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-2022-03077

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April 20, 2023

Tawnya Brummett
Forest Supervisor
1249 S. Vinnell Way, Suite 200
Boise, Idaho 83709

Re: Endangered Species Act Section 7(a)(2) Biological Opinion and Magnuson–Stevens Fishery Conservation and Management Act Essential Fish Habitat Response for Fire Suppression Actions on the Boise National Forest; South Fork Salmon River (HUC 17060208) and Upper Middle Fork Salmon River (HUC 17060205) Subbasins; Valley County, Idaho (One Project)

Dear Ms. Brummett:

Thank you for your letter of December 13, 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 fire suppression activities on the Boise National Forest (BNF).

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 (ITS) with the opinion. The ITS describes reasonable and prudent measures (RPM) NMFS considers necessary or appropriate to minimize the impact of incidental take associated with this action. The take statement sets forth terms and conditions, including reporting requirements that the BNF 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 Magnuson–Stevens Fishery Conservation and Management Act (MSA), and includes two Conservation Recommendations (CR) to avoid, minimize, or otherwise offset potential adverse effects on EFH. These CRs are similar, but not identical to the ESA terms and conditions. Section 305(b)(4)(B) of the MSA requires Federal agencies to provide a detailed written response to NMFS within 30 days after receiving these recommendations. If the response is inconsistent with the EFH CR, the BNF 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 (OMB), NMFS established a quarterly reporting requirement to determine how many CRs 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 CRs accepted.

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

Sincerely,

Nancy L Munn

Nancy L. Munn, Ph.D.
Acting Assistant Regional Administrator
Interior Columbia Basin Office

Enclosure

cc: H. Roerick – BNF
L. Nutt – BNF
J. Brickey – BNF
S. Dzielski – USFWS
M. Lopez – NPT
C. Coulter – SBT

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

Fire Suppression Actions on the Boise National Forest

NMFS Consultation Number: WCRO-2022-03077

Action Agency: USDA Forest Service, Boise National Forest

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: Nancy L Munn

Nancy L. Munn, Ph. D.
Acting Assistant Regional Administrator
Interior Columbia Basin Office

Date: April 20, 2023

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ACRONYMS

ATV	All-Terrain Vehicle
BA	Biological Assessment
BNF	Boise National Forest
BVC	Bear Valley Creek
CFR	Code of Federal Regulations
COE	U.S. Army Corps of Engineers
CR	Conservation Recommendation
CWA	Clean Water Act
DPS	Distinct Population Segment
DQA	Data Quality Act
EFH	Essential Fish Habitat
EFSFSR	East Fork South Fork Salmon River
ESA	Endangered Species Act
ESU	Evolutionarily Significant Unit
FMP	Fishery Management Plan
fps	Feet per second (fps)
FR	Federal Register
HAPC	Habitat Area of Particular Concern
ICTRT	Interior Columbia Technical Recovery Team
IDFG	Idaho Department of Fish and Game
ISAB	Independent Scientific Advisory Board
ITS	Incidental Take Statement
LWD	Large Woody Debris
MFSR	Middle Fork Salmon River
MPG	Major Population Group
MSA	Magnuson–Stevens Fishery Conservation and Management Act
MSL	Mean Sea Level
NFS	National Forest System
NMFS	National Marine Fisheries Service
OMB	Office of Management and Budget
opinion	Biological Opinion
PBF	Physical or Biological Feature
PCE	Primary Constituent Element
PDF	Project Design Feature
PFMC	Pacific Fishery Management Council
POD	Point of Diversion
RCA	Riparian Conservation Areas
RM	River Mile
RPA	Reasonable and Prudent Alternative
RPM	Reasonable and Prudent Measure
SFSR	South Fork Salmon River
SRB	Salmon River Basin
TEPC	Threatened, Endangered, Proposed or Candidate

UMFSR	Upper Middle Fork Salmon River
U.S.C.	U.S. Code
USFS	United States Forest Service
VSP	Viable Salmonid Population
WCI	Watershed Condition Indicators
WFDSS	Wildland Fire Decision Support System

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 NMFS office in Boise, Idaho.

1.2. Consultation History

In 2006, the Boise National Forest (BNF) and the Sawtooth National Forest completed a joint programmatic ESA Section 7 consultation for fire suppression activities occurring on both national forests (NMFS 2006). That program ended in 2010. Since 2012, aerial application of fire retardant in the Snake River basin has been covered by a series of regional and national programmatic ESA Section 7 consultations (NMFS 2019), but the effects of other fire suppression activities are still typically addressed at the forest level. Since 2011, fire suppression activities (except aerial application of retardant) on the BNF have been treated as emergency consultations, with respect to potential effects on ESA-listed anadromous fishes. Completing consultation on fire suppression actions will reduce the need for emergency consultation and will reduce potential adverse effects of fire suppression activities.

The project was presented to the BNF Level 1 Team on March 10, 2021 and the BNF submitted a draft biological assessment (BA) to the Level 1 Team for review on August 30, 2021. The project was discussed in meetings held on October 18, 2021 and December 14, 2021, and a second draft BA was submitted to the Level 1 Team on March 11, 2022. The Level 1 Team recommended finalization of the BA during its April 13, 2022, meeting, however, the change in status of wolverine (*Gulo gulo luscus*) necessitated additional revisions. The BNF submitted the final BA to NMFS on December 13, 2022. The BA described proposed wildfire suppression activities that are likely to occur on the BNF for the foreseeable future. The BA analyzed the potential effects of those activities on Snake River Basin steelhead (steelhead), Snake River spring/summer Chinook salmon (Chinook salmon), and designated critical habitat for Chinook salmon and steelhead. The BA also described potential effects on Chinook salmon EFH. On January 4, 2023, NMFS sent the BNF a letter accepting the consultation package. On February 6, 2023, NMFS requested additional information on the proposed action and the action area, and the BNF provided the information on February 15, 2023. In preparing this BO, we relied on information in the BA, information obtained from BNF via phone and e-mail communications, and a variety of publicly available information.

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 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 the BNF's authorization, funding, and implementation of wildland fire suppression activities, and management of wildland fire use, within the BNF fire protection area (Figure 1). Activities addressed in this proposed action will occur at multiple sites across the landscape administered by the BNF. Individual activities may be routine or sporadic, depending on the severity and intensity of future wildfire events and risks to resources. For the purposes of this document, the term wildfire management activities will be used whenever BNF activities[1] apply to any wildfire suppression or management of wildland fire for multiple objectives, including resource benefit. Additionally, amendments to the proposed action will be made as new information on fire suppression tactics effects become available or when new tactics are developed. Amendments will be discussed with the Level 1 Team prior to implementation to determine if reinitiation of consultation is necessary.

[1] Except aerial application of fire retardant, see NMFS (2019).

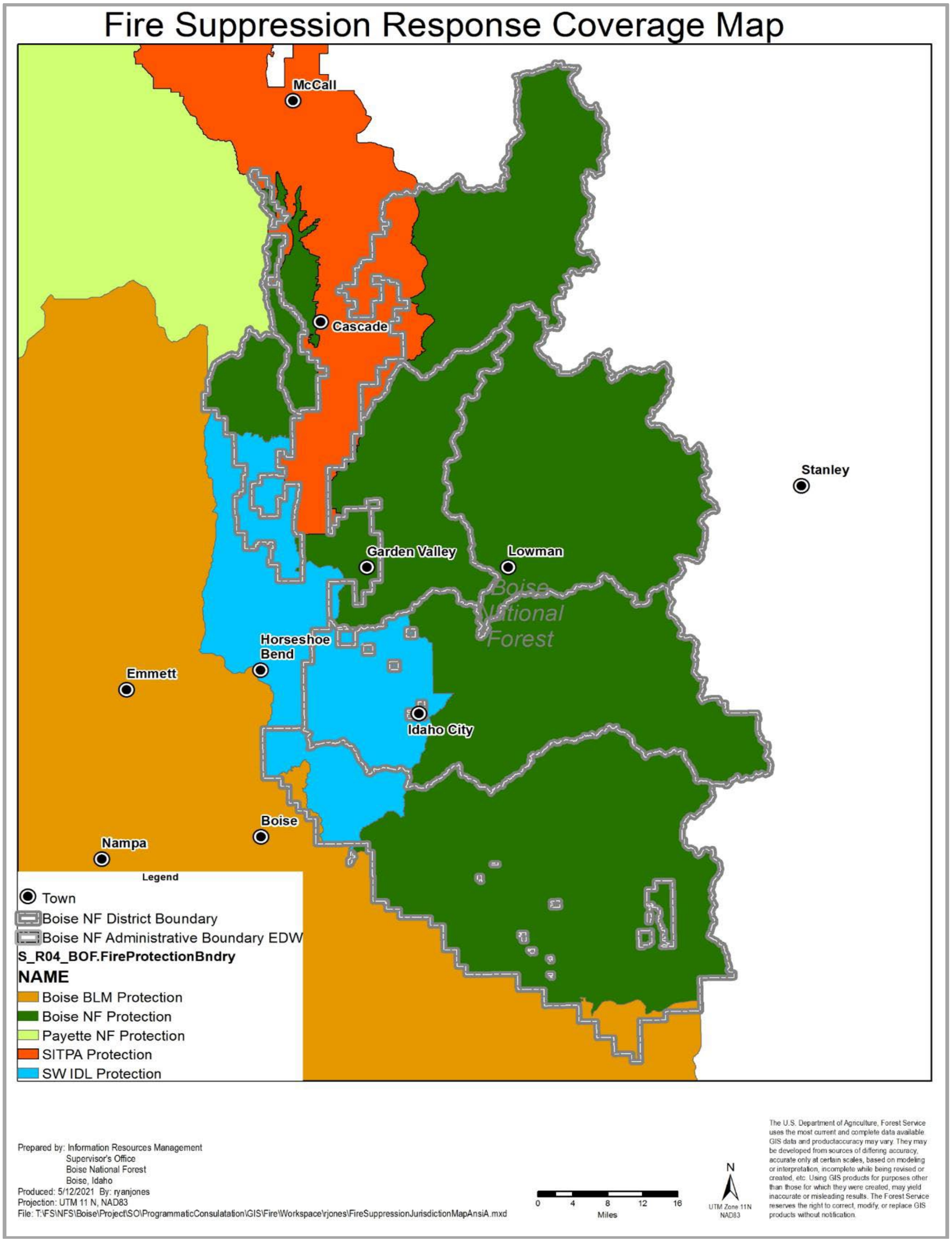

Figure 1. Boise National Forest fire protection area and adjacent fire protection areas administered by the Payette National Forest, Boise Bureau of Land Management, Southern Idaho Timber Protective Association, and the Southwest Idaho Department of Lands.

Wildfire management activities will be implemented in accordance with the Forest Service Manual (FSM 5130 [Wildland Fire Suppression]) and Zimmerman and Bunnell (1998). These activities include:

- Constructing fuel breaks around fire perimeters or high value resources.
- Completely removing understory vegetation, removing ladder and surface fuels, and potentially removing over-story vegetation as a part of constructing fire lines or mitigating fire behavior around or near high value resources.
- Opening and using closed roads and/or trails in areas where heavy equipment is allowed.
- Drafting from watercourses (including construction of temporary dams).
- Dipping (using buckets) water from rivers, large streams, and lakes/reservoirs by helicopter.
- Snorkeling (using a snorkel) water from heliwells, pumpkins (or other portable tanks), and lakes/reservoirs by helicopter. No snorkeling directly from any streams or river unless specifically directed by a resource advisor or when needed to aid in the safety of firefighters.
- Scooping water from lakes/reservoirs using fixed wing aircraft.
- Backburn and burnout operations between fire lines and the wildfire.
- Establishing camps, helibases, and other operational facilities.
- Transporting and using fuel and other chemicals for pumps, chainsaws, and engines; and cleaning and sanitizing equipment.
- Constructing suppression lines with hand tools and heavy equipment, including, but not limited to: excavators, bulldozers, and logging equipment.

A project design feature (PDF) is an aspect of the project that is specifically designed to minimize adverse effects. PDFs designed to minimize adverse effects of fire suppression activities are described in Section 1.3.1 and will be applied to all fire suppression activities covered by this consultation.

1.3.1 Fireline Construction

Fire lines are constructed to control the spread of the fire. In some instances, a fire line may consist of a line wetted using a hose lay with water pumped from a nearby source, or may be constructed via cold trailing (i.e., feeling for hot spots with the hand and digging out every hot spot) the fire’s edge. However, fire line construction typically involves:

- Clearing a path, removing all flammable material, and scraping a line clear to mineral soil wide enough to stop the spread of fire. A cup trench may be used across the bottom of steep slopes of the fire to catch rolling debris.

- Most often, hand tools and chainsaws are used for fire line construction, although heavy equipment (including, but not limited to: bulldozers, tracked excavators, feller-bunchers, masticators, chippers, log skidders, and skidgines) or explosives may also be used. Fuel characteristics, fire behavior, topography, access, and suppression strategy(s) will dictate the type and size of fire lines.

- Cooling the fire and knocking down hotspots can include separating burning heavy fuel and using dirt and/or water to cool them down. Some felling and burning of snags or hazard trees (those determined to be a likely threat of falling and striking fire personnel) and bucking of down logs may be required, using hand tools or chainsaws.

- Existing routes (including open, closed, decommissioned, and unauthorized routes) may be modified or re-opened temporarily (generally using heavy equipment) for use as a fire line and/or to provide access to parts of the fire (road reconstruction is additionally described below). Depending on the suppression strategy being implemented, this would generally include scraping the road surface to mineral soil and removing vegetation from roadsides, either to allow vehicle access or to provide a fuel break. This may require the use of machinery (such as a feller-buncher) or the use of hand tools and chainsaws. Any route opened would be returned to pre-fire conditions during fire suppression repair activities.

1.3.1. Water Pumping, Dipping, Snorkeling, and Scooping

Application of water is a common method of fire suppression. Typically, water is pumped, dipped, or scooped from nearby streams, rivers, lakes, or reservoirs and applied via aircraft, water tenders, tank trucks, fire engines, backpack sprayers, and via hose networks. In addition to application directly on fires, water is also applied to specific areas and/or structures, via temporary sprinkler systems to protect resources. Water is often pumped from the water source to portable storage tanks (heliwells, Fold-A-Tanks and/or pumpkins) before it is subsequently loaded onto aircraft, fire engines, etc. When adequate water sources are not available, water tenders may be used to transport water to the fire line and/or staging areas.

1.3.2. Pumping

A variety of portable pumps are used to draft water from streams, rivers, lakes, and reservoirs. Water may be pumped directly into sprinkler systems, directly into hose networks, into tender trucks or aircraft, or into portable storage tanks. Pumps are classified into two types, Mark 3 and Volume, based on rated pump rate. Mark 3 pumps have a rated pump rate of 0.22 cubic feet per second (cfs), typically operate at a pump rate of approximately 0.10 cfs, and are used to supply temporary sprinkler systems and hose lays. Volume pumps have a rated pump rate of 1.11 cfs, typically operate at a pump rate of approximately 0.67 cfs, and are used to fill water tenders, tank trucks, fire engines, aircraft, and portable storage tanks. Pumps typically operate at less than rated rates due to less than optimal head, hose length, etc.

Mark 3 pumps may be used in first order and larger streams. Because Mark 3 pumps are typically operated close to the resources being protected from fire, which limits pump location options, drafting from small streams is often necessary. Volume pumps can draft from second order and larger streams, but because Volume pumps can usually be operated some distance from the resources being protected from fire, thus increasing pump location options, drafting from second order streams will be relatively rare. If the source stream has inadequate depth for effective pumping, a sump may be constructed by hand using native materials, plywood, and/or plastic; and/or by blocking a culvert. Sumps that block fish passage and/or result in increased turbidity will only be constructed in streams reaches without ESA-listed fish and critical habitat. Pumping practices that block fish passage and/or increase turbidity in stream reaches with ESA-listed fish species are not covered by this consultation. Measures to minimize the effects of pumping are described in Section 1.3.11.3.

1.3.3. Helicopter Dipping and Snorkeling and Fixed-Wing Scooping

Helicopter buckets/snorkels or fixed-wing aircraft capable of "scooping" water may be used to collect water. Quantities of water may vary from 75 gallons to more than 2,000 gallons, depending on the allowable aircraft payload. It is usually not feasible to screen the water intakes of dipping, snorkeling, and scooping aircraft and fish could therefore be entrained during dipping, snorkeling, or scooping activities.

- Water is dipped or snorkeled by helicopters from lakes, rivers, streams, or portable tanks that are located as close to the incident as possible. Snorkeling occurs when the snorkel is screened to the maximum extent practicable, and the location avoids ESA-listed spawning fish. A suitable dip or snorkel site is located according to specific criteria that include safety considerations for the helicopter, water depth, and water surface area. Dipping or snorkeling generally occurs from lakes and large rivers. Sometimes dipping occurs in smaller streams; the size of the stream used is limited by the pool size available.

- Snorkeling directly from streams or rivers will be directed by a resource advisor. Helicopters with snorkel drafting apparatus will only snorkel from locations that do not contain ESA-listed species, or from portable storage tanks such as heliwells (hard side dip tank) and or pumpkins (collapsible dip tank), unless needed to aid in the safety of firefighters.

- During suppression, local water sources such as lakes and streams are generally used. However, depending upon the location and conditions, helicopters and aerial tankers may deliver water to fires from remote locations, such as existing tanker bases in Boise, McCall, Mountain Home, Ontario, and Twin Falls, Idaho.

- Fixed wing aircraft capable of "scooping" water may also be used to deliver water to wildfires. Due to limitations of fixed wing aircraft, they are limited to scooping water from large lakes/reservoirs such as Cascade Reservoir, Deadwood Reservoir, Lucky Peak Reservoir, Anderson Ranch Reservoir, and Anderson Reservoir.

- Dipping using helicopters will follow the direction from the Resource Direction and Guidelines for Fire Operations Resource Protection Maps (See Section 1.3.11.4) and will be consistent with United States Forest Service (USFS 2010).

- For streams and natural lakes, resource advisors or appropriate resource specialists will direct fire crews and helicopter pilots to draft, dip and snorkel locations where ESA-listed fish are not present whenever possible. Drafting, dipping and snorkeling are allowed in all reservoirs.

- Dipping may only occur in waterbodies closed to dipping on the Resource Direction and Guidelines for Fire Operations maps when necessary (i.e., when alternative locations close enough to afford the same water transport efficiency are not available) to provide protection for life or property.

- Dipping directly from streams will not occur if chemical products are injected into the bucket. Dipping from streams, lakes and reservoirs can occur only after chemical injection systems have been removed, disconnected, or rinsed clean.

- No helicopter activities will be permitted during the primary nesting season (timing restrictions and mapped buffer zones will be provided by Forest Service wildlife staff for appropriate species) within 0.25 to 0.5 miles (eagles) of occupied raptor nests (timing restrictions and mapped buffer zones will be provided by Forest Service wildlife staff for appropriate species).

1.3.4. Water Drops

Aerial water drops may be used on any size fire, from single-tree to landscape-scale fire complexes, and may be used during initial and extended attacks. Water drop operations may be used to strengthen fire lines or to treat hot spots. Water drop operations apply water directly to fuel burning at high intensities to extinguish flames, or to reduce flames heights so that hand crews can manage the flame front on the ground. Water drop usage and frequency depends on a variety of factors, including, but not limited to, the availability of aerial equipment, availability of water sources, weather conditions, land management designations (e. g, Designated Wilderness), and prevalence of wildfire on the landscape.

