UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
West Coast Region
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Refer to NMFS No: WCRO-2023-01469

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January 2, 2024

Jake Strohmeyer
Forest Supervisor
Sawtooth National Forest
370 American Avenue
Jerome, ID 83338

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 Sawtooth National Forest; Upper Salmon River Subbasin HUC 17060201; Custer and Blaine Counties, Idaho (One Project)

Dear Mr. Strohmeyer:

Thank you for your letter of June 29, 2023 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 Sawtooth National Forest (SNF).

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 (MSA) (16 U.S.C. 1855(b)), and concluded that the action would adversely affect the EFH of Chinook salmon contained in the fishery management plans (FMPs) developed by the Pacific Fishery Management Council (PFMC 2014) and approved by the Secretary of Commerce. Therefore, we have included the results of that review in Section 3 of this document.

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, Snake River sockeye salmon, or Snake River Basin steelhead. NMFS also determined the action will not destroy or adversely modify designated critical habitat for Chinook salmon, sockeye 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, which the SNF must comply with in order to be exempt from the ESA take prohibition.

This document also includes the results of our analysis of the action's effects on EFH pursuant to Section 305(b) of the MSA, and includes two Conservation Recommendations to avoid, minimize, or otherwise offset potential adverse effects on EFH. These Conservation Recommendations 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 Conservation Recommendations, the SNF must explain why the recommendations will not be followed, including the justification for any disagreements over the effects of the action and the recommendations. In response to increased oversight of overall EFH program effectiveness by the Office of Management and Budget, NMFS established a quarterly reporting requirement to determine how many Conservation Recommendations are provided as part of each EFH consultation and how many are adopted by the action agency. Therefore, in your statutory reply to the EFH portion of this consultation, NMFS asks that you clearly identify the number of Conservation Recommendations accepted.

Please contact Amanda Peterson, Fisheries Biologist in the Southern Snake Branch of the Interior Columbia Basin Office at 208-402-8791 or at amanda.peterson@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: K. Flannigan – SNRA
S. Meggers – SNF
T. Stewart – SNF
M. Haney – SNF
K. Hendricks – USFWS
C. Colter – SBT
J. Richards – IDFG

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 Sawtooth National Forest

NMFS Consultation Number: WCRO-2023-01469

Action Agency: USDA Forest Service, Sawtooth 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 sockeye salmon (*O. nerka*)	Endangered	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.
Assistant Regional Administrator
Interior Columbia Basin Office

Date: January 2, 2024

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BA	Biological Assessment
BAER	Burned Area Emergency Response
BNF	Boise National Forest
cfs	Cubic Feet per Second
CR	Conservation Recommendation
DPS	Distinct Population Segment
DQA	Data Quality Act
EFH	Essential Fish Habitat
EFSR	East Fork Salmon River
ESA	Endangered Species Act
ESU	Evolutionarily Significant Unit
FMP	Fishery Management Plan
HAPC	Habitat Area of Particular Concern
ITS	Incidental Take Statement
LWD	Large Woody Debris
MPG	Major Population Group
MSA	Magnuson–Stevens Fishery Conservation and Management Act
NLAA	Not Likely to Adversely Affect
NMFS	National Marine Fisheries Service
Opinion	Biological Opinion
PBF	Physical or Biological Feature
PCE	Primary Constituent Element
PDF	Project Design Features
POD	Point of Diversion
RCA	Riparian Conservation Area
RPA	Reasonable and Prudent Alternative
RPM	Reasonable and Prudent Measure
SNF	Sawtooth National Forest
SNRA	Sawtooth National Recreational Area
SR	Snake River
SRB	Salmon River Basin
SRLM	Salmon River Lower Mainstem
SRUM	Salmon River Upper Mainstem
TEPC	Threatened, Endangered, Proposed, or Candidate
USGCRP	U.S. Global Change Research Program
USR	Upper Salmon River
USRM	Upper Salmon River Mainstem
VC	Valley Creek
VSP	Viable Salmonid Population
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

The National Marine Fisheries Service (NMFS) prepared the biological opinion (opinion) and incidental take statement (ITS) portions of this document in accordance with Section 7(b) of the Endangered Species Act (ESA) of 1973 (16 U.S.C. 1531 et seq.), 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 at 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 Sawtooth National Forest (SNF) and the Boise National Forest (BNF) completed a joint programmatic ESA Section 7 consultation for fire suppression activities occurring on both national forests (NMFS 2006). That program ended in 2010, and between 2010 and 2012, fire suppression activities on the SNF were treated as emergency actions, with effects on ESA-listed anadromous fishes covered via emergency consultation. In 2012, the SNF completed a programmatic consultation on fire suppression activities (NMFS 2012), similar to the 2006 consultation, except that it only covered activities on the SNF. The 2012 consultation included the effects of helicopter dipping, but it did not cover the aerial application of fire retardant[1]. The 2012 consultation expired in July 2022, prompting the need for this consultation on the effects of fire suppression activities.

The SNF submitted draft biological assessments (BAs) to the SNF Level 1 Team on February 24, 2023, and May 20, 2023. After subsequent reviews by NMFS, and revisions by SNF, the SNF sent the final BA to NMFS on June 29, 2023. The SNF concluded that the proposed action is "likely to adversely affect" Snake River spring/summer Chinook salmon (*Oncorhynchus tshawytscha*), Snake River sockeye salmon (*O. nerka*), and Snake River Basin steelhead (*O. mykiss*), but is "not likely to adversely affect" their critical habitat. The SNF also concluded that the proposed action would not be likely to adversely affect Chinook salmon EFH. On July 5 and July 10, 2023, NMFS and SNF personnel met to discuss SNF's may affect, not likely to

[1] 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.

adversely affect (NLAA) determination for designated critical habitat. Although NMFS was unable to concur with the NLAA determination for the effects of the proposed action on designated critical habitat, the BA contained sufficient information to initiate formal consultation, and NMFS sent the SNF a letter accepting the consultation package on July 18, 2023. In preparing this biological opinion, we relied on information in the BA, information obtained from the SNF via phone and e-mail communications, and a variety of publicly available information.

On November 07, 2023, NMFS provided a copy of the proposed action and terms and conditions section of the draft opinion to the Shoshone-Bannock Tribe and requested comments. NMFS did not receive any comments.

On July 5, 2022, the U.S. District Court for the Northern District of California issued an order vacating the 2019 regulations that were revised or added to 50 CFR part 402 in 2019 ("2019 Regulations," see 84 FR 44976, August 27, 2019) without making a finding on the merits. On September 21, 2022, the U.S. Court of Appeals for the Ninth Circuit granted a temporary stay of the district court's July 5 order. On November 14, 2022, the Northern District of California issued an order granting the government's request for voluntary remand without vacating the 2019 regulations. The District Court issued a slightly amended order two days later on November 16, 2022. As a result, the 2019 regulations remain in effect, and we are applying the 2019 regulations here. For purposes of this consultation and in an abundance of caution, we considered whether the substantive analysis and conclusions articulated in the biological opinion and incidental take statement would be any different under the pre-2019 regulations. We have determined that our analysis and conclusions would not be any different.

1.3. Proposed Federal Action

Under the ESA, "action" means all activities or programs of any kind authorized, funded, or carried out, in whole or in part, by Federal agencies (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 (50 CFR 600.910). The proposed action is the SNF's authorization, funding, or undertaking of wildland fire suppression activities and management of wildland fire on the SNF (Figure 1), including Wildland Fire Management Tactics. Aerial retardant delivery is not addressed in the proposed action as it has been addressed at a national scale (NMFS 2019). Activities addressed in this proposed action will occur at multiple sites across the landscape administered by the SNF including State or private lands within their area of responsibility or agreement. 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 SNF activities apply to any wildfire suppression or management of wildland fire for multiple objectives, including resource benefit. Additionally, the SNF may propose amendments to the proposed action as new information on fire suppression effects become available or when new tactics are developed. Amendments will be discussed with the SNF Level 1 Team prior to their implementation in order to determine if reinitiation of consultation is necessary (50 CFR 402.16(a)).

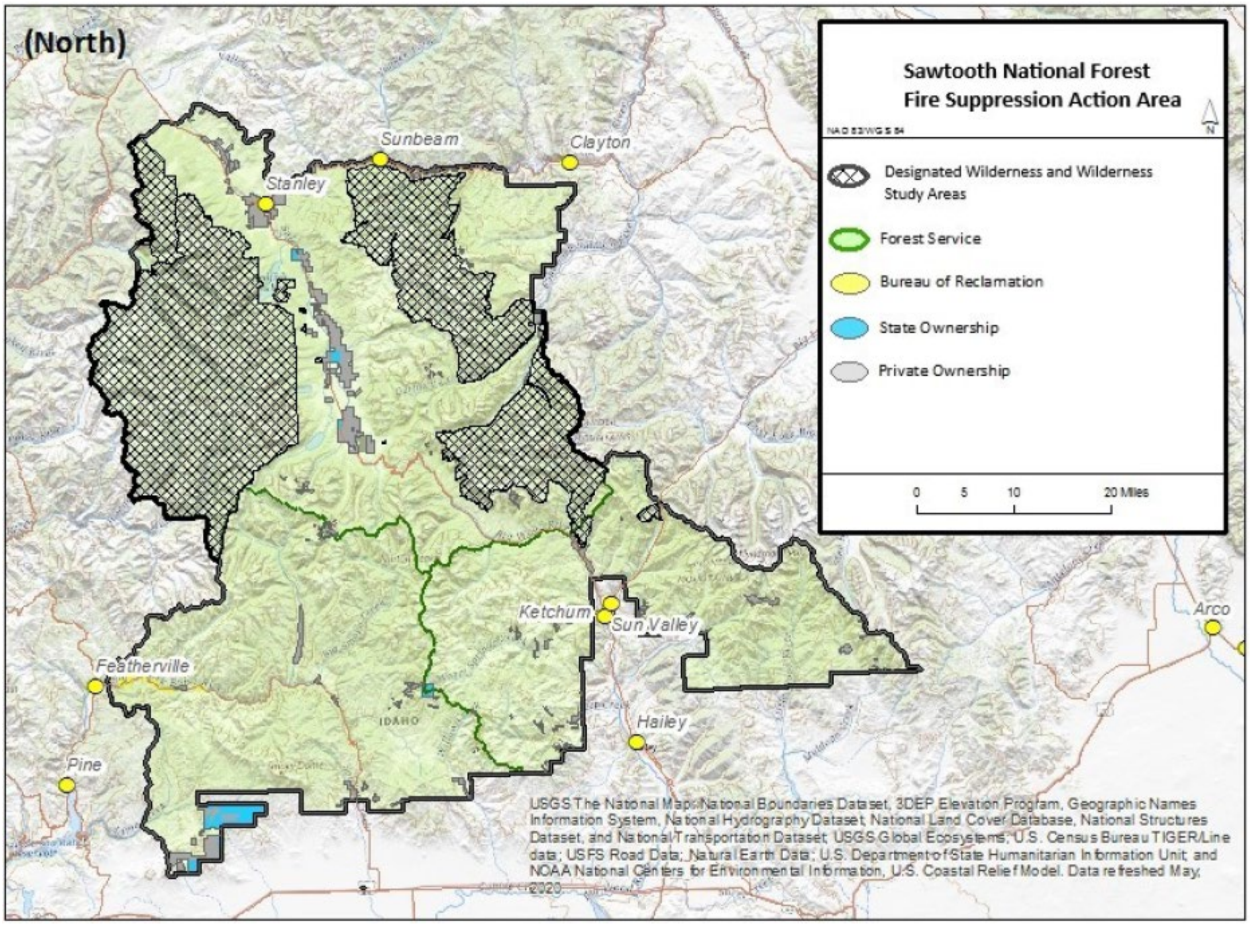

Figure 1. The three contiguous ranger districts (Fairfield, Ketchum, and the Sawtooth National Recreation Area) of the Sawtooth National Forest in central Idaho (the dark green lines are the ranger district boundaries). The northern most district (Sawtooth National Recreation Area) is currently occupied by anadromous fishes.

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, (potentially) over story vegetation, and removing ladder and surface fuels as a part of constructing Fireline or mitigating fire behavior around or near high value resources.
- Establishing camps, helibases, and other operational facilities.
- Backburn and burnout operations between firelines and the wildfire.
- 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 (helicopter-based water removal aircraft fit with 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 resource advisor or when needed to aid in the safety of firefighters.

- Scooping water from lakes/reservoirs using fixed-wing aircraft.

- 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, dozers, and machines used for logging.

- Use of unmanned aerial vehicles (UAV) or drones.

1.3.1. Fireline Construction

Firelines will be constructed to control the spread of the fire. In some instances, a fireline 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, fireline construction will typically involve:

- 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 line construction though heavy equipment (including, but not limited to dozers, tracked excavators, feller-bunchers, masticators, chippers, log skidders, skidgines) or explosives may also be used. Fuel characteristics, fire behavior, topography, access, and suppression strategy(s) dictate the type and size of fireline constructed.

