.) and natural events (e.g., wildfire, landslides, floods, and severe rain on snow events), which impact aquatic habitats. Active management and restoration may be required to restore these watersheds to their natural range of biological and physical integrity (DOI–BLM 2009). The BLM has not authorized livestock grazing in the Craig Mountain Wildlife Management Area since 1998, and IDFG has cancelled all livestock grazing. The Cottonwood Resource Management Plan (BLM 2009) has identified that BLM lands within the Craig Mountain Wildlife Management Area are not available for future livestock grazing.

Recent high intensity storm events and corresponding high precipitation occurred approximately on February 7 or 8, 2020, resulting in significant debris torrents in non-fish bearing streams within the general analysis area (downstream from China Creek). The debris torrents in the tributaries resulted in severe channel scouring and substrate debris deposition extending into the Salmon River. China Creek also experienced significant substrate debris deposition at the mouth of the stream, but evaluation of the lower reach did not detect significant channel scouring of China Creek.

Eagle Creek is a third order stream that flows into the Salmon River at river mile 13.4 with a total of 16,480 acres in the watershed (12% BLM). Elevations range from 1,080 feet at the mouth of Eagle Creek to 5,245 feet. The mainstem length is approximately 16 miles, and the road is adjacent to the creek for its entire length. The stream gradient ranges from 4 percent to 17 percent with an average of 7 percent. The dominant Rosgen channel type is A3. Stream flows generally range from 0.6 cfs (7-day, 2-year event) to 91.4 cfs (1.5-year event).

Eagle Creek has elevated summer water temperatures; BLM temperature monitoring (stream mile 0.25) has documented highs of 66–70º F (19.0 – 21ºC) during July thru September. The BLM has conducted sediment monitoring in Eagle Creek (stream mile 0.25 and 1.4); fines by depth (spawning gravels) of particles less than 6.3 mm ranged from 18 to 24 percent. Cobble embeddedness (stream mile 0.25 and 1.4) ranged from 23 to 41.66 percent; and surface fines ranged from 3 to 17 percent.

The primary limiting factor for fish in Eagle Creek is elevated summer temperatures and deposited sediment. No authorized livestock grazing in the drainage has occurred since 1998. The primary present land use impacting aquatic habitats is the road paralleling Eagle Creek, which has had periodic wash-outs and has encroached on riparian habitats in localized areas. Since its construction in the 1950s, road repairs and maintenance have been limited to improving drainage on the road (e.g., constructing dips and cleaning culverts). Six sites, totaling 191 feet, have been identified as persistent sources of sediment due to Eagle Creek encroaching on the roadbed. Riprap was placed at the bridge abutments (totaling 30 feet) at the time of construction; over time and numerous high flow events, some of the riprap has been undermined and moved leaving many large pieces in the channel adjacent to the bridge. No other stream segments have been riprapped in Eagle Creek.

Very large wildfires have occurred in the Craig Mountain Wildlife Management Area in the past 20 years, and several of these have occurred in the Eagle Creek drainage and include: Maloney Fire (2000); Big Cougar (2014), and Powerline (2017). The Maloney (2000) and Powerline (2017) were more significant and have resulted in stand replacement of riparian habitats within the lower portion of the Eagle Creek drainage. Shrub re-sprouting and vegetation cover has improved ground cover and reduced active erosion attributed to this fire, after several years of recovery. During 2021 the Snake River Complex Fire burned approximately 125,000 acres, which included the project area. Overall, the Eagle Creek riparian areas received low severity burn impacts.

Plant communities along Eagle Creek road consist of riparian habitats associated with conifers at higher elevation areas and riparian habitats associated with canyon grasslands at lower elevations. Common riparian vegetation associated with mid- to higher-elevation areas include: Douglas-fir, grand-fir, red-osier dogwood, *Alnus* spp., and *syringa*. Common riparian vegetation associated with lower elevation canyon grasslands include: white alder, black cottonwood, black hawthorn, *syringa*, poison ivy, and blackberry. Past wildfires have impacted riparian areas with some stand replacement occurring in the lower 5 miles of the drainage.

The BLM has a long-term monitoring site at stream mile 1.4 of Eagle Creek, fish densities are based on estimates at this site. The BLM noted that no adult Chinook salmon use has been documented in Eagle Creek, but the lower reaches are accessible and it is expected that some limited young-of-the-year rearing for juveniles exist. Eagle Creek is accessible to Chinook salmon from the mouth to at least stream mile 6.6, where a partial/full fish passage barrier occurs during low flows. Limited data suggest that the densities of young-of-the-year Chinook are very low, approximately 0–3 in 100 feet of stream. For this analysis, we used three young-of-the-year Chinook salmon per 100 feet of stream.

Eagle Creek provides spawning and rearing habitat for steelhead from the mouth to approximately stream mile 11.0. Eagle Creek has 10.8 miles of designated critical habitat for steelhead. Based on limited (one long-term monitoring site mentioned above) data, the estimated juvenile steelhead densities were 122 young-of-the-year and 66 over-yearlings for 200 feet of stream. Overall, the density within the project reaches of Eagle Creek may be expected to range from 30–92 steelhead per 100 feet (100–303 steelhead per 100 meters) (approximate estimate only). For the effects analysis, we used 92 steelhead per 100 feet of stream.

China Creek is a third order stream that flows into the Salmon River at river mile 11.1 with a total of 9,400 acres (11% BLM) in the watershed. Elevations range from 1,035 feet at the mouth of China Creek to 5,240 feet. The mainstem length is 9.0 miles. The dominant Rosgen channel type is A3. The stream gradient ranges from 5 to 9 percent, with an average of 6 percent. Stream flows generally range from 0.25 cfs (7-day, 2-year event) to 49 cfs (1.5-year event).

China Creek has elevated summer water temperatures with 7-day average maximums that exceed 68^{o} F (20^{o} C). BLM monitoring estimates that cobble embeddedness is 39 percent, surface fines are12 percent, and fines by depth (spawning gravels) are 20 percent less than 6.3 mm.

The primary limiting factor for fish in China Creek is elevated summer temperatures, deposited sediment, lack of good quality pools, and poor instream cover. No authorized livestock grazing in the drainage has occurred since 1998. Past wildfires have impacted riparian areas with some stand replacement occurring in the lower stream reaches of the drainage.

No adult Chinook salmon use has been documented in China Creek, however, the lower reaches are accessible and it is expected that some limited young-of-the-year rearing for juveniles exist. China Creek is designated critical habitat for Chinook salmon. China Creek also provides 5.1 miles of steelhead designated critical habitat, which is used by spawning and rearing steelhead.

Chinook salmon and steelhead use the mainstem Lower Salmon River as a juvenile and adult migration corridor (Table 10). These two species also use the mainstem Salmon River to a limited extent for rearing habitat. Salmon River tributary drainages with suitable aquatic habitat and that are accessible provide spawning and rearing habitat for Chinook salmon and steelhead. The action area likely does not have spawning habitat for spring/summer Chinook salmon, but these streams may be used to a limited extent for juvenile rearing.

Table 10. List of ESA-listed species and the life stage present in the action area.

Life stage	spring/summer Chinook salmon	steelhead
Adult Migration	APR–JUL Salmon River	AUG–APR Salmon River
Adult Spawning	AUG–SEP Trib. Streams	MAR–JUN Trib. Streams
Adult Overwintering	N/A	NOV–MAR Salmon River
Incubation & Emergence	SEP–MAY Trib. Streams	MAR–JUN Trib. Streams
Juvenile Rearing	1 Year Tributary Streams	1–3 Years Trib. Streams
Smolt Emigration	APR–JUL Salmon River	APR–JUL Salmon River

In general, the overall habitat quality of the action area is slightly degraded. Elevated water temperatures and deposited sediment are the main limiting factors for fish production within the action area. The recent increased frequency and severity of wildfires due to climate change has likely impacted the environmental baseline; effects to the action area include burned riparian areas with increased solar radiation and increased sediment inputs to the streams from debris torrents in tributary streams. However, the action area is part of the Craig Mountain WMA, and many of the past human-caused impacts are no longer occurring or minimized. Steelhead use 11 miles of Eagle Creek and 5.1 miles of China Creek for spawning and rearing habitat. There is no documented spawning of Chinook salmon in either creek. Chinook salmon young-of-the-year use the lower reaches of both creeks as rearing habitat.