Water drop heights and load capacity depends on equipment type and size. Water drops are conducted with fixed wing aircraft, helicopters equipped with buckets, and helicopters equipped with internal tanks. Helicopter capacities range from 100 to 2,800 gallons, helicopters have no minimum drop height, and drops may be from a hover, or at speed to disperse the water over a larger area. Water drops from fixed wing aircraft range from 500 to 1,600 gallons with minimum drop heights of 60 to 150 feet. Water drops from fixed wing aircraft must be at speed, with water dispersed along the flight path.

1.3.5. Ground Application of Retardant, Foams, and Surfactants

Chemical fire retardants, foams, and other surfactants may be used to increase the effectiveness of water in checking the spread of fire. Application may be via all-terrain vehicle (ATV) or truck mounted pumps, weed sprayers, or may be applied by hand using paintbrushes, etc. Ground based application of retardants, foams and surfactants is often used to support burnout and/or prescribed fire operations and during "mop-up" operations. Fire retardant may also be applied to infrastructure (buildings, power poles, wooden bridges, etc.) within the potential fire path. Resource advisors will develop incident-specific mitigation measures on a case-by-case basis.

1.3.6. Burnout and Firing Operations

Burning out is defined as setting a fire inside a control line to consume fuel between the edge of the control line and the fire to strengthen the fire line. Burning out will be used to consume unburned islands of fuel to provide for firefighter safety and reduce the potential for uncontrolled spread where there is not a continuous burn pattern. Burning out reduces the danger of flare-ups in unburned fuel near the fire line, thus reducing spotting across the fire line, thereby facilitating containment. Fires for burnout and firing operations are typically ignited with handheld drip torches (filled with a mixture of diesel and gasoline), fusees, flare guns, terra torch (truck mounted flame throwers), helitorches (helicopters with suspended tanks of gelled fuel and applicators), and aerially applied plastic spheres (filled with potassium permanganate mixed with liquid ethylene glycol) that combust upon delivery to the ground. Measures to minimize effects of burnout and firing operations are described in Section 1.3.11.5.

1.3.7. Establishment of Camps, Helibases, Helispots, and other Operational Facilities

Camps and staging areas will be established to house personnel and stage personnel and equipment for rapid deployment on large fires. Camps will vary in size from 'coyote' camps, for two people with minimal equipment and comforts, to large camps that can accommodate several hundred people and substantial amounts of equipment and supplies. Large camps may have areas for sleeping, eating, showering, staging supplies and equipment, fueling equipment, and work areas for incident management teams. Staging areas may be collocated with camps or may be separate. Staging areas may have sanitation facilities and places to safely park personnel carriers and equipment. Some fueling and light maintenance will be performed at camps and/or staging areas. Camps and staging areas are often located in areas without sewage systems and, consequently, black and grey water must be removed for disposal at appropriate facilities.

Helibases and Helispots will be established to facilitate helicopter use in a variety of firefighting activities. Helibases are areas where helicopters can be fueled, loaded, parked, and maintained. One to several helicopters can be stationed at a helibase. Helispots are areas where personnel and equipment can be loaded or unloaded from a helicopter. Helicopters are usually at helispots only long enough to drop or pick up a load. Helibases are typically located in established areas that require minimal maintenance. Helispots are typically located in natural openings, but may need a few trees felled for approach and landing paths.

1.3.8. Transport and Use of Fuel and Other Chemicals

Petroleum-based fuels (generally unleaded gasoline and diesel) will be used in a variety of fire suppression equipment, including: drip torches, portable pumps, chainsaws, and heavy equipment (e.g., bulldozers and tracked excavators). Portable pumps will be fueled by either an attached tank or a portable fuel tank attached with a rubber fuel line. Fuel will be transported and stored in a variety of containers including: 5-gallon cans, trailer-mounted fuel tanks, and contracted fuel tenders. Two-cycle oil (mixed with gasoline for two-cycle engines), miscellaneous lubricants, and other potentially toxic products [including, but not limited to: Jet A, Class A foam (Silv-ex®), Class B foam (AFFF)], antifreeze, propane, hydraulic fluid, motor oil, lead-acid batteries) may also be stored and used to supply, service, or maintain equipment during fires.

1.3.9. Reconstructed Roads

Closed roads may be reopened for fire suppression use, and used as a fire line, to facilitate access to the fire, or both. Both system roads and unauthorized roads may be opened. These roads may be improved if needed to allow for heavy equipment and vehicle use. This improvement may be as simple as brushing the road prism with chainsaws, or as intensive as using a bulldozer to remove vegetation and reestablish the drivable prism.

1.3.10. Mop-Up Activities

Mop-up activities begin when some of the fire spread has stopped. Mop-up involves ensuring that a portion of the fire is out. This will include cold trailing, using a bare hand to feel for heat along the edge of "the black" on larger fires, or throughout the entire area of smaller fires, to find hotspots. When hotspots are found, they will be extinguished with hand tools, dirt, and water. Surfactants, such as foam, may be used in mop-up activities outside of Riparian Conservation Areas (RCAs).

1.3.11. Suppression Repair Activities[2]

After the fire is controlled (or earlier if deemed appropriate by the incident management team), repair of the fire line, roads, camps, etc., will be implemented; in close coordination with one or more resource advisors or resource specialists. A fire suppression repair plan, approved by the line officer (and/or other appropriate responsible official(s)), will be provided to the incident management team. Specific instructions may also be provided in the daily incident action plan. Actions associated with suppression repair will be identified in the incident action plan or suppression repair plan and will include measures such as, but not limited to:

- Constructing water bars on the fire lines, covering the fire lines with debris, and seeding fire lines.

[2] Burn Area Emergency Response (BAER) activities are not considered wildfire suppression and are therefore not covered by this consultation. BAER activities that may affect ESA-listed species or critical habitat may be covered by other programmatic consultations (e.g., stream crossing, weed control, etc.), individual project consultation, or emergency consultation.

- Seeding and de-compacting areas such as camps, parking areas, staging areas, and helispots/helibases.

- Restoring streambanks where fire lines cross streams by hand placing rock, woody debris, straw, etc., above the normal high-water line, in the disturbed area.

- Restoring roads opened during suppression actions to pre-fire conditions.

- Scattering slash or other deposits of wood/vegetation created during suppression actions.

- Restoring any trails used for suppression actions to a pre-fire condition.

These activities may require heavy equipment. Additional repair activities are described in Section 1.3.11.10.

1.3.12. Project Design Features

The PDFs are design measures, management practices, and mitigations that are designed to minimize the adverse effects of fire suppression activities. These features apply to all fires, although many are specific to RCAs. For the purposes of this consultation, RCAs are defined as the area within 300 feet of the streambanks of perennial streams and within 150 feet of the streambanks of intermittent streams, ponds, lakes, reservoirs, and wetlands (USFS 2010).

1.3.12.1. Role of Resource Advisors and Resource Specialists

A resource advisor is typically a resource specialist (e.g., fisheries biologist, hydrologist, wildlife biologist, etc.) that is assigned to the unit where the fire is located. The resource advisor fulfills a liaison role between the home unit and the incident management team. Resource advisors will participate in the development of suppression strategies and tactics so as to minimize or mitigate the effects of fire and suppression actions on natural and social resources. Resource advisors will work to anticipate impacts on resources as fire operations evolve; will communicate requirements for resource protection to the incident commander or incident management team; will ensure that planned mitigation measures are carried out effectively; and will provide input in the development of short- and long-term natural resource and cultural repair plans. Specific roles of resource advisors and resource specialists include:

- Assist with development of the Wildland Fire Decision Support System (WFDSS), which will identify areas where there is a potential for suppression activities to affect ESA-listed species or their habitats. BNF resource management direction is integrated into WFDSS development.

- Assist in locating camps, staging areas and helibases. These locations will be identified early during the incident. Locations will be approved either during pre-suppression planning or on a case-by-case basis.

- Brief incident management teams about ESA-listed species present, including direction applicable to suppression tactics, as early as possible (i.e., at the forest/incident management team in-briefing) and at regular intervals throughout the incident.

- Serve on wildfire incident management teams (all Type 1, Type 2, and some Type 3 incidents[3]), review operational period plans (i.e., for wildfire suppression), monitor implementation of wildfire suppression actions, and assess the potential effects of wildfire suppression.

- Inform incident management teams about incident-related RCA resources and issues.

- Ensure compliance with the Guide to Preventing Aquatic Invasive Species Transport by Wildland Fire Operations (National Wildfire Coordinating Group [NWCG] 2017) to minimize spread of aquatic invasive species. General guidelines (NWCG 2017) are displayed here and guidelines for specific types of water handling equipment should be consulted in the NWCG (2017) document.

    - Fill water tanks from municipal water sources whenever possible.

    - When possible, avoid drafting from waterbodies with known infestations of aquatic invasive species.

    - Avoid transferring water between drainages or between unconnected waters within the same drainage. Do not dump water from one waterbody (e.g., stream, lake, or reservoir) into another waterbody. Do not allow water from portable storage tanks (fold-a-tanks or pumpkins) to drain into nearby waterways, if the tank was filled with water from a different drainage. Dispose of excess water over uplands.

    - Avoid sucking organic and bottom material into water intakes when drafting from shallow water. Use screens where feasible to reduce entrainment of noxious organisms.

    - Avoid entering (driving through) waterbodies or wet areas.

    - Remove all plant parts and mud from external surfaces of gear and equipment after an operational period.

    - Avoid obtaining water from multiple sources during a single operational period, unless drafting/dipping equipment is decontaminated or changed out with clean equipment between sources.

[3] Wildfire incidents are classified into five categories based on complexity, with Type 5 incidents being the least complex and Type 1 incidents being the most complex. Type 3, 2, and 1 incidents require substantial resources and extend for multiple operational periods.

- If contamination of equipment with untreated water or mud/plants is unavoidable, follow the direction in "Decontaminating Ground Equipment" and "Decontaminating Aviation Equipment" sections of NWCG (2017).

- Resource advisors or specialists and/or the BNF Level 1 Team representatives and/or district/zone biologists and botanists will periodically update the Level 1 Team regarding the status of wildfire incidents. A primary goal of these updates will be to determine whether this programmatic consultation can cover the incident or whether an emergency consultation is needed.

The Forest Service will update, as needed or requested, the status of wildfires and provide real-time reporting of compliance with this opinion, to the Level 1 Team, for all wildland fire management actions conducted under this programmatic consultation, which may affect ESA-listed species or their habitats. Requirements under the Migratory Bird Treaty Act, along with related Federal Acts (i.e., Bald and Golden Eagle Protection Act), will also be addressed.

1.3.12.2. Fireline Construction

The following PDF will be incorporated into construction of fire lines:

- Use minimum impact management techniques in areas where there is potential to adversely affect ESA-listed fishes or critical habitat. Every effort should be made to minimize stream course disturbance, sedimentation, and actions that will result in increased water temperatures.

- Heavy equipment uses for fire line construction within RCAs and/or landslide-prone areas, in drainages with ESA-listed fish species, will be approved by the line officer, resource specialist, resource advisor, or fish biologist prior to construction.

- Heavy equipment will not cross streams designated as critical habitat, that are occupied by an ESA-listed species, or within 600 feet upstream from occupied habitat.

- Fire lines will be constructed in a way to minimize collecting, concentrating, and delivering water and sediment into nearby waterways.

- Fire lines will be constructed using the minimum width and depth needed to safely accomplish the desired task.

    - Explosives for fire line construction and removal of hazard trees will adhere to the distances and charges stated in Table 1.

    - No fire lines will be constructed in occupied northern Idaho ground squirrel habitat.

    - Construction of fire lines, including blasting activities, is prohibited within 0.25 miles of occupied northern Idaho ground squirrel habitat.

- Once a wildland fire decision support system has been approved, heavy equipment will not be used to construct fire lines within RCAs or within occupied threatened, endangered, proposed or candidate (TEPC) plants habitat, unless the line officer or designee determines that imminent safety to human life or protection of structures is an issue; or the incident resource advisor determines and documents that an escaped fire would cause more degradation to RCAs than would result from the disturbance of heavy equipment (see FMST01 and TEST17 in USFS (2010)).

- Minimize intentional damage to whitebark pine (*Pinus albicaulis*). If possible, target other conifers for removal. Limbing whitebark pine is permissible.

- To the extent possible, protect high value "plus" whitebark pine trees from suppression activities. To the extent possible, protect high value "plus" trees from high fire intensity. Incident resource advisors will have a locality map of known BNF plus trees.

- Trees or snags that are felled within RCAs shall be left intact unless resource protection (e.g., leaving the material in place risks not meeting wildland fire management objectives) or public safety requires bucking them into smaller pieces.

- Felling/bucking that results in a measurable change in one or more watershed condition indicators (WCI) (See Appendix B in USFS (2010)) is outside the scope of this programmatic consultation. Where such actions may affect ESA-listed species or their critical habitats, the Forest Service shall initiate emergency consultation. Resource Advisors will direct actions adjacent to designated critical habitat and/or habitat occupied by ESA-listed species.

Table 1. Minimum setback distances (feet), from waterbodies with ESA-listed fishes, for explosive use, by substrate and charge weight [a].

Substrate Type	Charge Weight (pounds)								
	0.5	1	2	5	10	25	100	500	1,000
Rock	17	15	35	55	78	123	247	552	780
Frozen Material	16	22	31	50	70	111	222	195	701
Stiff Clay, Gravel, Ice	13	19	27	42	60	94	189	422	596
Clay Silt, Dense Sand	12	17	24	39	54	86	172	385	544
Medium to Dense Sand	9	13	19	30	42	67	133	298	420
For Embryos - All substrates	10	14	20	32	45	71	142	318	450

[a]. These setbacks should result in a maximum hydrostatic overpressure of 7.3 psi and a maximum vibration velocity of 2.0 inches per second.

1.3.12.3. Water Drafting

The following PDF will be applied to pumping from surface water sources that are occupied or potentially occupied by ESA-listed fishes:

- Drafting equipment will be inspected for proper screening when it arrives on Forest, prior to deployment on a fire.

- Pump intake screens shall have square or circular openings no greater than 3/32-inch or rectangular openings no greater than 1/16-inch in the narrow direction.

- Screens will be designed and operated so that the effective area (i.e., the area exposed to water and not obscured by debris) is sufficient to meet the approach velocity criteria of less than 0.2 feet per second (fps). The objective is to provide a positive barrier to fish entrainment and maintain an approach velocity of no more than 0.2 fps at the surface of the intake screen to avoid impingement.

- The pump intake screen shall be placed so that it does not block upstream or downstream fish migration, or movement into or out of side channels, sloughs, bank indentations, etc.

- The pump intake screen shall be inspected and cleaned after four hours of continuous operation or once per day, whichever is more frequent. If inspections determine that debris obscures more than 10 percent of the screen area, then inspection and cleaning will occur after two hours of continuous operation, or twice per day, whichever is more frequent.

- Resource advisors will monitor drafting operations to ensure that pumps stationed within the RCA have appropriate spill containment.

- Mark 3 pumps may be used to draft water from any stream with sufficient depth for efficient pumping, as long as pumping does not visually reduce flows.

- Source streams for Volume pumps will be second order or higher and pumping will cease if flows are visually reduced, unless cessation of pumping would threaten life or property. Deeper and faster-flowing streams and pools should be selected for pump intakes when available.

1.3.12.4. Helicopter Dipping and Fixed Wing Aircraft Scooping

The following PDFs will apply to dipping, snorkeling, or scooping activities from waters that are occupied or potentially occupied by ESA-listed fishes:

- Except during initial attack, dipping from streams and natural lakes should only occur after coordination with the resource advisor. Water dipping points will be consistent with (USFS 2010). The resource direction and guidelines for fire operations maps will display locations where dipping cannot occur, under this consultation.

- Helicopter bucketing directly from streams will not occur if chemical products are injected into the bucket. Helicopter bucketing can occur only after chemical injection systems have been removed, disconnected, or rinsed clean.

- Except during initial attack, resource advisors or specialists will be available to direct fire crews and helicopter pilots to dip locations where ESA-listed fish are not present.

- Scooping is limited to Cascade Reservoir, Deadwood Reservoir, Lucky Peak Reservoir, Anderson Ranch Reservoir, and Arrowrock Reservoir.

- No helicopter activities will be permitted within 0.25 miles (non-eagles) to 0.5 miles (eagles) of occupied raptor nests during the primary nesting season (timing restrictions and mapped buffer zones will be provided by Forest Service wildlife staff for appropriate species).

1.3.12.5. Burnout and Firing Operations

- Burnout and firing operations will be designed to minimize fire severity in RCAs.

- Fire will only be ignited within RCAs if it is necessary to meet wildland fire management (suppression) objectives and there will be no active ignitions within one site-potential tree height from perennial streams.

- To the extent possible, protect high value whitebark pine "plus" trees from suppression activities and from high intensity fire. Resource advisors will have a locality map of known BNF whitebark pine plus trees.

- Use of burnouts that may result in a Lynx Analysis Unit exceeding the 30 percent unsuitable lynx habitat threshold are outside the scope of this programmatic consultation.

1.3.12.6. Ground Application of Retardant, Foams and Surfactants

- Fire suppression chemicals will not be used in areas where there is potential for direct waterway contamination.

- A backflow check valve will be used anytime chemicals are injected while pumping directly from waterways.

- When retardant is applied using ground-based equipment, resource advisors and a fisheries biologist will develop specific mitigations measures to prevent contamination of waterways.

- No ground application of fire retardant, foams or surfactants is permitted in or within 0.25 miles of known occupied northern Idaho ground squirrel habitat.

- No application of retardant, foam or surfactants would be applied within RCAs.

1.3.12.7. Camps, Helibases, Helispots, and other Operation Facilities

- During wildfire suppression initial and extended attack, operational facilities will be located outside of RCAs to the extent possible. Coyote camps will only be allowed within RCAs if there are no other suitable sites and they will minimize vegetation disturbance (e.g., clearing and cutting of trees), follow pack it in/pack it out practices, and adhere to sanitation procedures found in the Forest Health and Safety Code Handbook (USFS 2018). Guidance from resource advisors and specialists will also be followed.

- Minimize intentional damage to whitebark pine when establishing coyote camps, helispots, staging areas or other centers for incident activities. If possible, target other conifers for removal. Limbing whitebark pine is permissible.

- Facilities located within RCAs in drainages with ESA-listed fish will be approved by a resource specialist, resource advisor, or fish biologist prior to activities taking place. If adjacent to occupied or critical habitat, the Level 1 Team will be updated on actions taken for suppression repair.

- Once a wildland fire decision support system has been approved, all operational facilities will be located outside RCAs and occupied TEPC plant habitats, unless the only suitable location for such activities is determined, and documented by the line officer or designee, to be within an RCA or occupied TEPC plant habitat. In no case will the decision to place these activities inside an RCA be delayed when the line officer or designee determines that safety, human life, or structures are at imminent risk, (see FMST02 and TEST18 in USFS 2010). Should camps, staging areas, or other operational facilities be located in RCAs or occupied TEPC plant habitat, measures will be developed with the incident resource advisor to mitigate potential effects.