- In some instances, a wet line using a hose lay with pump and water source or cold trailing the fire's edge may be sufficient. Natural barriers are used whenever possible, including rock outcrops, areas of little or no fuel, and streams, rivers, or lakes.

- Cooling the fire and knocking down the hotspots can include separating burning heavy fuel and using dirt, or water to cool them down. Some felling and burning 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 a chainsaw.

- Existing routes (including open, closed, decommissioned and unauthorized routes) may be modified or re-opened temporarily (generally using heavy equipment) for use as fireline 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.

1.3.2. Water Pumping, Dipping, Snorkeling, and Scooping

Application of water is a common method for fire suppression. When available, water will be pumped, dipped, or scooped from nearby streams, rivers, lakes, and/or reservoirs and applied via aircraft, water tenders and/or tank trucks, fire engines, backpack sprayers and/or pumps with hose networks. In addition to application on fires, water will also be applied to specific areas and/or structures, via temporary sprinkler systems, to strategically protect resources. If no adequate water source is available, portable storage tanks (e.g., heliwells, Fold-A-Tanks and/or pumpkins) may be set up and filled by water tenders to supply needs near a fireline.

1.3.2.1 Pumping

A variety of portable pumps will be 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 maximum rates due to less than optimal head, hose length, etc.

Typically, Mark 3 pumps are used to supply sprinklers and hose networks whereas Volume pumps are used to fill tender trucks, aircraft, and portable storage tanks (Fold-A-Tanks, pumpkins, etc.). Mark 3 pumps may be used in first order and larger streams. Due to the need to have water sources relatively close to the resources being protected when using Mark 3 pumps, most drafting from third order and smaller streams is via Mark 3 pumps. Water drafting sites for volume pumps are typically third order streams or higher to ensure adequate water supply, but second order streams are covered under this analysis in the rare event one may be used. 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 temporarily blocking a culvert. Sumps that block fish passage and/or result in increased turbidity will only be constructed in stream 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.

1.3.2.2 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 removed from a single event 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.

- 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. 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.

- When snorkeling from streams, helicopters with snorkel drafting apparatus will only snorkel from water not containing ESA-listed species or from portable storage tanks such as heliwells (hard side dip tank) and or pumpkins (collapsible dip tank). Snorkeling directly from any streams or rivers will not occur unless specifically directed by a resource advisor or when 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 drawing water from large lakes/reservoirs.

- Dipping using helicopters will follow the direction from the Resource Direction and Guidelines for Fire Operations Resource Protection Maps (See Section 4.2 Action Design Measures and Management Practices) and will be consistent with Forest Plan standard TEST21 (USFS 2012).

- For streams and natural lakes, resource advisors, or an appropriate resource specialist, will direct fire crews and helicopter pilots to draft, dip, and snorkel locations where ESA-listed fish are not present.

- 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.

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

- PowerFill buckets are helicopter buckets that are equipped with pumps that facilitate dipping from very shallow (as little as 18 inches) water sources. These buckets typically have four pumps that provide fill rates of 900 to 1,800 gallons per minute. The pumps on power fill buckets will not be used in waters containing ESA-listed species.

1.3.3. 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 fireline. Burning out is commonly 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 removes the danger of flare-ups in unburned fuel near the fireline to prevent spotting across the fireline and facilitate containment.

- Equipment used to light these burnouts are handheld drip torches (filled with a mixture of diesel and gasoline), fuses, flare guns, terra-torches (truck mounted flame throwers), Heli torches (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.

1.3.4. 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, to support burnout and/or prescribed fire operations, and during mop-up. Although fairly uncommon, fire retardant may be applied to infrastructure (buildings, power poles, wooden bridges, etc.) using ground-based equipment such as all-terrain vehicle or truck mounted pumps, weed sprayers, or applying by hand using paintbrushes or similar methods. Incident-specific mitigation measures will be developed on a case-by-case basis with resource advisors to mitigate potential contamination of surface water.

1.3.5. Camps, Helibases, Helispots, and other Operational Facilities

Camps, helibases, staging areas, and helispots will be established and used to camp or stage personnel and equipment and as places to land and park helicopters:

- Camps will vary in size and impacts from ‘coyote’ camps for two people with minimal equipment and comforts, to large camps for several hundred personnel camped in one area. Large camps have areas for sleeping, eating, showering, staging supplies and equipment, fueling equipment, and for incident management teams to work. Large camps may be located on private property, although they must adhere to all requirements for federal land.

- 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 only at helispots long enough to drop or pick up a load.

- Staging areas are places where personnel and equipment are placed for rapid deployment on large fires. These areas have sanitation facilities and places to safely park personnel carriers and equipment. Some fueling and light maintenance may be performed on equipment. Food and sleeping facilities are normally not provided at staging areas. Staging areas are short-term and for temporary use only.

- Camps, operational facilities, helibases and staging areas 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.

- Black and grey water are removed and disposed of at appropriate facilities.

1.3.6. Mop-Up Activities

Once some of the fire spread has stopped, mop-up will begin. Mop-up involves ensuring that a portion of the fire is out. This includes cold trailing, a process by which a bare hand is used to feel for heat along the edge of "the black" on larger fires or throughout the entire area of smaller fires, in search of hotspots. When hotspots are found, they will be extinguished with hand tools, dirt, and water. Surfactants, such as foam, may be used during mop-up outside riparian conservation areas (RCAs).

1.3.7. Reconstructed Roads

System and unauthorized roads and trails that have been overgrown or closed may be reopened and used as firelines, to facilitate access to fires, or both. These roads may be improved if needed to allow for heavy equipment and vehicles. This improvement may be as simple as brushing the road prism with chainsaws to using a bulldozer to remove vegetation and reestablish the drivable prism. Any route opened would be returned to pre-fire conditions during fire suppression repair activities.

1.3.8. Suppression Repair Activities

After the fire is controlled (or otherwise deemed appropriate by the incident management team), repair of the fireline, roads, camps, and other areas used, will be planned and completed as necessary in close coordination with one or more of the Forest's resource advisors. Suppression repair actions will be provided to the incident management team in a suppression repair plan approved by the line officer (and/or other appropriate responsible official[s]). 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 and covering the fireline with debris.

- Firelines constructed with heavy equipment usually require extensive repair (using a tracked excavator), and these areas may be seeded in addition to water bars and debris placement.

- All opened roads will be returned to pre-fire condition once wildfire management actions and suppression rehabilitation treatments are complete.

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

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

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

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

- All post-fire activities will be accomplished prior to cessation of normal outdoor activities due to onset of winter/adverse weather conditions.

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

1.3.9. Transport and Use of Fuel and Other Chemicals

Petroleum-based fuels (generally unleaded gasoline and diesel) are used in a variety of fire suppression equipment from portable pumps and chainsaws to heavy equipment such as dozers and tracked excavators. Drip torches used for burnout operations and prescribed fire use a mixture of diesel and unleaded gasoline. Portable pumps are fueled by either an attached tank or a portable fuel tank attached with a rubber fuel line. Fuel is generally transported and stored in either portable 5-gallon cans, trailer-mounted fuel tanks, or on large incidents, contracted fuel tenders. Two-cycle oil (mixed with gasoline for portable pumps and chainsaws), miscellaneous lubricants, and other synthetic or petroleum-based 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 service or maintain various equipment during fire situations.

1.3.10. Water Drops

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 usage and frequency depends on a variety of factors, including but not limited to: the availability of aerial equipment, water sources, weather conditions, land management designations such as Designated Wilderness, and prevalence of wildfire on the landscape.

Water drop operations apply water directly to fuel burning at high intensities to extinguish flames or reduce flames to heights, at which hand crews can manage the flame front on the ground. Water drops are generally ineffective at suppressing or reducing the spread of fire when not directly applied to burning fuels. Therefore, fire manager's direct water drops to actively burning fuels where they would be most effective.

Water drop heights and load capacity depends on equipment size. A variety of aerial equipment are used to conduct water drops. Buckets suspended beneath helicopters may be used on wildfires to strengthen a fireline or treat hot spots. Bucket load capacity is 75 to 2,000 gallons, depending on the helicopter type and bucket, with no minimum drop height. Drops may be from a hover point or in flight to disperse the spread of the water load. Helicopters can have internal or external tank systems. Water is obtained from nearby water sources. For single engine air tankers (SEATs), the minimum drop height is 60 feet and their load capacities are 500 to 800 gallons. Water is dropped in a dispersed pattern during flight. For multi-engine water scoopers, minimum drop height is 60 to 150 feet depending on factors such as whether direction of run is into the wind or downwind. Their load capacities are generally 800 to 1,600 gallons, depending on aircraft type. Water is released in flight in a dispersed pattern and usually hits surfaces with a force similar to the force of a rain drop.

1.3.11. Project Design Features

The project design features (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 2012).

1.3.11.1 Role of Resource Advisors and Resource Specialists

A resource advisor is generally a resource specialist (often a fisheries biologist, hydrologist, wildlife biologist, etc.) 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. They are to participate in the development of suppression strategies and tactics to minimize or mitigate effects of fire and suppression actions on natural and social resources. They anticipate impacts on resources as fire operations evolve; communicates requirements for resource protection to the incident commander or incident management team; ensure that planned mitigation measures are carried out effectively; and 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:

- District or forest resource specialists (including a fisheries biologist/wildlife biologist/botanist) will be involved in utilizing the Wildland Fire Decision Support System (WFDSS) to identify areas where there is a potential to affect listed species or their habitats.

- Resource advisors assist in locating camps, staging areas, and helibase locations, which will be identified early during the incident. Locations will be approved either during pre-suppression planning or on a case-by-case basis.

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

- Resource specialists/resource advisors assigned to wildfire incident management teams (all Type 1, Type 2, and some Type 3 incidents[2]) shall review operational period plans (wildfire suppression) to assess the potential effects of the planned actions. Resource specialists/resource advisors will monitor implementation of wildland fire management guidance stated within this consultation. The Forest Service will update, as needed or requested, the status of wildfires/consultation and provide real-time reporting of compliance with this consultation to the SNF Level 1 team (and shared with the U.S. Fish and Wildlife Service and NMFS) for all wildland fire management actions conducted under this proposed action that may affect ESA-listed species or their habitats.

- Resource advisors shall inform incident management teams of incident-related RCA resources and issues.

- The SNF will follow 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 described in NWCG (2017) include:

    - Fill 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 fold-a-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. If collapsible tanks can be filled with municipal water, draft from those tanks instead of untreated water sources.

[2] 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.

- Avoid entering (driving through) water bodies or wet areas when possible.
- 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.
- If contamination of equipment with untreated water or mud/plants is unavoidable, see "Decontaminating Ground Equipment" and "Decontaminating Aviation Equipment" sections of the 2018 NWCG document (NWCG 2018).

The SNF Level 1 team members or district/zone biologists and botanists will periodically update the Level 1 team to the status of wildfire incidents. Updates will be used by the Level 1 team to determine whether this programmatic consultation can cover the incident or whether an emergency consultation needs to be initiated.

1.3.11.2 Fireline Construction

The following PDF will be incorporated into construction of firelines:

- Use minimum impact management techniques (described in Appendix 2 of the BA) in areas where there is potential to adversely affect listed fishes or critical habitat. Minimum impact management techniques are used to minimize the impacts caused from fire suppression actions. Every effort should be made to minimize stream course disturbance, sedimentation, and actions that will result in increased water temperatures.

- Fireline construction should not occur on any slopes where excessive erosion to water bodies (e.g., slope fall line to lakes, streams, etc.) and resource damage will occur. Proper erosion control techniques will be utilized on steep slopes to prevent excessive erosion and resource damage from occurring. Any fireline constructed in RCAs will be rehabilitated.

- Once a WFDSS has been approved, heavy equipment shall not be used to construct firelines 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 an escaped fire would cause more degradation to RCAs than would result from the disturbance of heavy equipment (TEST17 and FMST01 in Chapter III) (USFS 2012). Use of heavy equipment for fireline construction within RCAs is outside the scope of this proposed action. Where such actions may affect ESA-listed species or their habitats, the Forest Service shall initiate emergency consultation per 50 CFR § 402.05.

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

- Heavy equipment cannot cross streams designated as critical habitat, occupied by a listed species, or less than 600 feet upstream of occupied habitat.

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

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

- Minimize felling/bucking of trees in RCAs. Trees or snags that are felled within RCAs shall be left intact unless bucking into smaller pieces is required to meet wildfire management objectives or public safety. All material felled/bucked should remain within the RCA. Bucking, or bucking and stacking that result in a potential change to how woody debris functions in the RCA or instream are outside the scope of this proposed action. Where such actions may affect ESA-listed species or their habitats, the Forest Service shall initiate emergency consultation per 50 CFR § 402.05.

- Explosives are not commonly used within the SNF and will not be used within RCAs. Explosive use will not occur within 300-foot slope distance from the water's edge of any waterbody or 150-foot slope distance from any intermittent stream regardless of the charge weight and buffer implemented. Explosives for fireline construction and removal of hazard trees outside of RCAs (300 feet from perennial streams) will adhere to the distances and charges stated within Table 1 below.

