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 97232-1274

Refer to NMFS No: WCRO-2022-01541

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October 13, 2022

Rowena DeFato
Regional Environmental Officer
U.S. Department of Commerce
Economic Development Administration
915 Second Ave, Room 1890
Seattle, WA 98174

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

Re: Endangered Species Act Section 7(a)(2) Biological Opinion and Magnuson–Stevens Fishery Conservation and Management Act Essential Fish Habitat Response Abstein Road Bridge Replacement, Valley County, Idaho, HUC 1706020802.

Dear Ms. DeFato and Lt. Col. KingSlack:

Thank you for your letter of June 30, 2022, requesting initiation of consultation 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 Abstein Road Bridge Project. NMFS also reviewed the likely effects of the proposed action on essential fish habitat (EFH), pursuant to section 305(b) of the Magnuson–Stevens Fishery Conservation and Management Act [16 U.S.C.1855(b)], and concluded that the action would adversely affect the EFH of Chinook salmon. Therefore, we have included the results of that review in Section 3 of this document.

On July 5, 2022, the U.S. District Court for the Northern District of California issued an order vacating the 2019 regulations that were revised or added to 50 CFR part 402 in 2019 ("2019 Regulations," see 84 FR 44976, August 27, 2019) without making a finding on the merits. On September 21, 2022, the U.S. Court of Appeals for the Ninth Circuit granted a temporary stay of the district court's July 5 order. As a result, the 2019 regulations are once again in effect, and we are applying the 2019 regulations here. For purposes of this consultation, we considered whether the substantive analysis and conclusions articulated in the biological opinion and incidental take statement would be any different under the pre-2019 regulations. We have determined that our analysis and conclusions would not be any different.

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

As required by section 7 of the ESA, NMFS provides an incidental take statement 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 Economic Development Administration, the U. S. Army Corps of Engineers, and any permittee who performs any portion of the action, must comply with in order to be exempt from the ESA take prohibition.

This document also includes the results of our analysis of the action's effects on EFH pursuant to section 305(b) of the MSA, and includes three Conservation Recommendations to avoid, minimize, or otherwise offset potential adverse effects on EFH. These Conservation Recommendations are similar but not identical to the ESA conservation terms and conditions. Section 305(b)(4)(B) of the MSA requires Federal agencies to provide a detailed written response to NMFS within 30 days after receiving these recommendations. If the response is inconsistent with the EFH Conservation Recommendations, the Economic Development Administration or Corps of Engineers 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.

If you have any questions concerning this consultation, or if you require additional information, you may contact Jim Morrow, Snake River Basin Office at 208-378-5695 or jim.morrow@noaa.gov.

Sincerely,

Michael P. Tehan
Assistant Regional Administrator
Interior Columbia Basin Office

Enclosure

cc: C. Griffith – USACE
K. Urbanek – USACE
C. Nalder – PNF
K. Hendricks – USFWS
M. Lopez – NPT
C. Colter – SBT

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

Abstein Road Bridge Project

NMFS Consultation Number: WCRO-2022-01541

Action Agencies: Economic Development Administration; U. S. Army Corps of Engineers

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 spring/summer Chinook salmon (*Oncorhynchus tshawytscha)*	Threatened	Yes	No	Yes	No
Snake River Basin steelhead (*O. mykiss*)	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 for Interior Columbia Basin Office

Date: October 13, 2022

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ACRONYMS

ATV	All-Terrain Vehicle
BA	Biological Assessment
BMP	Best Management Practice
COE	U.S. Army Corps of Engineers
DBH	Diameter at Breast Height
DPS	Distinct Population Segment
DQA	Data Quality Act
EDA	Economic Development Administration
EFH	Essential Fish Habitat
EFSFSR	East Fork South Fork Salmon River
EPA	Environmental Protection Agency
ESA	Endangered Species Act
ESCP	Erosion and Sediment Control Plan
ESU	Evolutionarily Significant Unit
fps	Feet Per Second
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
IDWR	Idaho Department of Water Resources
ISPWC	Idaho Standards for Public Works Construction
ITD	Idaho Transportation Department
ITS	Incidental Take Statement
LWD	Large Woody Debris
MPG	Major Population Group
MSA	Magnuson–Stevens Fishery Conservation and Management Act
NMFS	National Marine Fisheries Service
NTU	Nephelometric Turbidity Unit
OHWM	Ordinary High Water Mark
Opinion	Biological Opinion
OSHA	Occupation Safety and Health Administration
PBF	Physical or Biological Feature
PCE	Primary Constituent Element
PDF	Project Design Features
PFMC	Pacific Fishery Management Council
RPA	Reasonable and Prudent Alternative
RPM	Reasonable and Prudent Measure
SFSR	South Fork Salmon River
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
USGCRP	U.S. Global Change Research Program
VSP	Viable Salmonid Population

1. INTRODUCTION

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

1.1. Background

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.), as amended, and implementing regulations at 50 CFR 402.

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 the Snake Basin Office.

1.2. Consultation History

Informal consultation on the Abstein Road Bridge project (Project) began on December 16, 2021, when the Economic Development Administration (EDA) e-mailed a draft biological assessment (BA) to NMFS. Between December 16, 2021 and June 30, 2022, NMFS had numerous e-mails, phone, and computer conference communications with EDA and contractors. The communications were necessary to define the proposed action, determine which portions of the proposed action required ESA section 7 consultation, and to identify opportunities to minimize the adverse effects of the proposed action.

On June 30, 2022, EDA transmitted a final BA and a letter requesting formal consultation to NMFS via e-mail. The final BA described the proposed design and construction of the Abstein Road Bridge across the East Fork South Fork Salmon River (EFSFSR) in the town of Yellow Pine, Idaho. The EDA is funding the design of the bridge but, as of the completion date of this opinion, funding for construction of the bridge had not been secured. Because, it is likely that EDA will also fund construction of the bridge, this consultation covers design and construction of the Abstein Road Bridge under the presumption that EDA will be the primary action agency. Because construction of the Abstein Road Bridge will likely require permitting by the U. S. Army Corps of Engineers (COE), the COE is included as a secondary action agency.

NMFS reviewed the BA and requested additional information on July 13, 2022. The EDA provided the additional information on July 18, 2022, and NMFS determined that the BA was adequate for consultation and sent a 30-day letter to EDA and COE on July 25, 2022. In addition to information in the BA, NMFS also relied on information obtained from the Idaho Department of Fish and Game (IDFG), Idaho Fish and Wildlife Information Systems website; from the Nez Perce Tribe Department of Fisheries Management; and from Google Maps to analyze the effects of the proposed action. The proposed action will have short- and long-term adverse effects on Snake River spring/summer Chinook salmon (Chinook salmon), Snake River Basin steelhead (steelhead), and designated critical habitat for both Chinook salmon and steelhead. The Project will also adversely affect Chinook salmon EFH.

This project will likely affect tribal trust resources. Because the action is likely to affect tribal resources, a copy of the draft of the proposed action and terms and conditions was sent to the Nez Perce Tribe and the Shoshone-Bannock Tribes on August 31, 2022. Neither the Nez Perce Tribe nor the Shoshone-Bannock Tribes provided comments.

On July 5, 2022, the U.S. District Court for the Northern District of California issued an order vacating the 2019 regulations that were revised or added to 50 CFR part 402 in 2019 ("2019 Regulations," see 84 FR 44976, August 27, 2019) without making a finding on the merits. On September 21, 2022, the U.S. Court of Appeals for the Ninth Circuit granted a temporary stay of the district court's July 5 order. As a result, the 2019 regulations are once again in effect, and we are applying the 2019 regulations here. For purposes of this consultation, we considered whether the substantive analysis and conclusions articulated in the biological opinion and incidental take statement would be any different under the pre-2019 regulations. We have determined that our analysis and conclusions would not be any different.

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). The proposed action is design and construction of a new Abstein Road Bridge across the EFSFSR in Yellow Pine, Idaho. The new bridge will be located approximately five feet downstream from the existing Abstein Road Bridge. The proposed action includes construction of new approaches and realignment of Abstein Road for 200-300 feet on either side of the EFSFSR. The new bridge will be approximately the same width as the existing bridge and will have the same 15 miles per hour speed limit. The existing Abstein Road Bridge will be transitioned to all-terrain vehicle (ATV) and pedestrian use. The project will be administered by Valley County, Idaho, with funding from the EDA. Valley County will be responsible for maintenance of both the new and existing bridge after completion of the project. The approximate location of the Abstein Road crossing of the EFSFSR is depicted in Figure 1. Design drawings of the existing and the proposed new bridges, approaches, etc. are in Appendix A.

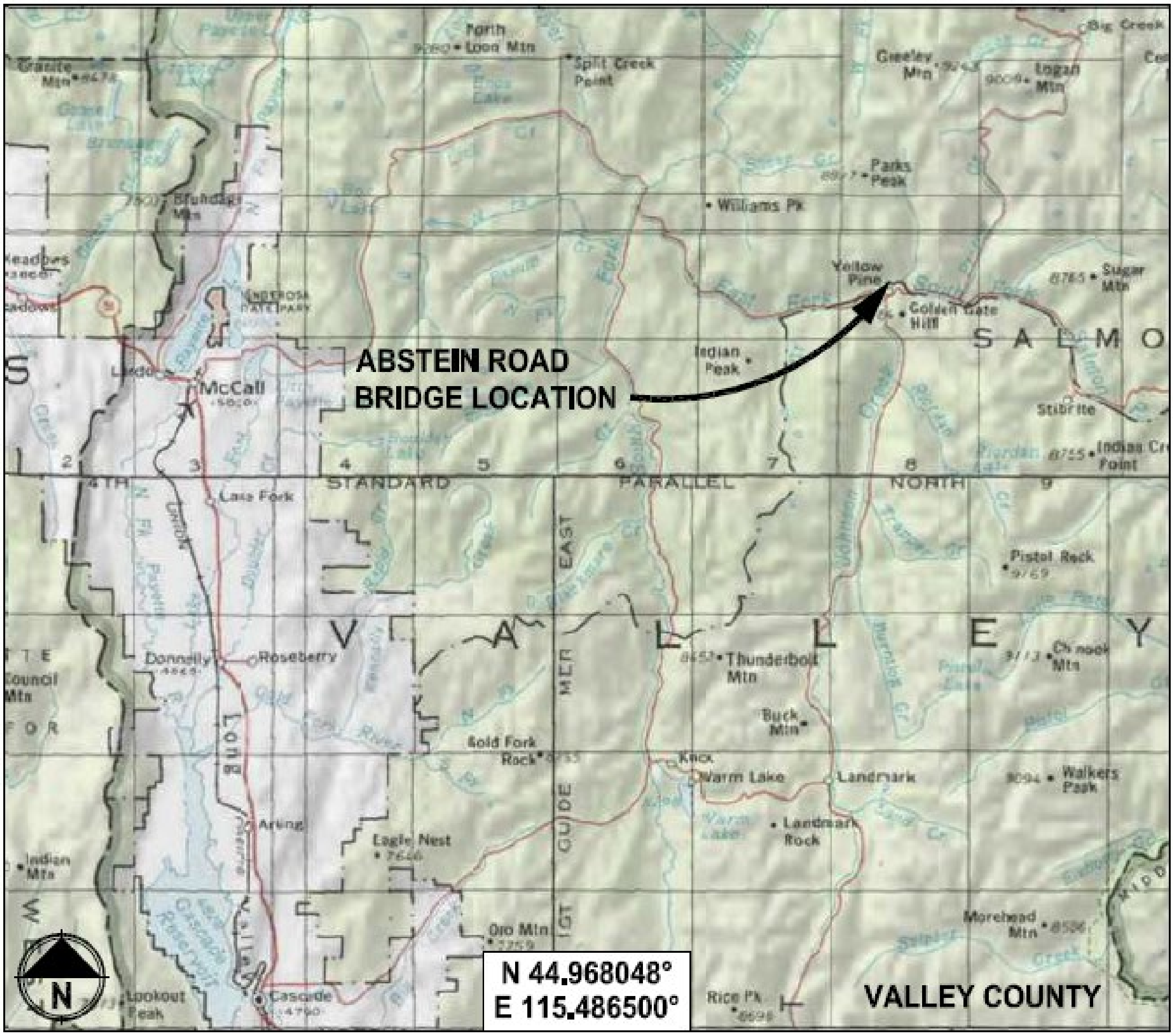

Figure 1 The Abstein Road crossing of the East Fork South Fork Salmon River is located in Valley County, Idaho, approximately 30 miles east northeast from McCall, Idaho.

Depending on funding timing, construction will begin in 2022, 2023, or 2024. In order to reduce effects on migratory birds, removal of trees and shrubs from the project area will likely occur during the fall or winter prior to the other construction activities. Construction activities (other than tree/shrub removal) will begin in late spring, after the snow has melted, and will be completed no later than the fall of the same year. If trees and shrubs are removed during the fall or winter prior to bridge construction, erosion control measures will be implemented as soon as vegetation is removed and will be maintained until construction is complete and all disturbed ground is stabilized. All work below the ordinary-high-water-mark (OHWM) will occur from July 15 through August 15.