    - If in RCAs, resource advisors will be contacted prior to set up and will assist in laying out the camp to avoid adverse effects to WCI. Measures they may use include flagging no-entry zones and educating personnel, about measures to protect streams and fish, at morning and evening briefings. Resource advisors will regularly visit the camp and ensure that problems are fixed quickly.

    - If in known occupied habitat, or in proposed designated critical habitat, for Slickspot peppergrass (*Lepidium papilliform*), resource advisors will be contacted prior to set up and will assist in laying out the camp to avoid adverse effects on individual plants and habitat. If avoidance is not feasible, the action will fall outside the scope of this programmatic consultation and the Forest will initiate emergency consultation.

- Helicopter landing sites and refueling areas will be located outside of RCAs whenever possible. No new helicopter landing sites will be constructed in RCAs.

- Each forest district should identify locations to wash equipment. These areas will be located where they are easily accessible and usable; on gravel or well-drained soils; where runoff will not directly enter stream or carry seeds/organism away from the site; and where they may be used repeatedly so that these areas can be monitored and treated for established weeds as needed. Portable weed-wash stations used on fire incidents are generally self-contained and collect effluent, which is disposed of off-site.

- No incident command posts, fire camps, or staging areas will be permitted in or within 0.25 miles of occupied northern Idaho ground squirrel sites.

1.3.12.8. Reconstructed Roads

- If closed roads and or trails are opened within RCAs, the resource advisor in conjunction with a fish biologist and or hydrologist will identify any associated erosional problems and recommend repair treatments needed to minimize or avoid sediment delivery to waterbodies and intermittent streams.

- Treatments identified by the resource advisor will be incorporated in the repair plan and repair treatments within the RCA will be prioritized for early implementation. The agency administrator will ensure that repair of all effects of fire suppression is addressed by the incident management team.

- All road reconstruction activities will be reviewed by the resource advisor(s) prior to implementation in order to minimize or avoid potential adverse effects.

- Appropriate erosion-control structures will be utilized to capture any sediment that may be generated during road reconstruction activities.

- All roads opened during fire suppression activities will be returned to pre-fire administrative status once all fire suppression actions and suppression repair treatments are complete, including effectively closing to unauthorized use.

- Construction of temporary crossings (bridges or culverts), or fording with vehicles or machinery, is prohibited if the stream is critical habitat, occupied by ESA-listed fishes, or within 600 feet upstream from occupied or designated critical habitat.

- All road activities in modeled lynx habitat will require clearance by a wildlife biologist.

- In suitable modeled northern Idaho ground squirrel habitat, a qualified wildlife biologist will conduct on-site surveys during the appropriate time period to determine potential occupancy prior to road reconstruction activities.

- Minimize damage to whitebark pine during road reconstruction activities. If possible, target other conifers for removal to protect whitebark pine. Limbing whitebark pine is permissible.

1.3.12.9. Mop-up Activities

- Use minimum-impact suppression tactics in areas where there is potential to adversely affect ESA-listed plants, ESA-listed fishes, or designated critical habitat. Every effort should be made to minimize stream course disturbance, sedimentation, and actions that will result in increased water temperatures.

- Minimize intentional damage to whitebark pine during mop-up activities. If possible, target other conifers for removal to protect whitebark pine. Limbing whitebark pine is permissible.

- Trees or snags felled within RCAs shall be left intact unless resource protection or public safety requires bucking them into smaller pieces.

1.3.12.10. Suppression Repair Activities

- Suppression repair measures will be completed for all fires where wildland fire management tactics are implemented.

- All erosion control materials (e.g., hay, straw, mulch, etc.) will be free of noxious weed seed. Materials, for which weed-seed free certification is unavailable will be inspected and determined to be free of weed seed prior to purchase and use.

- Suppression repair specialists will coordinate with the assigned Weed Management Specialist or Botanist for technical guidance on plant-based materials prior to awarding of contracts or submittal of purchase orders. All seed used on National Forest System (NFS) lands will be certified to be free of seeds from noxious weeds listed on the current All States Noxious Weeds test, and will consist of native or desirable non-native seed mixes and/or native cultivars.

- The resource advisor(s) assigned to the incident will review the wildland fire management tactics and repair efforts to ensure that they successfully avoid or mitigate adverse effects on listed species and critical habitat.

1.3.12.11. Transport and Use of Fuel and Other Chemicals

- During initial and extended attack, fueling of equipment may occur within RCAs if there are no other suitable locations. Refueling or storing over five gallons of fuel should occur outside of RCAs. If this is not physically possible, refueling and storage sites shall be located as far away from surface water as possible and no closer than 100 feet from waterbodies. If drip torches or pumps are fueled in the RCA, or fuel mixtures or other petroleum products are stored in the RCA, a containment basin or absorbent pad of adequate size to contain the potential spill volume will be used. Storing fuels and other toxicants, staging refueling sites, and refueling activities within RCAs shall be approved by the responsible official and will be covered by an approved spill containment plan that is appropriate for the amount of fuel at the site (See SWST11 in USFS 2010).

- All water drafting operations will have pumps and fuel setup within an adequate and appropriate containment system. Resource advisors will monitor water drafting operations, and other fuel-related storage locations within the RCA, to ensure that appropriate and sufficient controls (e.g., fuel containment and fuel absorbent pads commensurate with the amount of fuel on site) are in place.

- Petroleum products will be contained in impermeable devices of sufficient size to contain the amount of fuel or oil stored. Examples of fuel containers requiring containment are fuel trucks (including those at helibases), portable pumps and their fuel, portable generators and their fuel; and fuel stored in cans at camps, staging areas, or any other location.

- Spill containment equipment will be readily available and will be used whenever needed to minimize chance of and/or magnitude of adverse effects on ESA-listed species and their habitats.

- The BNF will develop a Hazardous Materials Safety and Response Plan identifying procedures to be initiated should a chemical spill or contamination occur. This plan will be posted on the BNF webpage.

1.3.13. Monitoring

The BNF will monitor all wildfires that are managed by a Type 1, 2 or 3 team[4]. The Fire Suppression Programmatic Checklists (Appendix A) will be used to document fire management compliance with the programmatic activity as described in the proposed action and biological assessment.

2. ENDANGERED SPECIES ACT: BIOLOGICAL OPINION AND INCIDENTAL TAKE STATEMENT

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

2.1. Analytical Approach

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

[4] See footnote 3.

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 (FR) notices and notice dates for the species and critical habitat listings considered in this opinion are included in Table 2.

Table 2. Listing status, status of critical habitat designations and protective regulations, and relevant Federal Register decision notices for ESA-listed species considered in this opinion.

Species	Listing Status	Critical Habitat	Protective Regulations
Chinook salmon (*Oncorhynchus tshawytscha*)			
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.

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 five percent risk of extinction within 100 years and "highly viable" as less than a one 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); Biological Viability Assessment Update for Pacific Salmon and Steelhead Listed Under the Endangered Species Act: Pacific Northwest (Ford 2022); 2022 5-Year Review: Summary & Evaluation of Snake River Spring/Summer Chinook Salmon (NMFS 2022a); and 2022 5-Year Review: Summary & Evaluation of Snake River Basin Steelhead (NMFS 2022b). These four documents are incorporated by reference here. Additional information that has become available since these documents were published, as well as population and drainage specific information that was not included in these documents, 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 Chinook salmon in that subbasin). The loss of this historical habitat substantially reduced the spatial structure of this species. The production of Snake River spring/summer Chinook salmon was further affected by the development of the eight Federal dams and reservoirs in the mainstem lower Columbia/Snake River migration corridor between the late 1930s and early 1970s (NMFS 2017).

Several factors led to NMFS' 1992 conclusion that Snake River spring/summer Chinook salmon were threatened: (1) abundance of naturally produced Snake River spring and summer Chinook runs had dropped to a small fraction of historical levels; (2) short-term projections were for a continued downward trend in abundance; (3) hydroelectric development on the Snake and Columbia Rivers continued to disrupt Chinook runs through altered flow regimes and impacts on estuarine habitats; and (4) habitat degradation and reduced streamflows existed throughout the region, along with risks associated with the use of outside hatchery stocks in particular areas (Good et al. 2005). NMFS completed its 5-year review for Pacific salmon and steelhead in 2022 and concluded the species should remain listed as threatened (NMFS 2022a).

Since Snake River spring/summer Chinook salmon were listed in 1992, there have been improvements in abundance/productivity in several populations. Relative to the time of listing, the majority of populations experienced sharp declines in abundance in the recent 5-year period, primarily due to variation in ocean survival, and declines for all populations in the 15-year trends. Limiting factors continue to include widespread areas of degraded habitat that persist across the basin, with simplified stream channels, disconnected floodplains, impaired instream flow, loss of cold water refugia, conditions increasingly favoring non-native predator fish, and other limiting factors, despite improving habitat conditions for spring/summer Chinook salmon spawning, rearing, and migration in many reaches (Ford 2022; NMFS 2022a). Predation by pinnipeds continues to pose a negative threat to the persistence of this ESU (NMFS 2022a). Climate change is a significant threat, particularly in the marine and freshwater rearing life stages (NMFS 2022a).

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

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

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

Within the Snake River ESU, the Interior Columbia Technical Recovery Team (ICTRT) identified 28 extant and 4 extirpated or functionally extirpated populations of spring/summer-run Chinook salmon, listed in Table 3 (ICTRT 2003; McClure et al. 2005). The ICTRT aggregated these populations into five MPGs: Lower Snake River, Grande Ronde/Imnaha Rivers, South Fork Salmon River, Middle Fork Salmon River, and Upper Salmon River. For each population, Table 3 shows the current risk ratings for the abundance/productivity and spatial structure/diversity VSP risk parameters.

Spatial structure risk is low to moderate for most populations in this ESU (Ford 2022) and is generally not preventing the recovery of the species. Spring/summer Chinook salmon spawners are distributed throughout the ESU albeit at very low numbers. Diversity risk, on the other hand, is somewhat higher, driving the moderate and high combined spatial structure/diversity risks shown in Table 3 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 3. 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).

Major Population Group	**Population[2]**	**VSP Risk Rating[1]**		**Viability Rating**	
		Abundance/ Productivity	**Spatial Structure/ Diversity**	**2022 Assessment**	**Proposed Recovery Goal[3]**
South Fork Salmon River (Idaho)	Little Salmon River	*Insuf. data*	Low	High Risk	Maintained
	South Fork Salmon River mainstem	**High**	**Moderate**	**High Risk**	**Viable**
	Secesh River	High	Low	High Risk	Highly Viable
	East Fork South Fork Salmon River	**High**	**Low**	**High Risk**	**Maintained**
Middle Fork Salmon River (Idaho)	Chamberlain Creek	High	Low	High Risk	Viable
	Middle Fork Salmon River below Indian Creek	High	Moderate	High Risk	Maintained
	Big Creek	High	Moderate	High Risk	Highly Viable
	Camas Creek	High	Moderate	High Risk	Maintained
	Loon Creek	*Insuf. data*	Moderate	High Risk	Viable
	Middle Fork Salmon River above Indian Creek	High	Moderate	High Risk	Maintained
	Sulphur Creek	High	Moderate	High Risk	Maintained
	Bear Valley Creek	**Moderate**	**Low**	**Maintained**	**Viable**
	Marsh Creek	Moderate	Low	Maintained	Viable
Upper Salmon River (Idaho)	North Fork Salmon River	*Insuf. data*	Low	High Risk	Maintained
	Lemhi River	High	High	High Risk	Viable
	Salmon River Lower Mainstem	High	Low	High Risk	Maintained
	Pahsimeroi River	High	High	High Risk	Viable
	East Fork Salmon River	High	High	High Risk	Viable
	Yankee Fork Salmon River	High	High	High Risk	Maintained
	Valley Creek	High	Moderate	High Risk	Viable
	Salmon River Upper Mainstem	High	Low	High Risk	Highly Viable
	Panther Creek[4]	*Insuf. data*	High	High Risk	*Reintroduction*
Lower Snake (Washington)	Tucannon River	High	Moderate	High Risk	Highly Viable
	Asotin Creek			*Extirpated*	*Consider Reintroduction*

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

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

Abundance and Productivity. Historically, the Snake River drainage is thought to have produced more than 1.5 million adult spring/summer Chinook salmon in some years (Matthews and Waples 1991), yet in 1994 and 1995, fewer than 2,000 naturally produced adults returned to the Snake River (ODFW and WDFW 2022). From the mid-1990s and the early 2000s, the population increased dramatically and peaked in 2001 at 45,273 naturally produced adult returns. Since 2001, the numbers have fluctuated between 32,324 (2003) and 4,183 (2019) (ODFW and WDFW 2022). Productivity is below recovery objectives for all of the populations (NMFS 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 will likely also 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 2022a). No populations within the ESU meet the minimum abundance threshold designated by the

ICTRT (NMFS 2022a), and the vast majority of the extant populations are considered to be at high risk of extinction due to low abundance/productivity (Ford 2022). Therefore, all currently extant populations of Snake River spring/summer Chinook salmon will likely have to increase in abundance and productivity in order for the ESU to recover (Table 3).

Recovery. NMFS completed a recovery plan for SR spring/summer Chinook salmon in 2017 (NMFS 2017). The proposed recovery goals for each population are summarized in Table 3. The greatest opportunities for advancing recovery include: (1) prioritizing actions that improve habitat resilience to climate change; (2) reconnecting stream channels with floodplains; (3) developing local- to basin-scale frameworks that prioritize restoration actions and integrate a landscape perspective; (4) implementing restoration actions at watershed scales; and (5) reducing pinniped predation on adults returning to the lower Columbia River (NMFS 2022a).

Crozier et al. (2019) concluded that SR spring/summer Chinook salmon has a high risk of overall climate vulnerability based on its high risk for biological sensitivity, very high risk for climate exposure, and high capacity to adapt. Negative effects of high temperatures encountered during the adult and juvenile freshwater stages have been documented (Crozier and Zabel 2006; Crozier et al. 2019, 2020). The Interior Columbia ESUs face the largest percentage loss of snow dominated habitat, potentially causing a net contraction in life history variability. Adults may have some flexibility in migration timing to avoid high stream temperatures in the migration corridor but the energetic costs might limit the adaptive capacity in the adult stage.

Populations Affected. Activities covered by this consultation will occur within portions of the Bear Valley Creek (BVC), South Fork Salmon River (SFSR), and the East Fork South Fork Salmon River (EFSFSR) Chinook salmon population areas. The portions of these populations that could be affected by the proposed action, and distribution and trends of Chinook salmon in these areas, are described in the Environmental Baseline (Section 2.4).

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 (NMFS 2022a).

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). On August 18, 2022, in the agency's 5-year review for Snake River Basin steelhead, NMFS concluded that the species should remain listed as threatened (NMFS 2022b).

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 2022b).

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 Salmon River Basin (SRB) steelhead over Lower Granite Dam (Good et al. 2005; Ford 2011). Despite implementation of restoration projects, widespread areas of degraded habitat persist, and further habitat degradation continues across the basin, with a lack of habitat complexity, simplified stream channels, disconnected floodplains, impaired instream flow, and a lack of cold water refugia continue to threaten the persistence of this DPS (NMFS 2022b). Other new or continuing threats include climate change, harvest and hatchery management, predation, and hydropower.

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 4 shows the current risk ratings for the parameters of a VSP (spatial structure, diversity, abundance, and productivity).

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

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

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).

Populations Affected. Activities covered by this consultation would occur within portions of the Upper Middle Fork Salmon River (UMFSR) and the SFSR steelhead population areas. The portions of these populations that could be affected by the proposed action, and distribution and trends of steelhead in these areas, are described in the Environmental Baseline (Section 2.4).

Table 4. Summary or 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 2022b).

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

Major Population Group	Population[2]	VSP Risk Rating[1]		Viability Rating	
		Abundance/ Productivity	**Spatial Structure/ Diversity**	**2022 Assessment**	**Proposed Recovery Goal[3]**
	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.

Recovery. NMFS completed a recovery plan for SRB steelhead in 2017 (NMFS 2017). The proposed recovery goals for each population are summarized in Table 4. The greatest opportunities for advancing recovery include: (1) prioritizing actions that improve habitat resilience to climate change; (2) reconnecting stream channels with floodplains; (3) developing local- to basin-scale frameworks that prioritize restoration actions and integrate a landscape perspective; (4) implementing restoration actions at watershed scales; and (5) connect tributaries to mainstem migration corridors (NMFS 2022b).

For SRB steelhead, the life stage that appears to be the most vulnerable to climate change is juvenile rearing (Crozier et al. 2019). Summer habitats may have reduced flow, or loss of tributary access, from irrigation withdrawals. High summer water temperatures are also prevalent. Climate change has and will cause earlier snowmelt timing, reduced summer flows, and higher air temperatures; all of which will exacerbate the low flows and high-water temperatures for juvenile SRB steelhead. This DPS is also considered to have only moderate capacity to adapt to climate change impacts. Given the extrinsic factors currently increasing the vulnerability of many populations to climate change impacts, it is unclear whether their adaptability would be sufficient to mitigate the risk climate change poses to the persistence of this DPS.

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

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 5). The proposed action affects freshwater spawning, rearing, and migration habitats.

Table 5. 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, food, riparian vegetation, space, and water temperature.	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 6 describes the geographical extent of Snake River spring/summer Chinook salmon and Snake River Basin steelhead critical habitat within the Snake River basin. 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 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 6. 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 and Snake River basin steelhead in particular (NMFS 2017).

Many stream reaches designated as critical habitat for these species are listed on the Clean Water Act (CWA) 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 EPA 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 U.S. Army Corps of Engineers (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 proposed action could potentially affect Chinook salmon and steelhead critical habitat in the Middle Fork Salmon River (MFSR) and SFSR drainages. Within the MFSR drainage the effects could occur in the non-wilderness portions of the Bear Valley Creek drainage. The portions of the Bear Valley Creek drainage within designated wilderness are administered by the Salmon-Challis National Forest and are not likely to be affected by BNF fire suppression activities. Within the SFSR drainage, the proposed action could affect designated critical habitat in the Johnson Creek watershed (1706020801), in the upper portion of the Upper SFSR watershed (1706020804), and in a small portion of the Lower EFSFSR watershed (1706020803). The vast majority of the action area is very lightly developed with aquatic habitats that are generally in very good condition. The Environmental Baseline Section 2.4 has a more detailed description of the condition of designated critical habitat within the action area.

The quality of designated critical habitat is not currently sufficient to support recovery of either the Snake River spring/summer Chinook salmon ESU or the Snake River Basin steelhead DPS. Improvement of migration and late rearing habitat within the mainstem Snake and Columbia Rivers, as well as improvement of spawning and rearing habitat within specific population areas, will probably be necessary for recovery. However, condition of designated critical habitat within the action area is among the best in the Snake River drainage, is possibly sufficient to support recovery, and is improving.

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

Climate change is affecting aquatic habitat and the rangewide status of Snake River spring/summer Chinook salmon and Snake River Basin steelhead. The U. S. Global Change Research Program reports average warming of about 1.3°F from 1895 to 2011, and projects an increase in average annual temperature of 3.3°F to 9.7°F by 2070 to 2099 (CCSP 2014). Climate change has negative implications for ESA-listed anadromous fishes and their habitats in the

Pacific Northwest (CIG 2004; Scheuerell and Williams 2005; Zabel et al. 2006; ISAB 2007). According to the Independent Science Advisory Board (ISAB), these effects will cause the following:

- 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 flows in the June through September period, while more precipitation falling as rain rather than snow will cause higher flows in winter, and possibly higher peak flows; and,

- Water temperatures are expected to rise, especially during the summer months when lower flows co-occur with warmer air temperatures.