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 pounds per square inch (psi) and a maximum vibration velocity of 2.0 inches per second (Buster 2019; Timothy 2013).

1.3.11.3 Water Pumping

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 and provided proper screening if needed.

- 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 0.33 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.

- Resource advisors/specialists will ensure that source streams for volume pumps are in a second or higher order stream at the point of diversion, 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.

- Equipment used to draft, dip, store, or deploy water to a wildfire can be exposed to a variety of invasive organisms. To prevent the spread of invasive species from contaminated to uncontaminated sources equipment will be sanitized and/or cleaned.

1.3.11.4 Helicopter and Aerial Dipping/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[3], dipping from streams and natural lakes should only occur after coordination with the resource advisor. Water dipping points and criteria for dipping

[3] For this consultation, initial attack will be considered to be the first 24 hours after commencement of firefighting activities.

points will be consistent with the SNF's Land and Resource Management Plan (USFS 2012). The resource direction and guidelines for fire operations maps will display where dipping cannot occur.

- 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 will be available to direct fire crews and helicopter pilots to dip locations where ESA-listed fish are not present.

- PowerFill bucket systems will not be used in waters with ESA-listed species.

- Scooper plane pilots will be instructed to draft from the center of lakes where water is deepest.

1.3.11.5 Burnout and Firing Operations

- Suppression tactics (backburns or burnouts) should minimize fire severity in RCAs.

- Direct ignition within RCAs will not be allowed unless it is necessary to meet wildland fire management (suppression) objectives, and the resource advisor documents that the ignition would not degrade soil, water, riparian, and aquatic conditions. No aerial ignitions will occur within RCAs except to meet suppression objectives. All active ignitions will stop at one site potential tree height from perennial streams.

- Application of chemical-filled (glycol and potassium permanganate) plastic spheres called, "ping pong balls" will not be applied within 300 feet of fish bearing streams to reduce the chance of chemical contamination and burning along streambanks.

1.3.11.6 Ground Application of Retardant, Foams, and Surfactants

- Fire suppression chemicals will not be used within 300 feet of waters with ESA-listed species or in areas where there is potential for direct waterway contamination as determined by a resource advisor.

- 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 mitigation measures to prevent contamination of waterways.

- Resource advisors should be knowledgeable of, and able to implement, the Forest's contingency plans (USFS 2012) in the event of a chemical spill or contamination.

1.3.11.7 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 or spike 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. Guidance from district or forest resource specialists will also be followed.

- 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 in or adjacent to occupied or critical habitat, the Level 1 team will be updated on actions taken for suppression repair.

- Once a WFDSS 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 safety or loss of human life or structures is at imminent risk, (FS 2012 LRMP FMST02 and TEST18) (USFS 2012). 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.

- Pre-identified incident base and helibase locations described in the Fire Management Plan or identified by a resource advisor will be used. These areas should be weed-free or have established site-specific mitigations.

- Where possible, camps, vehicle and crew staging areas, helispots, cargo and net loading/unloading areas, and airstrips will be established in noxious weed-free areas. If such areas are not available, mitigation measures will be implemented as determined by a resource advisor.

- All types of travel through noxious weed areas will be avoided or minimized.

- 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 watershed condition indicators. Measures they may use include flagging no-entry zones and educating personnel at morning and evening briefings about measures to protect streams and fish. Resource advisors will regularly visit the camp and ensure problems are fixed quickly.

- Helicopter landing sites and refueling areas will be located outside of the RCAs whenever possible. No new helicopter landings will be constructed in RCAs. Will not authorize storage of fuels and other toxicants or refueling with RCAs unless there are no other alternatives. Storage of fuels and other toxicants or refueling sites within RCAs shall be approved by the responsible official and have an approved spill containment plan commensurate with the amount of fuel. Gray water will be removed from camps and disposed of properly.

- 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 a stream or carry seeds/organisms 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.

- Wastewater will be disposed of at least 200 feet from water sources, 300 feet from waters with ESA-listed species, and at appropriate facilities.

- Toilet sites should be located a minimum of 200 feet from water sources, 300 feet from waters with ESA-listed species. Holes should be dug six to eight inches deep.

1.3.11.8 Reconstructed Roads

- If closed roads and or trails are opened within RCAs, the resource advisor in conjunction with a fish biologist and or hydrologist shall identify any associated erosional problems and recommend repair treatments needed to minimize or avoid sediment delivery to water bodies 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 shall ensure that repair of all effects of fire suppression is addressed by the incident management team.

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

- Erosion-control structures will be required to capture any sediment that may be generated during road reconstruction activities.

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

- 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 of these areas.

- Road reconstruction actions will require the use of erosion-control structures to capture any sediment that may be caused through implementation.

- Roads reopened within RCAs that have more than a discountable or insignificant effect to ESA-listed species or their habitats, as determined by the appropriate resource specialists, would be outside the scope of this proposed action and the Forest Service shall initiate emergency consultation per 50 CFR § 402.05.

- Culvert installation/replacement work will be confined only to crossings on first and second order non-fish bearing streams and waterways, and where treatments would have no potential to affect downstream fish bearing streams. All actions will require stream flows to be temporarily diverted around the installation site.

- Culvert installation/replacement and reconstruction of stream crossings within streams and waterways that contain ESA-listed fish are outside the scope of this proposed action. Where such actions may affect ESA-listed species or their habitats, the Forest Service shall initiate emergency consultation per 50 CFR § 402.05.

1.3.11.9 Mop-up Activities

- Minimum-impact suppression tactics will be used in areas where there is potential to damage listed plants, fish, or critical habitat. Every effort should be made to minimize stream course disturbance, sedimentation, and actions that will result in increased water temperatures.

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

1.3.11.10 Suppression Repair Activities

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

- All erosion control materials, including but not limited to: hay, straw, or mulch, 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 contract or submittal of purchase orders. All seed used on National Forest System lands will be certified to be free of seeds from noxious weeds listed on the current All States Noxious Weeds list, 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 to listed species and critical habitat.

- A separate Burned Area Emergency Response team (BAER) may be formed as appropriate for a wildfire, because burn area rehabilitation is not part of the wildland fire suppression actions covered in this proposed action. The BAER team will have to initiate emergency consultation if it is determined that any of its recommended rehabilitation actions may affect ESA-listed species or critical habitat that are not covered under existing programmatic consultations. To improve efficiencies and maintain consistency, BAER activities will, whenever appropriate and practical, tier to existing programmatic consultations (e.g., weed treatment programmatic, stream crossing replacement/removal programmatic, etc.).

1.3.11.11 Transport and Use of Fuel and Other Chemicals

- Spill containment equipment (e.g., absorbent pads, etc.) will be carried on all engines and will be readily available at the incident camp.

- Resource advisors should be knowledgeable of and able to implement the Forest's contingency plans (USFS 2012) in the event of a chemical spill or contamination.

- Storage of fuels and other toxicants or refueling within RCAs will not be authorized unless there are no alternatives. Storing fuels and other toxicants or staging refueling sites within RCAs shall be approved by the responsible official and have an approved spill containment plan commensurate with the amount of fuel at the site (USFS 2012).

- 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.

- The forest will develop a contingency plan identifying procedures to be initiated should a chemical spill or contamination occur. The Hazardous Materials Safety and Response Plan will be posted on the SNF webpage. In the case of a spill, emergency consultation will be initiated.

- 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.

- 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 are in place, such as fuel containment and fuel absorbent pads commensurate with the amount of fuel on site, to contain potential chemical spills and prevent delivery to perennial and intermittent waterbodies.

1.3.11.12 Monitoring

The SNF will monitor all wildfires that have a Type 1, 2, or 3 team[4]. The Fire Suppression Programmatic Checklists (Appendix 3 of the BA) will be used to document fire management compliance with the programmatic activity description as described in the proposed action and the BA.

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

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

2.1. Analytical Approach

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

This 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 Snake River spring/summer Chinook salmon, Snake River sockeye salmon, and Snake River Basin steelhead uses 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

[4] See footnote 2.

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[1,2]	T 4/22/92; 57 FR 14653	12/28/93; 58 FR 68543	6/28/05; 70 FR 37160
Sockeye salmon *(O. nerka)*			
Snake River	E 11/20/91; 56 FR 58619	12/28/93; 58 FR 68543	ESA Section 9 applies
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; 'E' means listed as endangered.
[1]The listing status for Snake River spring/summer Chinook salmon was corrected on 6/3/92 (57 FR 23458).
[2]Critical habitat for Snake River spring/summer Chinook salmon was revised on 10/25/99 (64 FR 57399).

2.2.1. Status of the Species

This section describes the present condition of the Snake River (SR) spring/summer Chinook salmon, and SR sockeye salmon evolutionarily significant units (ESUs), and the Snake River Basin steelhead distinct population segment (DPS). NMFS expresses the status of a salmonid ESU or DPS in terms of likelihood of persistence over 100 years (or risk of extinction over 100 years). NMFS uses McElhany et al.'s (2000) description of a viable salmonid population (VSP) that defines "viable" as less than a 5 percent risk of extinction within 100 years and "highly viable" as less than a 1 percent risk of extinction within 100 years. A third category, "maintained," represents a less than 25 percent extinction 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); ESA Recovery Plan for Snake River sockeye Salmon (NMFS

2015); 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); 2022 5-Year Review: Summary & Evaluation of Snake River sockeye Salmon (NMFS 2022b); and 2022 5-Year Review: Summary & Evaluation of Snake River Basin Steelhead (NMFS 2022c). These six documents are incorporated by reference here. Additional information that has become available since these documents were published is also summarized in the following sections and contributes to the best scientific and commercial data available.

2.2.2. Snake River Spring/Summer Chinook Salmon

Snake River spring summer Chinook salmon migrate into the Salmon River in the spring, begin spawning in early August, and complete spawning in late September. Juveniles emerge from the redds during the late winter and early spring following spawning and rear in freshwater for approximately one year before migrating downstream to the ocean. A summary of the current status of the SR spring/summer Chinook salmon ESU can be found on NMFS' publicly available intranet site (https://www.fisheries.noaa.gov/s3/2023-02/feb-2023-status-snake-r-spring-summer-chinook.pdf), and is incorporated by reference here (NMFS 2023a). 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). NMFS completed its 5-year review for Snake River spring/summer Chinook salmon on August 18, 2022, and concluded the species should remain listed as threatened (NMFS 2022a).

Activities covered by this consultation will occur within portions of the Salmon River Upper Mainstem (SRUM), Salmon River Lower Mainstem (SRLM), Valley Creek (VC), and the East Fork Salmon River (EFSR) Chinook salmon population areas[5]. These four populations are all at high risk of extinction due to low abundance/productivity (Table 3). 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).

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[5] Population areas for each independent population of Snake River spring/summer Chinook salmon and Snake River Basin steelhead are described in the recovery plan (NMFS 2017). All fish that are naturally produced in a population area are considered to be part of that population, but a population area may also contain rearing, migrating, and adult holding individuals from other populations. For example, the SRLM Chinook salmon population area also contains rearing and migrating individuals from the SRUM, Valley Creek, and the EFSR Chinook salmon populations.

Table 3. Summary of viable salmonid population (VSP) parameter risks, current status, and proposed recovery goal for Snake River spring/summer Chinook salmon populations that could be affected by the proposed action.

Major Population Group	Population	VSP Risk Rating[1]		Viability Rating	
		Abundance/ Productivity	Spatial Structure/ Diversity	2022 Assessment	Proposed Recovery Goal[2]
Upper Salmon River (Idaho)	Salmon River Lower Mainstem	High	Low	High Risk	Maintained
	East Fork Salmon River	High	High	High Risk	Viable
	Valley Creek	High	Moderate	High Risk	Viable
	Salmon River Upper Mainstem	High	Low	High Risk	Highly Viable

[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]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.

2.2.3. Snake River Sockeye Salmon

Snake River sockeye salmon typically migrate into freshwater from June 1 to July 31, complete the migration to the Sawtooth Valley by the end of August, and spawn in the Sawtooth Valley Lakes (currently Redfish and Pettit Lakes) during late summer. Juveniles rear in the Sawtooth Valley lakes for approximately one year before migrating downstream to the ocean. A summary of the current status of the Snake River sockeye salmon ESU can be found on NMFS' publicly available intranet site (https://www.fisheries.noaa.gov/s3/2023-02/feb-2023-status-snake-r-sockeye.pdf), and is incorporated by reference here (NMFS 2023b).

The area potentially affected by the proposed action includes the entire Sawtooth Valley (i.e., the Valley Creek drainage and Salmon River drainage upstream from Valley Creek) and the mainstem Salmon River between Valley Creek and the EFSR. The Sawtooth Valley supports the only remaining run of Snake River sockeye salmon. When the ESU was listed, the only extant population was the Redfish Lake population.