The existing Abstein Road Bridge is 71.5 feet long and the new bridge will be 90 feet long. The existing abutments are 10-20 feet from the water's edge during normal base flow and the new abutments will be approximately nine feet farther from the river. The bottom of the new abutments will be approximately eight feet below the existing ground surface and will be installed on top of 24 inches of compacted granular fill. The substrate at the bridge abutment locations consists of cobbles and soil, and excavation will therefore require no or minimal use of jackhammer, drill, or breaker-bar equipment. The abutments will be cast-in-place with form designs reviewed and approved by the supervising engineer prior to use. Wing walls will extend 10-20 feet inland from the abutments and will be cast-in-place using prefabricated hollow concrete "Eco-blocks" as modular forms. Construction of the new abutments and wing walls will not require in-water work.

A crane or cranes will be used to place prefabricated modular components on the new abutments. The bridge deck will be 16-feet wide and will accommodate one lane of traffic. The bridge deck will be surfaced in asphalt concrete. Containment tarps will be used to ensure that the bridge deck material does not fall into the river.

The roadway will be realigned to the new bridge by expanding the roadway cross-section up to 35 feet to the west for 150 feet north and south of the bridge. The roadway will be approximately 16 to 22 feet wide, will have 3:1 maximum side slopes, and will be surfaced with gravel. Trees and brush will be removed to accommodate the road realignment and to provide access for construction. Ten trees greater than six inches diameter at breast height (DBH) will be removed. These ten trees range in size from approximately 10 to 20 inches DBH and all are either Engelmann spruce (*Picea engelmannii*) or ponderosa pine (*Pinus ponderosa*). Two of the trees are immediately adjacent to the river bank, and the other eight are more than 75 feet from the OHWM. In addition, an unknown number of trees less than six inches DBH will also be removed. Trees removed for this project may be placed near or below the OHWM to improve instream habitat, depending on safety concerns for recreationists and downstream infrastructure.

The existing bridge roadway and approaches will be retained. After construction of the new bridge, the approaches to the existing bridge will be narrowed through placement of boulders and/or large woody debris (LWD), by grading portions of the approaches, and by planting native vegetation. Bollards or boulders will be installed on the existing bridge to preclude access of any vehicles larger than a small ATV.

Up to 3,500 square feet of river bank will be stabilized with rock revetment (riprap), up to 500 square feet, of which will be below the OHWM. Both the north and south banks will be revetted, approximately 47 feet of the north bank and 62 feet of the south bank. Riprap on the north bank will be sized to resist water velocities of eight feet per second (fps) and riprap on the south bank will be sized to resist water velocities of up to 16 fps. The bank revetment will include laying back existing slopes to a maximum 1.5:1 or 2:1, matching existing slopes where possible. This will include the removal of existing riparian vegetation within the footprint of the riprap area. Riprap will be keyed-in at the toe unless there is sufficient rock already present. All riprap will be installed using equipment operating from above the OHWM.

Heavy equipment used for this project will likely include an excavator, crane, front end loader, dump trucks, grader, and a compactor. The construction methods and procedures will follow Idaho Transportation Department (ITD) Standard Specifications for Highway Construction or the Idaho Standards for Public Works Construction (ISPWC), including all applicable best management practices (BMPs).

1.3.1 Measures to Reduce Adverse Effects of In-water Work

Cofferdams will be used to isolate the work areas below the OHWM. Cofferdams will be composed of new gravel bags without tears or leaks, and will be filled with clean gravel that is free of sand and other fines. The gravel bags will be placed on top of a geotextile sheeting (e.g., Visqueen or similar), with the geotextile folded back over the top of the gravel bag and weighted down. The geotextile sheeting will be laid by hand. The gravel bags will be placed using equipment operating from above the OHWM. Water will be pumped from the work area using pumps with intakes screened to NMFS' criteria for mesh size and approach velocity (NMFS 2022a). Water pumped from the instream work area will be applied to suitable uplands, stored in settling basins that are large enough to treat all pumped water, or filtered; and will comply with Idaho Department of Environmental Quality (IDEQ) standards before it is discharged into flowing water. Pumped water will not be placed into or released to any waterbody until it meets IDEQ water-quality standards. All appropriate stormwater runoff and discharge permits will be obtained before commencement of construction or vegetation removal activities.

Fish within the cofferdam will be removed by "herding" before the cofferdam is completely closed. After closing the cofferdam, the remaining fish will be removed by electroshocking. If a significant amount of water seeps into the work area between work periods (e.g., overnight) electroshocking will be conducted before the water is pumped out and before work begins. Electrofishing will be conducted in accordance with NMFS (2000) guidelines. All captured fish will be held in thermally regulated, air-bubbler equipped containers, filled with stream water, for a period only long enough to transport fish to the release location. Release locations will be identified before electroshocking commences.

When the in-water work is complete, cofferdams will be removed in such a manner as to return the water to the river slowly, so as to reduce the amount of sediment pulsed into the water column. This will involve removing the downstream edge of the cofferdam first then moving upstream to remove the next portion. This will be done until the entire cofferdam is removed.

Turbidity monitoring (both visual and measured) will be conducted by a qualified environmental monitor during all in-water work, including placing and removal of the cofferdams. Turbidity will be visually monitored by a qualified observer who will record size (width and length) and location of any visible plumes, and will also photograph all visible plumes. If a turbidity plume is visually observed entering the EFSFSR, a report will be made to IDEQ, the U.S. Fish and Wildlife Service (USFWS), and NMFS within 24 hours. Turbidity measuring, during in-water work activities, will proceed as follows:

- Obtain a background measurement upstream from the work site at the beginning of each workday to determine background turbidity levels.
- Obtain regular turbidity measurements at a location 300 feet downstream from the Abstein Road Bridge.
- Conduct visual monitoring during cofferdam installation and removal for turbidity plumes.

- Should a sediment plume occur, obtain turbidity measurements on a regular basis (e.g., every 15 minutes) to monitor turbidity increases over background levels. Should turbidity levels approach 35 nephelometric turbidity units (NTUs) over background levels, halt the construction activity for the time necessary to allow sediment to settle and avoid reaching a 50 NTU increase over background levels.
- Should turbidity levels increase greater than 50 NTUs over background levels, halt the construction activity immediately and obtain turbidity measurements on a regular basis (e.g., every 15 minutes) until levels drop close to the background level. At this point, the construction activity will be analyzed for improvements and changes will be implemented to prevent further exceedances before reinitiating any work.

Turbidity testing will be performed by a qualified environmental monitor. Turbidity will be monitored for the duration of the instream work associated with the cofferdam placement and removal, and riprap placement. During these activities, turbidity measurements shall be taken a minimum of every 2 hours. Turbidity monitoring plans will be submitted to the COE, USFWS, and NMFS for approval prior to commencing work.

1.3.2 Measures to Reduce Chance of Concrete Affecting Water Quality

During any activities involving wet concrete placement over, within, or adjacent to the river channel, both visual and pH monitoring of the adjacent river will be conducted. pH monitoring will be conducted within ten feet downstream of activities involving wet concrete and work will immediately cease if pH values lower than 6.5 or higher than 9.0 are measured. Work will resume when the source of the exceedance is identified and addressed. Visual monitoring of concrete slurry entering the river will be also be conducted during work with wet cement. If a concrete slurry plume is observed, it will be measured and photographed. If pH lower than 6.5 or higher than 9.0 is measured, or if a concrete slurry is observed entering flowing water, a report will be made to IDEQ, USFWS, and NMFS within 24 hours.

1.3.3 Erosion Control, Sediment Control, and Spill Prevention

The EDA or their designee will prepare an erosion and sediment control plan (ESCP), including a Spill Prevention Plan with BMPs and Spill Prevention Measures. The ESCP will be implemented for the entire construction area for the duration of construction activities. Activities that will be employed to control erosion, control sedimentation, and prevent spills, include:

- BMPs utilized may include but are not limited to sediment traps, silt fences, fiber wattles, and compost socks. Fiber wattles should consist entirely of biodegradable materials
- (i.e., no nylon mesh).
- All materials to be placed below OHWM (e.g., as part of the bank armoring) will be pre-washed to remove rock fines, silt, soil, and other extraneous material.
- All material will be removed and disposed of appropriately offsite in compliance with applicable regulations.
- Project Designated Use Areas (staging, stockpiling, storage areas including materials and equipment, fueling operations, access roads, source sites, waste sites, construction sites,

borrow site operations, and equipment/concrete washouts) will be identified prior to project initiation and will: (1) be located outside of designated critical habitat for bull trout, steelhead, and Chinook salmon; (2) be a minimum of 150 feet from all waterways or wetland in areas where topography does not restrict such a distance; and (3) be a minimum of 300 feet from the EFSFSR. In areas with high topographical restrictions, staging will occur away from any natural waterbody or wetlands to the greatest extent possible. The EDA, or their designee, will ensure that BMPs and secondary containments are in place to avoid and minimize erosion and sediment impacts as well as the capability to capture a volume equal to 125 percent of the stored petroleum products, concrete/cement materials, or other hazardous materials stored onsite.

- The EDA or their designee will ensure that appropriate BMPs will be employed to confine, remove, and dispose of excess concrete, cement, and other mortars or bonding agents, including measures for washout facilities. The EDA or their designee will ensure that wash out of concrete transit mixers occurs only in designated washout areas that are adequate to contain all washout waste. All hardened concrete, grout, or cement mortar waste will be collected and transported to an approved and licensed solid waste disposal/processing/recycling site.
- Storage of dry and wet materials associated with concrete will be located: (1) outside of designated critical habitat for bull trout, steelhead, and Chinook salmon; (2) a minimum of 150 feet from all waterways or wetland in areas where topography does not restrict such a distance; and (3) a minimum of 300 feet from the EFSFSR. In areas with high topographical restrictions, storage will occur away from any natural waterbody or wetland to the greatest extent possible.
- Appropriate BMPs will be used to contain, control, and filter stormwater prior to the water entering the river and/or associated wetlands. These include, but are not limited to, the use of sediment control rock check dams, sediment control berms, and vegetated
- bio-swales.
- The EDA or their designee will ensure that all erosion controls will be inspected daily, by a qualified environmental monitor, until the soils are stabilized and the temporary sediment erosion control measures are no longer needed.
- If inspection shows erosion controls are ineffective, work crews will be mobilized immediately to make repairs, install replacements, or install additional controls as necessary.
- All necessary stormwater runoff and discharge permits will be secured and a stormwater runoff plan will be in place prior to commencement of any ground disturbing or construction activities.
- All machinery and equipment will be cleaned of external oil, grease, dirt, and mud prior to arrival at the work site. In machinery used for in-water work, traditional hydraulic fluids will be replaced with ecofriendly fluids/oils (e.g., vegetable oil).
- At the completion of construction, native vegetation will be planted wherever ground is disturbed (except on the roadway and trail surface) for permanent erosion-control.

- The portions of the roadway that are decommissioned, due to narrowing the approaches to the existing bridge, will be replanted with native vegetation, consistent with other disturbed areas.

- Temporary erosion countermeasures will be maintained until perennial vegetation is established.

- The project area will be monitored until all disturbed areas are stabilized and/or revegetated.

1.3.4 Measures to Reduce Spread of Noxious Weeds

- Heavy equipment shall be cleaned to remove all visible plant parts, dirt, and material that may carry noxious weed seeds. Cleaning shall occur prior to entry onto the project area; and again, upon leaving the project area, if the project area has noxious weed infestations.
- Revegetate disturbed areas as soon as practical.
- All seed used for revegetation will be certified to be free of seeds from noxious weeds listed on the current All States Noxious Weeds List.
- Materials such as hay, straw, or mulch that are used for rehabilitation and reclamation activities shall be free of noxious weed seed and shall be certified weed-free.
- Gravel or borrow material source sites with noxious weed species present shall not be used unless effective treatment or other mitigation measures are implemented.
- The project area will be monitored until all disturbed areas are stabilized and/or revegetated.

1.3.5 Monitoring and Agency Notification

- The following agencies will be notified at least two weeks prior to work commencing: NMFS, USFWS, COE, U.S. Forest Service (USFS), IDEQ, IDFG, and Idaho Department of Water Resources (IDWR).
- Turbidity monitoring plans will be submitted to COE, USFWS, and NMFS by the EDA, or their designee, for approval prior to commencing work.
- Daily inspections of equipment will be logged/recorded, repairs and corrective actions will be documented, and copies of logs, records, and/or documentation will be made available to IDEQ, USFWS, NMFS, the COE, and/or the Payette National Forest, upon request.
- Reporting and remediation guidelines required by IDEQ, Occupation Safety and Health Administration (OSHA), and Environmental Protection Agency (EPA) will be followed. Any discharge of pollutants reported to any of these agencies will also be reported to NMFS, USFWS, EDA and the COE.
- Any turbidity or concrete/slurry observations will be reported to IDEQ, USFWS, and NMFS within 24 hours.