These changes will not be spatially homogeneous across the entire Pacific Northwest. Low-lying areas are likely to be more affected. Climate change may have long-term effects that include, but are not limited to, depletion of important cold-water habitat, variation in quality and quantity of tributary rearing habitat, alterations to migration patterns, accelerated embryo development, premature emergence of fry, and increased competition among species.

Climate change is predicted to cause a variety of impacts to Pacific salmon (including steelhead) and their ecosystems (Mote et al. 2003; Crozier et al. 2008a; Martins et al. 2012; Wainwright and Weitkamp 2013). The complex life cycles of anadromous fishes, including salmon, rely on productive freshwater, estuarine, and marine habitats for growth and survival, making them particularly vulnerable to environmental variation. Ultimately, the effects of climate change on salmon and steelhead across the Pacific Northwest will be determined by the specific nature, level, and rate of change and the synergy between interconnected terrestrial/freshwater, estuarine, nearshore, and ocean environments.

The primary effects of climate change on Pacific Northwest salmon and steelhead include:

- Direct effects of increased water temperatures on fish physiology;

- Temperature-induced changes to streamflow patterns;

- Alterations to freshwater, estuarine, and marine food webs; and,

- Changes in estuarine and ocean productivity.

While all habitats used by Pacific salmon will be affected, the impacts and certainty of the change vary by habitat type. Some effects (e.g., increasing temperature) affect salmon at all life stages in all habitats, while others are habitat-specific, such as streamflow variation in freshwater, sea-level rise in estuaries, and upwelling in the ocean. How climate change will affect each stock or population of salmon also varies widely depending on the level or extent of change, the rate of change, and the unique life-history characteristics of different natural populations (Crozier et al. 2008b). For example, a few weeks' difference in migration timing can have large differences in the thermal regime experienced by migrating fish (Martins et al. 2011).

Temperature Effects. Like most fishes, salmon are poikilotherms (cold-blooded animals); therefore, increasing temperatures in all habitats can have pronounced effects on their physiology, growth, and development rates (see review by Whitney et al. 2016). Increases in water temperatures beyond their thermal optima will likely be detrimental through a variety of processes, including increased metabolic rates (and therefore food demand), decreased disease resistance, increased physiological stress, and reduced reproductive success. All of these processes are likely to reduce survival (Beechie et al. 2013; Wainwright and Weitkamp 2013; Whitney et al. 2016).

By contrast, increased temperatures at ranges well below thermal optima (i.e., when the water is cold) can increase growth and development rates. Examples of this include accelerated emergence timing during egg incubation stages, or increased growth rates during fry stages (Crozier et al. 2008a; Martins et al. 2011). Temperature is also an important behavioral cue for migration (Sykes et al. 2009), and elevated temperatures may result in earlier-than-normal migration timing. While there are situations or stocks where this acceleration in processes or behaviors is beneficial, there are also others where it is detrimental (Martins et al. 2012; Whitney et al. 2016).

Freshwater Effects. Climate change is predicted to increase the intensity of storms, reduce winter snow pack at low and middle elevations, and increase snowpack at high elevations in northern areas. Middle and lower-elevation streams will have larger fall/winter flood events and lower late-summer flows, while higher elevations may have higher minimum flows. How these changes will affect freshwater ecosystems largely depends on their specific characteristics and location, which vary at fine spatial scales (Crozier et al. 2008b; Martins et al. 2012). For example, within a relatively small geographic area (the Salmon River basin in Idaho), survival of some Chinook salmon populations was shown to be determined largely by temperature, while in others it was determined by flow (Crozier and Zabel 2006). Certain salmon populations inhabiting regions that are already near or exceeding thermal maxima will be most affected by further increases in temperature and, perhaps, the rate of the increases. The effects of altered flow are less clear and likely to be basin-specific (Crozier et al. 2008b; Beechie et al. 2013). However, flow is already becoming more variable in many rivers, and this increased variability is believed to negatively affect anadromous fish survival more than other environmental parameters (Ward et al. 2015). It is likely this increasingly variable flow is detrimental to multiple salmon and steelhead populations, and also to other freshwater fish species in the Columbia River basin.

Stream ecosystems will likely change in response to climate change in ways that are difficult to predict (Lynch et al. 2016). Changes in stream temperature and flow regimes will likely lead to shifts in the distributions of native species and provide "invasion opportunities" for exotic species. This will result in novel species interactions, including predator-prey dynamics, where juvenile native species may be either predators or prey (Lynch et al. 2016; Rehage and Blanchard 2016). How juvenile native species will fare as part of "hybrid food webs," which are constructed from natives, native invaders, and exotic species, is difficult to predict (Naiman et al. 2012).

Estuarine Effects. In estuarine environments, the two big concerns associated with climate change are rates of sea level rise and water temperature warming (Wainwright and Weitkamp 2013; Limburg et al. 2016). Estuaries will be affected directly by sea-level rise: as sea level rises, terrestrial habitats will be flooded and tidal wetlands will be submerged (Kirwan et al. 2010; Wainwright and Weitkamp 2013; Limburg et al. 2016). The net effect on wetland habitats depends on whether rates of sea-level rise are sufficiently slow that the rates of marsh plant growth and sedimentation can compensate (Kirwan et al. 2010).

Due to subsidence, sea-level rise will affect some areas more than others, with the largest effects expected for the lowlands, like southern Vancouver Island and central Washington coastal areas (Verdonck 2006; Lemmen et al. 2016). The widespread presence of dikes in Pacific Northwest estuaries will restrict upward estuary expansion as sea levels rise, likely resulting in a near-term loss of wetland habitats (Wainwright and Weitkamp 2013). Sea level rise will also result in greater intrusion of marine water into estuaries, resulting in an overall increase in salinity, which will also contribute to changes in estuarine floral and faunal communities (Kennedy 1990). While not all anadromous fish species are highly reliant on estuaries for rearing, extended estuarine use may be important in some populations (Jones et al. 2014), especially if stream habitats are degraded and become less productive. Preliminary data indicate that some Snake River Basin steelhead smolts actively feed and grow as they migrate between Bonneville Dam and the ocean (Beckman 2018), suggesting that estuarine habitat is important for this DPS.

Marine Effects. In marine waters, increasing temperatures are associated with observed and predicted poleward range expansions of fish and invertebrates in both the Atlantic and Pacific Oceans (Lucey and Nye 2010; Asch 2015; Cheung et al. 2015). Rapid poleward species shifts in distribution in response to anomalously warm ocean temperatures have been well documented in recent years, confirming this expectation at short time scales. Range extensions were documented in many species from southern California to Alaska during unusually warm water associated with "the blob" in 2014 and 2015 (Bond et al. 2015; Di Lorenzo and Mantua 2016) and past strong El Niño events (Pearcy 2002; Fisher et al. 2015). For example, recruitment of the introduced European green crab (*Carcinus maenas*) increased in Washington and Oregon waters during winters with warm surface waters, including 2014 (Yamada et al. 2015). Similarly, the Humboldt squid (*Dosidicus gigas*) dramatically expanded its range northward during warm years of 2004–09 (Litz et al. 2011). The frequency of extreme conditions, such as those associated with El Niño events or "blobs" is predicted to increase in the future (Di Lorenzo and Mantua 2016), further altering food webs and ecosystems.

Expected changes to marine ecosystems due to increased temperature, altered productivity, or acidification will have large ecological implications through mismatches of co-evolved species and unpredictable trophic effects (Cheung et al. 2015; Rehage and Blanchard 2016). These effects will certainly occur, but predicting the composition or outcomes of future trophic interactions is not possible with current models.

Wind-driven upwelling is responsible for the extremely high productivity in the California Current ecosystem (Bograd et al. 2009; Peterson et al. 2014). Minor changes to the timing, intensity, or duration of upwelling, or the depth of water-column stratification, can have dramatic effects on the productivity of the ecosystem (Black et al. 2015; Peterson et al. 2014). Current projections for changes to upwelling are mixed: some climate models show upwelling unchanged, but others predict that upwelling will be delayed in spring, and more intense during summer (Rykaczewski et al. 2015). Should the timing and intensity of upwelling change in the future, it may result in a mismatch between the onset of spring ecosystem productivity and the timing of salmon entering the ocean, and a shift toward food webs with a strong sub-tropical component (Bakun et al. 2015).

Columbia River anadromous fishes also use coastal areas of British Columbia and Alaska and mid-ocean marine habitats in the Gulf of Alaska, although their fine-scale distribution and marine ecology during this period are poorly understood (Morris et al. 2007; Pearcy and McKinnell 2007). Increases in temperature in Alaskan marine waters have generally been associated with increases in productivity and salmon survival (Mantua et al. 1997; Martins et al. 2012), thought to result from temperatures that are normally below thermal optima (Gargett 1997). Warm ocean temperatures in the Gulf of Alaska are also associated with intensified down welling and increased coastal stratification, which may result in increased food availability to juvenile salmon along the coast (Hollowed et al. 2009; Martins et al. 2012). Predicted increases in freshwater discharge in British Columbia and Alaska may influence coastal current patterns (Foreman et al. 2014), but the effects on coastal ecosystems are poorly understood.

In addition to becoming warmer, the world’s oceans are becoming more acidic as increased atmospheric carbon dioxide is absorbed by water. The North Pacific is already acidic compared to other oceans, making it particularly susceptible to further increases in acidification (Lemmen et al. 2016). Laboratory and field studies of ocean acidification show that it has the greatest effects on invertebrates with calcium-carbonate shells, and has relatively little direct influence on finfish; see reviews by Haigh et al. (2015) and Mathis et al. (2015). Consequently, the largest impact of ocean acidification on salmon will likely be the influence on marine food webs, especially the effects on lower trophic levels (Haigh et al. 2015; Mathis et al. 2015). Marine invertebrates fill a critical gap between freshwater prey and larval and juvenile marine fishes, supporting juvenile salmon growth during the important early-ocean residence period (Daly et al. 2009; Daly et al. 2014).

Uncertainty in Climate Predictions. There is considerable uncertainty in the predicted effects of climate change on the globe as a whole, and on the Pacific Northwest in particular. Many of the effects of climate change (e.g., increased temperature, altered flow, coastal productivity, etc.) will have direct impacts on the food webs that species rely on in freshwater, estuarine, and marine habitats to grow and survive. Such ecological effects are extremely difficult to predict even in fairly simple systems, and minor differences in life-history characteristics among stocks of salmon may lead to large differences in their response (e.g., Crozier et al. 2008b; Martins et al. 2011; Martins et al. 2012). This means it is likely that there will be “winners and losers,” meaning some salmon populations may enjoy different degrees or levels of benefit from climate change while others will suffer varying levels of harm. Climate change is expected to impact anadromous fishes during all stages of their complex life cycle. In addition to the direct effects of rising temperatures, indirect effects include alterations in flow patterns in freshwater and changes to food webs in freshwater, estuarine, and marine habitats. There is high certainty that predicted physical and chemical changes will occur; however, the ability to predict bio-ecological changes to fish or food webs in response to these physical/chemical changes is extremely limited, leading to considerable uncertainty. In addition to physical and biological effects, there is also the question of indirect effects of climate change and whether human "climate refugees" will move into the range of salmon and steelhead, increasing stresses on their respective habitats (Dalton et al. 2013; Poesch et al. 2016).

Summary. Climate change is expected to impact Pacific Northwest anadromous fishes during all stages of their complex life cycle. In addition to the direct effects of rising temperatures, indirect effects include alterations in stream-flow patterns in freshwater and changes to food webs in freshwater, estuarine, and marine habitats. There is high certainty that predicted physical and chemical changes will occur; however, the ability to predict bio-ecological changes to fish or food webs in response to these physical/chemical changes is extremely limited, leading to considerable uncertainty. As we continue to deal with a changing climate, management actions may help alleviate some of the potential adverse effects (e.g., hatcheries serving as a genetic reserve and source of abundance for natural populations, increased riparian vegetation to control water temperatures, etc.)

Climate change is expected to make recovery targets for Chinook salmon and steelhead populations more difficult to achieve. Climate change is expected to alter critical habitat by generally increasing temperature and peak flows and decreasing base flows. Although changes will not be spatially homogenous, effects of climate change are expected to decrease the capacity of critical habitat to support successful spawning, rearing, and migration. Habitat action can address the adverse impacts of climate change on Chinook salmon and steelhead. 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 habitat and cold water refugia (Battin et al. 2007; ISAB 2007).

The proposed action is the continued implementation of the BNF's wildland fire program, which is likely to continue indefinitely. Although the program will be evaluated every ten years to determine if reinitiation of consultation is necessary, there is no set timeframe for reinitiation and the current consultation could possibly remain in place for decades. The proposed action will therefore likely occur while climate change-related effects are expected to become more evident within the range of the Snake River spring/summer Chinook salmon ESU and the Snake River Basin steelhead DPS.

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 includes fire suppression activities within the BNF Fire Protection Area (Figure 1), which includes most of the land administered by the BNF. The BNF Fire Protection Area also includes small amounts of land administered by other Federal agencies (e.g., Bureau of Land Management and Bureau of

Reclamation), lands owned by the State of Idaho, and a small amount of private land. A large portion of this area is within the Boise River and Payette River drainages. These drainages do not currently support anadromous fish species and have not been designated as critical habitat for ESA-listed anadromous fishes. Because activities in the Boise and Payette River drainages would not affect ESA-listed anadromous fishes or their critical habitat, those drainages were not included in the action area for this opinion. Therefore, the action area, for this consultation, is restricted to the portions of the BNF Fire Protection Area that are within the SFSR and MFSR drainages of central Idaho. The action area encompasses approximately 348,509 acres, and includes the Johnson Creek hydrologic unit code (HUC) (1706020801), the upper portion (approximately half) of Upper South Fork Salmon River HUC (1706020804), the Bear Valley Creek HUC (1706020502), and the lower portion (approximately half) of the Elk Creek HUC (1706020501).

The action area is in Valley County and is bordered by the Salmon-Challis and Sawtooth National Forests to the east, the Boise River drainage to the south, the Payette River drainage to the west, the Payette National Forest to the north. Elevations within the action area range from 4,290 feet above mean sea level (msl) at the confluence of Canton Creek and the EFSFSR, to over 9,000 feet msl in the SFSR and MFSR headwaters.

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 action area includes the portions of the MFSR and SFSR drainages that are within the BNF Fire Protection area. The action area is used by all freshwater life history stages of Chinook salmon and steelhead, and streams within the action area are designated critical habitat for Chinook salmon and steelhead. Climate is typical for the northern intermountain west, with cold, relatively wet winters and hot dry summers. Precipitation varies greatly with elevation and ranges from approximately 18 inches per year at the lowest elevations to more than 40 inches per year on the highest peaks. Most of the precipitation falls as snow and the hydrology is typical for snow dominated systems, with the highest flows occurring from late spring through early summer and base flows typically occurring from late summer through early spring. The fire season typically begins in mid to late summer and extends through early fall. The condition of the listed species and designated critical habitats in the action area are described further below.

2.4.1. Middle Fork Salmon River

The action area includes approximately 91,656 acres (approximately 5%) of the MFSR drainage. The MFSR drainage encompasses approximately 1.8 million acres of central Idaho. The mainstem MFSR begins at the confluence of Bear Valley and Marsh Creeks and flows north-northwest for 106 miles and joins the Salmon River at river mile (RM) 199. The MFSR drainage contains 10 independent populations of Chinook salmon, two independent populations of steelhead, and about 30 bull trout populations. The MFSR drainage has never been stocked with anadromous fishes, approximately 80 percent of the drainage is designated wilderness, and overall habitat quality in the drainage is among the least degraded in the Columbia River basin. Habitat concerns within the MFSR drainage include localized impacts of water diversions; livestock grazing in portions of the Marsh Creek and Camas Creek subbasins; roads in non-wilderness areas; and legacy effects of historic grazing, mining, fire suppression, and beaver trapping. Because the MFSR drainage is largely undeveloped, wildfires are often managed without aggressive suppression activities.

The action area portion of the MFSR drainage consists of the 75 percent of the Bear Valley Creek drainage that is outside of designated wilderness. The other 25 percent of drainage is administered by the Salmon-Challis National Forest and is therefore not part of the action area for this consultation. The action area portion of the Bear Valley Creek drainage represents one of the largest portions of the MFSR drainage that is not designated wilderness. Although not designated wilderness, the area is also not heavily developed, with no permanent residences, no large-scale mines, no irrigated agriculture, and very little livestock grazing. Quality of aquatic habitat in the MFSR portion of the action area is very good and continues to improve as riparian habitat and beaver populations recover from historic perturbations.

The Bear Valley Creek drainage consists of the Bear Valley Creek (BVC) (1706020502) and the Elk Creek (1706020501) HUCs, and constitutes the entire population area for the BVC Chinook salmon population. Because hatchery fish have never been stocked, and all of the spawning areas are occupied, the spatial structure and diversity risk for this population is low.

Redd counts have been conducted in all suitable Chinook salmon spawning habitat in the BVC drainage since 1995. The abundance trend for the population is similar to that for the ESU, increasing from very low levels in the mid-1990s, peaking in the early 2000s, and fluctuating since (Figure 2). The BVC Chinook salmon population is considered intermediate sized, based on historic returns. However, since 1995, more redds have been counted in the BVC population area than in any other non-supplemented population in the Snake River spring/summer Chinook salmon ESU. The relatively large number of non-hatchery returns is due to a combination of factors, including: the valley geology that supports a relatively high proportion of naturally productive meandering stream reaches, a relative lack of habitat perturbations, a long period of active and passive habitat restoration, and high-quality rearing and overwintering habitat in the mainstem MFSR downstream from BVC. Due in large part to the high quality of spawning/rearing habitat, the BVC Chinook salmon population is one of only three extant populations in the ESU that is not currently at high risk of extinction. This suggests that the BVC population is important for ensuring continued persistence of the ESU, until recovery can be achieved. In addition, the high elevation of spawning/rearing habitat makes this population relatively resilient to the adverse effects of climate change, further increasing its importance in continued persistence of the ESU.

The proposed recovery goal for the BVC Chinook salmon population is viable, with a low (1-5%) risk of extinction over 100 years (NMFS 2017). The MFSR Chinook salmon MPG could theoritically recover with the BVC population at moderate risk of extinction, but that would require five other MFSR populations to achieve low risk of extinction before the BVC population, which is very unlikely. The BVC Chinook salmon population is therefore very important for recovery of the MFSR Chinook salmon MPG, and likewise for recovery of the Snake River spring/summer Chinook salmon ESU. The action area contains approximately 75 percent of the designated critical habitat in the BVC Chinook salmon population area, and is therefore essential for recovery of the population.