The Redfish Lake population remains extant and there are also very small numbers of sockeye salmon in Pettit and Alturas Lakes (Ford 2022). Although there is some natural reproduction in all three populations, the ESU remains highly dependent on a captive broodstock program operated at the Sawtooth and Eagle Hatcheries. Although the captive brood program has been highly successful in producing hatchery sockeye, the diversity risk remains high and will continue to remain high without sustainable natural production (Ford 2022).

The species remains at high risk across all four VSP parameters and is at a high risk of extinction within 100 years. This ESU continues to face threats from habitat modification and degradation through the migratory corridor, predation, disease, and climate change. In particular, juvenile and adult losses during travel through the Salmon, Snake, and Columbia River migration corridor continue to present a significant threat to species recovery (NMFS 2022b). On August 18, 2022, in the agency's 5-year review for SR sockeye salmon, NMFS concluded that the species should remain listed as endangered (NMFS 2022b).

2.2.4. Snake River Basin Steelhead

Snake River Basin steelhead enter the Columbia River from late June to October and overwinter in larger rivers in the Snake River basin before moving into smaller tributaries to spawn from March through May. Juveniles typically reside in fresh water for 1 to 3 years before migrating downstream to the ocean. A summary of the current status of the Snake River Basin steelhead DPS can be found on NMFS' publicly available intranet site (https://www.fisheries.noaa.gov/s3/2023-02/feb-2023-status-snake-r-steelhead.pdf), and is incorporated by reference here (NMFS 2023c). This DPS continues to face threats from tributary and mainstem habitat loss, degradation, or modification; predation; harvest; hatcheries; and climate change (NMFS 2022c). 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 2022).

Activities covered by this consultation will occur in portions of the Upper Mainstem Salmon River (UMSR) and the East Fork Salmon River (EFSR) steelhead population areas[6]. The SRUM and EFSR populations exhibit moderate risk for abundance/productivity and spatial structure/diversity (Table 4). Overall, available information suggests that Snake River Basin steelhead continue to be at a moderate risk of extinction within the next 100 years.

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 present in the action area for fire suppression actions on the Sawtooth National Forest; Upper Salmon River Subbasin.

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

[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]Due to low returns since 2018, both populations may currently be high risk of extinction.

2.2.5. 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

[6] See footnote 4.

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 and sockeye salmon		
Spawning and juvenile rearing	Spawning gravel, water quality and quantity, cover/shelter (Chinook only), food, riparian vegetation, space (Chinook only), water temperature, and access (sockeye only)	Juvenile and adult
Migration	Substrate, water quality and quantity, water temperature, water velocity, cover/shelter, food[d], riparian vegetation, space, safe passage	Juvenile and adult

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

Table 6 includes a description of the geographical extent of critical habitat within the Salmon River Basin (SRB) for each of the three ESA-listed salmon and steelhead species covered by the consultation. 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 the two salmon species includes the adjacent riparian zone, which is defined as the area within 300 feet of the line of high water of a stream channel or from the shoreline of standing body of water (58 FR 68543). The riparian zone is critical because it provides shade, streambank stability, organic matter input, and regulation of sediment, nutrients, and chemicals.

Table 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 sockeye salmon	58 FR 68543; December 28, 1993	Snake and Salmon Rivers; Alturas Lake Creek; Valley Creek, Stanley Lake, Redfish Lake, Yellowbelly Lake, Pettit Lake, Alturas Lake; all inlet/outlet creeks to those lakes.
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 SRB, 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 Chinook salmon 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 303(d) list for impaired water quality, such as elevated water temperature (IDEQ 2022). Many areas that were historically suitable rearing and spawning habitat are now unsuitable due to high summer stream temperatures. 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 (IDEQ 2001; IDEQ & EPA 2003).

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 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 have implemented measures 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.

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

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

Climate change generally exacerbates threats and limiting factors, including those currently impairing salmon and steelhead survival and productivity. The growing frequency and magnitude of climate change related environmental downturns will increasingly imperil many ESA-listed stocks in the Columbia River basin and amplify their extinction risk (Crozier et al. 2019; Crozier et al. 2020; Crozier et al. 2021). This climate change context means that opportunities to rebuild these stocks will likely diminish over time. As such, management actions that increase resilience and adaptation to these changes should be prioritized and expedited. For example, the importance of improving the condition of and access and survival to and from the remaining functional, high-elevation spawning and nursery habitats is accentuated because these habitats are the most likely to retain remnant snowpacks under predicted climate change (Tonina et al. 2022).

Climate change is already evident. It will continue to affect air temperatures, precipitation, and wind patterns in the Pacific Northwest (ISAB 2007; Philip et al. 2021), resulting in increased droughts and wildfires and variation in river flow patterns. These conditions differ from those, under which native anadromous and resident fishes evolved and will likely increase risks posed by invasive species and altered food webs. The frequency, magnitude, and duration of elevated water temperature events have increased with climate change and are exacerbated by the Columbia River hydrosystem (EPA 2021a, 2021b; Scott 2020). Thermal gradients (i.e., rapid change to elevated water temperatures) encountered while passing dams via fish ladders can slow, reduce, or altogether stop the upstream movements of migrating salmon and steelhead (Caudill et al. 2013). Additional thermal loading occurs when mainstem reservoirs act as a heat trap due to upstream inputs and solar irradiation over their increased water surface area (EPA 2021a, 2021b, 2021c). Consider the example of adult sockeye salmon in 2015, when high summer water temperatures contributed to extremely high losses of Columbia River and Snake River stocks during passage through the mainstem Columbia and Snake River (Crozier et al. 2020), and through tributaries such as the Salmon and Okanogan rivers, below their spawning areas. Some stocks are already experiencing lethal thermal barriers during a portion of their adult migration. The effects of longer or more severe thermal barriers in the future could be catastrophic. For example, Bowerman et al. (2021) concluded that climate change will likely increase the factors contributing to pre-spawn mortality of Chinook salmon across the entire Columbia River basin.

Columbia River basin salmon and steelhead spend a significant portion of their life-cycle in the ocean, and as such the ocean is a critically important habitat influencing their abundance and productivity. Climate change is also altering marine environments used by Columbia River basin salmon and steelhead. This includes increased frequency and magnitude of marine heatwaves, changes to the intensity and timing of coastal upwelling, increased frequency of hypoxia (low oxygen) events, and ocean acidification. These factors are already reducing, and are expected to continue reducing, ocean productivity for salmon and steelhead. This does not mean the ocean is getting worse every year, or that there will not be periods of good ocean conditions for salmon and steelhead. In fact, near-shore conditions off the Oregon and Washington coasts were considered good in 2021 (NOAA 2022). However, the magnitude, frequency, and duration of downturns in marine conditions are expected to increase over time due to climate change. Any long-term effects of the stressors that fish experience during freshwater stages that do not manifest until the marine environment will be amplified by the less-hospitable conditions there due to climate change. Together with increased variation in freshwater conditions, these downturns will further impair the abundance, productivity, spatial structure, and diversity of the region’s native salmon and steelhead stocks (Isaak et al. 2018; ISAB 2007). As such, these climate dynamics will reduce fish survival through direct and indirect impacts at all life stages (NOAA 2022).

All habitats used by Pacific salmon and steelhead will be affected by climate dynamics. However, the impacts and certainty of the changes will likely vary by habitat type. Some changes affect salmon at all life stages in all habitats (e.g., increasing temperature), while others are habitat-specific (e.g., stream-flow variation in freshwater, sea-level rise in estuaries, upwelling in the ocean). How climate change will affect each individual salmon or steelhead stock also varies widely, depending on the extent and rate of change and the unique life-history characteristics of different natural populations (Crozier et al. 2008). The continued persistence of salmon and steelhead in the Columbia basin relies on restoration actions that enhance climate resilience (Jorgensen et al. 2021) in freshwater spawning, rearing, and migratory habitats, including access to high elevation, high quality cold-water habitats, and the reconnection of floodplain habitats across the interior Columbia River basin.

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 outer boundaries of the SNF (Figure 1), the vast majority of which is land administered by SNF, but also includes a small amount 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 private land. The southern portion of this proposed action area is in the Boise River, Wood River, and Lost River drainages, which 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, Wood, and Lost River drainages would not affect ESA-listed anadromous fishes or their critical habitat, the portion of the project area within those drainages was not included in the action area. Therefore, the action area, for this consultation, is restricted to the portions of the project area that are within the Upper Salmon River and the EFSR drainages of central Idaho.

The action area includes the mainstem Salmon River, and all tributary drainages on the south side of the river, from Thompson Creek upstream to Elkhorn Creek (approximately one mile downstream from Lower Stanley) and the mainstem and all tributary drainages upstream from Elkhorn Creek. The action area also includes the East Fork Salmon River and all tributary drainages upstream from Wickiup Creek. The action area encompasses approximately 537,308 acres, entirely within the Upper Salmon River subbasin (i.e., 4th field hydrologic unit code [HUC]) (HUC 17060201), and is roughly analogous to the Sawtooth National Recreation Area (SNRA). Within the Upper Salmon River watershed, the action area encompasses the entirety of five watersheds (i.e., 5th field HUCs): Alturas Lake Creek (HUC 1706020103), Redfish Lake Creek (HUC 1706020104), Warm Springs Creek (HUC 1706020107), Valley Creek (HUC 1706020101), and Upper East Fork Salmon River (HUC 1706020110); and portions of three watersheds: Basin Creek-Salmon River (HUC 1706020106), Slate Creek-Salmon River (HUC 1706020109), Middle East Fork Salmon River (HUC 1706020111), and the Middle East Fork Salmon River (HUC 1706020111). The action area is approximately 70 miles northeast of Boise, Idaho, and is bordered by the BNF to the east, the Salmon-Challis National Forest to the North and West, and by the Lost, Wood, and Boise River drainages to the south.

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 is used by all freshwater life history stages of Snake River spring/summer Chinook salmon, Snake River sockeye salmon, and Snake River Basin steelhead. Streams within the action area are designated critical habitat for all three of these species. The condition of the listed species and designated critical habitats in the action area are described further below.

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.

Wildfires are a natural part of the ecology of the action area. Fire-dependent vegetation communities, within the action area, consist of: Douglas-fir, aspen, lodgepole pine, subalpine fir, Engelmann spruce, whitebark pine, and some ponderosa pine at lower elevations. The number of fires and acres affected is extremely variable. From 2000–2022, the number of wildfires on the SNF ranged from two in 2005 and 2019, to 21 in 2022; and the total acres burned ranged from 75 in 2019 to 277,167 in 2022. The number of fires and the acres burned has increased since 1980; with an average of three fires from 1980–1999, versus six from 2000–2022; and an average of 15,884 acres burned from 1980–1999 versus 49,652 from 2000–2022. Interestingly, the trend in acres burned, on the SNF, has been mostly flat since 2000 and the average size of fires has decreased somewhat. However, the overall trend throughout the northern Rocky Mountains has been more intensive fire seasons with larger fires and increased acres burned, and it is reasonable to presume that fires on the SNF will likely trend larger over the long term.

The action area encompasses approximately 537,308 acres, or 36 percent, of the Upper Salmon River subbasin, and baseline conditions, trends, and history of the action area portion of the subbasin are similar to the subbasin as a whole. The Salmon River subbasin encompasses 1,551,686 acres, with approximately 35 percent administered by the SCNF, 34 percent administered by the SNF, 24 percent administered by the BLM, two percent owned by the State of Idaho, and approximately five percent in private ownership. Private lands are generally located along the broader valley bottoms (mainstem Salmon River, EFSR, and Valley Creek) and include significant lengths of mainstems. Large portions of the subbasin are designated as wilderness or roadless with minimal current or historical perturbations to the landscape or to salmonid habitat. Within the action area, there is approximately 347.7 miles of Chinook salmon critical habitat and 207.6 of Chinook salmon occupied habitat, 324.1 miles of steelhead critical habitat and 253.7 river miles of steelhead occupied habitat, and approximately 102.3 miles of sockeye salmon critical habitat at least 84.3 miles sockeye salmon occupied habitat.

Outside of wilderness areas, salmonid habitat is impacted by a variety of land use activities, including: road maintenance and use, timber harvest, livestock grazing, water diversion and use, agricultural production, etc. There are numerous rural residences, within the action area, that have localized impacts on salmonid habitat, and three designated communities: Sawtooth City, Stanley, and Lower Stanley. Although small, the communities are adjacent to the mainstem Salmon River, Valley Creek, and Smiley Creek and are largely within Chinook salmon designated critical habitat. Habitat-related limiting factors, within the action area, include: riparian condition, excess sediment, passage barriers, summer flow, floodplain connectivity, instream complexity, and high water temperatures (NMFS 2017). Habitat restoration has been ongoing within the action area since at least the early 1990s, resulting in improved flow in the mainstem Salmon River and several tributaries, and localized improvements in riparian and stream channel habitat. Although much progress has been made, habitat factors continue to limit Chinook salmon, sockeye salmon, and steelhead populations within the action area.