- Within eight weeks of project completion, a final report of turbidity monitoring will be submitted to the USFWS and NMFS.
- If trees and shrubs are removed from the project are during the fall and winter prior to bridge construction, measures to prevent erosion and sedimentation will be monitored, maintained, and repaired as necessary, during snowmelt and after any precipitation that occurs between snowmelt and commencement of construction activities.
- The EDA or their designee, will submit a monitoring report to NMFS within eight weeks of completion of the project that will include:
    - Results of required turbidity monitoring including notes regarding proximity of turbidity plumes to Chinook salmon redds (if applicable).
    - The number, size, and species of all salmonids captured and handled, and any mortalities that occur during salvage.

We considered, under the ESA, whether or not the proposed action would cause any other activities and determined that it would improve the ability to transport heavy equipment to mining claims in the Quartz Creek drainage, thus potentially encouraging mining activity north of the EFSFSR. All of the mining claims accessible by the Abstein Road Bridge are on USFS land and expansion of activity would therefore require approval by the USFS before any increase in activity. Because expansion of mining activity would require a separate Federal action, effects of increased mining activity north of the EFSFSR were not considered in this consultation. Because the new bridge will be approximately the same width as the existing bridge, and will have the same speed limit, the proposed action will not likely result in an appreciable increase in traffic volume.

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 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 opinion also relies on the regulatory definition of "destruction or adverse modification," which "means a direct or indirect alteration that appreciably diminishes the value of critical habitat as a whole for the conservation of a listed species" (50 CFR 402.02).

The designations of critical habitat for Chinook salmon and steelhead 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.

The ESA Section 7 implementing regulations define effects of the action using the term "consequences" (50 CFR 402.02). As explained in the preamble to the final rule revising the definition and adding this term (84 FR 44976, 44977; August 27, 2019), that revision does not change the scope of our analysis, and in this opinion we use the terms "effects" and "consequences" interchangeably.

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 critical 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 1.

Table 1 Listing status, status of critical habitat designations and protective regulations, and relevant Federal Register decision notices for EPA-listed species considered in this opinion.

Species	Listing Status	Critical Habitat	Protective Regulations
Chinook salmon (*Oncorhynchus tshawytcha*)			
Snake River spring/summer-run	T 4/22/92; 57 FR 14653	12/28/93; 58 FR 68543	6/28/05; 70 FR 37160
Steelhead (*O. mykiss*)			
Snake River Basin	T 8/18/97; 62 FR 43937	9/02/05; 70 FR 52630	6/28/05; 70 FR 37160

Note: Listing status 'T' means listed as threatened under the ESA.
[1]The listing status for Snake River spring/summer Chinook salmon was corrected on 6/3/92 (57 FR 23458).
[2]Critical habitat for Snake River spring/summer Chinook salmon was revised on 10/25/99 (64 FR 57399).

2.2.1 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 2017), 2022 5-Year Review: Summary and Evaluation of Snake River Spring/Summer Chinook Salmon (NMFS 2022b), and 2022 5-Year Review: Summary and Evaluation of Snake River Basin Steelhead (NMFS 2022c). Additional information that has become available since these documents were published is also summarized in the following sections and contributes to the best scientific and commercial data available.

2.2.1.1 Snake River Spring/Summer Chinook Salmon

The Snake River spring/summer Chinook salmon ESU was listed as threatened on April 22, 1992 (57 FR 14653). This ESU occupies the Snake River basin, which drains portions of southeastern Washington, northeastern Oregon, and north/central Idaho. 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 spring and summer Chinook salmon runs in that subbasin). The loss of this historical habitat substantially reduced the spatial structure of this species. The production of 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 2017).

Several factors led to NMFS' 1992 conclusion that 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 salmon 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). NMFS completed its 5-year review for Pacific salmon and steelhead in 2022 and concluded the species should remain listed as threatened (NMFS 2022b).

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-1smolts (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 spring/summer Chinook salmon 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 [SFSR]), SFSR 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 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, SFSR, 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. 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 2 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 2017; NMFS 2022b).

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[4]	**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
	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[5]	*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)[6]	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]Will likely be affected by the proposed action.

[5]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 occur, the role of the Panther Creek population in the MPG recovery scenario may be reevaluated (NMFS 2022b).
[6]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 2017) and has been below replacement for nearly all populations in the ESU since 2012 (Nau et al. 2021). The returns over Lower Granite Dam in 2021 and 2022 suggest that most of the populations will likely achieve replacement for the 2017 stock year, for the first time in five years, and suggest that most populations are also likely to achieve replacement for the 2018 stock year. However, even with the recent increases, abundance and productivity remain very low across the ESU.

As reported in the most recent viability assessment (Ford 2022), the five-year (2015-2019) geometric mean abundance estimates for 26 of the 27 evaluated populations are lower than the corresponding estimates for the previous five-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 2022b). No populations within the ESU meet the minimum abundance threshold designated by the ICTRT (NMFS 2022b), 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 the EFSFSR Chinook salmon population in 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.

2.2.1.2 Snake River Basin Steelhead

The Snake River Basin steelhead was listed as a threatened ESU on August 18, 1997 (62 FR 43937), with a revised listing as a DPS on January 5, 2006 (71 FR 834). This DPS occupies the Snake River basin, which drains portions of southeastern Washington, northeastern Oregon, and north/central Idaho. Reasons for the decline of this species include substantial modification of the seaward migration corridor by hydroelectric power development on the 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). NMFS completed its 5-year review for Pacific salmon and steelhead in 2022 and concluded the species should remain listed as threatened (NMFS 2022c).

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 *O. 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 (SFSR); 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 3 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 2017; NMFS 2022c).

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*

Major Population Group	Population[2]	VSP Risk Rating[1]		Viability Rating	
		Abundance/ Productivity	Spatial Structure/ Diversity	2022 Assessment	Proposed Recovery Goal[3]
Salmon River (Idaho)	Little Salmon River	Very Low	Moderate	Viable	Maintained
	South Fork Salmon River[5]	**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
	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.
[5]Will be affected by the proposed action.

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 2022c).

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 4).

Table 4 Types of sites, essential physical and biological features (PBFs), and the species life stage each PBF supports.

Site	Essential Physical and Biological Features	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, log jams, beaver dams, aquatic vegetation, large rocks and boulders, side channels, and undercut banks.
[d] Food applies to juvenile migration only.

Table 5 describes the geographical extent of critical habitat within the Snake River basin for Snake River spring/summer Chinook salmon and Snake River Basin steelhead. 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. In addition, critical habitat for Chinook salmon species 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 5 Geographical extent of designated critical habitat within the Snake River basin for ESA-listed salmon and steelhead.

Evolutionarily Significant Unit (ESU) /Distinct Population Segment (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 2017). 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 2017). 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 (NMFS 2017).

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 2020). 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. 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 by heavy metal contamination from mine waste (e.g., IDEQ and USEPA 2003; IDEQ 2001).

The construction and operation of water storage and hydropower projects in the Columbia River basin, including the eight run-of-river dams on the mainstem lower Snake and lower Columbia Rivers, have altered biological and physical attributes of the mainstem migration corridor. Hydrosystem development modified natural flow regimes, resulting in warmer late summer and fall water temperature. Changes in fish communities led to increased rates of piscivorous predation on juvenile salmon and steelhead. Reservoirs and project tailraces have created opportunities for avian predators to successfully forage for smolts, and the dams themselves have created migration delays for both adult and juvenile salmonids. Physical features of dams, such as turbines, also kill out-migrating fish. In-river survival is inversely related to the number of hydropower projects encountered by emigrating juveniles. However, some of these conditions have improved. The Bureau of Reclamation and COE have implemented measures in previous Columbia River System hydropower consultations to improve conditions in the juvenile and adult migration corridor including 24-hour volitional spill, surface passage routes, upgrades to juvenile bypass systems, and predator management measures. These measures are ongoing and their benefits with respect to improved functioning of the migration corridor PBFs will continue into the future.

The overall condition of designated critical habitat is currently inadequate to meet recovery objectives for either Snake River spring/summer Chinook salmon or Snake River basin steelhead. For some populations that spawn and rear in undeveloped areas, addressing the factors that influence migration survival may be sufficient to achieve recovery goals. However, in developed areas, improving spawning and/or rearing habitat will also typically be needed.

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 (http://www.ncdc.noaa.gov/sotc/global202013). Events such as the 2014-2016 marine heatwave (Jacox et al. 2018) are likely exacerbated by 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 1.3ºF from 1895 to 2011, and projects an increase in average annual temperature of 3.3ºF to 9.7ºF 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 2019). 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 for 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 proposed action is construction of a new Abstein Road Bridge and conversion of the existing bridge to pedestrian and ATV use. The action area consists of approximately 400 feet of Abstein Road and approximately 650 feet of the EFSFSR. The Abstein Road portion of the action area encompasses the linear extent of construction activities and includes the existing and the proposed new rights of way from approximately 150 feet south of the EFSFSR to approximately 150 feet north of the river, including both the existing and the new Abstein Road Bridges. The EFSFSR portion of the action area includes the river channel from approximately 30 feet upstream from the existing Abstein Road bridge (the approximate upstream extent of construction) to approximately 500 feet downstream from the new bridge (downstream extent of elevated turbidity), and riparian habitat on either side of the stream channel from approximately 30 feet upstream from the existing bridge to approximately 50 feet downstream from the new bridge (the approximate downstream extent of construction).

2.4. Environmental Baseline

The "environmental baseline" refers to the condition of the listed species or its designated critical habitat in the action area, without the consequences to the listed species or designated critical habitat caused by the proposed action. 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 consultations, and the impact of State or private actions which are contemporaneous with the consultation in process. The consequences to listed species or designated critical habitat from ongoing agency activities or existing agency facilities that are not within the agency's discretion to modify are part of the environmental baseline (50 CFR 402.02).

The portion of the EFSFSR within the action area is used by all freshwater life stages of Snake River spring/summer Chinook salmon and Snake River basin steelhead and is designated critical habitat for both species. The condition of the ESA-listed species and designated critical habitats in the action area are described further below. Because climate change has already had impacts across the Snake River basin, discussions of the status of the species, status of critical habitat, and environmental baseline within the action area incorporates effects of climate change.

2.4.1 Condition of Species in the Action Area

All freshwater life stages of Snake River spring/summer Chinook salmon and Snake River Basin steelhead could potentially be affected by the proposed action, although the primary effects will be on the juvenile rearing life stage. The following sections provide a summary of the current status of the portions of the EFSFSR Chinook salmon population and the SFSR steelhead population that utilize habitat in the action area, and the importance of those populations to the recovery of these two species.

2.4.1.1 Snake River Spring/summer Chinook Salmon

Chinook salmon affected by the proposed action are part of the EFSFSR Chinook salmon population, which includes all Chinook salmon spawning in the EFSFSR drainage (includes Johnson Creek) and all Chinook salmon in the Johnson Creek supplementation program. The EFSFSR Chinook salmon population is classified as large-sized, it has substantial hatchery influence (hatchery supplementation began in the 1998), and it is proposed to achieve maintained status in order to support recovery of the ESU. Geomean population size and productivity from 2010-2020 was approximately 453 and 0.82, respectively, which indicates a high risk of extinction due to low abundance and productivity, and the most recent 5-year review also indicates that this population is at high risk of extinction (NMFS 2022b). Most spawning, and presumably rearing, in the EFSFSR Chinook salmon population currently occurs in the Johnson Creek drainage, but some spawning and rearing does regularly occur in the mainstem EFSFSR and in EFSFSR tributaries upstream from Johnson Creek. The EFSFSR drainage, upstream from the Johnson Creek confluence, has been severely impacted by past mining activity. All upstream anadromous fish migration is currently blocked at the Yellow Pine Pit, a legacy feature of past mining activity located approximately 10.1 miles upstream from the Abstein Road Bridge. Although degraded by past activities, habitat in the EFSFSR drainage has recovered to some extent and Chinook salmon have regularly spawned in the mainstem EFSFSR since at least 1992.

The proposed action would potentially affect the portion of the EFSFSR Chinook salmon population that spawns in and upstream from the action area. Because the action area is approximately one mile upstream from the confluence of the EFSFSR and Johnson Creek, the portion of the EFSFSR Chinook salmon population potentially affected by the proposed action roughly corresponds to the portion of the population that spawns upstream from the confluence of the EFSFSR and Johnson Creek. Within this area, Chinook salmon regularly spawn in the 10.1 miles of the mainstem EFSFSR between the Abstein Road Bridge and the Yellow Pine Pit, and spawning has also been recently documented in the lower 2.7 miles of Sugar Creek and the lower 0.7 miles of Tamarack Creek. Although most spawning in the EFSFSR population occurs in the Johnson Creek drainage, there is also a substantial amount of currently used habitat upstream from EFSFSR/Johnson Creek confluence. In addition, there is a substantial amount of currently inaccessible habitat, due to legacy migration barriers, that could eventually be reconnected. Given that the population is at high risk of extinction due to low abundance/productivity, spawning and rearing habitat upstream from EFSFSR/Johnson Creek confluence is important for the continued existence of the EFSFSR Chinook salmon population, and reconnection of currently inaccessible habitat will be important for eventually meeting recovery objectives.