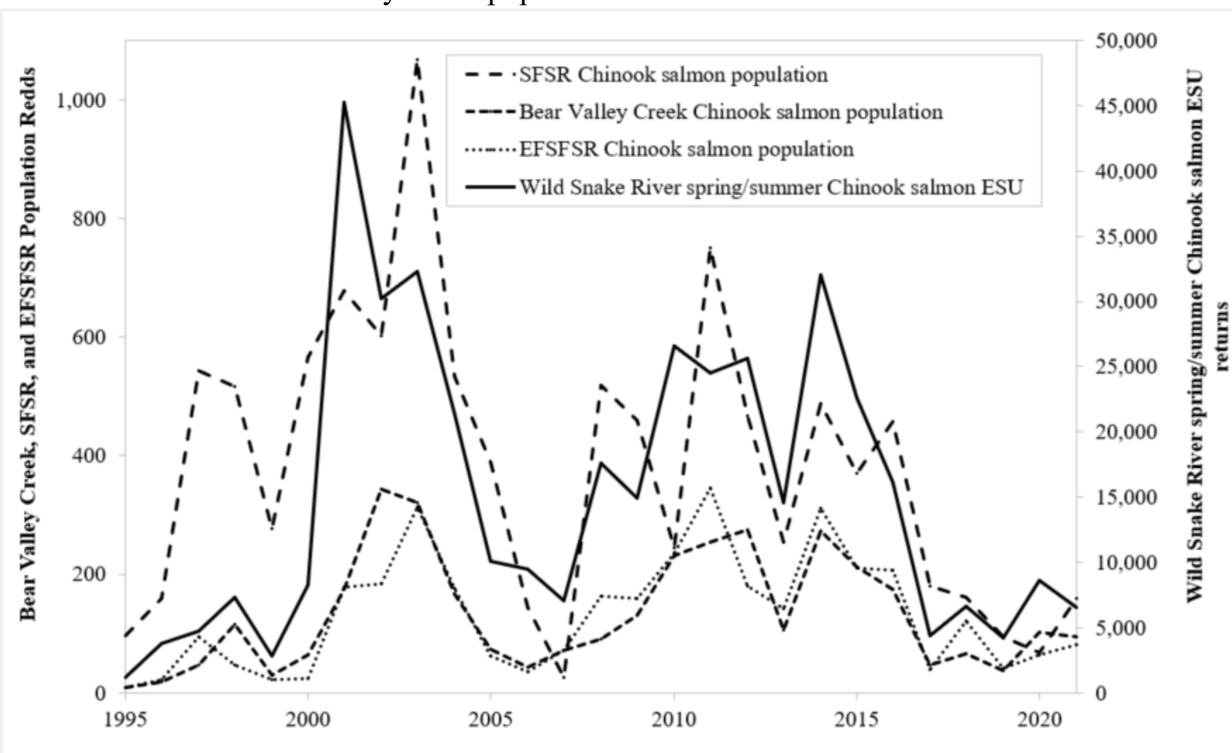

Figure 2. Population trends for the Snake River spring/summer Chinook salmon ESU (returns over Lower Granite Dam) and the Bear Valley Creek, South Fork Salmon River, and the East Fork South Fork Salmon River populations (redds counted in spawning ground surveys) for 1995 through 2021.

The MFSR drainage portion of the action area contains approximately 10 percent of the spawning and rearing habitat in the UMFSR steelhead population area. Because steelhead spawn in spring when conditions are usually not conducive to redd surveys, historic population trend data are not available for most populations, including the UMFSR steelhead population. However, a collaboration among the Idaho Department of Fish and Game (IDFG), Oregon Department of Fish and Wildlife, Washington Department of Fish and Wildlife, and the Nez Perce Tribe Fisheries Department developed methods for estimating abundance of Snake River Basin steelhead. These population specific estimates are available for the 2011 through the 2020 returns and indicate that abundance of the UMFSR steelhead population was sufficient to achieve moderate risk of extinction from 2011 through 2016. From 2017 through 2020 abundance was very low, suggesting that risk of extinction was likely high. Abundance of wild steelhead has also been very low across the DPS, suggesting that other populations that were previously considered moderate risk of extinction are likely high risk. Based on the most recent abundance estimates for the UMFSR steelhead population, and the trend for wild steelhead across the DPS, we conclude that the UMFSR steelhead population is at high risk of extinction due to low abundance and productivity (Figure 3). Because hatchery fish have never been stocked and all of the spawning areas are occupied, the spatial structure and diversity risk for the UMFSR steelhead population is low (Ford 2022).

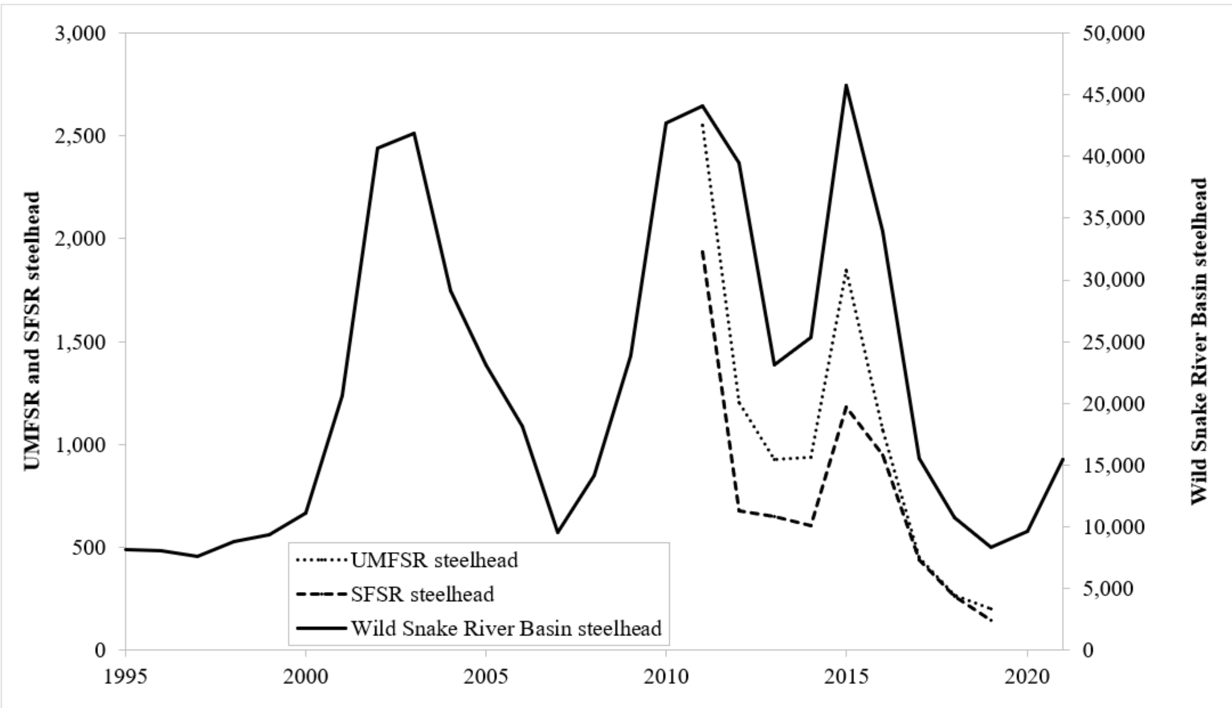

Figure 3. Population trends for the Snake River basin steelhead DPS (returns over Lower Granite Dam) for 1995-2021, and for the Upper Middle Fork Salmon River and South Fork Salmon River steelhead populations (estimated returns to spawning habitat) for 2011–2019.

The proposed recovery goal for the UMFSR steelhead population is viable, with a low (1–5 %) risk of extinction over 100 years (NMFS 2017). The Salmon River MPG could theoritically recover with the UFMSR steelhead population at moderate risk of extinction, but that would require five other Salmon River populations to achieve low risk of extinction before the UMFSR population, which is unlikely. The UMFSR is therefore very important for recovery of the Salmon River MPG, and likewise for recovery of the Snake River Basin steelhead DPS. The action area contains approximately 10 percent of designated critical habitat in the UMFSR steelhead population area. Because the action area contains a relatively small amount of habitat, it may be of only moderate importance for recovery of the population. However, because the habitat in the action area is among the highest elevation (and therefore the coldest) in the UMFSR population area, its importance will likely increase as the climate warms.

2.4.2. South Fork Salmon River

The action area includes 257,664 acres (approximately 31%) of the SFSR drainage. Baseline conditions, trends, and history of the action area portion of the SFSR drainage are similar to the drainage as a whole. The SFSR drainage encompasses approximately 838,400 acres in central Idaho mountains. The headwaters of the SFSR drainage are approximately 15 miles east of Cascade, Idaho. From there, the river flows approximately 89 miles north and enters the Salmon River at RM 134. Approximately 99.2 percent of the drainage is administered by the US Forest Service (USFS), 0.3 percent is owned by the State of Idaho, and 0.6 percent is privately owned. Although the entire eastern boundary of the drainage borders the Frank Church River of No Return Wilderness, only about 8 percent of the drainage is designated wilderness. From the 1940s through the mid-1960s, more than 800 miles of road were constructed and 320 million board feet of timber harvested from the drainage, with many of the roads crossing very steep terrain. During the winter of 1965-66 a series of storms resulted in catastrophic erosion that severely damaged aquatic habitat throughout large portions of the drainage. In addition, historic mining activity resulted in a migration barrier on the mainstem EFSFSR and severe water quality issues in portions of the upper EFSFSR drainage.

In 1965, the USFS established a moratorium on logging and road construction in the SFSR drainage and began to implement habitat restoration activities. Livestock grazing on USFS land in the SFSR drainage was largely phased out by 1970, which further facilitated habitat recovery. As with most of the intermountain west, fire activity in the SFSR drainage has increased, with 241,453 acres, or 29 percent of the drainage, burning from 2000 – 2020. The extensive fire activity has had both negative and positive effects on aquatic habitat, with negative effects including: increased sedimentation and reduced shade; and positive effects including: increased large woody debris (LWD), increased growth of riparian vegetation, and increased primary productivity. The extensive and ongoing habitat restoration, along with decades of natural recovery, including positive effects of wildland fire, have resulted in greatly improved quality of aquatic habitat throughout most of the SFSR drainage. With the exception of portions of the upper EFSFSR drainage, that remain degraded due to historic mining, overall habitat quality in the SFSR drainage is among the best in the Snake River Chinook salmon ESU and the Snake River basin steelhead DPS.

The action area portion of the SFSR drainage consists of the upper portion (approximately half) of the Upper South Fork Salmon River HUC (1706020804) (i.e., upstream from Roaring Creek), all of the Johnson Creek HUC (1706020801), and the southeast portion of the Lower East Fork South Fork Salmon River HUC (1706020803). The action area contains slightly more than half of the spawning habitat for the SFSR Chinook salmon population and the majority of accessible spawning habitat for the EFSFSR Chinook salmon population. Distribution of steelhead spawning is not as well documented as it is for Chinook salmon, but based on habitat characteristics, the action area contains approximately half of the spawning habitat for the SFSR steelhead population, and the majority of the high-quality spawning habitat.

Within the SFSR Chinook salmon population area, the vast majority of spawning currently occurs in the mainstem SFSR upstream from the EFSFSR. Approximately half of the spawning occurs in the action area and half occurs in the mainstem SFSR downstream from the action area. The spatial structure risk for the population is low because the current spawning distribution is similar to the historic distribution, and there has been no increase in gaps between utilized spawning areas. The diversity risk is moderate due to a high percentage of hatchery origin spawners, and the overall spatial structure/diversity risk is moderate. The abundance trend for the population is similar to that for the ESU, except that the returns in the mid-1990s were not as alarmingly low. The less precipitous population drop, compared to most other populations, may be due to the hatchery supplemental program that began in the early 1980s. The population is currently at high risk for low abundance and productivity, however, abundance is higher than most populations in the ESU, and the population is very close to moderate risk for this metric. The relatively high abundance is probably due to a combination of high-quality spawning/rearing habitat and the effects of the hatchery supplementation program.

The proposed recovery goal for the SFSR Chinook salmon population is viable, with a low (1–5%) risk of extinction over 100 years (NMFS 2017). The SFSR MPG cold theoritically recover with the SFSR Chinook salmon population at moderate risk of extinction, but that would require two of the other three populations in the MPG to achieve low risk of extinction before the SFSR population, which is very unlikely. The SFSR Chinook salmon population is therefore very important for recovery of the SFSR Chinook salmon MPG, and likewise for recovery of the Snake River spring/summer Chinook salmon ESU. Because the action area contains approximately half of the spawning habitat in the SFSR Chinook salmon population area, the action area is very important for continued existince of the population and is essential for the eventual recovery of the population. Because of the relationship of the population, the MPG, and the ESU, the action area is very important for the continued presistence, and eventual recovery, of the Snake River spring/summer Chinook salmon ESU. Because the action area contains the highest elevation spawning and rearing habitat in the SFSR population area, its relative importance in the persistence and recovery of the Snake River spring/summer Chinook salmon ESU will likely increase as the climate warms.

Within the EFSFSR Chinook salmon population area, most spawning currently occurs in the Johnson Creek drainage, which is entirely within the action area. The EFSFSR Chinook salmon population has been adversely affected by mining activity, much of which occurred in the 1940s, and most of which was in the EFSFSR drainage upstream from Johnson Creek, outside of the action area. Restoration efforts have been ongoing for decades, resulting in recolonization of the EFSFSR portion of the population beginning in the 1990s. Due largely to the past and ongoing restoration, spatial structure risk for the population is low. The hatchery supplementation program started in 1998, which tends to increase risk for diversity. However, the low risk for spatial structure combined with the hatchery practices, such as use of only within population brood stock, results in a spatial structure/diversity risk that is adequate for recovery. The abundance trend for the population is similar to that for the ESU and the population is currently at high risk for abundance and productivity. Although it is currently at high risk, abundance of the EFSFSR Chinook salmon population is substantially larger than many populations in the ESU, possibly due to relatively good quality of habitat in the Johnson Creek drainage, past and ongoing habitat restoration, and hatchery supplementation.

The proposed recovery goal for the EFSFSR Chinook salmon population is maintained, with no more than a moderate (6–25%) risk of extinction over 100 years (NMFS 2017). Under the current recovery scenarios, the SFSR MPG can only achieve viable status if the EFSFSR population achieves maintained or viable status, and the Snake River spring/summer ESU can only recover if the SFSR MPG achieves viable status. Therefore, ESU recovery depends on the EFSFSR Chinook salmon population achieving at least maintained status. Because the vast majority of currently used spawing and rearing habitat in the EFSFSR populaiton area is in the action area, the action area is essential for both the continued existence and the eventual recovery of the EFSFSR Chinook salmon population. Because of the relationship of the EFSFSR to the MPG and ESU, the action area is extremely important for the continued existance of the ESU, and is essential for the eventual recovery of the ESU.

The SFSR drainage portion of the action area contains approximately half of the steelhead habitat in the SFSR steelhead population area and contains most of the high-quality steelhead spawning and rearing habitat in the population area. Because steelhead spawn in spring when conditions are usually not conducive to redd surveys, historic population trend data are not available for most populations, including the SFSR steelhead population. However, a collaboration among the IDFG, Oregon Department of Fish and Wildlife, Washington Department of Fish and Wildlife, and the Nez Perce Tribe Fisheries Department developed methods for estimating abundance of Snake River Basin steelhead populations. These population specific estimates are available for the 2011 through the 2020 returns and indicate that abundance of the SFSR steelhead population was sufficient to achieve moderate risk of extinction from 2011 through 2016. From 2017 through 2020 abundance was very low, suggesting that risk of extinction was likely high. Abundance of wild steelhead has also been very low across the DPS, suggesting that some of the other populations that were previously considered moderate risk of extinction are likely at high risk. Based on the most recent abundance estimates for the SFSR steelhead population, and the trend for wild steelhead across the DPS, we conclude that the SFSR steelhead population is at high risk of extinction due to low abundance and productivity. Because hatchery fish have never been stocked and all of the spawning areas are occupied, the spatial structure and diversity risk for the SFSR steelhead population is low (Ford 2022).

The proposed recovery goal for the SFSR steelhead population is viable, with low (1–5%) risk of extinction over 100 years (NMFS 2017). Under the current recovery scenarios, the Salmon River steelhead MPG could theoritically achieve viable status with the SFSR steelhead population at moderate risk of extinction, but that would require five other Salmon River populations to achieve low risk of extinction before the SFSR population, which is unlikely. The SFSR is therefore very important for recovery of the Salmon River MPG, and likewise for recovery of the Snake River Basin steelhead DPS. The action area contains approximately 50 percent of the designated critical habitat in the SFSR steelhead population area. Because the action area contains half of the spawning and rearing habitat, it is likely essential for both the continued existince and the eventual recovery of the SFSR steelhead population. Because the habitat in the action area is among the highest elevation (and therefore the coldest) in the SFSR population area, it will probably become even more important as the climate warms.

Environmental Baseline Summary. Condition of Chinook salmon and steelhead habitat within the action area ranges from moderately degraded to very good and is generally improving. Unlike much of the Salmon River drainage, streamflow throughout most of the action area is unimpaired and livestock grazing is largely limited to saddle and pack animals with very minor adverse effects. Salmonid habitat throughout most of the action area is recovering from past land uses, and much of the action area has benefited from large scale habitat restoration activities. All indications suggest that habitat recovery within the action area will continue for the foreseeable future.

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).

2.5.1. Effects of the Action on Chinook salmon and Steelhead

The proposed action includes wildfire suppression activities, and management of wildfire use, that is authorized, funded, or carried out by the BNF. In general, these activities include: (1) pumping water from watercourses (including construction of temporary dams); (2) dipping (using buckets) water from rivers, large streams, and lakes/reservoirs by helicopter; (3) snorkeling (using a snorkel) water from heliwells, pumpkins (or other portable tanks) and lakes/reservoirs by helicopter; (4) scooping water from lakes/reservoirs using fixed wing aircraft; (5) constructing fuel breaks and suppression lines around fire perimeters or high value resources; (6) opening and using closed roads and/or trails in areas where heavy equipment is allowed; (7) backburn and burnout operations between fire lines and the wildfire; (8) establishing camps, helibases and other operational facilities; (9) transporting and using fuel and other chemicals for drip torches, pumps, chainsaws, and engines; and (10) cleaning and sanitizing equipment. Detailed descriptions of these activities are in Section 1.3.

2.5.1.1. Water Pumping from Streams, Rivers, Lakes, and Reservoirs

Water will be pumped from surface sources and used for fire suppression activities. Because there are currently no anadromous fishes in lakes or reservoirs in the action area, pumping from lakes or reservoirs will not affect anadromous fishes. Mark 3 pumps (diversion rate ≈ 0.10 cfs[5]) can be used in any sized stream and Volume pumps (diversion rate ≈ 0.67 cfs) can be used in any second order or larger stream. The PDFs to minimize adverse effects of pumping include

[5] The "typical" withdrawals in the BA were based on actual measurements that the BNF made during the Buck Fire. The BNF also measured actual pump rate for the Juniper Mountain Outfitters horse watering pump and found that it also pumps much less than the rated capacity. A Google search of pump rates supports these findings (i.e., pumps usually pump less than their rated capacities).

screening of pump intakes to reduce entrainment of juvenile fishes, and cessation of pumping if flows in the source stream are visually reduced. Also, PDFs to minimize effects of fuel transport and use apply to fuel use in pumps.