2.4.1. Salmon River Upper Mainstem, Valley Creek, Salmon River Lower Mainstem, and East Fork Salmon River Chinook Salmon Populations

Independent populations within the Snake River spring/summer Chinook salmon ESU are defined based on the areas in which the spawning, egg incubation, and alevin life stages occur (population areas). These areas are described for each population in the recovery plan (NMFS 2017). Although some individuals complete rearing in their population area, many move downstream early in the life cycle and spend a portion of the juvenile rearing life stage in other population areas, or even outside of the ESU boundary.

The SRUM Chinook salmon population area includes the Salmon River drainage upstream from the mouth of Redfish Lake Creek, including the Redfish Lake Creek drainage (NMFS 2017). The entire SRUM Chinook salmon population area is within the action area. Since 2012, approximately 93 percent of spawning has occurred in the mainstem Salmon River downstream from Alturas Lake Creek and approximately three percent has occurred in Alturas Lake Creek. Although high quality spawning habitat exists in the mainstem Salmon River upstream from Alturas Lake Creek, and in Pole and Pettit Lake Creeks, spawning in those reaches has been sporadic since at least 2000. Since listing under the ESA in 1995, the number of SRUM Chinook salmon redds counted has ranged from a low of 23 redds in 1995, to a high of 574 in 2002 (Figure 2). Since the high count in 2002, the number of redds counted has fluctuated between 63 (2020) and 382 (2003). The most recent 10-year geomean redd count (2013–2022) is 159, with 123 redds counted in 2022, the most recent year, for which data are available. This population is at high risk of extinction due to low abundance and productivity.

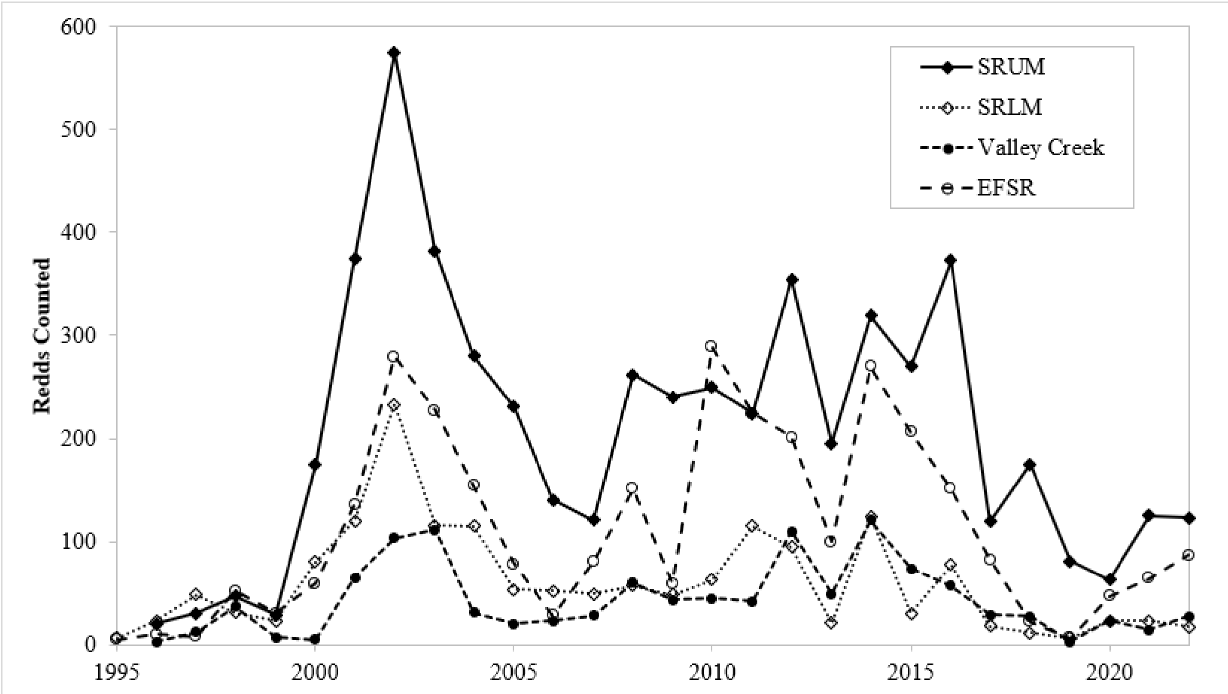

Figure 2. Population trends (redds counted) for the Salmon River Lower Mainstem, Salmon River Upper Mainstem, Valley Creek, and East Fork Salmon River Chinook salmon populations for 1995 through 2022.

The Valley Creek Chinook salmon population area encompasses the Valley Creek drainage, and the entire population area is within the action area. Redd surveys are typically conducted only in mainstem Valley Creek, and the vast majority of documented spawning has been in the mainstem. However, Chinook salmon redds were documented in Elk Creek in 2010 and 2012, and Chinook salmon spawning probably occurs, at least occasionally, in some of the other larger tributaries, such as Stanley Lake Creek and Iron Creek. Habitat restoration that has occurred since 2000 has improved passage into, and habitat conditions within, the Elk and Iron Creek drainages. Juvenile Chinook salmon probably utilize most of the Valley Creek tributary streams for rearing habitat. Since 1995, the number of redds counted in Valley Creek ranged from 0 in 1995 to 121 in 2014 (Figure 2). The most recent 10-year geomean (2013–2022) is 30 redds, with 27 redds counted in 2022, the most recent year, for which data are available. This population is high risk of extinction due to low abundance and productivity.

The SRLM Chinook salmon population area includes the mainstem Salmon River and all tributary drainages between Redfish Lake Creek and the Lemhi River, except the Redfish Lake Creek, Valley Creek, Yankee Fork Salmon River, EFSF Salmon River, Pahsimeroi River, and Lemhi River drainages (NMFS 2017). In spite of the name, the SRLM population area is entirely within the upper Salmon River drainage. Approximately half of the SRLM Chinook salmon population area is within the action area, but approximately 89 percent of spawning occurs in the action area. Spawning historically occurred in Challis and Morgan Creeks (downstream from the action area) but spawning currently only occurs in the Salmon River mainstem. Many of the tributary streams in the SRLM Chinook salmon population area are seasonally dewatered by irrigation diversions, greatly reducing juvenile rearing and temperature refugia habitat. Since

1995, the number of redds counted in the SRLM population area has ranged from 6 in 1995 to 233 in 2002 (Figure 2). The most recent 10-year geomean (2013–2022) is 24 redds, with 17 redds in 2022, the most recent year, for which data are available. The SRLM Chinook salmon population is among the weakest populations in the Snake River spring/summer ESU and is high risk of extinction due to low abundance and productivity.

The EFSF Chinook salmon population area encompasses the EFSF Salmon River drainage. Approximately one third of the EFSR Chinook salmon population area/EFSF Salmon River drainage is in the action area. All of the documented spawning occurs in the mainstem EFSR and in Herd Creek, but some spawning may also occur in other tributaries, such as Big Boulder and Little Boulder Creeks. Since 1995, the number of redds counted in the EFSR population area has ranged from 5 in 1995 to 289 in 2010 (Figure 2). The most recent 10-year geomean (2013–2022) is 69 redds, with 89 counted in 2022, the most recent year, for which data are available. This population is high risk of extinction due to low abundance and productivity.

2.4.2. Upper Mainstem Salmon River and East Fork Salmon River Steelhead Populations

As with Snake River spring/summer Chinook salmon, independent populations within the Snake River Basin steelhead DPS are defined based on the areas, in which spawning, egg incubation, and alevin life stages occur (population areas). The UMSR steelhead population area encompasses the entire Salmon River drainage upstream from the mouth of the EFSR, excluding the EFSR drainage. The EFSR steelhead population area includes the mainstem Salmon River and all tributary drainages between the EFSR and the Lemhi River, except the EFSR and the Lemhi River drainages (NMFS 2017).

Approximately one half of the UMSR steelhead population area and approximately one third of the EFSR steelhead population areas are in the action area. Because steelhead spawn when flows are high, spawning locations are not well documented. However, steelhead are sometimes able to utilize seasonally dewatered tributaries, and juvenile steelhead are well distributed throughout the population area, suggesting that spawning occurs in most stream reaches with suitable habitat. Both the UMSR and the EFSR steelhead populations, and the Snake River Basin steelhead DPS, declined dramatically from 2015 and 2019 but have recovered somewhat since 2019 (Figure 3). Although the most recent status review determined that the Upper Salmon River (USR) and EFSR steelhead populations were at moderate risk of extinction (Ford 2022), the returns since 2018 suggest that both populations are currently at high risk of extinction due to low abundance and productivity, even with the small increases since 2019.

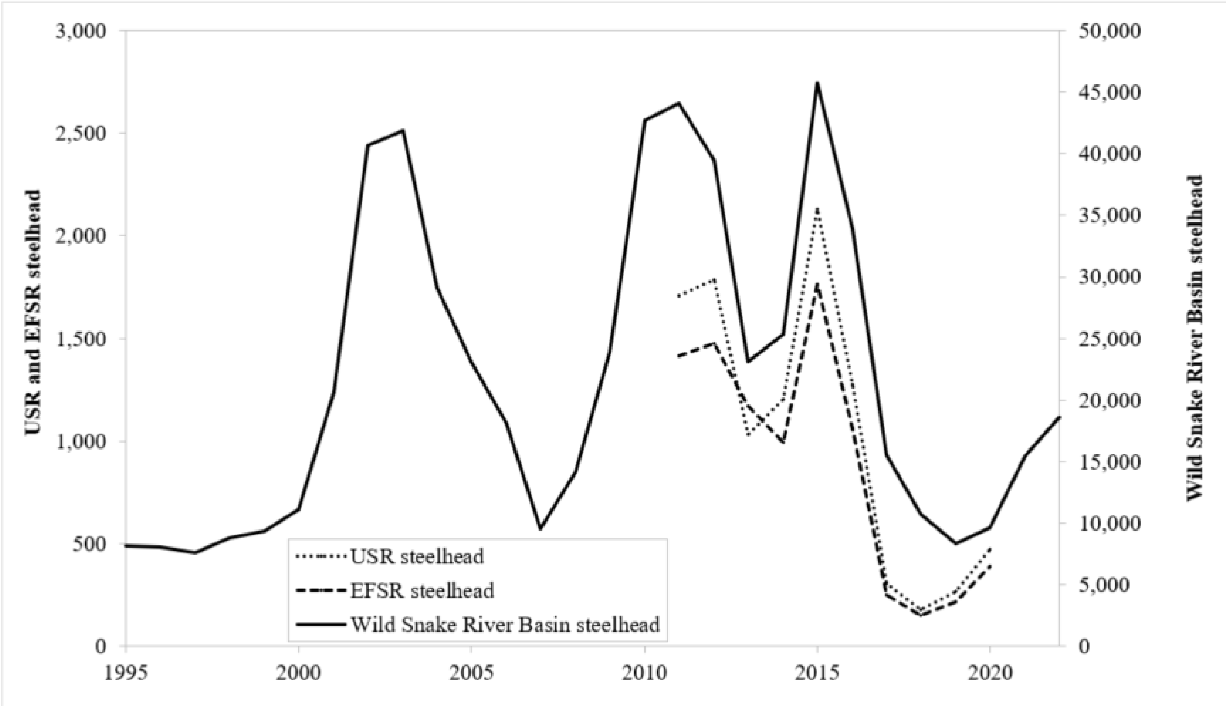

Figure 3. Population trends for the Snake River Basin steelhead DPS returns over Lower Granite Dam) for 1995–2022, and for the Upper Salmon River and East Fork Salmon River steelhead populations (estimated returns to Lower Granite Dam) for 2011–2020.

2.4.3. Sockeye Salmon

The Redfish Lake sockeye salmon population was the only Snake River sockeye salmon population that was not extinct when they were listed in 1991. The long-term recovery scenario focuses on reestablishing self-sustaining populations into Redfish, Pettit, and Alturas Lakes, although Yellowbelly and Stanley Lakes are designated critical habitat for sockeye salmon. A captive breeding program started in 1991 and the ESU remains largely dependent on the program. Although most returns are hatchery origin, efforts to reintroduce sockeye salmon are ongoing in Redfish and Pettit Lakes and some natural origin spawners currently return to both lakes. Spawning, rearing, and migration habitat within the action area is generally functioning appropriately, with the exception of Stanley Lake Creek, which is blocked by a "rough fish" barrier. Degradation of migration habitat (i.e., mainstem dams and reservoirs, high summer water temperatures, introduced predatory fishes, etc.), primarily outside of the action area, is the primary limiting factor for sockeye salmon (NMFS 2022b).

Environmental Baseline Summary

The condition of Chinook salmon and steelhead habitat within the action area ranges from somewhat, to very degraded. Like much of the Salmon River drainage, streamflow throughout most of the action area is impaired by water diversions and livestock grazing impacts are widespread outside of wilderness areas. Habitat in many important stream reaches has been improved by habitat restoration activities and overall habitat quality may be improving. Quality of sockeye salmon spawning, rearing, and migration habitat, within the action area is very good, except for the Stanley Lake Creek drainage that is currently blocked by a “rough fish” barrier.