2.5. Effects of the Action

Under the ESA, "effects of the action" means 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 that action, that will be added to the environmental baseline (50 CFR 402.02). Indirect effects are those that are caused by the proposed action and are later in time, but still are reasonably certain to occur.

2.5.1. Effects to the Species

There are two species listed under the ESA that are found within the action area. These ESA-listed species are Snake River spring/summer Chinook salmon and Snake River Basin steelhead. The steelhead in the action area belong to the Little Salmon River population in the Salmon River MPG. Origin of juvenile Chinook salmon in the action area is unknown since no spawning occurs in Eagle or China creeks. The likely source of these juveniles are populations within the South Fork Salmon River, Middle Fork Salmon River, and/or Upper Salmon River MPGs.

There is no documented Chinook salmon spawning in Eagle Creek, and the Chinook salmon that are in Eagle Creek are using the lower sections as rearing habitat. Though Chinook salmon have access to the lower 6.6 miles of Eagle Creek, most are found within the first 1 mile upstream of the confluence with the Salmon River. However, we have analyzed the effects from the action on the distance from the confluence to mile 6.6, as the juvenile Chinook salmon likely do have access to the full 6.6 miles of stream. Steelhead use both China and Eagle Creeks for spawning and rearing habitat and can be found throughout the action area.

The proposed action has the potential to affect ESA-listed Chinook salmon and steelhead in a variety of ways: (1) delivery of sediment, (2) riprap placement, (3) noise/disturbance, (4) blasting/pressure, (5) fish salvage, (6) fish herding/crushing, (7) chemical contamination, and (8) water withdrawals. Each of these effects will be discussed in detail in the following sections.

2.5.1.1. Sediment

Freshwater steelhead life stages (i.e., adult migration, spawning, and juvenile development from egg to smolt emigration) will be present at certain locations and in some or all months of the year during the implementation of the proposed action. There is the potential for young-of-the-year Chinook salmon to be rearing within the action area in the lower reaches of both Eagle and China Creeks. The proposed action has the potential to affect steelhead spawning, and Chinook salmon and steelhead rearing through increase of suspended and deposited sediment.

Concentration of suspended sediment in the water column is often measured as turbidity (i.e., scattering of light due to suspended sediment in the water column) in NTUs. The NTUs are often used as an alternative to turbidity measurements expressed in milligrams of sediment per liter of water (mg/L) because readings can be taken instantaneously on-site and, for any project, actions can be altered if readings approach thresholds harmful to fish. The most critical aspects of suspended sediment (turbidity) effects analysis are timing, duration, intensity, and frequency of exposure (Bash et al. 2001).

Suspended sediment can affect fish through a variety of pathways: abrasion (Servizi and Martens 1992), gill trauma (Bash et al. 2001), behavioral effects such as gill flaring, coughing, and avoidance (Berg and Northcote 1985; Bisson and Bilby 1982; Servizi and Martens 1992; Sigler et al. 1984), interference with olfaction and chemosensory ability (Wenger and McCormick 2013), and changes in plasma glucose levels (Servizi and Martens 1987). These effects of suspended sediment on salmonids generally decrease with sediment particle size, and increase with particle concentration and duration of exposure (Bisson and Bilby 1982; Gregory and Northcote 1993; Servizi and Martens 1987; Newcombe and Jensen 1996). The severity of sediment effects is also affected by physical factors such as particle hardness and shape, water velocity, and effects on visibility (Bash et al. 2001). Although increased amounts of suspended sediment cause numerous adverse effects on fish and their environment, salmonids are relatively tolerant of low to moderate levels of suspended sediment. Gregory and Northcote (1993) have shown that moderate levels of turbidity (35 to 150 NTU) can accelerate foraging rates among juvenile Chinook salmon, likely because of reduced vulnerability to predators (camouflaging effect).

Salmon and steelhead tend to avoid suspended sediment above certain concentrations. Avoidance behavior can mitigate adverse effects when fish are capable of moving to an area with lower concentrations of suspended sediment. To avoid turbid areas, salmonids may move laterally (Servizi and Martens 1992) or downstream (McLeay et al. 1987). Avoidance of turbid water may begin as turbidities approach 30 NTU (Sigler et al. 1984; Lloyd 1987). Servizi and Martens (1992) noted a threshold for the onset of avoidance at 37 NTU (300 mg/L total suspended sediment). However, Berg and Northcote (1985) provide evidence that juvenile coho salmon did not avoid moderate turbidity increases when background levels were low, but exhibited significant avoidance when turbidity exceeded a threshold that was relatively high (less than 70 NTU).

When suspended sediment settles out of suspension it becomes deposited sediment, which can cause detrimental effects on spawning and rearing habitats by filling interstitial spaces between gravel particles (Anderson et al. 1996; Suttle et al. 2004). Sedimentation can: (1) bury salmonid eggs or smother embryos; (2) destroy or alter prey habitat; and (3) destroy or alter spawning and rearing habitat (Spence et al. 1996). Excessive sedimentation can reduce the flow of water and supply of oxygen to eggs and alevins in redds. This can decrease egg survival, decrease fry emergence rates (Bash et al. 2001; Cederholm and Reid 1987; Chapman 1988), delay development of alevins (Everest et al. 1987), reduce growth and cause premature hatching and emergence (Birtwell 1999), and cause a loss of summer rearing and overwintering cover for juveniles (Bjornn et al. 1977; Griffith and Smith 1993; Hillman et al. 1987).

Numerous research studies have documented that forest roads are usually the leading contributor of fine sediment to stream channels (Megahan and King 2004). Forest roads can be chronic sources of sediment because road construction, use, and maintenance compact soils, reduce infiltration, intercept, and concentrate surface and subsurface runoff, and limit growth of vegetation. Road ditches can be a direct conduit of sediment from ditch and road erosion into water bodies. Also, roads can increase the frequency and magnitude of mass wasting (i.e., landslides) by one of several ways: improper alignment can undercut the base of unstable slopes; roads can intercept, divert, and concentrate runoff to sections of the hillside that are unaccustomed to overland flow, causing soil saturation and slope failures; and culverts and other drainage structures can become plugged with debris, and the subsequent flow over the road surface can cause failures (Megahan and King 2004).

Road construction work (blading; ditch cleaning; cleaning inlets and outlets of culverts; replacing stream culverts, installing relief culverts, ditch construction; constructing drivable water-bars; removing road berms; selective graveling at specific sites) all have the potential to deliver sediment into streams. The proposed road-related activities would cause some short-term increases in sediment delivery to area streams due to disturbance of the roadbed, culvert replacements, and work on ditch lines and stream crossings. Based on Foltz et al. (2008) the amount of sediment delivered from culvert replacements was 0.4–6.1 lbs. The culvert replacements are in very small or intermittent streams and straw bales will be placed in the stream below the work site. Straw bales have been shown to reduce sediment delivery by 95 percent (Foltz et al. 2008). Given the small size of the streams, the use of straw bales, and the fact that the streams will have little to no flow, the sediment input will most likely be at or below the 0.4 lbs. found by Foltz et al. (2008).

The amount of riprap at each site is small and a considerable amount of the placement will be in the dry, above the water level at the time of placement. The BMPs listed in the proposed action section should reduce sediment inputs during construction. The road improvements themselves are expected to reduce road-related sediment delivery in the long term by improved road drainage from the addition of aggregate, crowning of roads, and added cross drains that reduce the lengths of road sections draining directly to streams.

Short-term sediment effects from the five culverts replacement will primarily occur from the replacement of culverts in the two perennial non-fish-bearing streams. These streams will be routed around the construction site, the work area will be dewatered prior to construction activity, and straw bales will be placed in the streams as a sediment trap. Further, the three perennial streams are very small (0.1–0.2 cfs) and the turbidity that reaches Eagle Creek after re-watering is expected to be very small, if detectable at all. Turbidity will be monitored and if turbidity is measured at 50 NTU above background levels 150 feet downstream, then activities will be stopped and, if needed, measures will be implemented to reduce turbidity, before continuing.

Culvert replacements in three intermittent streams will occur when the stream has no flowing water or very small flows (trickles). Straw bales will be placed as sediment traps if a trickle is detected. Due to the stream being dry or extremely small, sediment is not expected to reach Eagle Creek from the culvert replacement on the two intermittent streams. However, if the channel is not dry, turbidity will be monitored and if turbidity is measured at 50 NTU above background levels 150 feet downstream, then activities will be stopped and, if needed, measures will be implemented to reduce turbidity.

The sediment delivery will be very small and short term. Turbidity is not expected to exceed 50 NTU above background levels at any of the sites. Further, a major portion of the riprap placement will be in the dry, above the water level at time of placement, and the culvert replacements are in very small or dry creeks.

2.5.1.2. Riprap Installation/Large Woody Debris Manipulation

A total of approximately 48 cubic yards of riprap will be used to stabilize the stream bank at the five culverts, the two bridges, and in six locations where the stream contacts the road. The placement of riprap is known to cause adverse effects to stream morphology, fish habitat, and fish populations (Schmetterling et al. 2001; Garland et al. 2002; USFWS 2000). As reported by Washington Department of Fish and Wildlife (WDFW et al. 2002), juvenile life stages of salmonids are especially affected by bank stabilization projects. In low flows, juveniles depend on cover provided by undercut banks and overhanging vegetation to provide locations for resting, feeding, and protection from predation. During periods of high streamflow, juveniles often seek refuge in low velocity microhabitats, including undercut banks and off-channel habitat. Riprap may preclude the future development of new off-channel rearing habitats by fixing the channel in its current location.

In-water placement of riprap has the potential to injure or kill fish located at the project site or immediately downstream from the site. A total of approximately 48 cubic yards of riprap will be used to stabilize the stream bank at the five culverts, the two bridges, and in six locations where the stream contacts the road. Any fish within the area where riprap will be placed have the potential to be crushed or injured during the initial phase of riprap placement activities.

To avoid negative effects on fish from the riprap installation process, fish will be herded out of the four locations along Eagle Creek, two locations in a perennial tributary, and at the two bridge sites (near the mouths of Eagle and China Creeks) prior to work beginning. Herding fish will consist of individuals wading through the area with nets to move the fish out of the area. There will not be any fish captured or handled during the herding process. Block nets will be installed parallel to the streambank to keep fish from reentering the stream edge areas where riprap will be placed. Each individual site where riprap will be placed is quite small, which means that all work at each individual site should be completed within a few hours. The installation of block nets, along with the continual noise and disturbance, will minimize the potential for fish to repopulate the area after being herded away. Block nets will be removed immediately after work is completed at each site.

A large majority of the riprap placement will be in the dry, above the water level at the time of placement, but below the mean high water level. When placing riprap in the water there will not be any excavation of the toe of the stream. Further, the areas receiving riprap have previously been armored, so the new riprap will be placed on old existing riprap. Due to the limited instream riprap placement, and the placement of riprap on already armored banks, the sediment inputs due to riprap placement will be minimal.

It is expected that riprap placement will have effects on some individual ESA-listed anadromous fish. The placement of riprap has the potential to crush fish that were not removed during the installation of block nets. This is discussed in detail in Section 2.5.1.6 below.

Prior to the LWD selective removal at Eagle Creek mile 6.7 and the alder snag-cutting just upstream from the Eagle Creek Bridge, fish would be herded from sites with nets, which would likely result in short term disturbance and displacement of the fish, likely to similar habitats nearby. All instream work would occur between July 15–October 1, which would avoid potential for disturbing spawning steelhead or juvenile fish utilizing the area for winter rearing. The activities of cutting snags and selectively removing pieces of LWD from the debris jam are not expected to cause appreciable disturbance of stream substrate or turbidity. Short-term disturbance or displacement of juvenile steelhead may occur in the area during the activity, which is expected to take 1–2 hours at each site. The pieces of large woody debris removed from the debris jam would be placed in the stream and/or riparian habitat immediately downstream from the site, which would result in localized disturbance but would also retain/slightly alter instream cover aspects that the LWD and snags provide at these sites. Therefore, the proposed LWD and snag activities are expected to temporarily displace fish but not cause harm to individual fish either directly, or indirectly through habitat modification.

Impacts to salmonids herded from riprap placement and LWD removal sites are expected to be very small and short term. Fish may be temporarily displaced for short periods of time. However, the fish will only move a short distance and likely to similar habitat types. Also, the two bridge abutments receiving riprap are previously armored sections of the bank and are suboptimal habitat.

2.5.1.3. Noise/Disturbance

Heavy equipment (e.g., excavator, grader, and dump truck, etc.) operation under the proposed action near streams will create visual, noise, vibration, and water surface disturbances. Popper et al. (2003) and Wysocki et al. (2007) discussed potential impacts to fish from long-term confined exposure to anthropogenic sounds, predominantly air blasts and aquaculture equipment, respectively. Popper et al. (2003) identified possible effects to fish including temporary and potentially permanent hearing loss (via sensory hair cell damage), reduced ability to communicate with species members due to hearing loss, and masking of potentially biologically important sounds. These studies evaluated noise levels ranging from 115 to 190 decibels (dB) referenced at 1 micropascal (re: 1µPa). In the studies identified by Popper et al. (2003) that caused ear damage in fishes, all evaluated fish were caged and thus incapable of moving away from the disturbance. Wysocki et al. (2007) did not identify any adverse impacts to rainbow trout from prolonged exposure to three sound treatments common in confined aquaculture environments (115, 130, and 150 dB root mean square re: 1µPa).

The Federal Highway Administration (FHWA) (2008) has found that noise production by a grader, backhoe, and truck ranges between 80 and 85 dB. Because 150 dB was not found to harm fish (Wysocki et al. 2007), and expected noise levels from roadwork are not expected to exceed 85 dB, noise from roadwork is not expected to harm Chinook salmon and steelhead. Therefore, noise-related disturbances from the proposed action are unlikely to result in injury or death of

Chinook salmon or steelhead. Although noise levels are not expected to injure or kill fish, they may cause fish to move away from the sounds. If fish move, they are expected to travel only short distances (10s of feet) to similar nearby habitat for a few hours in any given day. Because the work noise/visual disturbance will last just a few days at each location, Chinook salmon and steelhead are unlikely to be harmed or harassed by construction noise/vibration or visual disturbances in the action area.

2.5.1.4. Blasting/Pressure

Blasting may be used in areas where excavation is needed in bedrock areas for construction purposes such as culvert installation, ditching, or road re-shaping. It is expected that the use of dynamite would only occur in very few specific locations, if needed at all (BLM stated that it could be used at a maximum of 10 sites). The use of dynamite/blasting would be limited to the July 15–October 1 work window. The use of dynamite/blasting would require pre-project site inspection regarding distance from Eagle Creek, charge weight, and setback distance. Individual dynamite charge weight would not exceed 25 pounds (charges separated by at least 8 milliseconds). The setback distance is the distance from the blasting site that is required to prevent injury or death to fish. All areas of the stream within the setback distance will require fish salvage/removal to prevent injury or mortality. The setback distance for the proposed maximum charge weight (25 lbs.) is 86 feet based on the study summarized in Table 3, above. BLM added 14 feet to that distance for added buffering, and so the setback distance that will be applied is 100 feet. Stream reaches within a 100-foot radius of a blast site would have block nets installed and fish would be removed by electrofishing. All electrofishing would be conducted in accord with National Marine Fisheries Service Guidelines for Electrofishing Water Containing Salmonids Listed under the Endangered Species Act (NMFS 2000) and in accord with IDFG collecting permit provisions. Captured fish would be placed upstream and downstream of block nets prior to blasting.

There is limited information available to predict where fish might be injured by these activities. The potential of injury depends on site-specific factors such as: water depth; distance separating fish from the energy source; elevation of the energy source relative to the stream; duration of activity; type of equipment used for drilling (to set charges) and for blasting; the size of the charge; timing between charges; and BMPs used to dampen the energy. Literature reviews of blasting effects by Kolden and Aimone-Martin (2013) indicate that salmonids are likely to be injured when they are exposed to pressures of 69 kilopascal (kPa) and above. Based on the review by Kolden and Aimone-Martin (2013), the Alaska Department of Fish and Game (Timothy 2013) recommends 50 kPa as the maximum instantaneous pressure from blasting to prevent injury to salmonids, therefore, 50 kPa is used in this assessment as the threshold where salmonids may be injured by blasting.

Heavy equipment operation and drilling have limited potential to injure fish under the proposed action (see Section 2.5.1.3 above) since these activities would not occur in flowing water and fish will be buffered from these effects by distance from road to the stream.

Direct harm from blasting is not expected to occur because fish salvage would occur to remove fish from the area of potential blasting effect (100 feet). No specific locations have been identified where blasting would occur. However, sites that will require the use of dynamite will not exceed 10 sites.

2.5.1.5. Fish Salvage

Electrofishing can cause spinal injury to individual fish, which can lead to slower growth rates (Dalbey et al. 1996). Following the NMFS (2000) electrofishing guidelines will minimize the levels of stress and mortality related to electrofishing. McMichael et al. (1998) found a 5.1 percent injury rate for juvenile middle Columbia River steelhead captured by electrofishing in the Yakima River subbasin. A literature review by Nielson (1998), on the other hand, suggests that 25 percent of the total number of fish electrofished could be injured. Because of the required training BLM proposes and the adherence to NMFS criteria (2000), field crews will be adept at observing fish for signs of stress, knowing proper handling and transport methods, and they will know how and when to adjust electrofishing equipment to minimize stress. For these reasons, the 5.1 percent injury rate will be used in this analysis.

As mentioned above there are no specific proposed blasting locations. However, a maximum of 10 sites may require the use of dynamite. To estimate the effects on fish, we will analyze the maximum number of sites with the maximum number of estimated fish. Because the location of the 10 sites are unknown, NMFS assumes all 10 sites have the potential to have juvenile steelhead and Chinook salmon present.

Salvage of fish could occur in stream reaches that are each up to 200 feet long in Eagle Creek, with a 100-foot setback distance in both directions from the blasting site. Based on information on steelhead density within the area (92 steelhead per 100 feet of stream), a maximum of 184 steelhead would be present in each reach; therefore, for up to 10 such reaches, a maximum of 1,840 steelhead could be captured and handled during fish salvage operations. These estimates are based on the one long-term monitoring site at mile 1.4 of Eagle Creek. Using the 5.1 percent injury rate listed above, 94 steelhead could be injured or killed during fish salvage operations. Using a conservative smolt-to-adult survival rate of 2.0 percent, calculates to a one-time loss of two (calculated 1.88) adult steelhead returning. These numbers are likely overestimates as NMFS used the highest estimated number of steelhead and maximum number of blasting sites/fish salvage reaches.

Salvage of young-of-the-year Chinook salmon at 10 sites of 200 feet with a maximum of four young-of-the-year Chinook at each site (2 chinook per 100 feet of stream) means a maximum of 40 Chinook will be handled during fish salvage operation. Using the 5.1 percent injury rate listed above, two (calculated 2.04) young-of-the-year Chinook could be injured or killed during fish salvage operations. Assuming a smolt to adult return rate of 2.0 percent less than one (calculated 0.04) returning adult would be harmed due to fish salvage operations.

These numbers are likely overestimates. As mentioned above there no documented Chinook spawning and young-of-the-year are generally only using the lower 1 mile of the creeks. Further, we estimated the maximum number of fish for the maximum number of salvage sites, and it is likely that fewer sites will require fish salvage.

2.5.1.6. Fish Herding/Crushing

A total of 221 feet of bank will be armored with riprap. Habitat within the new riprap placement areas is primarily boulder and cobble substrate with a lack of available complex cover. Thirty feet of bank to be riprapped is at the bridge abutments where the bank has previously been armored.

In each of the riprap placement areas, fish will be herded out of the area by two or more individuals starting at the bank's edge, and moving them outward into the stream. During the disturbance of net placement, ESA-listed fish, will likely volitionally move from the area or out from under the coarse substrate. Herding is expected to remove 100 percent of the fish from the isolated area; if any fish remain it would be 10 percent or less (Pers. Comm. with Damon Keen, IDFG Fisheries Biologist, 2014); NMFS will use 90 percent removal for this analysis.

The densities of steelhead in the area is 92 steelhead per 100 feet. With a total of 221 feet of bank this calculates to 208 steelhead could be encountered. Assuming the 90 percent effectiveness of block nets, 21 steelhead will be crushed or killed during riprap placement.

Densities of Chinook salmon are two Chinook per 100 feet of stream. With a total of 221 feet of bank this calculates to four Chinook could be encountered. Assuming the 90 percent effectiveness of block nets, then a total of 0.4 Chinook will be crushed or killed during riprap placement.

These are most likely overestimates since the block nets will only be pushed out 2 to 3 feet away from the bank and the estimates are per 100 feet of stream. Further, the existing habitat at new riprap sites is impacted from the creek eroding the road bed and the displaced riprap at the armored bridge abutments. Higher quality salmonid habitat, particularly cover, is present adjacent to the riprap sites; therefore, it is expected that fish density will be lower at the riprap sites.

2.5.1.7. Chemical Contamination

Potential for a fuel spill affecting a stream exists wherever roads are near streams or road drainage enters streams (Furniss et al. 1991). Petroleum-based products (e.g., fuel, oil, and some hydraulic fluids) contain polycyclic aromatic hydrocarbons, which can cause lethal or cause chronic sublethal effects to aquatic organisms (Neff 1985). These products are moderately to highly toxic to salmonids, depending on concentrations and exposure time. Free oil and emulsions can adhere to gills and interfere with respiration, and heavy concentrations of oil can suffocate fish. Evaporation, sedimentation, microbial degradation, and hydrology act to determine the fate of fuels entering fresh water (Saha and Konar 1986).

Fuel, oil, and other toxic compounds from road equipment can also leak onto the road surface and eventually be delivered to the streams. Ethylene glycol (the primary ingredient in antifreeze) has been shown to result in sublethal effects to rainbow trout at concentrations of 20,400 milligrams per liter (mg/L) (Staples et al. 2001). Brake fluid is also a mixture of glycols and glycol ethers, and has about the same toxicity as antifreeze.

Fueling and storage of fuels is addressed with specific project design measures, such as the inspection of all equipment for leaks prior to, and during work, in or near stream and BMPs for fuel storage and spill contamination. Transport of fuels is regulated through project design measures that minimize the risk of accidents or accidental introduction of these materials to streams. Therefore, fuel delivery to streams will likely occur in at most very small amounts (ounces) that will be rapidly diluted in the stream and thus will not harm fish.

In summary, chemical contamination from equipment spills or leaks and from additional herbicide applications associated with the proposed action is unlikely to measurably affect water quality in the action area and is unlikely to cause harm or harassment of Chinook salmon or steelhead.

2.5.1.8. Water Withdrawals

Streamflows are a critical part of fish habitat and viability. Reducing streamflow can adversely affect the amount and quality of accessible habitat, reduce food availability and forage opportunities, and adversely affect water quality. This, in turn, can affect the growth, survival, and productivity of salmonids. Reducing flow could eliminate access of juvenile salmonids to important habitat types such as undercut banks and tributary streams (Brusven et al. 1986). Similarly, reducing the volume of water in streams would reduce the quantity and variety of prey and would limit foraging opportunities and foraging efficiency of salmonids (Boulton 2003; Davidson et al. 2010; Harvey et al. 2006; Nislow et al. 2004; Stanley et al. 1994). In addition to adverse impacts to habitat and forage, reductions in streamflow can adversely impact water quality by increasing summer water temperatures (Arismendi et al. 2012; Rothwell and Moulton 2001).

Water will be needed for compaction of culvert trenches, and other work requiring compaction (road grading, backfilling of retaining walls, etc.) Water will not be needed for dust abatement. Any project water withdrawals from fish-bearing streams would be properly screened and screen openings would not exceed 3/32-inch and approach velocity would not exceed 0.33 feet per second. Eagle Creek flows generally range from 0.6 cfs (7-day, 2-year event) to 91.4 cfs (1.5 year event). NMFS fish screen criteria (NMFS 2011) will be utilized for all water pumping activities. Any water withdrawal occurring in a fish-bearing stream the site will require approval from a fisheries biologist. With application of the BMPs and the limited amount of this activity, NMFS does not expect the proposed temporary water withdrawals to cause harm or harassment of steelhead or salmon.

Summary

Sediment delivery to the stream will be very small and short-term. Turbidity is not expected to exceed 50 NTU above background levels at any of the sites. Placement of riprap and removal of LWD will have very small short-term impacts on salmonids herded from the work sites. Fish may be temporarily displaced for short periods of time. Although noise levels are not expected to injure or kill fish, they may cause fish to move away from the sounds. If fish move, they are expected to travel only short distances (10s of feet) to similar nearby habitat for a few hours in any given day. Direct harm from blasting is not expected to occur because fish salvage would remove fish from the area of potential blasting effect (100 feet). Chemical contamination from equipment spills or leaks and from additional herbicide applications associated with the proposed action is unlikely to measurably affect water quality in the action area. With application of the BMPs and the limited amount of water withdrawals, NMFS expects the proposed temporary water withdrawals will not cause harm or harassment of steelhead or salmon.

Death or harm will likely occur due to fish salvage, fish herding, and riprap placement operations. Salvage will not exceed a total of 1840 steelhead and 40 young-of-the-year Chinook salmon. The fish salvage associated with the ten blasting sites adjacent to Eagle Creek, have the potential to injure or kill 92 juvenile steelhead and two juvenile Chinook salmon during fish salvage operations. Fish herding will occur at each of the riprap placement sites and will consist of using a block net to herd fish away from the area of riprap placement. A total of 208 steelhead will be displaced with 21 of those being killed in the nets or crushed by riprap. A total of four Chinook salmon will be displaced with 0.4 of those being killed in the nets or crushed by riprap. This equates to a one-time loss of up to two adult steelhead and less than one adult Chinook salmon.

2.5.2. Effects to the Critical Habitat

The action area includes designated critical habitat for spring/summer Chinook salmon and steelhead. The proposed action has the potential to affect the following PBFs: (1) water quality; (2) riparian vegetation; (3) natural cover; (4) forage/food; (5) substrate and (6) safe passage. Any modification of these PBFs may affect freshwater spawning or rearing in the action area. Proper function of these PBFs is necessary to support successful adult and juvenile migration, adult holding, spawning, rearing, and the growth and development of juvenile fish.

The following discussion on PBFs applies to freshwater spawning, rearing, and migration sites for steelhead and Chinook salmon within the action area.

2.5.2.1. Riparian Vegetation and Water Quality

Stream temperatures are the net result of a variety of transfer processes, including radiation inputs, evaporation, convection, conduction, and advection (Brown 1983). Removal of vegetation along streams may result in instream temperature increased during summer months, and in the loss of insulating vegetation that can contribute to colder winter stream temperatures. Water temperature influences the metabolism, behavior, and mortality of fish and other organisms in their environment (Mihurksy and Kennedy 1967).

Unsuitable temperatures can lead to disease outbreaks in migrating and spawning fish, altered timing of migration, and accelerated or retarded maturation. Unsuitable temperatures can also force adult and rearing juvenile fish to find thermal refuge in tributaries where there may be increased risk of predation and/or competition for food, potentially affecting a fish's fitness, thus its survival going into winter. Fish can often survive short durations of temperatures above or below their preferred range, growth is reduced at low temperatures because all metabolic processes are slowed, and at high temperatures because most or all food must be used for maintenance (Bjornn and Reiser 1991).

Colder water temperatures due to loss of insulating vegetation can lead to the formation of frazil or anchor ice on stream bottoms. Incubating embryos can be killed when frazil or anchor ice forms in streams and reduces water interchange between the stream and the redd (Bjornn and Reiser 1991).

The distance of the road from Eagle Creek ranges from 10 feet to 200 feet (averages 30–75 feet). Brushing is proposed to occur as needed along the entire length of the Eagle Creek road (10.9 miles) and would primarily occur within the road cut and fill areas, ditch areas, and branches that overhang the road. Some road segments would have minimal or no brushing while heavier brushing would occur in other areas where branches extend into the road and scrape passing vehicles. Brushing design measures would avoid or minimize any potential for adverse impacts to stream shading. The project design includes measures where riparian vegetation at construction sites will be retained unless removal is necessary for construction purposes. No cutting of live mature trees is proposed to occur within the RCH; however, potential does exist that a few trees (e.g., 1–3) would need to be cut along the 10.9 miles of road if they are a hazard. Culvert replacements at two perennial and three intermittent non-fish-bearing stream crossings would have minimal impacts on riparian vegetation for these small tributary streams and are not expected to have any effects on stream temperature in the short term or long term in Eagle Creek.

It is unlikely that the proposed action will have adverse effects on the riparian vegetation PBF and unlikely that it will increase water temperature in Eagle or China creeks.

Although machinery will be used adjacent to Eagle and China Creeks, the risk of chemical contamination is minor. Fuel storage and equipment fueling will be required to be within areas that cannot reach the creeks or with a containment area to reduce the likelihood of water contamination. Equipment will be cleaned and inspected prior to arrival onsite, ensuring an absence of leaks or drips. Spill containment and cleanup materials will also be on hand to address any spills as quickly as possible. Together, these measures result in only a very small likelihood of chemical contamination.

The proposed action has BMPs that ensure that the riparian vegetation and streamside shading will be retained unless absolutely necessary, and BMPs for fuel storage and herbicide use will ensure that the possibility of adverse effects to riparian vegetation and water quality are very small.

2.5.2.2. Natural Cover

The LWD is one of the most important sources of habitat and cover for fish populations in streams (MacDonald et al. 1991). LWD increases fish habitat complexity, which helps ensure that cover and suitable habitat can be found over a wide range of flow and climatic conditions (MacDonald et al. 1991). Large wood has a major impact on channel forming in smaller streams (Sullivan et al. 1987). The location and orientation of LWD can influence channel meandering and bank stability (Swanson and Lienkaemper 1978; Cherry and Beschta 1989). Often LWD is the most important structural agent forming pools in small streams (MacDonald et al. 1991). Bilby (1984), and Rainville et al. (1985) found that 80 percent of pools in small streams in Washington and the Idaho Panhandle, respectively, were wood associated. The presence of LWD also influences sediment transport in streams by forming depositional sites (MacDonald et al. 1991). Depositional locations associated with LWD were responsible for storing half the sediment in several small streams in Idaho (Megahan and Nowlin 1976). In small streams in forested areas, fine organic material can provide the bulk of the energy and materials entering into aquatic food web (MacDonald et al. 1991), and LWD can provide storage sites for leaves, twigs, and other organic material (MacDonald et al., 1991).