Pumping from streams and rivers will typically follow the water drafting operating guidelines listed in NMFS (2022c). However, some of the guidelines will not be met at all times. For example, pumping may occur outside of the specified times (i.e., one hour after sunrise to one hour before sunset) to operate sprinkler systems protecting structures and/or to ensure support of early morning and late afternoon watering activities; and pumping may exceed 10 percent of streamflow when second order streams are drafted during drought conditions. Drafting more than 10 percent of the flow in a source stream will probably occur very rarely, but drafting outside of the specified times may be a relatively common occurrence. All of the other operating guidelines listed in NMFS (2022c) will typically be followed.

The proposed action states that pumping will cease if flows are visually reduced. Because water depth and velocity are difficult to estimate without measuring, we presume that a change in wetted width will be detected before changes in depth or velocity. Based on review of wetted width/discharge relationships from upper Salmon River streamflow studies, a 50 percent change in discharge would result in a 2 percent change in wetted width, at bank full conditions, and a 20 percent change at base flow conditions. Because a 20 percent reduction in wetted width should be visually detectable, and because most fire suppression activities would likely occur during base flow, we presume that flows in source streams will not be reduced by more than 50 percent.

Because Mark 3 pumps may be used to supply sprinkler systems to protect infrastructure, they may be operated 24 hours per day for as long as the fire threatens the infrastructure, which would result in diversion of approximately 0.10 cfs, per pump, for up to several days. Because there is no lower limit on size of source streams for Mark 3 pumps, operation of even a single Mark 3 pump could, theoretically, remove more than 50 percent of the flow at the point of diversion (POD). However, it is unlikely that a stream with less than 0.2 cfs would have sufficient depth for pumping. Because it would be very difficult to pump any amount of water from a stream flowing 0.2 cfs, we presume that operation of Mark 3 pumps would not reduce flows by more than 50 percent, at the POD.

Although Volume pumps will usually be operated in third order and larger streams, operation in second order streams is covered in this consultation. The estimated 10-year low flow, in second order streams in the action area, ranges from 1 to 2 cfs[6], suggesting that operation of a single Volume pump could, temporarily, reduce flows by more than 50 percent in a second order stream, during a dry year. However, because of the provision to cease pumping if flows are visually reduced, we presume that flows will not be reduced by more than 50 percent. Because Volume pumps are typically used to support suppression activities that typically occur during daylight hours (i.e., ground based and aerial water application), the vast majority of Volume pump operations, and effects on streamflow, will also occur during daylight hours.

[6] Stream order determined using the NOAA Fisheries Protected Resource application and the single-day, ten-year low flow estimated using StreamStats (https://streamstats.usgs.gov/ss/).

We were unable to find peer-reviewed literature characterizing the amount of water used to suppress fires in the western US. However, a newspaper article reported the amount of water used on three fires in Utah in 2020 (Meiners 2020) and monitoring of the 2020 Buck Fire, on the BNF, included recording the amount of water drafted. Fire size and the amount of water used for suppression activities, for these four fires, are in Table 7.

Table 7. Fire size and the amount of water drafted to support fire suppression activities for four fires that burned during summer 2020.

Fire	Fire Size (acres)	Gallons Drafted	Acre Feet Drafted	Acre-Feet / 1,000 Acres
Veyo West	3,000	106,420	0.33	0.11
Turkey Farm Road	12,000	594,544	1.82	0.15
Cottonwood Trail	2,000	63,126	0.19	0.10
Buck	19,139	605,610	1.86	0.10
Average				0.11

Based on these four fires, a maximum of approximately 0.15 acre-feet per 1,000 acres of fire would be drafted to support fire suppression activities. During 2007, the Cascade Complex fire burned approximately 300,000 acres, approximately 200,000 acres, of which was within the action area. This probably represents a worst-case scenario for fire size within the action area. Presuming a water use of 0.15-acre feet per 1,000 acres of fire, suppression activities on a 200,000-acre fire would result in drafting 30 acre-feet. We therefore presume that 30 acre-feet is the maximum amount water that would likely be drafted, in a single fire season, to support fire suppression activities in the action area. A Volume pump, drafting 0.67 cfs, would have to operate for 542 hours to withdraw 30 acre-feet of water.

Water for a very large fire would likely be taken from more than one watershed, including from watersheds outside of the action area. However, all of the water could, theoretically, be taken from any one of the three watersheds (i.e., upper SFSR, Johnson Creek, Bear Valley Creek) in the action area. During the lowest flow years on record, annual flow in upper SFSR, Johnson Creek, and Bear Valley Creek, is 147,943-acre feet, 94,538-acre feet, and 105,247-acre feet, respectively. Therefore, if the worst-case for water drafting coincided with the worst-case for streamflow, then annual flow in the SFSR, Johnson Creek, or Bear Valley Creek could be reduced by 0.020 percent, 0.032 percent, 0.028 percent, respectively. As described above, flows in individual source streams may be temporarily reduced by up to 50 percent, but on a watershed scale, flow reduction would almost always be less than 0.032 percent.

The IDFG stream surveys indicate that, within the action area, rearing Chinook salmon and steelhead are distributed throughout second order and larger streams, with rearing steelhead also present in some first order streams. Prespawn and spawning adult Chinook salmon are also likely to be present in third order and larger streams within the action area. Pathways, by which the proposed pumping activities could affect Chinook salmon and steelhead present in source streams include: spilling of fuel during refueling of pumps; disturbance of adults or juveniles while installing and/or maintaining pumps, intake hoses, screens, etc.; entrainment of rearing or migrating juveniles in pump intakes; and reducing flow volume in adult holding, rearing, spawning, and migration habitat. Adverse effects from fuel spills are unlikely (Section 2.5.1.7). Because installation and maintenance tasks can typically be completed quickly, require little in-water activity other than wading and brushing the screen, and will be confined to the area immediately adjacent to the POD; disturbance of Chinook salmon and steelhead will be minor, temporary, and localized. Entrainment of juvenile Chinook salmon and steelhead in diversion intakes (including impingement on screens) and reduction of flow in Chinook salmon and steelhead habitat could result in adverse effects, which are described below.

The proportion of juvenile salmonids entrained in water diversions is variable (Simpson and Ostrand 2012) but is likely to be approximately equal to (Simpson and Ostrand 2012), or slightly less (Walters et al. 2012) than the proportion of flow diverted. Because pumping locations cannot be determined in advance, a watershed scale analysis will likely provide the best estimate of potential entrainment. As described above, on a watershed scale, pumping for fire suppression could, theoretically, divert a maximum of 0.020 percent to 0.032 percent of annual flow in the Chinook salmon spawning/rearing areas within the action area. Screening reduces entrainment effects by at least 97 percent (Simpson and Ostrand 2012; Walters et al. 2012), further reducing chance of juvenile fish entrainment. Because pumping would remove less than 0.020 percent to 0.032 percent of flow, and because pump intakes would be effectively screened, pumping would likely entrain 0.0006 percent to 0.00096 percent of juvenile Chinook salmon or steelhead in a watershed, under a worst-case scenario of the largest fire on record during an extremely dry year, and with all of the water diverted from a single watershed.

In addition to entrainment effects, flow reduction due to water pumping could reduce quality of rearing habitat. Year class strength of many salmonid populations is positively related to streamflow (Ricker 1975; Mathews and Olson 1980; Mitor et al. 2003; Elliott et al.1997; Nislow et al. 2004; Arthaud et al. 2010; Beecher et al. 2010), and a review of 46 studies found that salmonid demography was usually positively, and was never negatively, related to summer flow (Kovach et al. 2016). Specific relationships of Chinook salmon population productivity and rearing streamflow in undeveloped Salmon River drainages (Figure 4), suggests that reducing rearing streamflow by 0.020 percent to 0.032 percent could reduce population productivity by 0.04 percent to 0.06 percent. The effects of flow reduction on steelhead are likely similar to those on Chinook salmon, but because both the SFSR and MFSR steelhead populations occupy several watersheds, the potential population level effects on steelhead are less than for Chinook salmon. However, because steelhead populations occupy several watersheds, they are likely to experience effects of water drafting more often than any single Chinook salmon population. The level of effects described in this analysis are unlikely to occur more than once during a Chinook salmon or steelhead generation.

Summary – Adverse effects due to fuel spills during pump refueling are unlikely. Disturbance of adult Chinook salmon and of juvenile Chinook salmon and steelhead during pump installation, maintenance, and screen cleaning; will be localized, temporary, and minor. Pumping could temporally reduce flow by up to 50 percent in short reaches of occupied Chinook salmon and steelhead habitat, potentially adversely affecting rearing Chinook salmon and steelhead. However, at a watershed scale, streamflow would be reduced by less than 0.032 percent, less than 0.00096 percent of juvenile Chinook salmon and steelhead would be entrained, and Chinook salmon and steelhead population productivity would be reduced by less than 0.06 percent. Considering the sum of the potential adverse effects and the sizes of the affected populations, the estimated reduction in returns is less than one adult Chinook salmon or steelhead, in year classes affected by the worst-case scenario. During most years, individual Chinook salmon and steelhead populations would have very minor, or no, adverse effects due to water drafting, and significant adverse effects would rarely affect the same population in subsequent years. Therefore, on an annual bases, the average adverse effects would equate to a small fraction of a single adult Chinook salmon or steelhead.

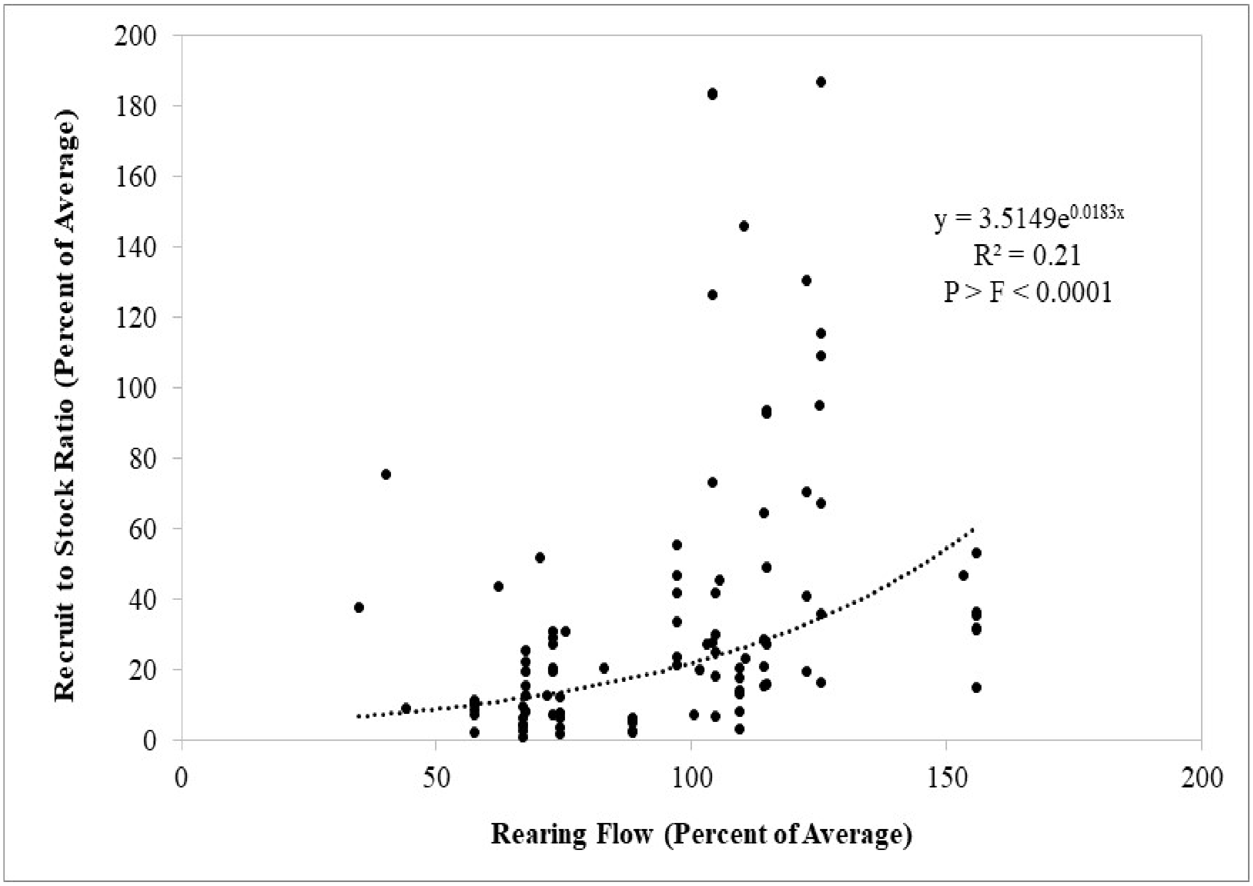

Figure 4. Relationship of whole life cycle productivity and rearing streamflow for the Bear Valley Creek, Big Creek, Camas Creek, Loon Creek, Marsh Creek, Secesh River, and Sulphur Creek Chinook salmon populations.

2.5.1.2. Helicopter Dipping and Snorkeling, and Fixed Wing Aircraft Scooping

There are no waterbodies within the action area that are suitable for water scooping with fixed wing aircraft and scooping will therefore not affect anadromous fishes. Snorkeling water with helicopters will be confined to portable tanks, lakes, and reservoirs. There are no anadromous fishes in lakes or reservoirs within the action area, and snorkeling will therefore not entrain any anadromous fishes. Water removed by dipping and snorkeling helicopters would temporarily reduce flow in source streams and downstream from source lakes. However, water removed by dipping and snorkeling helicopters was presumably included in the estimates of water use on large fires described in Section 2.5.1.1, and adverse effects of flow reductions due to dipping and snorkeling are therefore analyzed in Section 2.5.1.1. Entrainment of juvenile Chinook salmon and steelhead in helicopter buckets is possible and disturbance of adult Chinook salmon and adult and juvenile Chinook salmon and steelhead, due to helicopter dipping, is likely.

Entrainment. Unlike snorkeling, helicopter dipping (buckets) from occupied anadromous fish habitat is covered by this consultation. The two known studies on fish entrainment in helicopter buckets (Jimenez and Burton 2001; Gamett 2022) suggest that salmonids might not be vulnerable to entrainment in helicopter buckets dipping from lakes (Jimenez and Burton 2001) or streams/rivers (Gamett 2022). Those studies were conducted using a 325-gallon bucket whereas firefighting helicopters currently utilize buckets as large as 2,650 gallons (https://www.colheli.com/aerial-firefighting/). Also, buckets are sometimes equipped with fill pumps to facilitate operation in shallow water (https://kawakaviation.com/what-we-do/aerial-fire-fighting/helicopter-bucket-pumps-jp-series/). Given the large size of buckets that can currently be used for helicopter dipping, the use of filler pumps, and the lack of studies on entrainment effects of either large buckets or buckets equipped with filler pumps, it is reasonable to presume that rearing Chinook salmon and steelhead might occasionally be entrained by helicopter dipping. However, because the Gamett (2022) study involved 145 dips with no salmonid entrainment, because the reaction of salmonids to large buckets and buckets with filler pumps would likely be similar to that for smaller buckets, and because dipping from streams with Chinook salmon and steelhead will typically only occur during initial attack (i.e., the first twelve hours of firefighting), Chinook salmon and steelhead entrainment in helicopter buckets is likely to be very rare.

Disturbance. Helicopter dipping locations are typically as close to the wildfire as feasible. Suitable dip sites are chosen based on helicopter safety and suitability of the water source (primarily depth and width). After the initial attack, dipping typically sifts from streams to storage tanks that are filled via drafting from the streams (see Section 2.5.1.1). However, the initial attack could last for an entire operational period (i.e., 24 hours) before the resource advisor and/or resource specialist direction can be implemented, which could result in dozens to hundreds of dips in spawning/rearing habitat. Each dip could result in disturbance due to the bucket entering the water, the physical presence of the helicopter, splash from the bucket entering the water, etc. Although studies of the effects of helicopter dipping on fishes are lacking, the size of the buckets and the proximity of helicopters to the water surface suggests that helicopter dipping could result in substantial disturbance of fishes at, or immediately adjacent to, the dipping location. In the absence of studies specific to fish disturbance, we presume that the disturbance "footprint" of a hovering helicopter would be the same as the rotor disk area. Although hovering helicopters can produce damaging winds for distances of up to three times the rotor diameter (FAR/AIM 2022), most of the wind outside of the rotor "footprint" would be parallel to the water surface, with winds directly impinging on the water surface mostly confined to the rotor "footprint." Under these presumptions, dipping with the largest available helicopters could disturb fishes for the entire stream width, 50 feet upstream and downstream from the bucket.

Within the action area, adult Chinook salmon spawn from early August through mid-September, which is also the peak of the fire season. Disturbance of adult Chinook salmon can result in increased prespawn mortality, temporary displacement from redds, and abandonment of partially completed redds (NMFS 2010). From 2000 through 2020 there were 23 fires in the action area, with the vast majority of fires resulting in no dipping in occupied Chinook salmon or steelhead habitat. The relative lack of dipping in Chinook salmon and steelhead habitat is likely primarily due to implementation of PDFs that discourage dipping in occupied habitat, but it is also at least partially due to presence of desirable dipping locations, such as high mountain lakes, within the action area.

During most years, there will likely be no helicopter dipping activities in occupied Chinook salmon and steelhead habitat in the action area. However, an ignition close to any of the larger streams could result in helicopter dipping in occupied habitat, for up to 14 hours (i.e., daylight hours during one operational period), without direction from a resource specialist or a resource advisor. Based on the frequency of fires since 2000, and the history of helicopter dipping in the action area, there will likely be no more than two instances[7], per year, in which helicopters dip in occupied Chinook salmon or steelhead habitat without direction by resource advisors or specialists. Because Chinook salmon spawn throughout the larger streams in the action area, and because disturbance could extend for 50 feet upstream and downstream from the dipping location, there is a reasonable chance that helicopter dipping in occupied habitat, without direction from a resource advisor or specialist, will result in disturbance of juvenile Chinook salmon and steelhead, and prespawning and spawning adult Chinook salmon.

The severity of the disturbance is probably related to water depth and size of pools/deep runs. In deep runs and/or deep or large pools, disturbance could be relatively minor, possibly not resulting in disturbed fish leaving the pool. In shallower areas and/or smaller pools, disturbance could be sufficient to cause fish to relocate, which could result in physiological stress and increased predation risk. Disturbance severity is also likely dependent on the life stage affected. Juvenile salmonids usually rear near escape cover (Hardy et al. 2006; Holecek et al. 2009), to which they retreat when disturbed, and therefore typically do not move long distances due to temporary disturbance. Multiple disturbances of rearing juveniles could cause physiological stress, potentially increasing cortisol, glucose, and lactate levels; which could alter feeding and reduce predator avoidance (Mesa 1994). However, most of the physiological effects would probably resolve within 24 hours (Mesa 1994) and overall effects on rearing juveniles would likely be relatively minor.

Holding adult Chinook salmon typically utilize deep holes and/or areas with substantial cover and are therefore not very susceptible to disturbance. Actively migrating adult Chinook salmon are relatively exposed and therefore susceptible to disturbance, but because they are moving and the disturbance would be localized, individual fish are unlikely to be disturbed more than one time, and would likely continue migrating upstream after the disturbance. Therefore, disturbance of holding and migrating adult Chinook salmon would be likely to result in relatively minor adverse effects on individual adult Chinook salmon. Unlike holding and migrating adult Chinook salmon, spawning Chinook salmon are relatively exposed and they tend to remain in the same area for an extended period of time, which makes them susceptible to multiple disturbances. Therefore, effects of disturbance, due to helicopter dipping, on spawning Chinook salmon could be relatively severe, possibly reducing survival and/or spawning success.