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, Sockeye Salmon and Steelhead

The proposed action includes wildfire suppression activities, and management of wildfire use, that is authorized, funded, or carried out by the SNF. 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 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 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 firelines 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. Most of the streams within the action area, and all of the Sawtooth Valley Lakes, except Stanley Lake, are likely to be occupied by anadromous salmonids. The reservoirs within the action area are small impoundments used for livestock watering and recreation, and some are occupied by anadromous fishes. Pumping from surface water sources could affect anadromous fishes via disturbance when pumps are installed, removed, and when pump intakes are cleaned/maintained; via direct entrainment in the pump intake; and via habitat effects related to reducing streamflow.

Mark 3 pumps (diversion rate ≈ 0.10 cfs) 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 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 (2022d). 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 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, especially in summer months. 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 (2022d) 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 with 0.2 cfs of flow, 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, for many second order streams in the action area, is less than one cfs[7], 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.

We were unable to find peer-reviewed literature characterizing the amount of water used to suppress fires in the western United States. 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.

[7] Stream order determined using the NOAA Fisheries Protected Resource application and the single-day, 10-year low flow estimated using StreamStats. https://streamstats.usgs.gov/ss/

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 2012, the worst fire season on record for the SNF, approximately 272,167 acres burned. Because the action area is only 26 percent of the SNF, this is probably substantially more than is likely to burn within the action area in a single fire season. Presuming a water use of 0.15-acre feet per 1,000 acres of fire, suppression activities on 272,167 acres of fire would result in drafting 41 acre-feet. We therefore presume that 41 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 740 hours to withdraw 41 acre-feet of water.

Water for a very large fire would likely be taken from multiple locations, including from locations outside of the action area. However, if the water source was large enough, all of the water could, theoretically, be taken from a single location and all of the effects of water drafting could, therefore be concentrated on a single population. Estimated effects of water drafting on individual populations are described below.

Redfish Lake and Pettit Lake Sockeye Salmon

Removing 41 acre-feet from Redfish Lake would reduce the lake level by 0.33 inches, if the water was removed instantaneously. However, 41 acre-feet represents less than 12 hours of Redfish Lake inflow, so removing the water over a period of days would result in a lake level change of a very small fraction of an inch and would not likely impair spawning or rearing sockeye salmon in Redfish Lake. Instantaneously removing 41 acre-feet from Alturas Lake would reduce the lake level by 0.59 inches and 41 acre-feet represents approximately 25 hours of Alturas Lake inflow, so the maximum lake level effect would be approximately twice as large as for Redfish Lake. But it would still be only a small fraction of an inch and would not likely impair spawning or rearing sockeye salmon in Alturas Lake. Instantaneously removing 41 acre-feet from Pettit Lake would reduce the lake level by 1.23 inches and 41 acre-feet represents approximately 36 hours of Pettit Lake inflow, so the maximum lake level effect would be approximately three times as much as the effect for Redfish Lake. But it would still be a small fraction of an inch, and would not likely impair spawning or rearing sockeye salmon in Pettit Lake. Because the flow effects on lake outflows would be buffered by the lake volumes, the effect on flow in migration habitat, downstream from the lakes, would be sufficiently small that it would not impair migration of juvenile or adult sockeye salmon. Therefore, NMFS does not expect water pumping, and resultant reduction of lake levels and downstream flows, to affect juvenile or adult sockeye salmon.

The pump intakes will be within a few feet of the surface. Juvenile sockeye salmon typically rear more than 60 feet below the surface (see Section 2.5.1.2), making the chance of juveniles encountering a pump intake very small, and the required pump intake screening will further reduce the chance of entrainment due to water drafting. Due to high burst speed of adult sockeye salmon, and the screening requirements, the chance of an adult sockeye salmon becoming entrained in a pump intake is very small. Therefore, NMFS does not expect water pumping to result in entrainment of sockeye salmon.

Snake River spring/summer Chinook Salmon and Snake River Basin steelhead

Average flow at or near the lower end of the SRUM, SRLM, Valley Creek, and EFSR Chinook salmon population areas is 392,854 acre-feet, 147,155 acre-feet, 722,798 acre-feet, and 178,737 acre-feet, respectively. Therefore, if all of the water for the largest fire on record were drafted from a single Chinook salmon population area, annual flow in the SRUM, SRLM, Valley Creek, or the EFSR population area could be reduced by 0.010 percent, 0.005 percent, 0.028 percent, or 0.023 percent, respectively. As described above, flows in individual source streams may be temporarily reduced by up to 50 percent, but on a population area scale, flow reduction would almost always be less than 0.028 percent. Because the USR and EFSR steelhead population areas include the same drainages as the Chinook salmon populations, and are larger than any of the Chinook salmon population areas, the effect of water drafting on flow, on a population area scale, would be less than for any of the Chinook salmon population areas. Therefore, at a population area scale, flow reduction, due to water drafting for fire suppression, would almost always be less than 0.028 percent.

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. Pre-spawn 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 (see 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 & Ostrand 2012) but is likely to be approximately equal to (Simpson & Ostrand 2012), or slightly less than (Walters et al. 2012), 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 0.028 percent of annual flow in the Chinook salmon and steelhead spawning/rearing areas within the action area. Screening reduces entrainment effects by at least 97 percent (Simpson & Ostrand 2012; Walters et al. 2012), further reducing chance of juvenile fish entrainment. Because pumping would remove less than 0.028 percent of available flow, and because pump intakes would be effectively screened, pumping would likely entrain 0.00084 percent (i.e., 0.028 x 0.03) of juvenile Chinook salmon or steelhead, in a population, under a scenario of the largest fire on record with all of the water diverted from a single population area.

In addition to entrainment effects, flow reduction due to water pumping could reduce the quality of rearing habitat. Year class strength of many salmonid populations is positively related to streamflow (Arthaud et al. 2010; Beecher et al. 2010; Elliott et al.1997; Mathews & Olson 1980; Mitro et al. 2003; Nislow et al. 2004; Ricker 1975), 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 0.028 percent could reduce Chinook salmon population productivity by 0.034 percent. The effects of flow reduction on steelhead are likely similar to those on Chinook salmon, but because both the USR and EFSR steelhead population areas are larger than Chinook salmon population areas, 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 on any anadromous fishes, due to fuel spills during pump refueling, are unlikely. Disturbance of adult Chinook and sockeye salmon; and of juvenile Chinook salmon, sockeye salmon, and steelhead during pump installation, maintenance, and screen cleaning; will be localized, temporary, and minor. The effects on water drafting on lake levels and flow in sockeye salmon spawning, rearing, and migration habitat will likely be too small to result in adverse effects on spawning, rearing, or migrating sockeye salmon. 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 population area scale, streamflow would be reduced by less than 0.028 percent, less than 0.00084 percent of juvenile Chinook salmon and steelhead would be entrained, and Chinook salmon and steelhead population productivity would be reduced by less than 0.04 percent (i.e., 0.034 percent due to reduced rearing flows + 0.00084 percent due to entrainment). 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 fire suppression activities during an unusually severe fire season. 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.

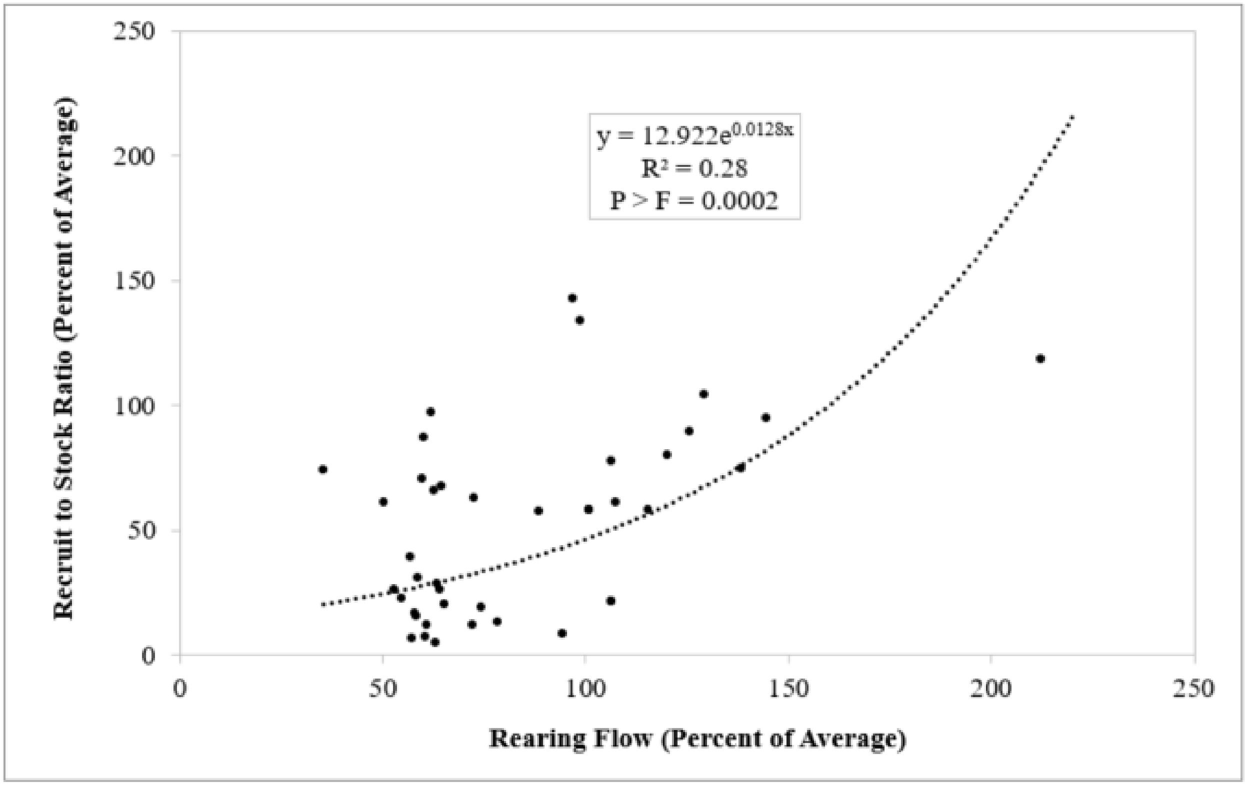

Figure 4. Relationship of whole life cycle productivity and rearing streamflow for the SRLM, Valley Creek, and Lemhi River Chinook salmon populations.

2.5.1.2 Helicopter Dipping and Snorkeling, and Fixed Wing Aircraft Scooping

Helicopters equipped with buckets will be used to collect water (dipping) from streams, rivers, or lakes in the action area; helicopters equipped with snorkels will be used to collect water (snorkeling) from streams that do not contain ESA-listed fishes and from lakes that may or may not contain ESA-listed fishes; and fixed-wing aircraft will be used to scoop water (scooping) from lakes that are more than one mile long (i.e., Redfish, Alturas, and Pettit Lakes). Potential pathways, by which dipping, snorkeling, or scooping may affect ESA-listed anadromous fishes include: (1) habitat effects due to removal of water from fish habitat; (2) entrainment of adult or juvenile fishes; and (3) disturbance of adult or juvenile fishes due to helicopters or fixed wing aircraft operating over or on the water. Water removed by aircraft was presumably included in the estimates of water use on large fires described in Section 2.5.1.1, and adverse effects to salmon and steelhead due to removal of water from fish habitat are therefore analyzed in Section 2.5.1.1. Potential effects due to entrainment and disturbance are described below.

Entrainment in Buckets

Helicopter dipping may occur in lakes, streams, and rivers with ESA-listed anadromous fishes. Individual helicopters can make multiple dips per hour and multiple helicopters may work a single fire. The two known studies on fish entrainment in helicopter buckets (Gamett 2022; Jimenez & Burton 2001) suggest that salmonids might not be vulnerable to entrainment in helicopter buckets dipping from lakes (Jimenez & Burton 2001) or streams/rivers (Gamett 2022;

Pyron & Gamett 2003), presumably because salmonids actively avoid the buckets. 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/). Given the large size of buckets that can currently be used for helicopter dipping, and the lack of studies on entrainment effects of large buckets, it is reasonable to presume that rearing Chinook salmon, sockeye salmon, and steelhead might occasionally be entrained by helicopter dipping. However, because the Gamett (2022) study involved 145 dips with no salmonid entrainment; the reaction of salmonids to large buckets would likely be similar to that for smaller buckets; and dipping from streams containing ESA-listed anadromous fishes will only occur during initial attack (i.e., the first twelve hours of firefighting), entrainment of anadromous fishes due to dipping in streams and rivers in the action area is likely to be very rare. Because juvenile Chinook salmon and steelhead are not likely to rear in the center of lakes where dipping would occur, and because juvenile sockeye salmon typically rear more than 60 feet or more below the surface of lakes (see Entrainment by snorkeling and scooping, below), ESA-listed anadromous fishes are not likely to be entrained by helicopter dipping from lakes in the action area.