Chinook salmon in the action area are affected by activities and events upstream from and within the action area, including: land management activities, habitat restoration, wildland fire and wildland fire suppression, avalanches and debris flows, etc. Activities within the action area that affect Chinook salmon include maintenance of roads on both sides of the river, maintenance of cleared land around residences (primarily on the north side of the river), and construction and maintenance of the Abstein Road Bridge. The limited information available suggests that the Abstein Road Bridge was originally constructed in the early 1900s and, based on the right of way map, was probably located immediately downstream from the location of the existing bridge. In the 1980s, new bridge abutments were constructed and an old bridge span from the Warm Lake Road crossing of the SFSR was repurposed as the existing bridge span. The size and position of rocks adjacent to the abutments suggest that riprap was added at some point, possibly as part of the bridge construction that occurred in the 1980s. Riparian vegetation immediately downstream from the existing bridge is relatively small, possibly due to that area being underneath the previous bridge. Elsewhere in the action area, riparian vegetation is relatively mature, and LWD appears to be relatively abundant. In spite of the cleared land, past bridge construction and bank stabilization, roads, legacy mining effects, etc., overall condition of Chinook salmon habitat within the action area appears to be good. Chinook salmon redds have never been surveyed in the action area, but based on condition of habitat and location of redds documented in upstream and downstream reaches, Chinook salmon spawning likely occurs in the action area. Based on snorkel survey data, juvenile Chinook salmon regularly rear in the in the action area (Table 6).

Table 6. Density and number of ESA listed salmonids observed during Idaho Department of Fish and Game snorkel surveys in the East Fork South Fork Salmon River between Johnson Creek and Quartz Creek.

Survey Date	Number of Fish Observed			Density (fish/feet^2)		
	Bull Trout	Steelhead	Chinook Salmon	Bull Trout	Steelhead	Chinook Salmon
7/2/1994	0	50	3	0	0.006	0.0003
7/14/1994	3	53	47	0.0005	0.009	0.008
7/15/1994	2	70	58	0.0003	0.010	0.007
7/29/2015	3	131	89	0.0002	0.010	0.006
8/12/2019	0	23	10	0	0.001	0.0005

Source: Idaho Fish and Wildlife Information Systems website: https://idfg.idaho.gov/data

2.4.1.2 Snake River Basin Steelhead

Steelhead affected by the proposed action are part of the SFSR steelhead population. The SFSR steelhead population area encompasses the entire SFSR drainage except for the Secesh River and its tributaries. The SFSR steelhead population has one of the highest proportions of B-run fish and is one of the few steelhead populations that has never been supplemented with hatchery fish. The most recent five-year review suggests that the SFSR steelhead population is low risk for spatial structure and moderate risk for abundance/productivity (NMFS 2022c). The geomean of estimated returns for 2011-2019 is 598 and the geomean population productivity for 2015-2019 is 0.53, which indicates a high probably at risk of extinction due to low abundance and productivity.

The proposed action could potentially affect the portion of the SFSR steelhead population that spawns in the EFSFSR drainage within and upstream from the action area. As with Chinook salmon, this roughly corresponds with the portion of the SFSR steelhead population that spawns in the mainstem EFSFSR and tributaries upstream from the EFSFSR/Johnson Creek confluence. Also like Chinook salmon, upstream migration of steelhead is blocked at the Yellow Pine Pit, approximately 10.1 miles upstream from the action area. Because the SFSR steelhead population is likely at high risk due to low abundance and productivity, habitat upstream from the EFSFSR/Johnson Creek confluence is important for continued existence of the population. As with the EFSFSR Chinook salmon population, reconnection of currently inaccessible habitat will be important for eventually meeting recovery objectives of the SFSR steelhead population and will be important for eventual recovery of the population.

Steelhead in the action area are affected by the same activities, events, and conditions that affect Chinook salmon (see section 2.4.1.1). Steelhead spawning surveys have not occurred within the action area but, based on habitat condition and documented presence of steelhead, steelhead spawning likely occurs there. Rearing steelhead have been documented in the action area (Table 6).

2.4.2 Condition of Designated Critical Habitat

The vast majority of the action area is designated critical habitat for Snake River spring/summer Chinook salmon and the EFSFSR portion of the action area is designated critical habitat for Snake River Basin steelhead. Habitat quality in the EFSFSR was at one time severely impacted by grazing, timber harvest, and mining. Large scale logging and grazing no longer occurs in the EFSFSR drainage and mining activity is currently limited. There is almost no irrigated agriculture in the EFSFSR drainage and water use associated with mining is currently very limited. Consequently, streamflow in the action area is currently nearly unimpaired. Wildland fire has greatly altered the landscape since 2000, which has resulted in increased inputs of fine and course sediment, large wood, and fine organic matter, and has resulted in changes in the riparian vegetation community. Quality of designated critical habitat has been on a generally improving trend due to recovery from past perturbations, habitat restoration, and increased inputs of LWD due to widespread wildland fire. Within the action area, stream channel and riparian habitat has been degraded by roads on both sides of the river; by clearing of land around residences, primarily on the north side of the river; and by construction of at least two Abstein Road bridges (see section 2.4.1.1). In spite of these habitat perturbations, photographs in the BA suggest that the action area contains a relatively large amount of LWD, possibly due to wildland fire and recent debris flows, and most of the riparian areas appear healthy. Although habitat data specific to the action area are lacking, data from nearby reaches suggests that summer water temperature is probably adequate for Chinook salmon and steelhead spawning and rearing, and fine sediment levels are probably functioning appropriately.

Upstream migration of anadromous fishes is currently blocked at the Yellow Pine Pit, approximately 10.1 miles upstream from the Abstein Road Bridge. Currently accessible anadromous fish habitat, upstream from the action area, includes 10.1 miles of the mainstem EFSFSR as well as tributary streams between the bridge and the Yellow Pine Pit, such as Quartz Creek, Profile Creek, Tamarack Creek, Salt Creek, and Sugar Creek. Chinook salmon regularly spawn in the mainstem EFSFSR, between the bridge and the Yellow Pine Pit, and have been documented spawning in the lower 2.7 miles of Sugar Creek and the lower 0.7 miles of Tamarack Creek. Specific information on steelhead spawning locations is lacking but steelhead likely also spawn throughout the accessible reaches of the mainstem EFSFSR and, because they can utilize smaller tributary streams, likely utilize more tributary habitat than Chinook salmon. All Chinook salmon and steelhead spawning or rearing upstream from the action area must migrate through the action area as juveniles moving downstream to the ocean, and as returning adults. In addition to migration habitat, the EFSFSR portion of the action area is also rearing habitat for juvenile Chinook salmon and steelhead, is likely spawning habitat for Chinook salmon and steelhead, and is possibly used as pre-spawn holding habitat by adult Chinook salmon and steelhead. Because a substantial portion of the currently accessible spawning and rearing habitat for the EFSFSR Chinook salmon population and the SFSR steelhead population is upstream from the action area, unimpeded migration through the action area is extremely important for both species. Because the action area is relatively small, the amount of Chinook salmon and steelhead rearing habitat within the action area is also relatively small. However, because the EFSFSR Chinook salmon and the SFSR steelhead populations are limited by amount and quality of rearing habitat, even small effects on rearing habitat could be consequential.

The action area contains migration habitat that is extremely important for both the EFSFSR Chinook salmon and the SFSR steelhead populations. All of the available information indicates that cover, streamflow, depth, gradient, water quality, etc., are adequate for unimpaired upstream and downstream migration of adult and juvenile Chinook salmon and steelhead. The action area contains a small amount of possible spawning habitat and documented rearing habitat for both populations. The amount of rearing habitat is small, but it is likely important for achieving recovery goals for both populations. Although portions of the action area appear to have been adversely impacted by construction, bank revetment, and clearing of riparian vegetation; rearing habitat in most of the action area appears to be in good condition.

2.5. Effects of the Action

Under the ESA, "effects of the action" are all consequences to listed species or critical habitat that are caused by the proposed action, including the consequences of other activities that are caused by the proposed action (see 50 CFR 402.02). A consequence is caused by the proposed action if it would not occur but for the proposed action and it is reasonably certain to occur. Effects of the action may occur later in time and may include consequences occurring outside the immediate area involved in the action (see 50 CFR 402.17). In our analysis, which describes the effects of the proposed action, we considered the factors set forth in 50 CFR 402.17(a) and (b).

As described above, the proposed action is construction of a new Abstein Road Bridge across the EFSFSR, including realignment of the road on both sides of the river, installation of riprap to protect both the new and existing bridges from erosion, and conversion of the existing bridge to pedestrian and ATV use. The proposed action will require in-water work, will result in removal of riparian vegetation, and will approximately double the footprint of the Abstein Road crossing of the EFSFSR. Chinook salmon and steelhead are present in the action area and will be affected by construction activities and by short and long-term habitat changes.

2.5.1 Effects on Designated Critical Habitat

Within the action area, the mainstem EFSFSR channel is designated critical habitat for Snake River Basin steelhead and the EFSFSR channel and adjacent riparian areas are designated critical habitat for Snake River spring/summer Chinook salmon. For Chinook salmon designated critical habitat, riparian areas are defined as within 300 feet of the OHWM. Table 4 summarizes the suite of essential PBFs of designated critical habitat.

The proposed action has the potential to affect the following PBFs: (1) water quality (i.e., chemical contamination, water temperature, and turbidity); (2) spawning gravel/substrate; (3) food/forage; (4) cover/shelter; and (5) riparian vegetation. Any modification of these PBFs may affect freshwater spawning, rearing, or migration in the action area. Proper function of these PBFs is necessary to support successful adult and juvenile migration, adult holding and spawning, and the growth and development of juvenile fish. All remaining PBFs will not be affected by the proposed action. As previously described, the proposed action incorporates a variety of BMPs and project design features (PDF) that will minimize the potential for and magnitude of adverse effects to these PBFs.

2.5.1.1 Water Quality

Chemical Contamination. The following components of the proposed action have the potential to cause chemical contamination of designated critical habitat: Equipment operation in and adjacent to the EFSFSR; storage and transportation of fuel; refueling equipment; and transportation and poring of concrete. As described in the proposed action section, various BMPs and PDF (e.g., fueling equipment at least 300 feet from the EFSFSR, daily inspection of equipment for leaks, and keeping spill containment equipment on site, etc.) will be implemented to minimize the risk of toxic substances reaching flowing water and will minimize the adverse effects should any toxic substances be released. Because the BMPs that will be employed have proven effective in many past projects, we do not expect adverse effects on designated critical habitat due release of toxic substances.

Water Temperature. The proposed action will result in the removal of riparian vegetation, including ten relatively large trees, two of which are immediately adjacent to the EFSFSR. Removing this vegetation will reduce stream shade, which will tend to increase summer water temperature. However, the effects on shade will be minor due to the short length of riparian habitat affected (<130 feet) and will be at least partially offset by the shade of the new bridge. The overall effect of the proposed action on water temperature will be very small.

Turbidity. The proposed action will result in delivery of fine sediment into, and mobilization of fine sediment within the mainstem EFSFSR, which will result in increased turbidity in Chinook salmon and steelhead designated critical habitat. Placement of rock below the OHWM will occur in the dry, and will therefore not cause turbidity. Water pumped from the work area will be filtered through upland vegetation and/or stored in settling basins to reduce turbidity, prior to discharge into the EFSFSR, but some turbidity could still occur during pumping. Small pulses of turbidity will occur when the cofferdams are placed to isolate the work areas below the OHMW, and larger plumes are likely to occur when the cofferdams are removed to rewater the work areas. The measures described in the BA, and summarized in section 1.3.1, should ensure that turbidity plumes are monitored and that measures are implemented to ensure that turbidity does not exceed 50 NTUs over background, measured 300 feet downstream from the work area. These measures should ensure that turbidity plumes do not extend more than 500 feet downstream, that adverse effects of turbidity will be largely confined to the reach extending 300 feet downstream form the work area, and that adverse turbidity effects will be minor and temporary. Because the measures proposed have proven effective in past projects, we expect turbidity-related effects on designated critical habitat to be minor, localized, and temporary.

2.5.1.2 Spawning Gravel/Substrate

The proposed action will result in ground disturbance, construction of approximately 300 feet of new road, conversion of approximately 300 feet of existing road into a pedestrian/ATV trail, and installation of approximately 3,500 square feet of riprap in and adjacent to the EFSFSR. The BMPs and PDF described in the BA, and summarized above should ensure that construction activities, other than placement of riprap, do not result in fine sediment reaching aquatic habitat. Roads are a long-term source of fine sediment and the 300 feet of new road would therefore result in a small increase in fine sediment. However, conversion of approximately the same amount of existing road to a trail would tend to reduce sedimentation over the long term. Overall, the change in sediment delivery due to the proposed changes in Abstein Road would likely be very small. Installation of riprap in and adjacent to the EFSFSR will result in fine sediment entering Chinook salmon and steelhead designated critical habitat, however, the erosion control measures described in the BA (e.g., use of only clean riprap, visual monitoring for turbidity plumes, water testing for turbidity, halting work before turbidity limits are exceeded, etc.), and summarized in section 1.3.1, should ensure that the amount of fine sediment entering the EFSFSR is very small and that the fine sediment inputs are temporary. Because the amount of fine sediment entering the EFSFSR will be very small, the inputs will be temporary, and because the affected reach of the EFSFSR is likely functioning appropriately for fine sediment, the proposed action is not likely to degrade the spawning gravel/substrate PBF.

2.5.1.3 Food/Forage

The pathways that could affect the food/forage PBF are increases in fine sediment, which can adversely affect primary and secondary productivity (Spence et al. 1996), and conversion of riparian vegetation to riprap, which could reduce inputs of plant matter and invertebrates to the EFSFSR. As described above, the amount of fine sediment entering the EFSFSR would be small, the inputs would be mostly temporary, and the substrates in the action area are likely functioning appropriately. The fine sediment related effects of the proposed action, therefore, are not expected to degrade the food/forage PBF. The total length of riprap (both banks) would be approximately 109 feet, approximately half of which is currently riprapped with little or no riparian vegetation. The proposed action would, therefore, convert approximately 55 feet of currently vegetated streambanks to riprap. Because only a very short length of streambank would be adversely affected, the effect of riprap on food/forage for rearing Chinook salmon and steelhead, would be very small.

2.5.1.4 Cover/Shelter

The proposed action would adversely affect the cover/shelter PBF primarily through effects on riparian habitat in the project area. The proposed action includes installing riprap to approximately 109 feet of streambank (approximately 62 feet on the south side of the river and approximately 47 feet on the north side). Approximately half of this length has apparently been riprapped in the past and has little or no riparian vegetation. The remainder of the area has riparian vegetation that would be removed and replaced with riprap. Replacing riparian vegetation with riprap typically reduces the amount and quality cover available for rearing juvenile and holding adult salmonids. However, most of the riparian vegetation that would be affected is relatively small and does not appear to provide much cover or shelter, possibly because much of the affected area was in the footprint of the previous Abstein Road Bridge and was also possibly impacted by historic bank revetment. Because a small amount of streambank would be affected, approximately half of that area is currently riprapped, and much of the remainder is probably within the footprint a historic bridge, the effect of the proposed action on cover/shelter would be very small over the short term. Over the long term, doubling the size of the river crossing footprint, due to leaving the existing bridge in place, will approximately double the amount of streambank that is permanently shaded by bridges, in which riparian vegetation will not recover. This will likely result in a long-term reduction in cover/shelter along approximately 40 feet of streambank (approximately 20 feet on each side of the river), resulting in a small long-term adverse impact on the cover/shelter PBF. The proposed action also includes removal of two relatively large conifers (>10 inches DBH), which if left in place would have eventually fallen into the river and provided cover/shelter. Removing these two trees will have a small adverse effect on cover/shelter in the form of less LWD recruited to the stream channel. There is a possibility that some of the downed trees will remain along the river bank, in which case the proposed action could result a very small increase in cover/shelter.

2.5.1.5 Riparian Vegetation

As described in the previous section, the proposed action would cause a short- and long-term reduction in riparian vegetation in the project area. Because the affected reach is very short, the overall effect on the riparian vegetation PBF would be very small.

2.5.2 Effects on ESA-listed Fish Species

Juvenile Chinook salmon and steelhead have been documented rearing in the action area and juvenile and adult Chinook salmon and steelhead regularly migrate through the action area. Although spawning has not been documented in the action area, it likely occurs there at least occasionally. Construction activities will likely occur from spring through fall and will overlap with presence of all freshwater life stages of Chinook salmon and steelhead. However, in-water work will only occur during the in-water work window of July 15 – August 15 and therefore could affect rearing juveniles and prespawn adult Chinook salmon. In-water work is not likely to affect adult steelhead, spawning Chinook salmon or steelhead, or Chinook salmon or steelhead eggs or alevins, because those life stages would not be present in the action area during the in-water work window.

The proposed action could directly affect ESA-listed fish species via intentional harassment and capture of juvenile fishes in the in-water work areas, stranding of fishes when the work areas are dewatered, and disturbance of juvenile and adult fishes due to construction activities in and near occupied habitat. Chinook salmon and steelhead could also be indirectly affected through effects on occupied habitat. As described in the previous section, the proposed action could affect ESA-listed fish through impacts to water quality, spawning gravel/substrate, food/forage, cover/shelter, and riparian vegetation. Each of the potential pathways for effects of the proposed action on Chinook salmon and steelhead are described in more detail below.

2.5.2.1 Intentional Harassment and Capture of Juvenile Fishes

The proposed action includes installation of up to 500 square feet of riprap below the OHWM of the EFSFSR, up to 250 square feet on each side of the river. These areas will be isolated with cofferdams and dewatered prior to commencement of work. Including the footprint of the cofferdams, a total of 2,600 square feet could be isolated for in-water work, 1,900 square feet on the north side of the river and 700 square feet on the south side. There are three years of snorkel survey data (1994, 2015, and 2019) for the EFSFSR between Quartz (approximately 0.42 miles upstream from the action area) and Johnson (i.e., approximately 1.1 miles downstream from the action area) Creeks. Assuming average density observed during these surveys, approximately ten juvenile Chinook salmon and 16 juvenile steelhead would be present in the proposed in-water work area. Because there are only three years of data, calculating meaningful confidence intervals is not feasible. In the absence of meaningful confidence intervals, we calculated the maximum number of juvenile Chinook salmon and steelhead that would likely be present in the project area. We did that by comparing the densities observed in the snorkel surveys to the number of wild adult Chinook salmon and steelhead returning the year prior to the surveys, under the assumption that the density of rearing juveniles is related to the number of adults available for spawning. The preliminary counts at Lower Granite Dam indicate that returns of Snake River anadromous fishes in 2022 may be the highest since 2015, suggesting that densities of juvenile Chinook salmon and steelhead may be relatively high in the project area in 2023, and possibly in subsequent years if returns of anadromous fishes remain relatively high. Using these comparisons and assuming that Chinook salmon and steelhead returns will be the highest since listing, then a total of approximately 21 juvenile Chinook salmon and 38 juvenile steelhead could be present in the in-water work area during placement of the cofferdams and dewatering of the work area.

Based on the estimates described in the previous paragraph, we presume that approximately 21 juvenile Chinook salmon and 38 juvenile steelhead will be in the in-water work area, prior to cofferdam placement. We also presume that all of these fish will be either temporarily displaced from the in-water work area or killed. Displacement will occur via incidental disturbance as the cofferdams are placed, via intentional harassment to drive fish out of the in-water work area, and by capture and removal. Monitoring reports from habitat restoration projects indicate that a combination of gradual dewatering and driving fish, as described above, successfully moved at least 50 percent of Chinook salmon and steelhead out of the project areas. Based on these estimates, approximately 11 juvenile Chinook salmon and 19 juvenile steelhead will likely resist being driven out and would have to be captured by electrofishing. McMichael et al. (1998) found that juvenile Chinook salmon and steelhead captured by electrofishing had injury rates of 2.0 percent and 5.1 percent, respectively. Information on effects of injury on long-term survival of Chinook salmon and steelhead is lacking. In the absence of information, we assumed that none of the fish injured as juveniles would reach maturity and therefore, mortality rate of fish captured during salvage would be 2.0 percent and 5.1 percent, respectively, for Chinook salmon and steelhead. Based on the estimated number of juvenile Chinook salmon and steelhead that will be captured during salvage operations, and injury rates described by McMichael et al.

(1998), up to one juvenile Chinook salmon and one juvenile steelhead are likely to be killed due to dewatering and salvage associated with the proposed action. Based on the estimated number of adult returns and typical smolt to adult return rates, one juvenile Chinook salmon and one juvenile steelhead represents substantially less than 0.01 percent of the EFSFSR Chinook salmon and the SFSR steelhead populations.

2.5.2.2 Disturbance and Passage

Other than the in-water work activities, salvage, etc., described above, disturbance of fish will be entirely due to activity associated with construction activities above the OHWM. These activities will include operation of heavy equipment, may include jackhammering, but will not include blasting or pile driving. Heavy equipment operation produces noise levels of 80 – 88 dB (FHWA 2008) and jackhammers can produce noise levels of 130 dB (3M website). Wysocki et al. (2007) did not identify any adverse impacts to rainbow trout from prolonged exposure to three sound treatments common in aquaculture environments (115, 130, and 150 dB). The noise produced by the proposed construction will, therefore, probably not physically harm any fishes, but construction activity will likely cause fish that are rearing or holding in the immediate vicinity of the Abstein Road crossing, to temporarily relocate.

The project is not likely to impair upstream or downstream fish passage. Because the in-water work area will be isolated with cofferdams, cofferdams will only be placed on one side of the river at a time, and the cofferdams will not extend across the entire width of the river, disruption of upstream or downstream migration, is not likely. Although the cofferdam will constrain flows somewhat, the resultant water velocity increase will be very small and will not impair upstream fish migration. After removal of the cofferdams, water velocities should be essentially the same as before the project.

2.5.2.3 Turbidity Due to In-water Work

The proposed action will result in delivery of fine sediment into, and mobilization of fine sediment within, the mainstem EFSFSR, which will result in increased turbidity in occupied habitat and sedimentation on substrates in occupied habitat. Some small pulses of turbidity will occur when the cofferdams are installed and may occur when water pumped out of the work area is discharged into the EFSFSR. These pulses will likely be small and localized, will quickly dissipate, and are not likely to reach levels expected to harm Chinook salmon or steelhead. However, larger plumes will likely occur when the cofferdams are removed and flow is reintroduced to the in-water work areas. Based on documented effects of past projects involving in-water work, the measures to minimize sedimentation, described in Section 1.3, are expected to be effective (AWRC 2009; AWRC 2010; Eisenbarth 2011). We therefore expect turbidity levels in excess of 35 NTUs over background levels, measured 300 feet downstream from the project area, to be of extremely short duration, if they occur at all. We also expect turbidity plumes to be no more than 500 feet long and we expect turbidity levels to quickly return to background levels after the cofferdams are removed (AWRC 2010; Eisenbarth 2011).

Depending on duration and intensity, elevated turbidity due to suspended sediment can cause lethal, sublethal, and behavioral effects in juvenile and adult salmonids (Newcombe and Jensen

1996). Because turbidity would be limited in duration and extent, lethal effects are unlikely. However, some sublethal adverse effects could occur. Sublethal effects of turbidity due to suspended sediment include: gill flaring, coughing, avoidance, and increase in blood sugar levels (Bisson and Bilby 1982; Sigler et al. 1984; Berg and Northcote 1985; Servizi and Martens 1992). Although turbidity may cause stress, Gregory and Northcote (1993) have shown that moderate levels of turbidity (35 to 150 NTUs) accelerate foraging rates among juvenile Chinook salmon, likely because of reduced vulnerability to predators (camouflaging effect). This suggests that the turbidity expected due to the proposed action is not likely to result in long-term adverse effects on adult Chinook salmon or rearing juvenile Chinook salmon or steelhead. Because all in-water work will be conducted during July 15 through August 15, Chinook salmon and steelhead eggs and pre-emergent fry are not likely to be present in the action area when turbidity plumes and sedimentation, caused by the proposed action, would occur.

2.5.4.4 Reduction in Quality and Quantity of Rearing Habitat

The quality and quantity of rearing habitat influences productivity of anadromous salmonid populations, even at very low population densities (Arthaud et al. 2010; Walters et al. 2013). Although the mechanisms are not precisely understood, the statistical relationships between population productivity and rearing habitat indicate that reducing quality and/or quantity of rearing habitat reduces fitness of rearing Chinook salmon and steelhead. The proposed action would reduce quality of Chinook salmon and steelhead rearing habitat by riprapping approximately 109 feet of streambank. The placement of riprap typically causes adverse effects to stream morphology, salmonid habitat, and salmonid populations (USFWS 2000; Schmetterling et al. 2001; Garland et al. 2002). As reported by WDFW et al. (2002), juvenile life stages of salmonids are especially affected by riprap. Rearing juveniles depend on cover provided by undercut banks and overhanging vegetation for resting, feeding, and protection from predation. Riprapping streambanks replaces these types of habitat features with rock, which typically results in poorer quality habitat that supports fewer rearing juvenile salmonids (Garland et al. 2002). Over time, woody vegetation can encroach on riprapped streambanks and partially restore some of the habitat function. However, because the vast majority of riprap will be underneath either the new or existing bridge, recovery of vegetation is likely to be minimal. Although the proposed action will reduce quality of rearing habitat in the affected area, because only 109 feet of streambank would be affected, and because most of the affected area have been impacted by historic construction activities, the overall effects on quality of rearing habitat will be very small (see also sections 2.5.1.3 – 2.5.1.5).

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 402.17(a)]. 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.

The action area is in the unincorporated community of Yellow Pine, Idaho, which is located in north-central Valley County. The action area is entirely private land. Ongoing and future activities that are reasonably certain to occur and that will likely affect fish habitat include:

construction of residential structures, management of residential properties, road maintenance, maintenance of utilities, and management of private forest. These activities could affect riparian vegetation, LWD, river substrates, water quality, and anadromous fishes in the action area. Because these activities will occur on private land, they will often not be dependent on Federal actions. The population of Valley County is growing rapidly, suggesting that activities associated with residential properties, roads, and utilities will likely increase within the action area. These types of activities typically reduce quality of riparian vegetation and the amount of LWD, and we therefore expect the quality of riparian and instream habitat, within the action area, to decline over time. However, even with some degradation of riparian and instream habitat, the action area will likely continue to function appropriately as migration habitat. Also, because the action area constitutes less than 0.2 percent of accessible habitat in the EFSFSR Chinook salmon and the SFSR steelhead population areas, the overall effect of non-Federal activities on spawning, rearing, adult holding, etc., will be very small.

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 2.2.3).

2.7. Integration and Synthesis

The Integration and Synthesis section is the final step assessing the risk that the proposed action poses to species and critical habitat. 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 biological 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.

2.7.1 Designated Critical Habitat

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. Mainstem migration habitat is largely degraded due to presence of dams, reservoirs, and introduced predatory fishes. The overall condition of designated critical habitat is currently inadequate to meet recovery objectives for either Snake River spring/summer Chinook salmon or Snake River Basin steelhead. For some populations that spawn and rear in undeveloped areas, addressing the factors that influence migration survival may be sufficient to achieve recovery goals. However, in developed areas, improving spawning and/or rearing habitat will also typically be needed.

The action area is relatively small, encompassing approximately 550 feet of the EFSFSR and approximately 150 feet of Abstein Road on either side of the river. Although small, the action area is important migration and rearing habitat for Chinook salmon and steelhead, and is likely also spawning habitat for both species. Although habitat is somewhat degraded in the immediate vicinity of the bridge and adjacent to residences on the north side of the river, the overall condition of designated critical habitat within the action area is relatively good and generally supports the PBFs listed in Table 4. The proposed action may temporally degrade water quality throughout the lower 500 feet of the action area, and will reduce quality of cover/shelter and riparian vegetation, over the long term, in the immediate vicinity of the Abstein Road crossing. Because the effects on water quality are temporary and the long-term effects will only occur in a very short reach immediately adjacent to the road crossing, the overall adverse effects on Chinook salmon and steelhead designated critical habitat will be very small.

When considering the status of the critical habitat, environmental baseline, effects of the action, and cumulative effects, NMFS concludes that EDA's and the COE's implementation of this proposed action will not appreciably diminish the value of designated critical habitat, as a whole, for the conservation of Chinook salmon and steelhead.

2.7.2 Species

As described in Section 2.2, individuals belonging to one population in the Snake River spring/summer Chinook salmon ESU (EFSFSR) and one population in the Snake River Basin steelhead DPS (SFSR) use the action area to fully complete the migration, spawning, and rearing parts of their life cycle. The Snake River spring/summer Chinook salmon ESU is currently at a high risk of extinction. Similarly, the Snake River Basin steelhead DPS is not currently meeting its VSP criteria and is at a moderate risk of extinction. Large improvements in abundance will be needed to bridge the gap between the current status and the proposed status for recovery most of the ESU/DPS component populations.

The environmental baseline incorporates effects of restoration actions implemented to date. It also reflects impacts that have occurred as a result of mining, recreation, and implementation of various programmatic activities. In addition, impacts from existing State and private actions are reflected in the environmental baseline. Cumulative effects from State and private actions in the action area are expected to continue and will likely increase in severity, however, due to the small size of the action area, the overall impact of cumulative effects will be very small. The environmental baseline also incorporates the impacts of climate change on both the species and the habitat, on which they depend. Increased summer temperatures and decreased summer flows negatively impact VSP parameters and are likely to become more severe due to climate change.

The EFSFSR Chinook salmon population is at high risk of extinction and the most recent population estimates suggests that the SFSR steelhead population is also at high risk of extinction. NMFS' preferred recovery scenarios for the Snake River spring/summer Chinook salmon ESU requires the EFSFSR population to be at least maintained status (i.e., moderate risk of extinction). The preferred recovery scenario for the Snake River Basin steelhead DPS requires the SFSR population to be at least viable status (i.e., low risk of extinction). In order to achieve these goals, it is vitally important to preserve habitat conditions that are currently functioning properly and to improve habitat conditions that are currently degraded.

As previously described, the proposed action could adversely affect Chinook salmon and steelhead via four pathways: (1) intentional harassment and/or capture of juveniles in the in-water work area; (2) incidental disturbance of juveniles and adults during construction; (3) increased turbidity in occupied habitat; and (4) long-term reduction in quality and/or quantity of accessible habitat, which will increase density dependent effects on individuals. Up to 21 juvenile Chinook salmon and 38 steelhead could be present in the in-water work area and would be removed by harassment and capture. All of these fish will either be displaced via harassment or captured and moved, which could result in death of up to one Chinook salmon and one steelhead. The incidental disturbance due to construction activities will be temporary, localized, and minor and is therefore not likely to appreciably impair migrating adult Chinook salmon or appreciably reduce growth or survival of juvenile Chinook salmon or steelhead. Likewise, turbidity plumes will be low intensity, temporary, and localized and are therefore not likely to impair adult Chinook salmon migration or growth or survival of juvenile Chinook salmon or steelhead. The reduction in habitat quality will be long term, but will affect a very short reach of the EFSFSR and will affect habitat that is already degraded due to the current Abstein Road crossing, and will therefore have a very small overall effect on growth and survival of rearing juvenile Chinook salmon and steelhead.

The proposed action is not likely to result in a measurable effect on productivity of the EFSFSR Chinook salmon population or the SFSR steelhead population. This is because only one juvenile Chinook salmon and one juvenile steelhead are likely to be killed (less than 0.01 percent of either population); disturbance and turbidity effects are likely to be minor, temporary, and localized; and long-term adverse effects will occur on a very short reach of the EFSFSR that has long been impacted by the Abstein Road crossing. These impacts are not likely to have a measurable effect on the productivity of the EFSFSR Chinook salmon or the SFSR steelhead populations. Our assessment assumes that the EDA and any contractors will properly implement appropriate PDFs and BMPs during project implementation. Because these impacts will not reduce the productivity of the affected populations, it is reasonable to conclude that the action will not negatively influence VSP criteria at the population scale. Thus, the viability of the MPGs and the ESU/DPS are also not likely to be reduced. When considering the status of the species, and adding in the environmental baseline, and cumulative effects, implementation of the proposed action will not appreciably reduce the likelihood of survival and recovery of Snake River spring/summer Chinook salmon or Snake River Basin steelhead.

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 the cumulative effects, it is NMFS' biological opinion that the proposed action is not likely to jeopardize the continued existence of Snake River spring/summer Chinook salmon and Snake River Basin steelhead or 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). "Harass" if further defined by interim guidance as to "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 ESA-listed species. NMFS is reasonably certain the incidental take described here will occur because: (1) the proposed action will occur in occupied habitat and will result in dewatered habitat, capture, movement, and injury/death of ESA-listed fishes; and (2) the project will result in mobilized sediment that will cause turbidity plumes that could harm rearing ESA-listed fishes. In the opinion, NMFS determined that incidental take is reasonably certain to occur as follows:

2.9.1.1 Dewatering and Fish Salvage

Dewatering within the mainstem SFSR during construction would displace approximately 21 juvenile Chinook salmon and 38 juvenile steelhead. Up to half of displaced fishes could be captured during salvage activities, for a total of 11 juvenile Chinook salmon and 19 juvenile steelhead. Approximately 2.0 percent of captured Chinook salmon and 5.1 percent of captured steelhead would die due to effects of electrofishing, stress of handling, etc., for a total of one juvenile Chinook salmon and one juvenile steelhead killed due to dewatering and fish salvage during construction. NMFS will consider the amount of take exceeded if more than one juvenile Chinook salmon or one juvenile steelhead are killed as a result if fish salvage efforts.

2.9.1.2 Turbidity

For turbidity, the number of individual Chinook salmon and steelhead that experience harm from exposure to plumes cannot be accurately determined. There is no feasible way to quantify how many fish will be affected, how long they will be affected, or what injury levels or behavioral modifications may be incurred. These uncertainties make it impossible to quantitatively identify the amount of turbidity-related take that will occur due to the proposed action. Because circumstances causing take are likely to arise, but cannot be quantitatively evaluated in the field, the extent of incidental take is described, pursuant to 50 CFR 402.14[I].

NMFS will consider the extent of take exceeded if turbidity readings, taken approximately 300 feet downstream from the Abstein Road crossing, reveal levels greater than 50 NTUs above background for more than 90 minutes, or greater than 100 NTUs instantaneously. Literature reviewed in Rowe et al. (2003) indicated that NTU levels below 50 generally elicit only behavioral responses from salmonids, thereby making this a suitable surrogate for sublethal incidental take monitoring. This take indicator functions as an effective reinitiation trigger because it can be readily monitored, and thus will serve as a regular check on the proposed action.

2.9.2 Effect of the Take

In the 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 EDA and COE (for those measures relevant to the Section 404 Clean Water Act permit) shall:

1. Minimize the adverse impacts of temporarily dewatering habitat and fish salvage due to the action.
2. Minimize the mobilization of fine sediment, and the resultant turbidity plumes and sediment deposition caused by the action.
3. Monitor the proposed action to confirm the terms and conditions in this ITS effectively avoid and minimize incidental take from the proposed activities and ensure the amount and extent of incidental take are 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 complies) with the following terms and conditions. The EDA, COE, 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: (minimize dewatering and fish salvage impacts): The EDA and COE shall ensure:

    a. The size of the dewatered work areas shall be minimized to the extent necessary to successfully complete the proposed activities.
    b. The cofferdams shall be installed slowly and flow shall be incrementally reduced to encourage fish to leave the area volitionally.
    c. All electrofishing will be done in accordance with NMFS electrofishing guidance (NMFS 2000).

d. All captured fish shall be held in thermally regulated, air-bubbler equipped containers, filled with stream water, for a period only long enough to transport fish to the release location.

e. Electrofishing and fish handling activities will be overseen by a qualified environmental monitor with experience in electrofishing and handling juvenile salmonids.

f. A suitable release location will be identified prior to commencement of dewatering.

2. The following terms and conditions implement RPM 2 (minimize turbidity and sediment):

    a. The EDA and the COE shall ensure that contracts and permits authorizing work shall stipulate successful implementation of all minimization measures, BMPs, and monitoring described in Section 1.3 of this document.

    b. Personnel with natural resource training who are knowledgeable of turbidity monitoring and with the effects of turbidity on salmonid habitat, will be present whenever activities that are likely to produce sediment are being conducted.

3. The following terms and conditions implement RPM 3 (monitoring and reporting):

    a. The EDA or their designee will monitor turbidity levels while water is being pumped out of the in-water work area, as described in Section 1.3, and will stop or delay pumping, and/or or increase filtration or settling capacity, if turbidity exceeds 35 NTUs over background levels, measured 300 feet downstream from the Abstein Road crossing.

    b. The EDA or their designee will monitor turbidity levels while the cofferdam is being removed, as described in Section 1.3, and will stop or delay cofferdam removal if turbidity exceeds 35 NTUs over background levels, measured 300 feet downstream from the Abstein Road crossing.

    c. The EDA or their designee will record number and species of fish captured during salvage operations, condition of fish captured and released, and number of fish killed during salvage operations.

    d. The EDA or their designee, will submit a monitoring report to NMFS within eight weeks of completion of the project that will include:

        i. Results of required turbidity monitoring (term and conditions 3.a and 3.b).

        ii. The number, size, and species of all salmonids captured and handled, and any mortalities that occur during salvage.

    e. The EDA shall submit the monitoring report to: nmfswcr.srbo@noaa.gov.

    f. If monitoring during in-water work indicates that the amount of extent of take described above will be exceeded if work continues, then work will stop and the EDA, COE, or their designee will contact NMFS.

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).

The EDA and COE should adopt and implement the following conservation recommendations:

1. Minimize the amount and extent of riprap as much as feasible while still meeting project objectives.
2. Plant appropriate woody vegetation along the water's edge, in the project area and within 50 feet upstream and downstream from the project area, where feasible and where vegetation is currently lacking.
3. Monitor survival of riparian plantings during the summer of the year following the project and replant as needed to replace plantings that did not survive.
4. Ensure that soils in revegetated portions of the existing roadway and approach are de-compacted sufficiently to promote growth and survival of vegetation.