A logjam made up of LWD will be partially removed from mile 6.7 of the Eagle Creek Road. This will be completed due to the debris causing the stream to back up and flow down the road. Some of the LWD will be removed from this logjam, and relocated downstream where it will not impact the road. The natural cover in this reach will not be substantially reduced, with only a portion of the logjam removed, and those pieces re-added downstream.

It is also proposed to remove five dead white alder trees that occur immediately upstream from the Eagle Creek bridge. The purpose of the removal of these dead trees (snags) is prevent the trees from falling on the bridge, or causing a logjam upstream from the bridge that redirects stream flow into the bridge abutments. High stumps will be left on these trees to secure LWD that occurs at the base of these trees, because these trees are below mean high water level. The cut trees will be placed in the riparian zone immediately upstream from the bridge and not removed from the site. Cutting of these trees will result in a minor loss of potential large woody debris recruitment. Stand replacing fires (2000 and 2017) occurring in the lower reaches of Eagle Creek have resulted in abundant riparian snags; as a result, large woody debris recruitment is not presently a limiting factor to stream function in Eagle Creek.

Because a minimal number of mature live trees are proposed to be cut within any RCHs under the proposed action, and because the logjam and snag removals are partial and small, the proposed road maintenance and construction activities are expected to have very small effects on, and not alter the function of the natural cover PBF.

2.5.2.3. Forage/Food

More than half of some fish's food originates from terrestrial sources (Baxter et. al. 2005; Saunders and Fausch 2007). The remaining food is aquatic, with many of these prey species feeding on terrestrial leaf litter. Aquatic invertebrates, another major fish food source, also depend heavily on terrestrial vegetation inputs. Therefore, riparian vegetation and LWD are very important to fish growth and survival in natal streams.

As noted in the preceding sections, the effects on the riparian vegetation and natural cover PBF will be very small. Similarly, the effects of the action on the forage/food PBF are expected to be very small and will not alter function of that PBF in Eagle and China Creeks.

2.5.2.4. *Substrate*

Vegetation and soil disturbances, removal of vegetation, mechanical disturbance, and topographic alteration increases the erodibility of soils and, consequently both the amount of soil available for transport and the likelihood of transport downslope and into streams. Fine sediment (less than 6.33 mm) deposited in spawning areas can trap or smother eggs and embryos, reducing reproductive success of spawning adults. In spawning areas, egg deposition, development, and survival become limited when sediment fills the spaces between gravel, preventing the flow of oxygen and the flushing of metabolic wastes.

The sediment analysis above, Section 2.5.1, discusses how the BMPs proposed will likely be effective in limiting sediment delivery to very small amounts. Because sediment delivery from the proposed action is expected to be small, it will likely not alter the function of the substrate PBF in Eagle and China Creeks.

2.5.2.5. *Fish Passage*

The installation of block nets during fish salvage will create a temporary fish barrier. The block nets will generally be in place for less than 8 hours, and will be in place no more than 2 days at 10 possible locations. This means passage may be blocked in sections of Eagle Creek for up to 20 days total during the 2-year period of the project in-water work period (July 15–October 1). The block nets will be removed immediately after work is completed at each site. The proposed action will take 2 years to complete, and the sites where block nets would be used will be spread across the 3-month in-water periods during the 2 years of the project.

The proposed in-water work window is outside of the migration period for adult steelhead, and does not involve stream sections used by adult spring/summer Chinook salmon. The temporary passage barriers caused by block nets will only affect movement of juvenile fish. Also, 10 sites with block nets in place for a maximum of 2 days at each site is most likely an overestimate. The 10 sites are a maximum number of sites and generally, block nets will be placed and removed within a single day. Given the short period of time passage will be impeded, block net installation will have short-term (1 to 2 days each) effects on the safe passage PBF in Eagle Creek.

The proposed action will have very limited effects on critical habitat. The riparian vegetation, water quality, natural cover, forage/food, and substrate PBFs will be subjected to extremely small short-term effects from road construction, culvert replacements, and brushing. The main effect to critical habitat will be the blockage of passage by block nets. However, this effect will be small as the work window is outside of adult migration and each block net will only be in place for 1–2 days at a time.

2.6. Cumulative Effects

"Cumulative effects" are those effects of future State or private activities, not involving Federal activities, that are reasonably certain to occur within the action area of the Federal action subject to consultation (50 CFR 402.02 and). Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the ESA.

Some continuing non-Federal activities are reasonably certain to contribute to climate effects within the action area. However, it is difficult if not impossible to distinguish between the action area's future environmental conditions caused by global climate change that are properly part of the environmental baseline *vs.* cumulative effects. Therefore, all relevant future climate-related environmental conditions in the action area are described earlier in the discussion of environmental baseline (Section 2.4).

Eagle and China Creek basins have a moderate risk for effects of activities occurring on private and State lands. Primary potential for adverse effects is associated with increased development, residences, roads, highways, timber harvest, livestock grazing, and recreation use. No livestock grazing is authorized on IDFG lands in the Craig Mountain Wildlife Management Area. Future activities reasonably certain to occur on private and State lands within the action area include ongoing existing private land livestock grazing, private land development (residences) and private land vegetation treatments and timber harvest. The BLM is not aware of any specific timber sales occurring on private or State lands within the action area watersheds. It is likely that cumulative effects in the action area will continue at current levels.

2.7. Integration and Synthesis

The Integration and Synthesis section is the final step in our assessment of the risk posed to species and critical habitat as a result of implementing the proposed action. In this section, we add the effects of the action (Section 2.5) to the environmental baseline (Section 2.4) and the cumulative effects (Section 2.6), taking into account the status of the species and critical habitat (Section 2.2), to formulate the agency's opinion as to whether the proposed action is likely to: (1) reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing its numbers, reproduction, or distribution; or (2) appreciably diminish the value of designated or proposed critical habitat as a whole for the conservation of the species. Juvenile Snake River basin (SRB) steelhead and SR spring/summer Chinook salmon will be present in the action area during implementation of the project. Steelhead use 11 miles of Eagle Creek and 5.1 miles of China Creek for spawning and rearing habitat. There is no documented spawning of Chinook salmon in either creek. Chinook salmon young-of-the-year use the lower reaches of both creeks as rearing habitat.

The potential project effects of noise, chemical contamination, and suspended sediment will be minimized using best management practices. The possibility of impingement/entrainment will be minimized by implementing the proposed fish exclusion procedure. Death or harm will likely occur due to fish salvage, fish herding, and riprap placement operations. Salvage will not exceed a total of 1840 steelhead and 40 young-of-the-year Chinook salmon. The fish salvage associated with the ten blasting sites adjacent to Eagle Creek, have the potential to injure or kill 92 juvenile steelhead and two juvenile Chinook salmon during fish salvage operations. Fish herding will occur at each of the riprap placement sites and will consist of using a block net to herd fish away from the area of riprap placement. A total of 208 steelhead will be displaced with 21 of those being killed in the nets or crushed by riprap. A total of four Chinook salmon will be displaced with 0.4 of those being killed in the nets or crushed by riprap. This equates to a one-time loss of up to two adult steelhead and less than one adult Chinook salmon.

Within the SRB steelhead Distinct Population Segment, the Salmon River MPG is the only MPG potentially affected by the proposed action. The Little Salmon River SRB steelhead population, which is the only population affected by the proposed action, is the only population in the MPG with a Viability Rating of viable; the other populations are rated as Maintained (ten populations) or High Risk (one population). The Little Salmon River population also has an Abundance/ Productivity rating of Very Low Risk and a Spatial Structure and Diversity rating of Moderate, making it a strong component of the viability rating for the Little Salmon River MPG. It is expected that few steelhead juveniles will be exposed and adversely affected as a result of the proposed action. The loss of 113 steelhead fry will not alter the viable status of the Little Salmon River population, and similarly will not change the viable status of the Salmon River MPG. Because we expect no change to the status of the Salmon River MPG, we do not think the implementation of the proposed action will change the survival and recovery of the SRB steelhead DPS.

Chinook salmon utilization of the action area is limited; the closest known Chinook salmon spawning area is 42 miles up the Salmon River from the action area. Small numbers of juvenile Chinook salmon appear to use lower Eagle Creek for rearing. Fish salvage, herding, and riprap placement are estimated to kill a total of less than three juveniles. The origin of the juveniles is unknown but likely come from one or more of the following Salmon River MPGs: (1) South Fork Salmon River MPG, (2) Middle Fork Salmon MPG, or (3) the Upper Salmon River MPG. All of the populations within these MPGs (n=22) have Viability Ratings of High Risk with the exception of two (Marsh Creek and Bear Valley Creek are Maintained). The loss of 2.4 Chinook salmon young-of-the-year, which equates to a fraction of one adult fish, will not alter the viable status of any of the Salmon River populations, and similarly will not change the viable status of any of the Salmon River MPGs. Because we expect no change to the status of these Salmon River MPGs, we do not think the implementation of the proposed action will change the survival and recovery of the SR spring/summer Chinook salmon ESU.

After reviewing and analyzing the current status of the listed species, the environmental baseline within the action area, the effects of the proposed action, the effects of other activities caused by the proposed action, and cumulative effects, it is NMFS' biological opinion that the proposed action is not likely to jeopardize the continued existence of SRB steelhead or SR spring/summer Chinook salmon.

The action area is designated critical habitat for SRB steelhead and SR spring/summer Chinook salmon. The area provides migratory, spawning, and rearing habitat for adult and juvenile steelhead as well as providing rearing habitat for juvenile Chinook salmon. The primary impacts to critical habitat are derived from the adjacent road (sediment inputs) and wildfires (sediment, loss of riparian cover, and increased water temperatures). The riparian vegetation, water quality, natural cover, forage/food, and substrate PBFs will be subjected to extremely small short-term effects from the proposed road maintenance/improvements, culvert replacements in tributary streams, and brushing. The main effect to critical habitat will be the blockage of passage by block nets. The proposed in-water work window is outside of the migration period for adult steelhead, and the action area does not include stream sections used by adult spring/summer Chinook salmon. Juvenile Chinook salmon and steelhead may be present during the work window. Given the short period of time passage will be impeded, block net installation will have short term and minimal effects on the safe passage PBF in Eagle Creek. The proposed project includes upsizing tributary culverts to handle 100-year flood events and actions to reduce road related sediment; therefore, long-term effects should be beneficial to critical habitat.

Considering the baseline, status of critical habitat, and cumulative effects, it is unlikely that the effects of the proposed action will appreciably diminish the value of designated critical habitat in the Eagle or China Creek watersheds or Salmon River basin. Because the value of designated critical habitat will not likely be appreciably reduced at these scales, it is unlikely that the value of designated critical habitat will be reduced as a whole for the conservation of the Snake River Basin steelhead or Snake River spring/summer Chinook salmon.

2.8. Conclusion

After reviewing and analyzing the current status of the listed species and critical habitat, the environmental baseline within the action area, the effects of the proposed action, the effects of other activities caused by the proposed action, and cumulative effects, it is NMFS' opinion that the proposed action is not likely to jeopardize the continued existence of SRB steelhead or Snake River spring/summer Chinook salmon, and is not likely to destroy or adversely modify their designated critical habitat.

2.9. Incidental Take Statement

Section 9 of the ESA and Federal regulations pursuant to section 4(d) of the ESA prohibit the take of endangered and threatened species, respectively, without a special exemption. "Take" is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. "Harm" is further defined by regulation to include significant habitat modification or degradation that actually kills or injures fish or wildlife by significantly impairing essential behavioral patterns, including breeding, spawning, rearing, migrating, feeding, or sheltering (50 CFR 222.102). On an interim basis, NMFS interprets "Harass" to mean "Create the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns, which include, but are not limited to, breeding, feeding, or sheltering." "Incidental take" is defined by regulation as takings that result from, but are not the purpose of, carrying out an otherwise lawful activity conducted by the Federal agency or applicant (50 CFR 402.02). Section 7(b)(4) and section 7(o)(2) provide that taking that is incidental to an otherwise lawful agency action is not considered to be prohibited taking under the ESA if that action is performed in compliance with the terms and conditions of this ITS.

2.9.1. Amount or Extent of Take

The proposed action is reasonably certain to result in incidental take of Chinook and steelhead. NMFS is reasonably certain the incidental take described here will occur because young-of-the-year Chinook and juvenile steelhead currently occur in parts of the action area, and/or could occur there in the future during the proposed action time period. Those fish may be exposed to effects of the proposed action. In this biological opinion, NMFS determined that incidental take is reasonably certain to occur as follows:

1. Effects ranging from short-term harm and harassment to death of juvenile steelhead during fish salvage for up to 10 sites that may require blasting.

2. Effects ranging from short-term harm and harassment to death of young-of-the-year Chinook during fish salvage for up to five sites that may require blasting.

3. Effects ranging from short-term harm and harassment to death (crushing) of juvenile steelhead during fish herding and riprap placement.

4. Effects ranging from short-term harm and harassment to death (crushing) of young-of-the-year Chinook salmon during fish herding and riprap placement.

As described in the analysis (Sections 2.5.1.5 and 2.5.1.6), NMFS was able to quantify the number of steelhead and Chinook salmon that could be harmed or killed during fish salvage, and fish herding operations.

NMFS estimated the total number of Chinook salmon and steelhead that may experience adverse effects, ranging from short-term stress to death, when fish are captured and handled at any of potential blasting sites. NMFS estimates that up to a total of 1,840 juvenile steelhead and 40 juvenile Chinook salmon may be subjected to electrofishing during fish salvage, with up to 92 of those steelhead and two Chinook salmon being killed or injured by electroshocking. NMFS shall consider the extent of take exceeded if more than a total of 1,840 steelhead and 40 Chinook salmon are captured and handled at the fish salvage sites, and if more than 92 steelhead or two Chinook salmon are killed or injured in total during fish salvage at the 10 blasting sites.

NMFS also enumerated the total number of Chinook salmon and steelhead that may experience effects ranging from short-term stress by being displaced by herding, stuck in the nets, and killed or crushed by riprap placements. NMFS estimated that a total of 208 steelhead could be encountered with 21 of these being killed, and a total of four young-of-the-year Chinook could be encountered with 0.4 killed. It would be very challenging if not impossible to enumerate the number of fish that were moved during herding, and even harder to determine how many fish, if any, were crushed by riprap. The linear length of riprap placement was used to determine the number of steelhead and Chinook salmon affected by herding and riprap installation. Since riprap placement will cause direct mortality, NMFS will use the length of the bank being riprapped as a surrogate for take. NMFS shall consider the extent of take exceeded if more than 221 feet of bank is armored with riprap.

2.9.2. Effect of the Take

In this opinion, NMFS determined that the amount or extent of anticipated take, coupled with other effects of the proposed action, is not likely to result in jeopardy to the species or destruction or adverse modification of critical habitat.

2.9.3. Reasonable and Prudent Measures

"Reasonable and prudent measures" are measures that are necessary or appropriate to minimize the impact of the amount or extent of incidental take (50 CFR 402.02).

The BLM and the Corps [for those measures relevant to the Clean Water Act (CWA) section 404 permit] shall comply with the following RPMs:

1. Ensure completion of a monitoring and reporting program to confirm that the terms and conditions in this ITS are effective in avoiding and minimizing incidental take from permitted activities and ensuring amount/extent of incidental take defined herein is not exceeded.

2.9.4. Terms and Conditions

In order to be exempt from the prohibitions of section 9 of the ESA, the Federal action agency must comply (or must ensure that any applicant or contractor complies) with the following terms and conditions. The BLM, the Corps, or any applicant has a continuing duty to monitor the impacts of incidental take and must report the progress of the action and its impact on the species as specified in this ITS (50 CFR 402.14). If the entity to whom a term and condition is directed does not comply with the following terms and conditions, protective coverage for the proposed action would likely lapse.

1. The following terms and conditions implement RPM 1:

    a. All steelhead and Chinook salmon handled, injured, or killed shall be counted, and recorded with the date of occurrence to ensure incidental take is not exceeded. If the amount of extent of take is exceeded, stop project activities, and notify NMFS immediately.

    b. Annual reports summarizing the results of all monitoring shall be submitted to NMFS by December 31. The annual project reports shall also include a statement on whether all the terms and conditions of this opinion were successfully implemented.

    c. The post-project reports shall be submitted electronically to: nmfswcr.srbo@noaa.gov. Hard copy submittals may be sent to the following address:

        National Marine Fisheries Service
        Attn: Ken Troyer
        800 Park Boulevard
        Plaza IV, Suite 220
        Boise, Idaho 83712-7743

d. NOTICE: If a steelhead or salmon becomes sick, injured, or killed as a result of project-related activities, and if the fish would not benefit from rescue, the finder should leave the fish alone, make note of any circumstances likely causing the death or injury, location, and number of fish involved, and take photographs, if possible. If the fish in question appears capable of recovering if rescued, photograph the fish (if possible), transport the fish to a suitable location, and record the information described above.

2.10. Conservation Recommendations

Section 7(a)(1) of the ESA directs Federal agencies to use their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of the threatened and endangered species. Specifically, conservation recommendations are suggestions regarding 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).

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

Please notify NMFS if the BLM or the Corps, or another entity, carries out these recommendations so that we will be kept informed of actions that minimize or avoid adverse effects and those that benefit listed species or their designated critical habitats.

2.11. Reinitiation of Consultation

This concludes formal consultation for the BLM and the Corps.

As 50 CFR 402.16 states, reinitiation of consultation is required and shall be requested by the Federal agency or by NMFS 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 incidental taking specified in the ITS is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the identified action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in the biological opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action.

3. Magnuson–Stevens Fishery Conservation and Management Act Essential Fish Habitat Response

Section 305(b) of the MSA directs Federal agencies to consult with NMFS on all actions or proposed actions that may adversely affect EFH. Under the MSA, this consultation is intended to promote the conservation of EFH as necessary to support sustainable fisheries and the managed species' contribution to a healthy ecosystem. For the purposes of the MSA, EFH means "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." Adverse effect means any impact that reduces quality or quantity of EFH, and may include direct or indirect physical, chemical, or biological alteration of the waters or substrate and loss of (or injury to) benthic organisms, prey species and their habitat, and other ecosystem components, if such modifications reduce the quality or quantity of EFH. Adverse effects on EFH may result from actions occurring within EFH or outside of it and may include site-specific or EFH-wide impacts, including individual, cumulative, or synergistic consequences of actions (50 CFR 600.810). Section 305(b) of the MSA also requires NMFS to recommend measures that can be taken by the action agency to conserve EFH. Such recommendations may include measures to avoid, minimize, mitigate, or otherwise offset the adverse effects of the action on EFH [CFR 600.905(b)].

This analysis is based, in part, on the EFH assessment provided by the BLM and descriptions of EFH for Pacific Coast salmon (PFMC 2014); contained in the fishery management plans developed by the Pacific Fishery Management Council (PFMC) and approved by the Secretary of Commerce.

3.1. Essential Fish Habitat Affected by the Project

The action area, as described in Section 2.3 of the above opinion, is also EFH for Chinook salmon (PFMC 2014). The PFMC designated the following five habitat types as habitat areas of particular concern (HAPCs) for salmon: complex channel and floodplain habitat, spawning habitat, thermal refugia, estuaries, and submerged aquatic vegetation (PFMC 2014). The proposed action may adversely affect the following HAPCs: complex channel and floodplain habitat and spawning habitat.

3.2. Adverse Effects on Essential Fish Habitat

Based on the information provided in the BA and the analysis of effects presented in the ESA portion of this document, NMFS concludes that the proposed action will have the following adverse effects on EFH designated for Chinook salmon:

1. Temporary migration barriers due to block net installation for fish salvage.

3.3. Essential Fish Habitat Conservation Recommendations

NMFS believes that the following conservation recommendation is necessary to avoid, mitigate, or offset the impact that the proposed action has on EFH.

a. Blasting and fish salvage shall not involve more than ten 200-foot reaches of Eagle Creek.

b. For those actions requiring fish salvage and block net installation, block nets shall not be in place for more than 2 days, and shall be removed immediately after the work at each site is completed.

c. Block nets shall only be installed within the approved work window in the opinion.

Fully implementing this EFH conservation recommendation would protect, by avoiding or minimizing the adverse effects described in Section 3.2, above, approximately 10 (1 acre at each of the fish salvage sites) acres of designated EFH for Pacific Coast salmon.

3.4. Statutory Response Requirement

As required by section 305(b)(4)(B) of the MSA, BLM and the Corps must provide a detailed response in writing to NMFS within 30 days after receiving an EFH Conservation Recommendation. Such a response must be provided at least 10 days prior to final approval of the action if the response is inconsistent with NMFS' EFH Conservation Recommendation unless NMFS and the Federal agency have agreed to use alternative timeframes for the Federal agency response. The response must include a description of measures proposed by the agency for avoiding, minimizing, mitigating, or otherwise offsetting the impact of the activity on EFH. In the case of a response that is inconsistent with the conservation recommendation, the BLM and the Corps must explain their reasons for not following the recommendation, including the scientific justification for any disagreements with NMFS over the anticipated effects of the action and the measures needed to avoid, minimize, mitigate, or offset such effects [50 CFR 600.920(k)(1)].

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

3.5. Supplemental Consultation

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

4. DATA QUALITY ACT DOCUMENTATION AND PRE-DISSEMINATION REVIEW

The DQA specifies three components contributing to the quality of a document. They are utility, integrity, and objectivity. This section of the opinion addresses these DQA components, documents compliance with the DQA, and certifies that this opinion has undergone pre-dissemination review.

4.1. Utility

Utility principally refers to ensuring that the information contained in this consultation is helpful, serviceable, and beneficial to the intended users. The intended users of this opinion are the BLM and the Corps. Other interested users could include the Nez Perce Tribes. Individual copies of this opinion were provided to the BLM and the Corps. The document will be available within 2 weeks at the NOAA Library Institutional Repository [https://repository.library.noaa.gov/welcome]. The format and naming adheres to conventional standards for style.

4.2. Integrity

This consultation was completed on a computer system managed by NMFS in accordance with relevant information technology security policies and standards set out in Appendix III, 'Security of Automated Information Resources,' Office of Management and Budget Circular A-130; the Computer Security Act; and the Government Information Security Reform Act.

4.3. Objectivity

Information Product Category: Natural Resource Plan.

Standards: This consultation and supporting documents are clear, concise, complete, and unbiased; and were developed using commonly accepted scientific research methods. They adhere to published standards including the NMFS ESA Consultation Handbook, ESA regulations, 50 CFR 402.01 et seq., and the MSA implementing regulations regarding EFH, 50 CFR 600.

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

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

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

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