Entrainment by Snorkeling and Scooping

Alturas, Pettit, and Redfish Lakes are the only lakes in the action area that are long enough for water scooping with fixed wing aircraft, and are therefore the only lakes, in which entrainment of ESA-listed fishes by scooping aircraft is possible. Snorkeling helicopters will not withdraw water from streams with ESA-listed fishes but they will withdraw water from lakes in the action area, including high mountain lakes, that do not contain anadromous fishes, and Sawtooth Valley Lakes (e.g., Alturas, Pettit, Redfish, Little Redfish, Perkins, and Yellow Belly lakes) that may contain ESA-listed anadromous fishes. Chinook salmon and steelhead can physically access the Sawtooth Valley Lakes, but because they do not spawn in lakes, typically do not rear in lakes; and because Chinook salmon spawning habitat in tributary streams (i.e., streams flowing into the lakes) is limited, adult and juvenile Chinook salmon and steelhead are uncommon in the Sawtooth Valley Lakes. When juvenile Chinook salmon and steelhead do rear in lentic habitats, they are typically in the literal zones (near shore) far away from the areas where snorkeling and scooping would occur. Adult and juvenile Chinook salmon and steelhead are, therefore, very unlikely to be entrained by snorkeling or scooping from lakes in the action area.

Unlike Chinook salmon and steelhead, adult sockeye salmon spawn in lakes and juvenile sockeye salmon typically rear in lakes until they are ready to migrate downstream. Sockeye salmon are currently extinct in Stanley and Yellow Belly Lakes; but adult and juvenile sockeye salmon are present, during the fire season, in Alturas, Perkins, Pettit, Redfish, and Little Redfish Lakes. Although studies of fish entrainment by snorkeling and scooping aircraft are lacking, the available literature indicates that juvenile sockeye salmon rearing in deep, clear lakes, such as the Sawtooth Valley Lakes, spend the daylight hours more than 230 feet below the surface and ascend to approximately 60 feet from the surface to feed at night (Clark & Levy 1988; Levy 1987), and are therefore probably not vulnerable to entrainment by snorkeling or scooping. Adult sockeye salmon spawn on rocky shoals that are relatively near to the shore and/or well below the surface, suggesting that they would also not be vulnerable to entrainment. Because snorkeling and scooping must occur from the surface of the lake and adult and juvenile sockeye salmon are typically far below the surface, the chance of entraining a sockeye salmon due to the proposed snorkeling and scooping is small.

Disturbance of ESA-listed Anadromous Fishes in Streams and Rivers

During the initial attack phase of a fire, helicopter dipping may occur in streams and rivers occupied by ESA-listed anadromous fishes. 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 shifts 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.

Adult and juvenile Chinook salmon, adult sockeye salmon, and juvenile steelhead are present in streams and rivers in the action area during the fire season. Adult steelhead typically complete spawning before the fire season and juvenile sockeye salmon typically migrate downstream before the fire season. Migrating adult sockeye salmon are present in the Salmon River, Redfish Lake Creek, Alturas Lake Creek, and Pettit Lake Creek during the fire season, but spawning sockeye salmon would typically not be present in streams and rivers in the action area. Helicopter dipping in streams and rivers in the action area could, therefore, disturb juvenile rearing Chinook salmon and steelhead, migrating adult sockeye salmon, and prespawn holding and actively spawning adult Chinook salmon.

During most years, there will likely be no helicopter dipping activities in streams and rivers occupied by ESA-listed fishes. 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[8], per year, in which helicopters dip in streams and rivers occupied by ESA listed anadromous fishes, without direction by resource advisors or specialists. Because disturbance could extend for 50 feet upstream and downstream from the

[8] 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.

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 migrating adult sockeye salmon, juvenile Chinook salmon and steelhead, and prespawning and spawning adult Chinook salmon.

The severity of the disturbance of ESA-listed anadromous fishes rearing in streams and rivers 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 juvenile Chinook salmon and steelhead would likely be relatively minor. As described above, juvenile sockeye salmon are not likely to be present in streams and rivers during the fire season.

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 and sockeye 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, and migrating adult sockeye salmon, would be likely to result in relatively minor disturbance related adverse effects on individuals. 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.

The PDFs described in the BA will reduce disturbance of ESA-listed anadromous fishes in streams and rivers, due to helicopter dipping. After the first operational period (i.e., 24 hours) dipping locations will be chosen by a resource advisor or specialist, which will substantially reduce dipping in streams and rivers occupied by ESA-listed fishes, and will 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, 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 four Chinook salmon populations in the action area has more than 100,000 feet of occupied spawning habitat. Helicopter dipping would therefore result in disturbance to spawning Chinook salmon in less than 0.2 percent of spawning habitat in a single population in a single fire season.

Disturbance of ESA-listed Anadromous Fishes in Lakes

As described above, juvenile sockeye salmon typically rear more than 60 feet below the surface of lakes, and adult sockeye salmon spawn on rocky shoals well below the surface and/or relatively near to the lake shore. Dipping, snorkeling, and scooping activities are not likely to substantially disturb sockeye salmon in lakes, because: sound does not transmit well across the water/air interface, or across thermoclines within the water column; dipping, snorkeling, and scooping aircraft will be in contact with the water for only short periods; juvenile sockeye salmon are typically far below the surface; and adult sockeye salmon are typically either far below the surface or far removed from dipping, snorkeling, and scooping locations (i.e., in the center of lakes).

As described above, Chinook salmon and steelhead do not spawn in lakes, typically do not rear in lakes, and are typically in literal zones when they do rear in lakes. Because dipping, snorkeling, and scooping aircraft will operate in the middle of the lakes; because sound does not transmit well across the water/air interface; and because dipping, snorkeling, and scooping aircraft are only in contact with the water for very short periods; dipping, snorkeling, and scooping activities are not likely to substantially disturb Chinook salmon and steelhead in lakes in the action area.

Summary

Juvenile Chinook salmon and steelhead could be entrained via dipping in streams and rivers, but entrainment would be rare, with no entrainment on most fires, and possibly no entrainment during most fire seasons. Entrainment of ESA-listed anadromous fishes due to dipping, snorkeling, or scooping from lakes, in the action area, is unlikely. Dipping from streams and rivers will have minor disturbance effects on juvenile Chinook salmon and steelhead, migrating adult Chinook salmon, and migrating adult sockeye salmon; and substantial adverse effects on less than 0.02 percent of pre-spawning and spawning Chinook salmon. Adult steelhead and juvenile sockeye salmon are not likely to be present in streams and rivers, in the action area, when dipping would occur. ESA-listed anadromous are unlikely to be entrained by dipping, snorkeling, and scooping from lakes in the action area, and disturbance due to dipping, snorkeling, and scooping from lakes will likely be very minor for all species/life stages except pre-spawning and spawning Chinook salmon.

2.5.1.3 Fireline Construction

As described in Section 1.3.1, firelines 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, fireline 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 large woody debris (LWD) recruitment to streams. Use of explosives for fireline construction could potentially injure incubating eggs, rearing juveniles, pre-spawning adults, and spawning adults. Fireline construction near streams could also disturb rearing juveniles and pre-spawning and spawning adults.

The PDFs described in Section 1.3.11.2 and the repair activities described in Section 1.3.8, 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 firelines, 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 streams 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.

- The amount of sediment entering lakes will be sufficiently small, localized, and temporary that adverse effects on sockeye salmon eggs, adults, or 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, adult sockeye salmon, and juvenile Chinook salmon and steelhead will be localized and temporary.

- Fireline construction activities are not likely to disturb juvenile sockeye salmon.

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, sockeye salmon, and steelhead, due to fireline construction, should be minor, and not likely to harm individuals.

2.5.1.4 Reconstructed Roads

Mobilization of fine sediment is the pathway, by which reconstruction of closed roads could potentially affect ESA-listed anadromous salmonids in the action area. Erosion control PDFs described in Section 1.3.11.8 and the repair activities described in Section 1.3.8 have proven effective in the past and should minimize the instances that sediment reaches streams or lakes, due to road reconstruction, and should minimize the amount of sediment reaching streams or lakes when it does occur. Because the PDF and repair activities will be effective, the amount of sediment entering stream or lakes will be sufficiently small, localized, and temporary that adverse effects on Chinook salmon or sockeye salmon eggs; Chinook salmon or sockeye salmon adults; or Chinook salmon, sockeye salmon, or steelhead rearing juveniles, will be minor and not likely to harm individuals.

Summary

Because the PDF and repair activities described in the proposed action will effectively minimize both the chance of and magnitude of effects, harm to individual Chinook salmon, sockeye salmon, or steelhead is 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 PDFs 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, sockeye salmon, and steelhead, due to burnout and firing operations, are unlikely.

2.5.1.6 Camps, Helibases, Helispots, and other Operational Facilities

This activity could affect Chinook salmon, sockeye salmon, and steelhead 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 sockeye 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 1.3.8 will further minimize effects of soil compaction and the chance of noxious weed spread. Also, the PDFs described in Section 1.3.11.11 will reduce the chance of chemical contamination. Because the PDFs 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, sockeye salmon, or steelhead.

Summary

Because the PDFs 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, sockeye salmon, and steelhead, due to establishment of camps, helibases, and other operational facilities, are unlikely.

2.5.1.7 Transport 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 PDFs 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

2.5.1.9 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.

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.

Potential effects include exposure of fish to retardants, foams, or surfactants; sediment entering streams or lakes due to ground disturbed during mop-up or repair activities; spread of noxious weeds and other invasive species; vegetation removal; and erosion from water drops. However, the activities listed in the above bullets typically do not result in adverse effects on aquatic resources and the PDFs described in the proposed action will further reduce the risk of adverse 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 do not involve in-water work, and because the PDFs described in the proposed action will further reduce effects, these activities are not likely to harm Chinook salmon, sockeye salmon, or steelhead.

Summary

Because these activities typically do not involve in-water work, and because the PDFs described in the proposed action should reduce the chance of toxic substances entering streams, sedimentation, spread of noxious weeds, etc., these activities are unlikely to harm Chinook salmon, sockeye salmon, or steelhead.

2.5.2. Effects of the Action on Chinook Salmon, Sockeye Salmon, and Steelhead Designated Critical Habitat

The habitat-related effects of fireline 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, sockeye salmon, and steelhead habitat are sufficiently small, localized, and temporary that Chinook salmon, sockeye 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, sockeye salmon, salmon or steelhead, they would also minimally affect Chinook salmon, sockeye salmon, or steelhead designated critical habitat.

Helicopter dipping will adversely affect adult Chinook salmon and sockeye 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 temporarily avoid portions of habitat, it could negatively affect the space PBF[9]. The effects on rearing juvenile Chinook salmon and steelhead, migrating adult and juvenile Chinook salmon and sockeye salmon, and holding adult Chinook salmon are not likely to be severe enough to impair habitat use, and the space PBFs and critical habitat 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

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

200 feet of Chinook salmon spawning habitat in a single fire season, possibly resulting in temporary non-utilization of 200 feet of spawning habitat. Because snorkeling and scooping will occur near the surface of lakes and far for shorelines, spawning and rearing sockeye salmon are not likely to be disturbed.

Removing water from streams via drafting and helicopter dipping will reduce flow in occupied Chinook salmon, sockeye salmon, and steelhead habitat. Flow reductions from these activities could be as much as 50 percent of available flow in some of the smaller source streams, or as much as 41 acre-feet from a population area. These flow reductions could adversely affect PBFs for space, food, forage, access to cover, and water temperature in stream habitats. These effects on PBFs in stream habitats would reduce population productivity, as described in Section 2.5.1.2. 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. The effect of removing water from lakes, with designated critical habitat, would likely be sufficiently small that PBFs in lake habitat would not be adversely affected.

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. Disturbance effects on steelhead and sockeye salmon are likely to be very minor. 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), but is not likely to adversely affect sockeye salmon PBFs. 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 the status of the species (Section 2.2.3).

The majority of the action area is in Custer County, Idaho and a small portion is in Blaine County, Idaho. The small portion of Blaine County, in the action area, is very rural and resembles Custer County with respect to development, population growth, local economy, etc. Between 2010 and 2020, the population of Custer County shrank 2.2 percent and Blaine County increased 13.6 percent[10]. A significant portion of the Salmon River, East Fork Salmon River, and Valley Creek mainstems are in private ownership. Private lands are primarily managed as agricultural and recreational properties. 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.

2.7. Integration and Synthesis

The Integration and Synthesis section is the final step assessing the risk that the proposed action poses to species and critical habitat. In this section, we add the effects of the action (Section 2.5) to the environmental baseline (Section 2.4) and the cumulative effects (Section 2.6), taking into account the status of the species and critical habitat (Section 2.2), to formulate the agency's biological opinion as to whether the proposed action is likely to: (1) reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing its numbers, reproduction, or distribution; or (2) appreciably diminish the value of designated or proposed critical habitat as a whole for the conservation of the species.

2.7.1. Species

As described in Section 2.2, individuals belonging to four populations in the Snake River spring/summer Chinook salmon ESU, the only extant population of Snake River sockeye salmon, 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 and Snake River sockeye ESUs are currently at a high risk of extinction. 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 all of the extant 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 all three 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.

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

The action area provides rearing, migration, and spawning habitat for ESA-listed Chinook salmon, sockeye salmon, and steelhead. The overall baseline conditions in the action area are generally very good. The adverse effects on ESA-listed Chinook salmon and steelhead will be due to reduction in flows due to water drafting, entrainment in pumps used for drafting water, entrainment in helicopter buckets, and disturbance due to helicopter dipping. The estimated effect of suppression activities for the largest fire on record, expressed as adult returns, equates to less than one adult Chinook salmon and one adult 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 four affected Chinook salmon populations (i.e., SRUM, VC, SRLM, and EFSR) or either of the two affected steelhead populations (i.e., EFSR and USR). The effects of the proposed action are not likely to reduce productivity of the single extant sockeye salmon population (Redfish Lake) and are not likely to reduce adult returns of sockeye salmon.

The four affected populations of Chinook salmon and the one population of sockeye salmon are at high risk of extinction. Due to the low returns since 2015, the EFSR and the USR steelhead populations are also currently at high risk of extinction. NMFS' recovery goals for the four affected populations of Snake River spring/summer Chinook salmon are: Highly viable status (one percent risk of extinction over 100 years) for the SRUM population; at least viable status (five percent risk of extinction over 100 years), for the EFSR and VC populations, and at least maintained status (25 percent risk of extinction over 100 years) for the SRLM population. For sockeye salmon, the recovery goal is reestablishment of self-sustaining populations in Redfish, Alturas, Pettit, Yellow Belly, and Stanley Lakes (NMFS 2015). 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, sockeye salmon, and steelhead via four pathways: (1) entrainment of juveniles in pumps; (2) entrainment of juveniles in helicopter buckets, helicopter snorkels, or via fixed wing scooping; (3) temporary reduction of flow in rearing habitat; (4) disturbance of juvenile Chinook salmon, sockeye salmon, and steelhead, and adult Chinook salmon via helicopter dipping, helicopter snorkeling, or fixed wing scooping. As described above, disturbance of ESA-listed anadromous fishes in lakes and effects due to reducing flow in lakes are likely to be very minor. Because the pumps will be effectively screened, entrainment of juveniles in pumps will be very rare, likely not occurring every year. Because helicopter buckets do not typically entrain salmonids, entrainment of ESA-listed salmonids due to helicopter dipping from streams will be very rare, likely not occurring every year. Because dipping, snorkeling, and scooping from lakes would only occur from the surface and far from shore, where ESA-listed anadromous salmonids are not typically present, entrainment of ESA-listed salmonids due to dipping, snorkeling, and scooping from lakes, is not likely to occur. Also, PDFs described in the proposed action will minimize dipping in occupied streams and rivers, further making entrainment of ESA-listed anadromous salmonids due to the proposed action extremely rare. The proposed action could temporarily reduce flow by up to 50 percent in some of the smaller source streams, and could remove up to 41 acre-feet from a population area, which could reduce population productivity of Chinook salmon populations by as much as 0.04 percent, could reduce productivity of steelhead populations by less than 0.04 percent, and is not likely to reduce productivity of the one affected sockeye population.

Helicopter dipping activities will likely disturb juvenile Chinook salmon and steelhead, and adult Chinook salmon and sockeye salmon. Adverse effects on juvenile Chinook salmon and steelhead, holding adult Chinook salmon, and on migrating adult Chinook salmon and sockeye salmon, will 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 very severe fire 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 SRUM, VC, EFSR, or SRLM Chinook salmon populations; the Redfish Lake sockeye salmon population; or the EFSR or USR 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, Snake River sockeye salmon, or Snake River Basin steelhead. Our assessment assumes that the SNF 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 Snake River ESA-listed fish species. 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 rearing, migration, and spawning habitat for all of the affected populations of Chinook and sockeye salmon, and steelhead in the Snake River basin. 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 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 SNF's implementation of this proposed action will not appreciably diminish the value of Chinook salmon, sockeye 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' biological opinion that the proposed action is not likely to jeopardize the continued existence of Snake River spring/summer Chinook salmon, Snake River sockeye salmon, or 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. Amount or Extent of Take

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, operation of pumps in occupied habitat could result in entrainment, even if all pumps are effectively screened. In a single fire season, up to 41 acre-feet of water could be drafted from occupied Chinook salmon, sockeye salmon, and steelhead habitat. If all of the drafting occurred in a single population area, population productivity of a Chinook salmon population could be reduced by up to 0.04 percent, productivity of a steelhead population could be reduced by less than 0.04 percent, and fewer than 0.00084 percent of juvenile Chinook salmon and steelhead from a single population could be entrained. Productivity of sockeye salmon would not be reduced and sockeye salmon are not likely to be entrained. 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. Because 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 pumps, the extent of take via these two pathways will be exceeded if more than 41 acre-feet is pumped from occupied habitat, in a single fire season. We presume that approximately 85 percent of water used will be drafted via Volume pumps, and therefore, take by these two pathways would be exceeded if pumping via Volume pumps exceeded 35 acre feet in a single fire season. 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 presumed to be exceeded if Volume pumps operate for more than 631 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. Because buckets up to 2,600 gallons 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, 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), the extent of take will be described as the number of large 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). Because helicopter availability during initial attack will likely be limited, it is unlikely that more than 100 dips with large buckets, would be made in occupied Chinook salmon or steelhead stream/river 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, were made in occupied Chinook salmon or steelhead stream/river habitat in a single fire season.

2.9.1.3 Disturbance Due to Helicopter Dipping

Adult Chinook salmon and sockeye 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 and migrating adult sockeye salmon would also be relatively minor. Adverse effects on spawning Chinook salmon adults could increase mortality and/or reduce spawning success. Because 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 and sockeye 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, sockeye 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, prior to October 1, 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 the species or destruction or adverse modification of critical habitat.

2.9.3. Reasonable and Prudent Measures

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

1. Minimize the effects of entraining Chinook salmon, sockeye 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 scooper planes, helicopter snorkels, and helicopter buckets.

3. Minimize the adverse effects of disturbing salmonids during helicopter dipping, helicopter snorkeling, and scooper plane 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 SNF 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, helicopter snorkels, and scooper planes):

    a. When utilizing streams and rivers as water sources for helicopter buckets, 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 stream and river habitat, whenever feasible.

    c. Direct helicopters and scooper planes to withdraw water from the middle of lakes, avoiding shore lines.

3. The following terms and conditions implement RPM 3 (minimize disturbance due to helicopter dipping, helicopter snorkeling, and scooper plane activities):

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

        (1) Updates should include any new Chinook salmon spawning areas and other potential dip sites that should be avoided during future wildfire suppression activities.

        (2) To avoid repeating procedures that led to increased levels of harm and/or harassment of ESA-listed fish, annual updates shall incorporate any lessons learned from the proceeding year's suppression activities. Input should be sought and incorporated from fire management staff, resource advisors, and aquatic resource specialists on the SNF, as well as from similar staff on adjacent National Forests.

b. Direct helicopters to dipping locations outside of Chinook salmon spawning habitat within 24-hours of the start of fire suppression activities, whenever feasible.

c. Direct helicopters and scooper planes to withdraw water from in the middle of lakes occupied with ESA-listed species, avoiding shore lines.

d. When feasible, use alternative locations for dipping to avoid known adult Chinook salmon spawning sites. If a site is needed and occupancy is unknown, have a Resource Advisor or specialist survey the site 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 either the hours that Volume pumps are operated in occupied habitat (accurate to within 18 hours), or the volume of water drafted, with Volume pumps, from occupied habitat (accurate to within one acre-foot).

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.

e. Record the number of scoops by type of scooper plane.

f. Record the dipping location and the date for all instances of helicopter dipping in Chinook salmon spawning habitat.

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

h. A written report will be submitted to the SNF 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, sockeye salmon, or steelhead habitat; (3) scooping occurs with fixed-wing aircraft in the action area; (4) 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 SNF should adopt and implement the following Conservation Recommendations (CR):

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

2. Identify and map suitable helicopter dipping locations outside of Chinook salmon and steelhead occupied streams and rivers 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 and aerial scooping operations. The term and condition (above) did not require the identification and mapping of suitable dipping and scooping locations.

3. Avoid helicopter dipping and snorkeling from the smaller lakes with anadromous salmonids (e.g., Perkins Lake, Little Redfish Lake, Yellowbelly Lake).

4. Identify and map water drafting locations that will minimize drafting effects on Chinook salmon, sockeye salmon, and steelhead, and distribute maps and coordinates to SNF employees and contractors who may direct, oversee, or implement water drafting operations. Having these maps available would make complying with Sections 1.3.2 and 1.3.11.3 of the proposed action more successful.

5. Conduct annual meetings with the regional Forest Service fire staff and resource advisors to discuss specific actions necessary to consistently conduct wildfire management activities with limited impacts to ESA-listed species and designated critical habitats.

2.11. Reinitiation of Consultation

This concludes formal consultation for Fire Suppression Actions on the SNF. Under 50 CFR 402.16(a): "Reinitiation of consultation is required and shall be requested by the Federal agency or by the Service where discretionary Federal agency involvement or control over the action has been retained or is authorized by law and: (1) if the amount or extent of incidental taking specified in the ITS is exceeded; (2) if new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not previously considered; (3) if the identified action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in the biological opinion or written concurrence; or (4) if a new species is listed or critical habitat designated that may be affected by the identified action."

3. MAGNUSON–STEVENS FISHERY CONSERVATION AND MANAGEMENT ACT ESSENTIAL FISH HABITAT RESPONSE

Section 305(b) of the MSA directs Federal agencies to consult with NMFS on all actions or proposed actions that may adversely affect EFH. Under the MSA, this consultation is intended to promote the conservation of EFH as necessary to support sustainable fisheries and the managed species' contribution to a healthy ecosystem. For the purposes of the MSA, EFH means "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity," and includes the physical, biological, and chemical properties that are used by fish (50 CFR 600.10). Adverse effect means any impact that reduces quality or quantity of EFH, and may include direct or indirect physical, chemical, or biological alteration of the waters or substrate and loss of (or injury to) benthic organisms, prey species and their habitat, and other ecosystem components, if such modifications reduce the quality or quantity of EFH. Adverse effects on EFH may result from actions occurring within EFH or outside of it and may include site-specific or EFH-wide impacts, including individual, cumulative, or synergistic consequences of actions (50 CFR 600.810). Section 305(b) of the MSA also requires NMFS to recommend measures that can be taken by the action agency to conserve EFH. Such recommendations may include measures to avoid, minimize, mitigate, or otherwise offset the adverse effects of the action on EFH (CFR 600.905(b))

This analysis is based, in part, on the EFH assessment provided by SNF and descriptions of EFH for Pacific Coast salmon (PFMC 2014) contained in the fishery management plans (FMPs) developed by the Pacific Fishery Management Council 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 and spawning habitat.

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. 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 CR 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 Conservation Recommendations would protect, by avoiding or minimizing the adverse effects described in Section 3.2, above, for Pacific Coast salmon EFH.

3.4. Statutory Response Requirement

As required by Section 305(b)(4)(B) of the MSA, SNF must provide a detailed response in writing to NMFS within 30 days after receiving an EFH Conservation Recommendation. Such a response must be provided at least 10 days prior to final approval of the action if the response is inconsistent with any of NMFS' EFH Conservation Recommendations unless NMFS and the Federal agency have agreed to use alternative timeframes for the Federal agency response. The response must include a description of the measures proposed by the agency for avoiding, minimizing, mitigating, or otherwise offsetting the impact of the activity on EFH. In the case of a response that is inconsistent with the Conservation Recommendations, the Federal agency must explain its reasons for not following the recommendations, including the scientific justification for any disagreements with NMFS over the anticipated effects of the action and the measures needed to avoid, minimize, mitigate, or offset such effects (50 CFR 600.920(k)(1)).
In response to increased oversight of overall EFH program effectiveness by the Office of Management and Budget, NMFS established a quarterly reporting requirement to determine how many Conservation Recommendations are provided as part of each EFH consultation and how many are adopted by the action agency. Therefore, we ask that in your statutory reply to the EFH portion of this consultation, you clearly identify the number of Conservation Recommendations accepted.

3.5. Supplemental Consultation

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

4. DATA QUALITY ACT DOCUMENTATION AND PRE-DISSEMINATION REVIEW

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

4.1. Utility

Utility principally refers to ensuring that the information contained in this consultation is helpful, serviceable, and beneficial to the intended users. The intended users of this opinion are SNF 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 SNF. The document will be available within 2 weeks at the NOAA

Library Institutional Repository (https://repository.library.noaa.gov/welcome). The format and naming adhere to conventional standards for style.

4.2. Integrity

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

4.3. Objectivity

Information Product Category: Natural Resource Plan

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

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

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

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

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