Please notify NMFS if the EDA, COE, 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 Abstein Road Bridge Replacement project. Under 50 CFR 402.16(a): "Reinitiation of consultation is required and shall be requested by the Federal agency or by the Service where discretionary Federal agency involvement or control over the action has been retained or is authorized by law and: (1) if the amount or extent of incidental taking specified in the ITS is exceeded; (2) if new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not previously considered; (3) if 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 written concurrence; or (4) if a new species is listed or critical habitat designated that may be affected by the identified 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", and includes the physical, biological, and chemical properties that are used by fish

(50 CFR 600.10). 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 EDA 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/floodplain habitat and spawning habitat.

3.2. Adverse Effects on Essential Fish Habitat

The proposed action will dewater approximately 2,600 square feet of the EFSFSR channel for up to one month and will produce temporary turbidity plumes that will potentially affect an additional 500 feet of the EFSFSR. Chinook salmon spawning and rearing habitat exists, and is utilized, in the action area. The dewatering will render rearing habitat in the project area temporarily unusable and will temporarily displace rearing salmon, and mobilization of fine sediment may temporarily displace rearing salmon. Removing vegetation, revetment of the river banks, and increasing the footprint of the Abstein Road crossing, will reduce the long-term quality of salmon rearing habitat within an approximately 60-foot reach of the EFSFSR.

3.3. Essential Fish Habitat Conservation Recommendations

NMFS determined that the following Conservation Recommendations are necessary to avoid, minimize, mitigate, or otherwise offset the impact of the proposed action on EFH:

1. Minimize the amount and extent of riprap as much as feasible while still meeting project objectives.
2. Plant appropriate woody vegetation along the water's edge, in the project area and within 100 feet upstream and downstream from the project area, where feasible and where vegetation is currently lacking.

3. Monitor survival of plantings during the summer of the year following the project and replant as needed to replace plantings that did not survive.

Fully implementing these EFH conservation recommendations would protect, by avoiding or minimizing the adverse effects described in section 3.2, above, for approximately 0.25 acres of designated EFH for Pacific Coast salmon.

3.4. Statutory Response Requirement

As required by section 305(b)(4)(B) of the MSA, the EDA 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 any of NMFS' EFH Conservation Recommendations unless NMFS and the Federal agency have agreed to use alternative timeframes for the Federal agency response. The response must include a description of the 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 Recommendations, the Federal agency must explain its reasons for not following the recommendations, 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 agency. 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 EDA or COE 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 EDA and the COE. Other interested users could include Valley County, Idaho; contractors implementing the project; and government agency personnel providing technical assistance to the EDA or the COE. Individual copies of this opinion were provided to the EDA, COE, and the Payette National Forest. The document will be available within 2 weeks at the NOAA Library Institutional Repository (https://repository.library.noaa.gov/welcome). The format and naming adhere 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.

5. References

Arthaud, D. L., C. M. Greene, K. Guilbault, and J. V. Morrow Jr. 2010. Contrasting life-cycle impacts of stream flow on two Chinook salmon populations. Hydrobiologia 655:171– 188.

AWRC (American Water Resources Company). 2009. Environmental Compliance Monitoring Report, Idaho Transportation Department District 6, Salmon River Bridge West of Clayton Replacement Project, State Highway 75, MP 220. Custer County, Idaho. Project No. ST-6390(607) Key No. 6504. January 2009. 13 pp.

AWRC. 2010. Environmental Compliance Monitoring Report, Idaho Transportation Department District 6, Watts Bridge, Custer County Salmon River Bridge Replacement Project, State Highway 75, MP 265.49-257.25. Project No. ST-6350(653) Key No. 07811. March 2010. 44 pp.

Battin, J., M. W. Wiley, M. H. Ruckelshaus, R. N. Palmer, E. Korb, K. K. Bartz, and H. Imaki. 2007. Projected impacts of climate change on salmon habitat restoration. Proceedings of the National Academy of Sciences of the United States of America 104(16):6720–6725.

Beechie, T., H. Imaki, J. Greene, A. Wade, H. Wu, G. Pess, P. Roni, J. Kimball, J. Stanford, P. Kiffney, and N. Mantua. 2013. Restoring Salmon Habitat for a Changing Climate. River Research and Application 29:939-960. DOI: 10.1002/rra.2590.

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

Bisson, P .A. and R. E. Bilby. 1982. Avoidance of suspended sediment by juvenile coho salmon. North American Journal Fisheries Management 4: 371-374.Bjornn, T. C. 1978. Survival, production, and yield of trout and Chinook salmon in the Lemhi River, Idaho. University of Idaho, College of Forestry, Wildlife and Range Sciences Bulletin 27, Moscow, Idaho, USA.

Bjornn, T. C., and D. W. Reiser. 1991. Habitat requirements of salmonids in streams. Pages 83–138 *in* W. R. Meehan, editor. Influences of forest and rangeland management on salmonid fishes and their habitats. American Fisheries Society, Special Publication 19. Bethesda, Maryland.

Connor, W. P., Marshall, A. R., Bjornn, T. C., and Burge, H. L. 2001. Growth and long-range dispersal by wild subyearling spring and summer Chinook salmon in the Sanke River basin. Transactions of the American Fisheries Society 130:1070–1076.

Copeland, T., and D. A. Venditti. 2009. Contribution of three life history types to smolt production in a Chinook salmon (*Oncorhynchus tshawytscha*) population. Canadian Journal of Fisheries and Aquatic Sciences 66: 1658-1665.

Crozier, L. G., J. E. Siegel, L. E. Wiesebron, E. M. Trujillo, B. J. Burke, B. P. Sandford, and D. L. Widener. 2020. Snake River sockeye and Chinook salmon in a changing climate: Implications for upstream migration survival during recent extreme and future climates. PLoS One. 2020 Sep 30;15(9).

Ecovista, Nez Perce Tribe Wildlife Division, and Washington State University Center for Environmental Education. 2003. Draft Clearwater Subbasin Assessment, Prepared for Nez Perce Tribe Watersheds Division and Idaho Soil Conservation Commission. 463 p.

Eisenbarth, S. 2011. Water Quality and Fisheries Monitoring Report, Idaho Transportation District 4. Old Slate Creek Bridge Removal, State Highway 75, MP 213.47. Custer County Idaho. Project No. STP-2390(133), Key No. 07799. November 2011. 14 pp. Attachment.

Everest, F. H., and D. W. Chapman. 1972. Habitat selection and spatial interaction by juvenile Chinook salmon and steelhead trout in two Idaho streams. Journal of the Fisheries Research Board of Canada 29(1):91–100.

Ford, M. J. (ed.) 2011. Status review update for Pacific salmon and steelhead listed under the Endangered Species Act: Pacific Northwest. U.S. Dept. Commer., NOAA Tech. Memo. NMFS-NWFSC-113, 281 p. https://www.westcoast.fisheries.noaa.gov/publications/status_reviews/salmon_steelhead/multiple_species/5-yr-sr.pdf

Ford, M. J., editor. 2022. Biological Viability Assessment Update for Pacific Salmon and Steelhead Listed Under the Endangered Species Act: Pacific Northwest. U.S. Department of Commerce, NOAA Technical Memorandum NMFS-NWFSC-171.

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

Garland, R. D., K. F. Tiffan, D. W. Rondorf, and L. O. Clark. 2002. Comparison of subyearling fall Chinook salmon's use of riprap revetments and unaltered habitats in Lake Wallula of the Columbia River. North American Journal of Fisheries Management. 22: 1283-1289.

Good, T. P., R. S. Waples, and P. Adams (editors). 2005. Updated status of Federally listed ESUs of West Coast salmon and steelhead. U.S. Dept. Commerce, NOAA Tech. Memo. NMFS-NWFSC-66, 598 p.

Gregory, R. S. and T. S. Northcote. 1993. Surface, planktonic, and benthic foraging by juvenile Chinook salmon (*Oncorhynchus tshawytscha*) in turbid laboratory conditions. Canadian Journal of Fisheries and Aquatic Sciences 50: 223-240.

Hauck, F. R. 1953. The Size and Timing of Runs of Anadromous Species of Fish in the Idaho Tributaries of the Columbia River. Prepared for the U.S. Army Corps of Engineers by the Idaho Fish and Game Department, April 1953. 16 pp.

Healey, M. C. 1991. Life history of Chinook salmon (*Oncorhynchus tshawytscha*). Pages 80 *in* C. Groot, and L. Margolis, editors. Pacific salmon life histories. University of British Columbia Press, Vancouver, Canada.

Herring, S. C., N. Christidis, A. Hoell, J. P. Kossin, C. J. Schreck III, and P. A. Stott, Eds. 2018: Explaining Extreme Events of 2016 from a Climate Perspective. Bulletin of the American Meteorological Society. 99(1): S1–S157.

ICTRT (Interior Columbia Technical Recovery Team). 2003. Working draft. Independent populations of Chinook, steelhead, and sockeye for listed evolutionarily significant units within the Interior Columbia River domain. NOAA Fisheries. July.

ICTRT. 2007. Viability Criteria for Application to Interior Columbia Basin Salmonid ESUs, Review Draft March 2007. Interior Columbia Basin Technical Recovery Team: Portland, Oregon. 261 pp.

ICTRT. 2010. Status Summary – Snake River Spring/Summer Chinook Salmon ESU. Interior Columbia Technical Recovery Team: Portland, Oregon.

IDEQ (Idaho Department of Environmental Quality). 2001. Middle Salmon River–Panther Creek Subbasin Assessment and TMDL. IDEQ: Boise, Idaho. 114 p.

IDEQ. 2020. Idaho's 2018/2020 Integrated Report, Final. IDEQ. Boise, Idaho. 142 p.

IDEQ and U.S. Environmental Protection Agency (EPA). 2003. South Fork Clearwater River Subbasin Assessment and Total Maximum Daily Loads. IDEQ: Boise, Idaho. 680 p.

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

Islam, S. U., R. W. Hay, S. J. Dery, and B. P. Booth. 2019. Modelling the impacts of climate change on riverine thermal regimes in western Canada's largest Pacific watershed. Scientific Reports 9:14.

Jacox, M. G., M. A. Alexander, N. J. Mantua, J. D. Scott, G. Hervieux, R. S. Webb and F. E. Werner. 2018. Forcing of multiyear extreme ocean temperatures that impacted California Current living marine resources in 2016. Pages S1-S33 *In* S. C. Herring et al., editors. Explaining Extreme Events of 2016 from a Climate Perspective. Bulletin of the American Meteorological Society. 99(1). doi:10.1175/BAMS-D-17-0119.1.

Kennedy, V. S. 1990. Anticipated Effects of Climate Change on Estuarine and Coastal Fisheries. Fisheries 15(6):16-24.

Limburg, K., R. Brown, R. Johnson, B. Pine, R. Rulifson, D. Secor, K. Timchak, B. Walther, and K. Wilson. 2016. Round-the-Coast: Snapshots of Estuarine Climate Change Effects. Fisheries 41(7):392-394, DOI: 10.1080/03632415.2016.1182506.

Lindsey, R., and L. Dahlman. 2020. Climate change: Global temperature. January 16. https://www.climate.gov/news-features/understanding-climate/climate-change-globaltemperature

Mantua, N., I. Tohver, and A. Hamlet. 2009. Impacts of climate change on key aspects of freshwater salmon habitat in Washington State. Climate Impacts Group, University of Washington, Seattle.

Matthews, G. M., R. S. Waples. 1991. Status Review for Snake River Spring and Summer Chinook Salmon. U.S. Dept. of Commerce, NOAA Tech. Memo., NMFS-F/NWC-200. https://www.nwfsc.noaa.gov/publications/scipubs/techmemos/tm201/

McClure, M., T. Cooney, and ICTRT. 2005. Updated population delineation in the interior Columbia Basin. May 11, 2005 Memorandum to NMFS NW Regional Office, Co-managers, and other interested parties. NMFS: Seattle. 14 p.

McElhany, P., M. H. Ruckelshaus, M. J. Ford, T. C. Wainwright, and E. P. Bjorkstedt. 2000. Viable salmonid populations and the recovery of evolutionarily significant units. U.S. Department of Commerce, NOAA Technical Memorandum NMFS-NWFSC-42, Seattle, 156 p.

McMichael, G. A., A. L. Fritts, and T. N. Pearsons. 1998. Electrofishing injury to stream salmonids; injury assessment at the sample, reach, and stream scales. North American Journal of Fisheries Management 18:894-904.

Melillo, J. M., T. C. Richmond, and G. W. Yohe, eds. 2014. Climate change impacts in the United States: The third national climate assessment. U.S. Global Change Research Program, Washington, D.C.

NMFS (National Marine Fisheries Service). 1992. Federal Register Notice: Threatened status for Snake River spring-summer Chinook salmon, threatened status for Snake River fall Chinook salmon. Federal Register 57:78(22 April 1992):14653–14663.

NMFS. 2000. Guidelines for Electrofishing Waters Containing Salmonids Listed Under the Endangered Species Act. National Marine Fisheries Service. Portland, Oregon and Santa Rosa, California.

NMFS. 2015. ESA Recovery Plan for Snake River Sockeye Salmon (*Oncorhynchus nerka*), June 8, 2015. NOAA Fisheries, West Coast Region. 431 p. https://www.westcoast.fisheries.noaa.gov/publications/recovery_planning/salmon_steelhead/domains/interior_columbia/snake/snake_river_sockeye_recovery_plan_june_2015.pdf

NMFS. 2017. ESA Recovery Plan for Snake River Spring/Summer Chinook & Steelhead. NMFS. https://www.westcoast.fisheries.noaa.gov/publications/recovery_planning/salmon_steelhead/domains/interior_columbia/snake/Final%20Snake%20Recovery%20Plan%20Docs/final_snake_river_spring-summer_chinook_salmon_and_snake_river_basin_steelhead_recovery_plan.pdf

NMFS. 2022a. NOAA Fisheries West Coast Region Anadromous Salmonid Design Manual. NMFS, WCR, Portland, Oregon. 180 pp.

NMFS. 2022b. 2022 5-Year Review: Summary & Evaluation of Snake River Spring/Summer Chinook Salmon. NMFS. West Coast Region. 101 pp.

NMFS. 2022c. 2022 5-Year Review: Summary & Evaluation of Snake River Basin Steelhead. NMFS. West Coast Region. 95 pp.

Nau, C. I., E. A. Felts, B. Barnett, M. Davison, C. McClure, J. R. Poole, R. Hand, and E. Brown. 2021. Idaho adult Chinook Salmon monitoring. Annual report 2020. Idaho Department of Fish and Game Report 21-08. 82 pp.

Newcombe, C. P. and J. O. Jensen. 1996. Channel Suspended Sediment and Fisheries: A Synthesis for Quantitative Assessment of Risk and Impact. North American Journal of Fisheries Management 16, No. 4.

NWFSC (Northwest Fisheries Science Center). 2015. Status review update for Pacific salmon and steelhead listed under the Endangered Species Act: Pacific Northwest. 356 p.

ODFW (Oregon Department of Fish and Wildlife) and WDFW (Washington Department of Fish and Wildlife). 2022. 2022 Joint Staff Report: Stock Status and Fisheries for Spring Chinook, Summer Chinook, Sockeye, Steelhead, and other Species. Joint Columbia River Management Staff. 102 pp.

PFMC (Pacific Fishery Management Council). 2014. Appendix A to the Pacific Coast Salmon Fishery Management Plan, as modified by Amendment 18. Identification and description of essential fish habitat, adverse impacts, and recommended conservation measures for salmon.

Rowe, M., D. Essig, and B. Jessup. 2003. Guide to Selection of Sediment Targets for Use in Idaho TMDLs. https://19january2017snapshot.epa.gov/sites/production/files/2015-10/documents/sediment-appendix5.pdf

Scmetterling, D.A., C.G. Clancy, and T.M. Brandt. 2001. Effects of riprap bank reinforcement on stream salmonids in the western United States. Fisheries 26(7): 6-13.

Servizi, J. A. and D. W. Martens. 1992. Sublethal responses of coho salmon (*Oncorhynchus kisutch*) to suspended sediments. Canadian Journal of Fisheries and Aquatic Sciences 49: 1389-1395.

Siegel, J. and L. Crozier. 2019. Impacts of Climate Change on Salmon of the Pacific Northwest: A review of the scientific literature published in 2018. Fish Ecology Division, Northwest Fisheries Science Center, National Marine Fisheries Service, NOAA. December.

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

Spence, B., G. Lomnicky, R. Hughes, and R. P. Novitski. 1996. An ecosystem approach to salmonid conservation. TR-4501-96-6057. ManTech Environmental Research Services Corp.: Corvallis, Oregon.

USFWS (U. S. Fish and Wildlife Service). 2000. Impacts of riprapping to ecosystem functioning, Lower Sacramento River, California. Fish and Wildlife Coordination Act Report. June. 40 pp.

USGCRP (U.S. Global Change Research Program). 2018. Impacts, risks, and adaptation in the United States: Fourth National Climate Assessment, Volume II [Reidmiller, D. R., C. W. Avery, D. R. Easterling, K. E. Kunkel, K. L. M. Lewis, T. K. Maycock, et al. (eds.)] Washington, D.C., USA. DOI: 10.7930/NCA4.2018.

Wainwright, T. C., and L. A. Weitkamp. 2013. Effects of climate change on Oregon Coast coho salmon: habitat and life-cycle interactions. Northwest Science 87(3):219-242.

Walters, A. W., T. Copeland, and D. A. Venditti. 2013. The density dilemma: limitations on juvenile production in threatened salmon populations. Ecology of Freshwater Fish 22(4): 508-519.

WDFW (Washington Department of Fish and Wildlife, Washington) State Department of Transportation, and Washington Department of Ecology. 2002. Washington State Aquatic Habitat Guidelines Program: Integrated Streambank Protection Guidelines 2003. 625 pp.

Whitney, J. E., R. Al-Chokhachy, D. B. Bunnell, C. A. Caldwell, et al. 2016. Physiological Basis of Climate Change Impacts on North American Inland Fishes. Fisheries 41(7):332-345. DOI: 10.1080/03632415.2016.1186656.

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

6. Appendix A

Figure A-1 The current Abstein Road Bridge from the north bank looking upstream.

Figure A-2 View of aquatic and riparian habitat beneth the existing Abstein Road Bridge. The proposed locations of the abutments for the new bridge are at the bottom left and top right of the picture.

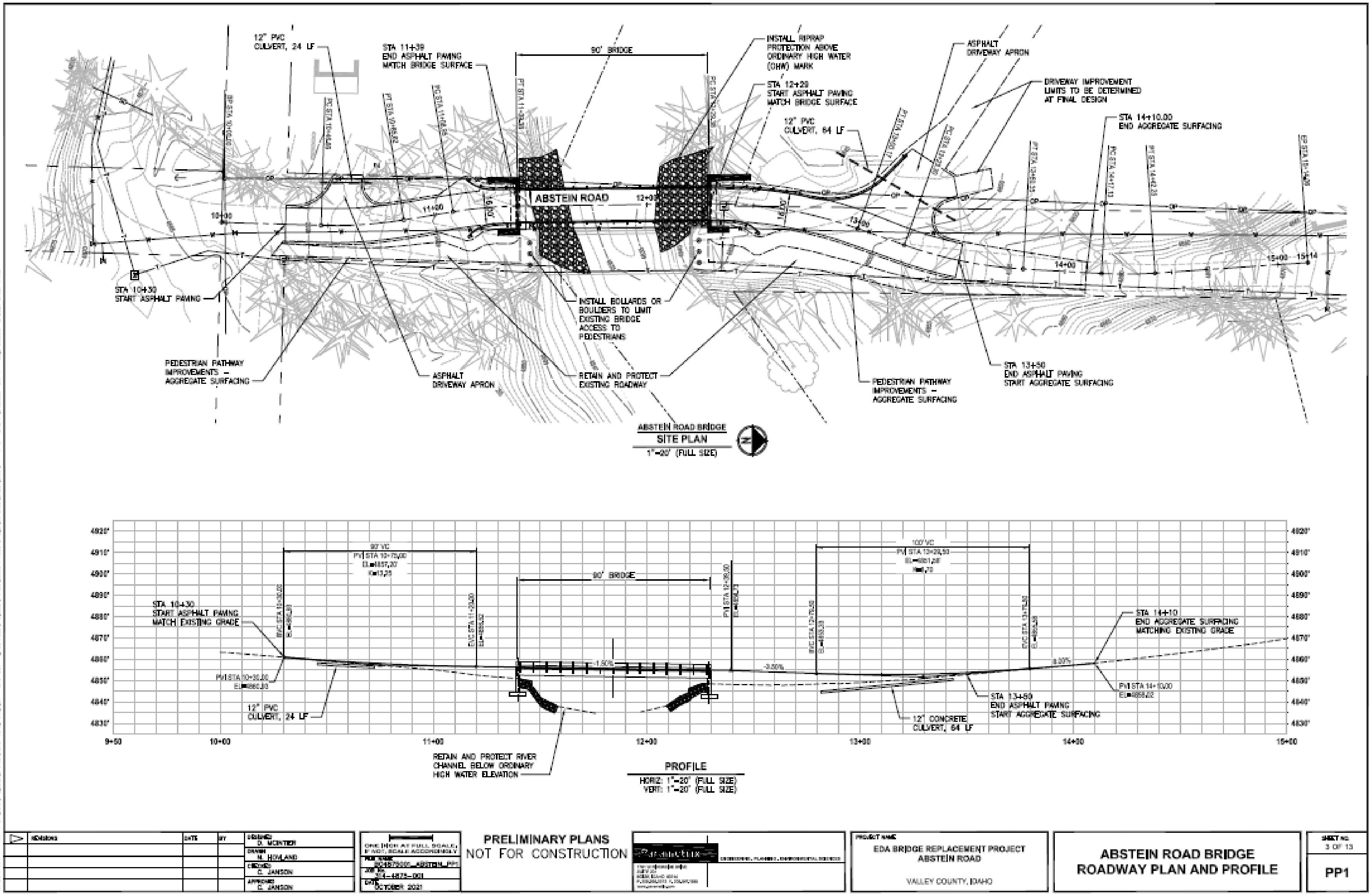

Figure A-3 Page 3 of the design drawings in the BA.

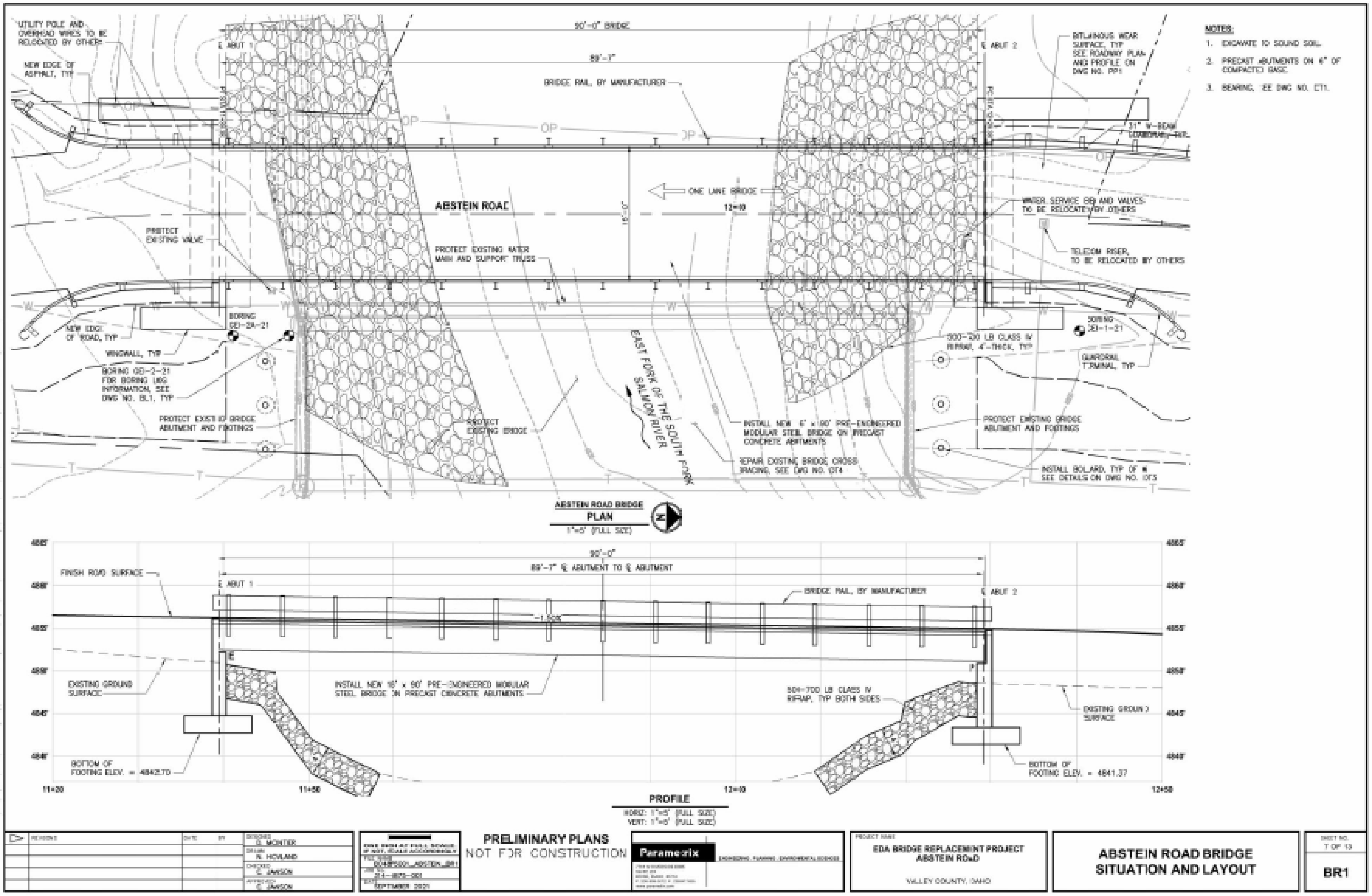

Figure A-4 Page 7 of the design drawings in the BA.