[7] An instance is defined as 14 hours during initial attack and is based on the approximate day length in the action area during mid-August.

The PDFs described in the BA will reduce disturbance of Chinook salmon and steelhead due to helicopter dipping. After the first operational period (i.e., 24 hours) dipping locations will be chosen by a resource advisor or specialists, which will substantially reduce dipping in occupied Chinook salmon and steelhead habitat and virtually eliminate dipping in known Chinook salmon spawning habitat. Although an operational period is 24 hours, helicopter dipping only occurs during daylight hours, which is approximately 14 hours during late summer in the action area. Because dipping during initial attack would typically only occur at the nearest suitable dipping location, to the fire, the disturbance would usually be confined to approximately 100 feet of stream. Because helicopter dipping in Chinook salmon spawning habitat might occur twice in a single fire season, spawning Chinook salmon in approximately 200 feet of stream could be disturbed sufficiently to reduce spawning success. Each of the three Chinook salmon populations in the action area has more than 100,000 feet of occupied spawning habitat. Helicopter dipping would therefore result in disturbance spawning Chinook salmon in less than 0.2 percent of spawning habitat in a single population in a single fire season.

Summary – Scooping airplanes and snorkeling helicopters will not operate in occupied Chinook salmon and steelhead habitat and will therefore not affect Chinook salmon or steelhead. Juvenile Chinook salmon and steelhead could be entrained in dipping buckets, but entrainment would be rare, with no entrainment on most fires, and possibly no entrainment during most fire seasons. Helicopter dipping activities will likely disturb juvenile Chinook salmon and steelhead and adult Chinook salmon. Disturbance of adult Chinook salmon will be limited to two instances of up to 14 hours each. Adverse effects on juvenile Chinook salmon and steelhead, and on holding and migrating adults, will likely be relatively minor. Adverse effects on spawning Chinook salmon could potentially decrease spawning success of disturbed individuals in less than 0.2 percent of spawning habitat in a single population in a single fire season.

2.5.1.3. Fireline Construction – Fuel Breaks, Suppression Lines, etc.

As described in Section 1.3.1, fire lines are constructed to stop advancing fire fronts, to serve as anchor points for burn-out operations, to protect high value resources, etc. Fireline construction removes vegetation and, when heavy equipment is used, can result in soil displacement and compaction. Consequently, fire line construction can result in increased overland flow of water, increased mobilization of sediment, increased fine sediments entering aquatic habitat, reduction in stream shade, and reduction of LWD recruitment to streams. Use of explosives for fire line construction could potentially injure incubating eggs, rearing juveniles, prespawning adults, and spawning adults. Fireline construction near streams could also disturb rearing juveniles and prespawning and spawning adults.

The PDFs described in Section 1.3.11.2 and the repair activities described in Section 1.3.10, should minimize the chance of adverse effects on anadromous salmonids, and should reduce the magnitude of any effects that might occur. For example, restrictions on, and mandated oversight of, heavy equipment use will minimize soil disturbance and compaction in RCAs; construction of water bars, seeding, adding debris, etc., soon after construction, will minimize mobilization of fine sediments over the short- and long-term; leaving downed trees in RCAs will minimize effects on LWD recruitment and will reduce sediment mobilization in RCAs; and restrictions on use of explosives near streams will minimize effects on salmonid eggs, juveniles, and adults. However, because this consultation could cover many fires, each of which may involve multiple fire lines, it is reasonable to presume that some sediment could reach aquatic habitat, LWD recruitment or stream shade could be reduced, adult or juvenile salmonids could be disturbed, etc. Because the PDFs and repair activities will minimize both the chance and magnitude of effects:

- The amount of sediment entering stream will be sufficiently, small, localized, and temporary that adverse effects on Chinook salmon eggs, Chinook salmon adults, or Chinook salmon or steelhead rearing juveniles, are unlikely.

- Effects on LWD recruitment will be very small, and could be positive over the short to medium terms, due to felled trees being left in the RCAs.

- Disturbance of adult Chinook salmon and juvenile Chinook salmon and steelhead will be localized and temporary.

Summary – Because the PDFs and repair activities described in the proposed action will effectively minimize both the chance of and magnitude of effects, adverse effects on Chinook salmon and steelhead, due to fire line construction, are unlikely.

2.5.1.4. Reconstructed Roads

Mobilization of fine sediment is the pathway by which reconstruction of closed roads could potentially affect Chinook salmon and steelhead. Erosion control PDFs described in Section 1.3.11.8 and the repair activities described in Section 1.3.10 should minimize the instances that sediment reaches streams, due to road reconstruction, and should minimize the amount of sediment reaching streams when it does occur. Because the PDF and repair activities will be effective, the amount of sediment entering stream will be sufficiently small, localized, and temporary that adverse effects on Chinook salmon eggs, Chinook salmon adults, or Chinook salmon or steelhead rearing juveniles, are unlikely.

Summary – Because the PDF and repair activities described in the proposed action will effectively minimize both the chance of and magnitude of effects, adverse effects on Chinook salmon and steelhead due to road reconstruction are unlikely.

2.5.1.5. Burnout and Firing Operations

Burnout and firing operations result in reduced vegetative cover, in the treated areas, which potentially reduces stream shading, reduces LWD, and could increase sedimentation due to creation of hydrophobic soils. However, because the PDFs described in Section 1.3.11.5 (i.e., minimize fire severity in RCAs and no ignitions within one site potential tree height from perennial streams) should effectively reduce the chance of any sediment reaching streams, and should minimize effects on LWD and stream shading, adverse effects on Chinook salmon or steelhead, due to burnout and firing operations, are unlikely. Note: The effects of transporting and handling of fuel used in drip torches are discussed in Section 2.5.1.7.

Summary – Because the PDF and described in the proposed action will effectively minimize chance of increased sedimentation, and will minimize the magnitude of effects on stream shade and LWD, adverse effects on Chinook salmon and steelhead due to burnout and firing operations are unlikely.

2.5.1.6. Establishment of Camps, Helibases and other Operational Facilities

This activity could affect Chinook salmon via the following pathways: Soil compaction, spread of noxious weeds, removal and/or damage of riparian vegetation, bank instability, sedimentation, chemical contamination, waste water contamination, and disturbance of adult Chinook salmon and juvenile Chinook salmon and steelhead. The PDFs described in Section 1.3.11.7 will address all of these pathways, and the repair activities described in Section 1.3.10 will further minimize effects of soil compaction and the chance of noxious weed spread. Also, the PDF described in Section 1.3.11.11 will reduce the chance of chemical contamination. Because the PDF described in the BA will effectively minimize both the chance of effects occurring, and the magnitude of any effects that do occur; the establishment of camps, helibases and other operational facilities used to suppress wildfires, is not likely to result in adverse effects on Chinook salmon or steelhead.

Summary – Because the PDF and repair activities described in the proposed action would minimize soil compaction, removal and damage of riparian vegetation, and sedimentation; and would minimize the chance of noxious weed spread, chemical contamination and waste water contamination; adverse effects on Chinook salmon and steelhead, due to establishment of camps, helibases, and other operational facilities, are unlikely.

2.5.1.7. Transporting and Use of Fuel and Other Chemicals

All of the motorized equipment, and drip torches, used in fire suppression activities use fuel that will have to be transported into and within the action area. All motorized equipment will also use other chemicals (e.g., lubricating oils, hydraulic fluid, antifreeze, etc.) that will be transported into and within the action area. Very small spills will likely occur periodically as hand tools, drip torches, and pumps are refueled by hand; and when heavy equipment and helicopters are refueled, due to residual fuel left in hoses and nozzles, etc. The PDF described in Section 1.3.11.11 should ensure that large spills are very unlikely and that small spills are quickly contained and cleaned so that toxic substances will not enter aquatic habitat.

Summary – Because the PDF described in the proposed action should minimize the chance of any fuel, or other chemicals, entering aquatic habitat, adverse effects on Chinook salmon or steelhead due to transport and use of fuel and other chemicals are unlikely.

2.5.1.8. Other Activities

Other activities that are included in this consultation include:

- Ground application of retardant, foams, and surfactants

- Mop-up activities

- Water drops
- Suppression repair activities

Potential effects include exposure of fish to retardants, foams, or surfactants; sediment entering streams due to ground disturbed during mop-up or repair activities; spread of noxious weeds; and erosion from water drops. However, these activities typically cause only minor effects on aquatic resources, and the PDFs described in the proposed action will further reduce the effects. For example, check valves are required to ensure that retardant does not enter streams when tanks are filled directly from surface water pumps, weed free materials are required for repair activities, etc. Because these activities typically cause only minor effects, and because the PDFs described in the proposed action will further reduce effects, these activities are not likely to cause injury to, or harm of Chinook salmon or steelhead.

Summary – Because these activities typically do not result in adverse effects, and because the PDFs described in the proposed action should reduce chance of toxic substances entering streams, sedimentation, spread of noxious weeds, etc., adverse effects on Chinook salmon or steelhead due to the activities described above are unlikely.

2.5.2. Effects of the Action on Chinook salmon and Steelhead Designated Critical Habitat

The habitat-related effects of fire line construction; ground application of retardant, foams, and surfactants; burnout and firing operations; opening and reconstruction of closed roads; transport and use of fuel and other chemicals; establishment of camps, helibases, Helispots, and other operational facilities; mop-up activities; and suppression repair activities are described in Section 2.5.1. Potential effects of these activities include introduction of toxic substances into streams, reduced stream shade, increased sedimentation, and spread of noxious weeds. However, as described in Section 2.5.1, the effects of these activities on Chinook salmon and steelhead habitat are sufficiently small, localized, and temporary that Chinook salmon and steelhead would be minimally affected. Because the habitat-related effects of these actions are sufficiently small, localized, and temporary that they would minimally affect Chinook salmon or steelhead, they would also minimally affect Chinook salmon or steelhead designated critical habitat.

Helicopter dipping will adversely affect adult Chinook salmon, and juvenile Chinook salmon and steelhead, primarily via disturbance of individual fish. Although fish disturbance will not directly affect habitat, if it causes fish to avoid portions of habitat, it could negatively affect the space PBF[8]. The effects on rearing juvenile Chinook salmon and steelhead, migrating adult and juvenile Chinook salmon, and holding adult Chinook salmon are not likely to be severe enough to impair habit use, and the space PBFs are therefore not likely to be affected for those life stages. Helicopter dipping could disturb spawning Chinook salmon for up to 14 hours, which could result in individuals moving out of the disturbed area. Because there is a narrow window for utilization of spawning habitat, even temporary avoidance of the disturbed area could result in non-utilization of spawning habitat. Disturbance due to helicopter dipping could affect up to 200 feet of Chinook salmon spawning habitat in a single fire season, possibly resulting in

[8] Space is listed as a PBF for Chinook salmon only.

temporary non-utilization of 200 feet of spawning habitat. This represents less than 0.2 percent of the available spawning habitat in any of the three affected Chinook salmon populations.

Removing water from streams via drafting and helicopter dipping will reduce flow in occupied Chinook salmon and steelhead habitat. Flow reductions from these activities could be as much as 50 percent of available flow in the source stream, or as much as 30 acre-feet from a watershed. These flow reductions could adversely affect PBFs for space, food, forage, access to cover, and water temperature. These effects on PBFs would reduce productivity, as described in Section 2.5.1.1. However, because the flow reductions would be temporary, adverse effects on space, food, forage, access to cover, and water temperature would also be temporary. Also, because the flow reductions would be temporary; PBFs that are typically affected by long-term flow reductions, such as substrate, spawning gravel, and riparian vegetation, are not likely to be noticeably affected by the flow reductions caused by the proposed dipping and water drafting.

Summary – Helicopter dipping could result in Chinook salmon avoidance of up to 200 feet of spawning habitat in a single fire season, affecting the space PBF for Chinook salmon spawning at the fifth field HUC scale. Flow reductions due to water drafting and helicopter dipping may affect Chinook salmon and steelhead PBFs sufficiently to reduce habitat productivity (measured as recruits/spawner). The adverse effects caused by flow reduction are not likely to occur every year, are minor at the action area scale, and are temporary, ending when drafting ceases. Effects of the other proposed activities will be minor, localized, and temporary.

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.

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 versus cumulative effects. Therefore, all relevant future climate-related environmental conditions in the action area are described earlier in the discussion of status of the species (Section 2.2.3).

The entire action area is in Valley County, Idaho. The population of Valley County grew from 9,862 in 2010 to 11,746 in 2020, a 19 percent increase.[9] Although Valley County is growing rapidly, the action area portion of the county is very remote, limiting development. Also, the vast majority of land in the action area is administered by the USFS, further limiting the potential for adverse effects due to future development. NMFS is not aware of any additional proposed private or state actions in the action area and assumes that future private actions will occur at rates similar to those that are currently occurring, and which are considered in the baseline.

[9] U. S. Census Bureau. Available at: https://www.census.gov/quickfacts/fact/table/valleycountyidaho/POP010210.

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 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. Species

As described in Section 2.2, individuals belonging to three populations in the Snake River spring/summer Chinook salmon ESU and two populations in the Snake River Basin steelhead DPS 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 recovery goals for 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 amount of non-USFS land in 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 action area provides rearing, migration, and spawning habitat for ESA-listed Chinook salmon and steelhead. The overall baseline conditions in the action area are generally very good. The drainages in the action area (Upper South Fork Salmon River, Johnson Creek, and Bear Valley Creek) are probably the least impaired of any non-wilderness drainages in the Snake River spring/summer Chinook salmon ESU and the Snake River Basin steelhead DPS. The adverse effects on ESA-listed Chinook salmon and steelhead will be due to reduction in flows due to water drafting and helicopter dipping, entrainment in pumps used for drafting water, entrainment in helicopter buckets, and disturbance due to helicopter dipping. The estimated effect of a worst-case scenario of the largest fire on record during the lowest flows on record, expressed as adult returns, equates to less than one adult Chinook salmon and one steelhead. On an average annual basis, the effect would be a small fraction of a Chinook salmon and steelhead adult return. This adverse effect would not appreciably increase the chance of extinction for any of the three affected Chinook salmon populations (i.e., SFSR, EFSFSR, BVC) or either of the two affected steelhead populations (i.e., SFSR, UMFSR).

The EFSFSR and SFSR Chinook salmon populations are at high risk of extinction and the BVC population is at moderate risk. Both the SFSR and the UMFSR steelhead populations are at moderate risk of extinction, although recent return numbers suggest that these populations may actually be at high risk. NMFS' recovery scenarios for the Snake River spring/summer Chinook salmon ESU requires that all three of the affected Chinook salmon populations achieve at least maintained status (i.e., moderate risk of extinction). In addition, either the SFSR or the EFSFSR Chinook salmon population will also have to achieve at least viable status (i.e., low risk of extinction). The preferred recovery scenario for the Snake River Basin steelhead DPS requires both of the affected steelhead populations achieve at least maintained status (i.e., moderate 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) entrainment of juveniles in pumps; (2) entrainment of juveniles in helicopter buckets; (3) temporary reduction of flow in rearing habitat; (4) disturbance of juvenile Chinook salmon and steelhead and adult Chinook salmon via helicopter dipping. Due to the programmatic nature of the proposed action and the unpredictability of wildfires, the amount of habitat or the number of fishes affected, cannot be accurately calculated. Because the pumps will be screened, helicopter buckets do not typically entrain salmonids, and PDF described in the proposed action will minimize dipping in occupied habitat, entrainment in pumps or helicopters will be extremely rare. In a worst-case scenario of the largest fire on record, flow in individual source streams could be temporarily reduced by up to 50 percent and up to 30 acre-feet could be removed from a drainage. If the worst-case fire size occurred during the lowest flows on record, flow and population productivity could be reduced by up to 0.032 percent and 0.06 percent, respectively. Helicopter dipping activities will likely disturb juvenile Chinook salmon and steelhead and adult Chinook salmon. Adverse effects on juvenile Chinook salmon and steelhead, and on holding and migrating adults, could be relatively minor, but adverse effects on spawning Chinook salmon could potentially decrease spawning success of disturbed individuals in less than 0.2 percent of spawning habitat in a single population in a single fire season. The reduction in population productivity due to these adverse effects equates to less than one adult Chinook salmon and one adult steelhead during a worst-case year, and a small fraction of an adult Chinook salmon and steelhead on an average annual basis. The reduction in habitat quality would be short-term, ending as soon as the fire suppression activities stop.

The proposed action is not likely to result in a measurable effect on productivity of the EFSFSR, SFSR, or BVC Chinook salmon populations; or the SFSR or UMFSR steelhead populations. This is because the effects during a worst-case year equate to fewer than one adult Chinook salmon and one adult steelhead, and effects equate to a small fraction of one Chinook salmon and one steelhead on an average annual basis. These impacts are not likely to have a measurable effect on the productivity of the EFSFSR, SFSR, or BVC Chinook salmon populations; or the SFSR or UMFSR steelhead populations. 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. Our assessment assumes that the BNF and any contractors will properly implement the PDFs described in the proposed action.

2.7.2. Designated Critical Habitat

Spawning and rearing habitat quality in the Snake River drainage 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 encompasses substantial portions of spawning and rearing habitat for all of the affected populations. The overall condition of designated critical habitat within the action area is relatively good and generally supports the PBFs listed in Table 5. Helicopter dipping could impair use of small portions of Chinook salmon spawning habitat, potentially affecting the space PBF for spawning Chinook salmon for the duration of the spawning season. Drafting water in occupied habitat could reduce flow sufficiently to temporarily degrade PBFs for space, food, forage, access to cover, and water temperature. These effects would be temporary, ending as soon as the fire suppression activity stops. Because only very small portions of spawning habitat would be affected by disturbance, and because the flow effects are relatively small and are short-term, adverse effects on designated critical habitat will be small and will generally be short term. When considering the status of the critical habitat, environmental baseline, effects of the action, and cumulative effects, NMFS concludes that the BNF's implementation of this proposed action will not appreciably diminish the value of Chinook salmon or steelhead designated critical habitat.

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' 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" is 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. <u>Amount or Extent of Take</u>

In the opinion, NMFS determined that incidental take is reasonably certain to occur as follows:

2.9.1.1. Entrainment in Pumps and Reduction of Flow in Occupied Habitat

As described in Section 2.5, entrainment in Type 3 pumps is unlikely, but operation of Volume pumps in occupied habitat could result in entrainment, even if all pumps are effectively screened. In a single fire season, up to 30 acre-feet of water could be drafted from occupied Chinook salmon and steelhead habitat. If this amount of drafting occurred during a low flow year, and if all of the drafting occurred in a single watershed, then 0.0006 percent to 0.00096 percent of juvenile Chinook salmon and steelhead in that watershed could be entrained and killed. Because the number of fish present in any given year is unknown, the number of fishes that will be entrained and killed cannot be calculated.

As described in Section 2.5, reduction of flow in occupied Chinook salmon and steelhead habitat will affect rearing juvenile Chinook salmon and steelhead. Also described in Section 2.5, adverse effects on flow in occupied habitat will primarily occur via operation of Volume pumps, which could remove up to 30 acre-feet of water, potentially reducing Chinook salmon and steelhead productivity by 0.04 percent to 0.06 percent. Because the number of fish present in any given year is unknown, translating the reduction in productivity into numbers of Chinook salmon and steelhead, is not feasible.

When take cannot be adequately quantified, NMFS describes the extent of take through the use of surrogate measures of take that would define the limits anticipated in this opinion. Effects due to entrainment in pumps and due to reduction of flow in rearing habitat are both related to the amount of water drafted via Volume pumps. Because withdraw of 30 acre-feet represents a worst-case scenario, and because Volume pumps withdraw water at a rate of approximately 0.67 cfs (0.0554 acre-feet/hour), extent of take via these two pathways will be exceeded if Volume pumps operate for more than 542 pump hours in a single fire season.

2.9.1.2. Entrainment in Helicopter Buckets

The available studies suggest that chance of entrainment of salmonids in helicopter buckets up to 325 gallons is very unlikely to occur, but there is no information on larger helicopter buckets or helicopter buckets equipped with filler pumps. Because buckets up to 2,600 gallons and/or buckets equipped with filler pumps can be used, and because the consultation will likely be in effect for many years; we presume that some entrainment of juvenile Chinook salmon or steelhead will likely occur. Because there is no information on entrainment risk of large buckets and/or buckets equipped with filler pumps, because dipping locations cannot be determined, and because the number of fish present in any given year is unknown, we cannot calculate the number of Chinook salmon or steelhead that will be entrained via helicopter dipping. When take cannot be adequately quantified, NMFS describes the extent of take through the use of surrogate measures of take that would define the limits anticipated in this opinion. Because entrainment of Chinook salmon and steelhead will presumably be related to the number of dips utilizing large buckets (greater than 400 gallons) and or pumps equipped with filler pumps, the extent of take will be described as the number of large bucket and filler pump equipped bucket dips in occupied habitat. Helicopters can make multiple dips per hour and could theoretically operate in occupied habitat for up to 28 hours (two instances of 14 hours each) without direction from a resource advisor or specialist. However, some of the dips would likely be with small buckets (less than 400 gallons) without filler pumps. Because helicopter availability during initial attack will likely be limited, it is unlikely that more than 100 dips with large buckets and/or buckets equipped with filler pumps, would be made in occupied Chinook salmon or steelhead habitat in a single fire season. The extent of take would therefore be exceeded if more than 100 dips with buckets greater than 400 gallons and/or buckets equipped with filler pumps, were made in occupied Chinook salmon or steelhead habitat in a single fire season.

2.9.1.3. Disturbance Due to Helicopter Dipping

Adult Chinook salmon and juvenile Chinook salmon and steelhead are likely to be harassed and/or harmed at dip sites. Adverse effects on juveniles would likely be relatively minor and would likely resolve soon after dipping stops. Likewise, adverse effects on holding and migrating adult Chinook salmon would also be relatively minor. Adverse effects on spawning adults could increase mortality and/or reduce spawning success. Because future timing and location of future dipping cannot be precisely predicted, and because the number of fish that will be present is unknown, we cannot calculate the number of juvenile Chinook salmon and steelhead and adult Chinook salmon that will be disturbed via helicopter dipping. When take cannot be adequately quantified, NMFS describes the extent of take through the use of surrogate measures of take that would define the limits anticipated in this opinion. Because disturbance of Chinook salmon and steelhead will presumably be related to helicopter dipping activities, the extent of take will be described as the instances of helicopter dipping in Chinook salmon spawning habitat, with one instance defined as helicopter dipping from Chinook salmon spawning habitat for one operation period (i.e., up to 14 hours of dipping). During most fire seasons, there is no helicopter dipping in Chinook salmon spawning habitat in the action area, and more than one instance during a fire season is extremely rare. However, it is reasonable to presume that, during an active fire season, two instances of helicopter dipping from Chinook salmon spawning habitat might be necessary. Therefore, the extent of take would be exceeded if more than two instances of helicopter dipping occurred in Chinook salmon spawning habitat during a single fire season.

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 either species or destruction or adverse modification of their 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 BNF shall:

1. Minimize the effects of entraining Chinook salmon and steelhead in pumps and reducing flow in occupied Chinook salmon and steelhead habitat.

2. Minimize the effects of entraining Chinook salmon and steelhead in helicopter buckets.

3. Minimize the adverse effects of disturbing Chinook salmon and steelhead during helicopter dipping activities.

4. 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 BNF 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 entrainment and flow reduction effects):

    a. Unless necessary for safety or infrastructure protection, avoid drafting from second order streams with Volume pumps.

    b. Note the wetted margins of the stream prior to pumping and cease pumping if flows are visually reduced.

    c. Pumping will cease when the container (i.e., tank, truck, aircraft, etc.,) being filled is full.

2. The following terms and conditions implement RPM 2 (minimize entrainment in buckets):

    a. Establish facilities to fill buckets with screened water (e.g., water tanks filled via screened Volume pumps) as soon as feasible.

    b. Direct helicopters to dipping locations outside of occupied habitat, whenever feasible.

3. The following terms and conditions implement RPM 3 (minimize disturbance due to helicopter dipping):

    a. Ensure that Chinook salmon spawning habitat maps, data, etc. are distributed to all resource advisors, air operations, operations section chief, and contractors and contractors who may direct, oversee, or implement helicopter dipping operations.

    b. Direct helicopters to dipping locations outside of Chinook salmon spawning habitat within one administrative cycle of the fire start, whenever feasible.

    c. When feasible, use alternative locations for dipping to avoid known adult Chinook salmon sites. If a site is needed and occupancy is unknown, have a Resource Advisor or specialist survey prior to dipping.

4. The following terms and conditions implement RPM 4 (monitoring):

    a. Monitor and maintain condition of screens on Mark 3 and Volume pumps.

    b. Record the hours that Volume pumps are operated in occupied habitat.

    c. Record all instances of visual reduction in streamflow due to operation of Volume pumps.

    d. Record the number of dips, in occupied habitat, by large (greater than 400 gallons) helicopter buckets or by helicopter buckets equipped with filler pumps.

    e. Record the dipping location, duration of dipping, and number of helicopters used for all instances of helicopter dipping in Chinook salmon spawning habitat.

    f. Each year, after the conclusion of the fire season, the BNF will report the results of the monitoring described in 4 a-e to the BNF Level 1 Team.

    g. A written report will be submitted to the BNF Level 1 Team by April 1, following the fire season if: (1) helicopter dipping occurs in Chinook salmon spawning habitat; (2) water drafting with Volume pumps occurs in occupied Chinook salmon or steelhead habitat; (3) fire suppression activities occur that do not include the PDF described in the proposed action.

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 BNF should adopt and implement the following CRs:

1. When drafting water from occupied habitat: Comply with the water drafting operating guidelines in NMFS (2022c).

2. Identify and map suitable helicopter dipping locations outside of Chinook salmon and steelhead occupied habitat and include that information in the maps distributed to resource advisors, air operations, operations section chief, and contractors who may direct, oversee, or implement helicopter dipping operations. The term and condition (above) did not require the identification and mapping of suitable dipping locations.

3. Identify and map water drafting locations that will minimize drafting effects on Chinook salmon and steelhead, and distribute maps and coordinates to BNF employees and contractors who may direct, oversee, or implement water drafting operations. Having these maps available would make complying with section 1.3.2 of the proposed action more successful.

2.11. **Reinitiation of Consultation**

This concludes formal consultation for Fire Suppression on the Boise National Forest. 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 incidental take statement 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 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 information provided by BNF and descriptions of EFH for Pacific Coast salmon (PFMC 2014) contained in the fishery management plans (FMP) 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 thermal refugia.

3.2. Adverse Effects on Essential Fish Habitat

Within the action area, Chinook salmon designated critical habitat and EFH are essentially the same, and the adverse effects on EFH are essentially the same as the adverse effects on Chinook salmon designated critical habitat described in Section 2.5.2. The HAPCs that will likely be affected are thermal refugia and spawning habitat. Tributary streams are typically cooler than the receiving streams and often provide thermal refugia for salmonids. Volume pumps may occasionally be operated in small tributary streams, which would temporarily reduce flow, possibly reducing available thermal refugia in the tributary and in the receiving stream immediately downstream from the tributary. Because the effects on flow would cease as soon as pumping stops, the effects on thermal refugia will be temporary. As described in Section 2.5.2, the effects on Chinook salmon spawning habitat could extend through the end of the spawning season, potentially affecting up to 0.02 percent of spawning habitat in a single year. These effects on thermal refugia and spawning habitat will not occur during every fire, and are unlikely to occur every year. When they do occur, the effects will be localized, affecting only very small amounts of habitat.

3.3. Essential Fish Habitat Conservation Recommendations

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

1. Measure streamflow prior to drafting from second order streams and do not draft more than 10 percent of measured flow.

2. Do not helicopter dip in Chinook salmon spawning habitat unless: (1) it is necessary to protect lives or property; (2) it would greatly increase the chance of extinguishing the fire during initial attack, thus potentially avoiding the adverse effects of a large fire.

Fully implementing these EFH CRs would protect, by avoiding or minimizing the adverse effects described in Section 3.2, above, on Pacific Coast salmon EFH.

3.4. **Statutory Response Requirement**

As required by Section 305(b)(4)(B) of the MSA, the BNF must provide a detailed response in writing to NMFS within 30 days after receiving an EFH CR. 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 CRs 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 CRs, 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 OMB, NMFS established a quarterly reporting requirement to determine how many CRs 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 CRs accepted.

3.5. **Supplemental Consultation**

The BNF 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 CRs [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 BNF personnel. Other interested users could include other Federal agencies, state agencies, or contractors conducting fire suppression activities in the action area. Individual copies of this opinion were provided to the BNF. 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 (OMB) Circular A-130; the Computer Security Act; and the Government Information Security Reform Act.

4.3. Objectivity

Information Product Category: Natural Resource Plan

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

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

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

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

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6. APPENDICES

Appendix A

Boise National Forest Monitoring Checklist for all Type 1-3 Fires
Fire Suppression Programmatic Biological Assessment
Consistency Checklist

Incident Name: Date Suppression Initiated:

7.Acres: **Date of Containment:**

Subbasin(s):

Table 1. Identification of Endangered Species Act - listed species or critical habitats in area(s) affected by the incident.

SPECIES	Yes/No	CRITICAL HABITAT	Yes/No
Spring/summer Chinook Salmon (Snake River)		Spring/summer Chinook Salmon (Snake River) Critical Habitat	
Steelhead Trout (Snake River summer)		Steelhead Trout (Snake River summer) Critical Habitat	
Bull Trout		Bull Trout Critical Habitat	
Yellow-billed Cuckoo			
Canada lynx			
Northern Idaho ground squirrel			
Slickspot peppergrass		Slickspot peppergrass Proposed Critical Habitat	
Whitebark pine			

Table 2. The following provides a brief overview of the mitigations required in Fire Suppression Programmatic Biological Assessment; the 2022 Programmatic Biological Assessment should be referenced for the complete list of mitigations.

Yes*	No*	Fire Management Activity and Mitigation Required by the Biological Assessment
		Resource Advisors
		Appropriate resource specialists were involved in the Wildland Fire Decision Support System. Resource Advisors were assigned to Type 1-3 incidents and all other fires when appropriate. Resource Advisors provided information at the in-briefing and throughout the incident regarding Endangered Species Act listed species, Riparian Conservation Areas and the Boise National Forest applicable Resource Direction and Guidelines.
		Reconstructed roads were discussed with the Resource Advisor prior to implementation, and potential adverse effects were avoided during reconstruction. Suppression repair treatments, including returning roads to pre-fire administrative status, were included in the suppression repair plan and implemented by the Incident Management Team. Temporary crossings (including installation of bridges/culverts) or fording did not occur in occupied or critical habitat.

Yes*	No*	Fire Management Activity and Mitigation Required by the Biological Assessment
		Fireline Construction
		Minimum Impact Suppression Tactics were used where potential impacts to ESA-Listed species may occur. Actions that disturb stream courses, increase sedimentation, or may result in increased stream temperatures were minimized to negligible levels.
		Minimized intentional damage to and avoided falling whitebark pine. Targeted other conifers for removal.
		Incident resource advisors were provided a locality map of known Boise National Forest whitebark pine plus trees with specific location information.
		Protected high value whitebark pine "plus" trees or identified blister-rust resistant trees from suppression activities and, to the extent possible, from high fire intensity.
		Heavy equipment use for fire line construction in Riparian Conservation Areas or landslide prone areas was approved by a Resource Advisor or Fish Biologist Equipment crossings of live water did not occur in, or within 600 feet of, occupied or critical habitat. If avoidance is not feasible due to a determination there is an imminent threat to human life or property, the action will fall outside the scope of this programmatic Consultation and the Forest will initiate emergency consultation.
		Trees cut or felled within RCAs were left intact unless fire management objectives or public safety requires bucking into smaller pieces (SWST10) and did not result in a measurable change in one or more Watershed Condition Indicators.
		If fire line explosives were used, appropriate setback distances (located in the Biological Assessment) were applied.
		Water Drafting, Dipping, Snorkeling and Scooping
		Water drafting equipment was appropriately screened (meeting National Marine Fisheries Service criteria for size and intake velocity), streamflows were not visually reduced in occupied and/or potentially occupied waters, and volume pumps were only deployed in lakes, reservoirs, and second order and larger streams.
		Helicopter dipping was consistent with the Boise National Forest Resource Direction and Guidelines Maps and coordinated with the incident. Dipping did not occur if chemical products were injected into the bucket, or chemical injection systems were removed, disconnected, or rinsed. • Regular communication occurred with local Level 1 team. • Helicopter snorkeling only occurred from non-Endangered Species Act listed waters, reservoirs and or dip tanks such as a heliwells, pumpkins or similar collapsible devices. • Helicopter dipping and snorkeling avoided active spawning areas after August 15 and a fish biologist was consulted.
		Burnout and Firing Operations
		Ignitions within Riparian Conservation Areas were conducted only where necessary to meet fire management objectives and were conducted to minimize fire severity in Riparian Conservation Areas. No active ignition within riparian conservation areas. • Active ignition within riparian conservation areas and active ignition stopped at one site potential tree height from occupied and or critical habitat.
		Protected high value whitebark pine "plus" trees or identified blister-rust resistant trees from suppression activities and, to the extent possible, from high fire intensity. Incident resource advisors were provided a locality map of known Boise National Forest plus trees with specific location information.

Yes*	No*	Fire Management Activity and Mitigation Required by the Biological Assessment
		Ground Application of Retardant, Foams and Surfactants
		Fire suppression chemicals (foams, surfactants) were not used where there was potential for direct waterway contamination and were not injected while pumping directly from waterways without appropriate mitigations.
		Incident-specific measures were developed and used for ground based retardant application to prevent contamination of waterways.
		Camps, Helibases, Helispots and other Operation Facilities
		Once a wildland fire decision support system was approved, all operational facilities were located outside occupied threatened, endangered, proposed or candidate plant habitats. If NO. If the only suitable location for such activities was determined and documented by the line officer or designee to be within occupied TEPC plant habitat, the decision of where to place these activities was not delayed when the line officer or designee determined safety or loss of human life or structures was at imminent risk. • If camps, staging areas, or other operational facilities were in occupied threatened, endangered, proposed or candidate plant habitat, measures were developed with the incident resource advisor to avoid and or minimize potential effects. • If in known occupied habitats or proposed designated critical habitats for Slickspot peppergrass, resource advisors will be contacted prior to set up and will assist in laying out the camp to avoid adverse effects to individual plants or slick spot habitats. If avoidance is not feasible, the action will fall outside the scope of this programmatic Consultation and the Forest will initiate emergency consultation.
		Minimized intentional damage to and avoided falling whitebark pine when establishing coyote camps, helispots, staging areas or other centers for incident activities. Targeted other conifers for removal.
		Operational facilities (including those accommodating aircraft and aircraft re-fueling) were located outside Riparian Conservation Areas unless no other suitable locations exist. Operational facilities where Endangered Species Act - listed fishes occur or within Riparian Conservation Areas were approved by a Resource Advisor or Fish Biologist prior to activities taking place, measures were developed and used to protect stream and fish, and resource advisors regularly visited operational facilities.
		Invasive Species
		All equipment such as dozers and backhoes were inspected and clear of dirt and debris.
		Guidelines from the Guide to Preventing Aquatic Invasive Species Transport by Wildland Fire Operations (National Wildfire Coordinating Group 2017) were followed to minimize the spread of Aquatic Invasives.
		Decontaminated internal and external tanks by spraying the internal surface with hot water (140 degrees Fahrenheit) from a hot pressure washer (e.g., a 'Hotsy')
		Weed wash station(s) were located in easily accessible areas, runoff did not enter stream channels or carry seeds/organisms off-site, and the area may be monitored/treated for established weeds as needed. Any erosion control materials used (such as straw used in suppression repair) were certified weed free.
		Mop-up
		Used minimum-impact suppression tactics in areas where there is potential to damage listed plants, fishes or critical habitat. Every effort was made to minimize stream course disturbance, sedimentation, and actions that would result in increased water temperatures.
		Minimized intentional damage to and avoid falling whitebark pine during road reconstruction activities. Targeted other conifers for removal.

Yes*	No*	Fire Management Activity and Mitigation Required by the Biological Assessment
		Suppression Repair Activities
		Suppression repair measures were completed where fire management tactics were implemented, and they addressed avoidance and/or minimized adverse effects to Endangered Species Act - listed species and/or Critical Habitat.
		All erosion control materials including but not limited to hay, straw or mulch, were determined free of noxious weed seed. Materials, for which weed-seed free certification was unavailable were inspected and determined to be free of weed seed prior to purchase and use.
		Suppression repair specialists coordinated with assigned Weed Management Specialist or Botanist for technical guidance on plant-based materials prior to awarding of contract or submittal of purchase order. All seed used on National Forest System lands were certified to be free of seeds from noxious weeds listed on the current *All States Noxious Weeds* test and consisted of native or desirable non-native seed mixes and/or native cultivars.
		Storage, Transport and Use of Fuel and Other Chemicals
		Storage of fuel and other toxicants, refueling in Riparian Conservation Areas (including aircraft) did not occur unless there were no other alternatives, was approved by the responsible official, and had appropriate spill containment and a spill containment plan commensurate with the amount of fuel (SWST11). This includes fuel trucks (including helibases), portable pumps and their associated fuel (either in storage or while in use), portable generators, fuel stored in cans at camp(s), staging areas, or any other location where fuel is stored. o No fuel spill occurred o Fuel spill occurred. Add narrative details on size of spill, location, response and cleanup.
		Monitoring
		Closeout reports were provided to the Boise National Forest Level 1 Team as appropriate (Type 1-3 fires) or as requested by the USFWS and/or the NMFS.

**Rationale (if needed) should be recorded on the following page.*

☐ Check here if incident management actions were not within the scope of the programmatic consultation, and the decision was made by the Forest Supervisor to initiate emergency consultation.

Signature of Lead Resource Advisor and Date

NAME   Incident dates, start to end
Incident Resource-Advisor

List other Resource Advisors assigned to incident

Rationale: