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-2020-01609

August 10, 2020

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Chad Hamel
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Re: Endangered Species Act Section 7(a)(2) Biological Opinion, and Magnuson–Stevens Fishery Conservation and Management Act Essential Fish Habitat Response for the Pettit Lake Creek Weir Reconstruction Project, HUC # 170602010302 – Lower Alturas Lake Creek, Blaine County, Idaho

Dear Mr. DeMaagd, Mr. Hamel, and Lt. Col. Childers:

Thank you for your letter of June 11, 2020, requesting initiation of formal consultation with NOAA's National Marine Fisheries Service (NMFS) pursuant to section 7 of the Endangered Species Act of 1973 (ESA) (16 U.S.C. 1531 et seq.) for the Pettit Lake Creek Weir Reconstruction Project. This consultation was conducted in accordance with the 2019 revised regulations that implement section 7 of the ESA (50 CFR 402, 84 FR 45016). The Sawtooth National Forest (SNF) is the lead federal action agency. The Bonneville Power Administration (BPA) and the U.S. Army Corps of Engineers (Corps) are cooperating federal agencies.

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 (*Oncorhynchus tshawytscha*). Similarly, we found the proposed action will not destroy or adversely modify designated critical habitat for Snake River spring/summer Chinook salmon, Snake River Basin steelhead (*O. mykiss*), and Snake River sockeye salmon (*O. nerka*). NMFS also concurs with the SNF's determination that the action may affect, but is not likely to adversely affect Snake River sockeye salmon. 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 (RPMs) NMFS considers necessary or appropriate to minimize the impact of incidental take associated with this action. The take statement sets forth nondiscretionary terms and conditions, including reporting requirements, that the SNF, all other federal action agencies, and any permittee or contractor who performs any portion of the action, must comply with to carry out the RPM. Incidental take from actions that meet these terms and conditions will be exempt from the ESA take prohibition.

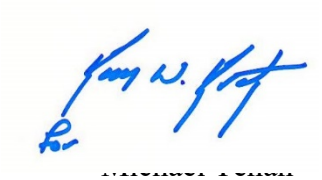
The SNF also determined the action will have "no effect" on Snake River Basin steelhead. "No effect" determinations under section 7 of the ESA are the province of action agencies, which may make such findings without seeking the agreement of NMFS. It is NMFS procedure to not provide any written concurrence with a federal action agency's determination that its action will have "no effect" on any ESA-listed species or designated critical habitat. Therefore, The ESA does not require NMFS to concur or evaluate a no effect determination.

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

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

Please contact Chad Fealko, Southern Snake Branch Office, (208) 756-5105, or chad.fealko@noaa.gov if you have any questions concerning this consultation, or if you require additional information.

Sincerely,



Assistant Regional Administrator
Interior Columbia Basin Office

Enclosure

cc: J. Joyner – USACE
S. Fisher – USFWS
C. Colter – SBT
K. Tardy – SBT
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L. Hardin - SNF
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Endangered Species Act Section 7(a)(2) Biological Opinion and Magnuson–Stevens Fishery and Conservation and Management Act Essential Fish Habitat Response

Pettit Lake Creek Weir Reconstruction Project (NWW-2018-00329-I01), HUC #170602010302 Lower Alturas Lake Creek, Blaine County, Idaho

NMFS Consultation Number: WCRO-2020-01609

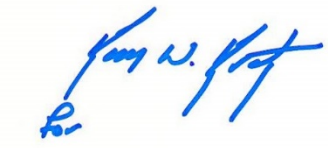
Action Agencies: Sawtooth National Forest, U.S. Army Corps of Engineers, Bonneville Power Administration

Affected Species and 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 Basin steelhead (*Oncorhynchus mykiss*)	Threatened	NA	NA	Yes	No
Snake River spring/summer Chinook salmon (*O. tshawytscha*)	Threatened	Yes	No	Yes	No
Snake River Sockeye Salmon (*O. nerka*)	Endangered	No	NA	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 b  Administrator

Date: August 10, 2020

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ACRONYMS

ACRONYMN	DEFINITION
ATV	All-Terrain Vehicle
BA	Biological Assessment
BPA	Bonneville Power Administration
CFR	Code of Federal Regulations
cfs	Cubic Feet per Second
Corps	U.S. Army Corps of Engineers
CRS	Columbia River System
CWA	Clean Water Act
DQA	Data Quality Act
EFH	Essential Fish Habitat
EOS	Equivalent Opening Size
ESA	Endangered Species Act
ESU	Evolutionarily Significant Unit
FHWA	U.S. Federal Highway Administration
HAPC	Habitat Areas of Particular Concern
HUC	Hydrologic Unit Code
IDFG	Idaho Department of Fish and Game
ISAB	Independent Scientific Advisory Board
ITS	Incidental Take Statement
LWD	Large Woody Debris
MPG	Major Population Group
MSA	Magnuson–Stevens Fishery Conservation and Management Act
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
NTU	Nephelometric Turbidity Units
NWP	Nationwide Permit
OHWM	Ordinary High Water Mark
Opinion	Biological Opinion
PBF	Physical or Biological Feature
PCE	Primary Constituent Element
PFMC	Pacific Fishery Management Council
Plan	Snake River Sockeye Salmon Recovery Plan
RPM	Reasonable and Prudent Measure
SBT	Shoshone Bannock Tribes
SNF	Sawtooth National Forest
SNRA	Sawtooth National Recreation Area
Spill Plan	Spill Prevention and Countermeasure or Pollution Control Plan
SUP	Special Use Permit
USBWP	Upper Salmon Basin Watershed Project
FWS	U.S. Fish and Wildlife Service
VSP	Viable Salmonid Population
Weir	Pettit Lake Creek Weir

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 USC 1531 et seq.), and implementing regulations at 50 CFR 402, as amended.

We also completed an essential fish habitat (EFH) consultation on the proposed action, in accordance with section 305(b)(2) of the Magnuson–Stevens Fishery Conservation and Management Act (MSA) (16 U.S.C. 1801 et seq.) and implementing regulations at 50 CFR 600.

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

1.2 Consultation History

The Bonneville Power Administration (BPA) contacted NMFS staff in February 2019, notifying us of planning efforts beginning to replace the existing Pettit Lake Creek Weir (hereafter "Weir") and intentions to cover the action programmatically. Shortly afterwards, BPA notified NMFS that design changes resulted in pulling the proposed action from programmatic consultation consideration and that formal consultation would need to be pursued. NMFS staff (Chad Fealko, Fisheries Biologist and Aaron Beavers, Engineer) attended a June 19, 2019, site visit with the BPA, representatives of the Shoshone Bannock Tribes (SBT) who operate the Weir, the U.S. Fish and Wildlife Service (FWS), and the Sawtooth National Forest (SNF). The U.S. Army Corps of Engineers (Corps) was invited to the site visit but was unable to attend.

The SBT operates the existing Weir and juvenile trapping structure at Pettit Lake Creek, which is integral to investigating Snake River sockeye salmon reproduction in Pettit Lake. The Pettit Lake sockeye investigations support the sockeye captive broodstock program. The Weir is/will be used to monitor sockeye in- and out-migration from Pettit Lake. The current facility was constructed in 1995, but was inadvertently sized too small for the spring flows and is ineffective for out-migration monitoring. The current Weir (Figure 1) is a safety hazard for SBT staff, contributes to bank erosion, can injure juvenile sockeye, and does not allow for adult monitoring.

Figure 1. Existing Weir on Pettit Lake Creek.

The SNF, BPA, NMFS, and the FWS exchanged draft biological assessments (BAs), comments, and revisions multiple times during 2020. Specific dates of each transmission are available in our project record. The SNF Level 1 Team discussed the project during the May 19, 2020, April 21, 2020, March 17, 2020, February 25, 2020, and December 18, 2019, meetings. The Level 1 Team visited the site on August 13, 2019, meeting with SBT representatives. The BPA and SNF co-authored the BA, and the final BA was received by NMFS on June 11, 2020. NMFS formally responded by letter on June 18, 2020, notifying the action agencies ESA consultation was formally initiated on June, 11, 2020, the date we received the consultation initiation package.

NMFS shared draft excerpts of the opinion with the SNF, BPA, and the Corps on July 27, 2020. Responses were received from the SNF on July 30, 2020, apparently inclusive of SBT's input. The SNF and SBT suggested minor edits and provided an updated access route (Figure 3), which were adopted by NMFS in this opinion. The Corps responded on July 27, 2020, indicating approval with the draft materials. Because this action has the potential to affect tribal trust resources, NMFS provided copies of the draft proposed action and terms and conditions for this opinion to the SBT on July 27, 2020. As the project Applicant and sponsor, the SBT has been engaged throughout the ESA consultation process and no further comments were provided.

1.2.1 Snake River Sockeye Salmon Program

Precipitous declines of sockeye led to the listing of Snake River sockeye salmon (*Oncorhynchus nerka*) under the ESA as Endangered in 1991 (56 FR 58619). In that same year, a captive broodstock program was initiated to maintain sockeye and prevent species extinction. The long-term goal of the program is to reestablish sockeye runs to the Upper Salmon River basin and to provide sport and treaty harvest opportunities. The near-term program goal is to prevent species extinction, slow the loss of genetic diversity, and to increase the population abundance and spatial structure.

These goals are part of a three-phase recovery strategy, as outlined in the Snake River Sockeye Salmon Recovery Plan (NMFS 2015) (hereinafter "plan") (NMFS 2015). Phase one focused on population recovery and includes the captive broodstock program which has been critical in maintaining the sockeye population and preventing the species' extinction. The program is now transitioning into phase two, the recolonization phase, which will incorporate more natural-origin sockeye in the hatchery-spawning program and provide anadromous adults to recolonize available habitat in Redfish, Pettit, and Alturas Lakes. Over the next decade, this phase will focus exclusively on smolt and adult releases to Sawtooth Basin lakes (primarily Redfish and Pettit).

The SBT's Sockeye Program conducts investigations of lake habitats and sockeye-specific monitoring and evaluation in Redfish, Alturas, and Pettit Lakes in support of the captive broodstock program. The SBT conducts juvenile out-migrant monitoring on outlets from Pettit and Alturas lakes using a weir below Pettit Lake and a screw trap below Alturas Lake where sockeye salmon smolts are PIT-tagged, have data recorded, and biological samples taken.

The SBT conduct the direct handling of juvenile endangered sockeye at the Weir under the authority of NMFS' section 10(a)(1)(A) Research Permit #1341-5R, valid from March 31, 2017, through December 31, 2021. NMFS completed a biological opinion addressing this permit (and others) in 2013 (NMFS No. WCR-2017-6413). The BPA funds the Snake River Sockeye Salmon Captive Broodstock Program, including the SBT's Sockeye Program, to mitigate for fish losses caused by the construction and operation of the Columbia River System (CRS).

The plan describes a long-term recovery scenario which includes restoring at least two of the three historical lake populations to a "highly viable" status, and one to a "viable" status, using the Redfish Lake, Alturas Lake, and Pettit Lake populations. The plan identified a minimum spawning abundance threshold of 500 spawners that represent a naturally self-sustaining population in Pettit Lake (NMFS 2015). The plan also supports investigation and development of strategies "for future actions to support Sawtooth Valley Sockeye Salmon reintroduction and adaptation phases for Pettit Lake". This Weir is central to such ongoing investigations, and is identified in the recovery plan for improvement and replacement (NMFS 2015).

In late 2013, NMFS issued two section 10(a)(1)(A) research/enhancement permits[1] pursuant to the ESA, as amended. These permits, one to the Idaho Department of Fish and Game (IDFG) (permit #1454), and one to NMFS' Northwest Fisheries Science Center (permit #1455), authorized the continued operation, monitoring, and evaluation of the Snake River Sockeye Captive Broodstock Program and releasing adult and juvenile ESA-listed sockeye through 2023. Prior to that, NMFS and BPA conducted section 7 consultation and were provided a September 28, 2013, biological opinion from NMFS. The proposed action considered in that opinion included the research and monitoring activities of the SBT which are conducted using the current Weir. Future adult sockeye take at the Pettit Lake Creek Weir is covered by Permit #1454, and the permit was amended to ensure the Pettit Lake Creek weir is specifically identified as part of that program (NMFS 2020). The conclusion of the 2013 consultation was that the program's actions will not likely jeopardize the continued existence of Snake River spring/summer Chinook salmon (*O. tshawytscha*), Snake River sockeye salmon, or Snake River steelhead (*O. mykiss*). It also concluded that the action was not likely to destroy or adversely modify critical habitat, and that it will have an adverse effect on EFH.

Because all take and habitat effects associated with the future operation and maintenance of the Weir have been addressed by NMFS through the ESA's section 10 permitting process, those effects are part of the environmental baseline and are not discussed as consequences of the action in this document.

1.3 Proposed 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). The proposed action is the SNF's pending authorization of a 20-year special use permit (SUP), under the Organic Administration Act of June 4, 1897, allowing the SBT to reconstruct and operate the Weir on SNF-managed lands. The SNF's authorization will also include removal of the current weir and removal of old concrete abutments (dependent upon availability of funding) within Pettit Lake Creek's banks approximately 90 feet upstream of the current weir. These abutments were originally elements of a 1962 IDFG fish barrier that was partially removed in 1996. This proposal will remove those abutments, then reshape and restore those banks with plantings and large woody debris (LWD) placements (if needed). Timing of this element is dependent on funding and could occur within about 10 years.

The BPA's nexus is the provision of federal funding for the SBT's construction of the new Weir. Funding is provided as part of their mitigation for the effects of the CRS on ESA-listed salmon and steelhead. The Corps's nexus for the action is their proposed issuance of a section 404 permit under the Clean Water Act (CWA) for the placement of fill in waters of the United States.

The Weir is located on Pettit Lake Creek approximately 0.25 miles downstream of the outlet from Pettit Lake, near the headwaters of the Salmon River. The site is approximately 1.5 miles upstream of Highway 75 along the Pettit Lake Road (Forest Road 208) within the Alturas Lake

[1] This type of permit is authorized under the ESA to "take" (harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect, etc.) listed species for scientific purposes, to enhance the propagation or survival of a listed species, or for purposes of establishment and maintenance of experimental populations.

Creek subwatershed [Hydrologic Unit Code (HUC) 170602010113]. The creek flows from the weir for approximately 1.2 miles to its confluence with Alturas Lake Creek, which then drains into the Salmon River approximately 20 miles upstream of Stanley, Idaho (Figure 2).

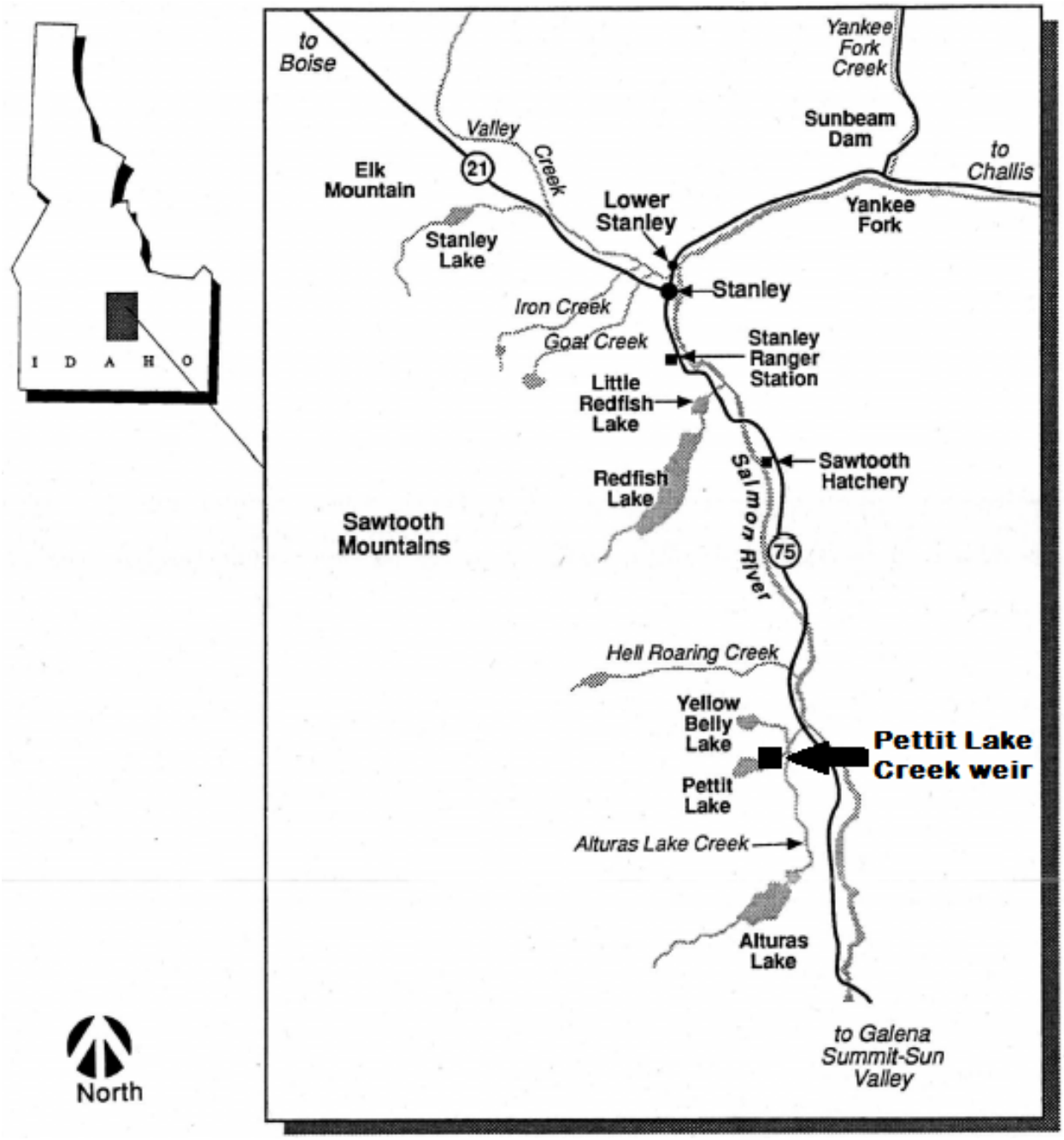

Figure 2. Location of Pettit Lake Creek weir.

1.3.1 Proposed Facility Descriptions and Construction Requirements

1.3.1.1 Project Design

The new structure will be larger, with a new sill, new abutments, and effective vehicle access to the structure. The area of ground disturbance is anticipated at approximately 0.5 acres including a 300-foot reach of Pettit Lake Creek. As part of this construction, a temporary access road (approximately 150 feet) will be built from an existing, previously disturbed off-road parking site upstream of the current weir, and terminate at the weir site 5 feet above Pettit Lake Creek's surface elevation (Figure 3). Following construction, the access road width will be reduced to 50 inches, to allow for all-terrain vehicle (ATV) access while restricting vehicle access (consistent with the SNF travel management plan). The facility currently has no vehicle access or functional work area.

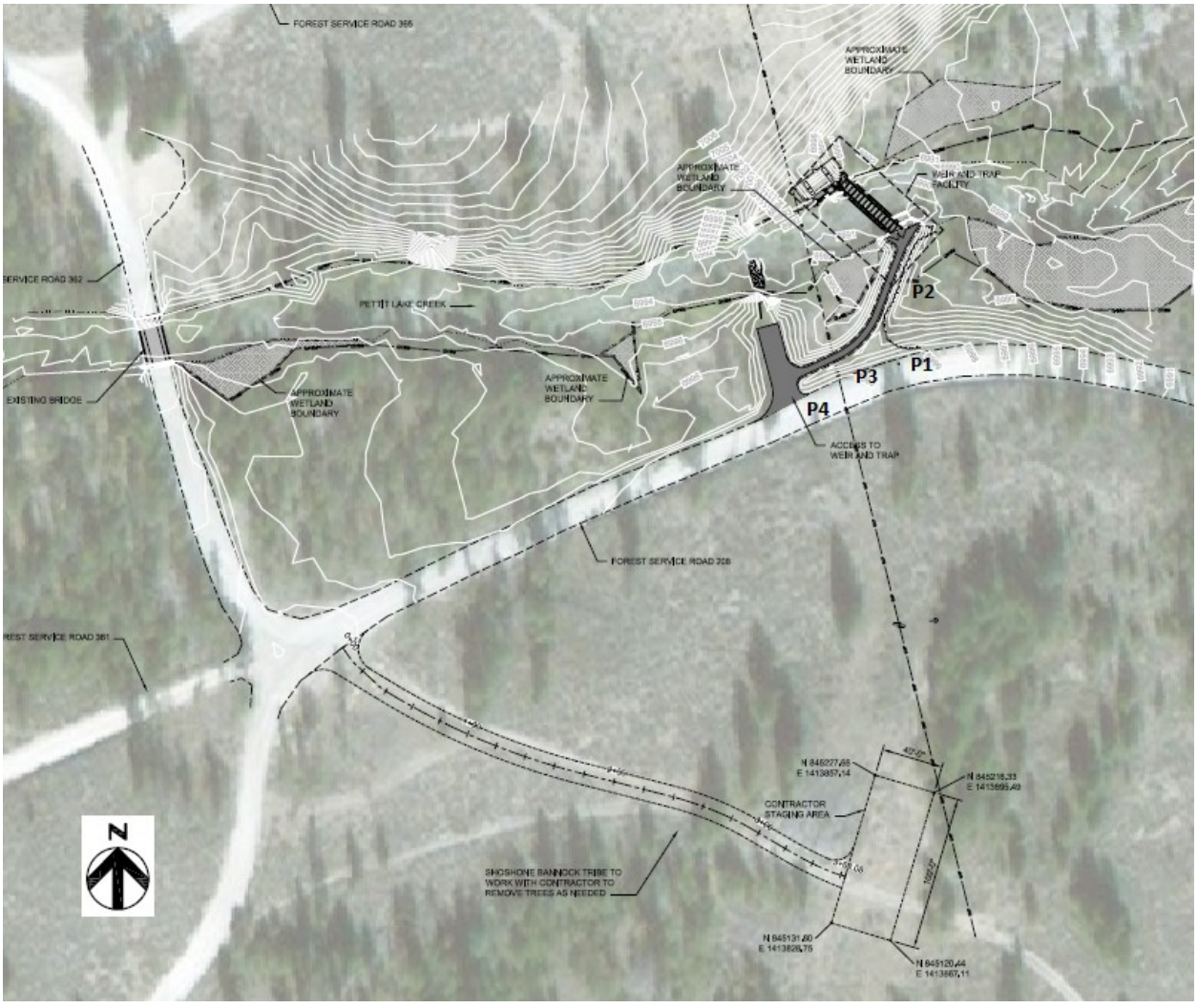

Figure 3. Alignment of proposed weir, access, work area, and staging area.

The staging area is proposed on previously disturbed ground south of the weir site as shown in Figure 3. It will be accessed from the junction of Forest Roads 208 and 362, then along a closed access road approximately 420 feet to the southeast.

1.3.1.2 Project Access and Staging Area

A spur to the weir site will be constructed from Forest Road 208, starting at an existing parking spur atop the right bank abutment fill of the abandoned IDFG barrier site. The spur will incorporate a work area and temporary parking area, as shown in Figure 4, to provide an off-road parking location while operating the weir. The surface will be graded, compacted, and include a layer of gravel to maintain the traveling surface and minimize erosion. Gravel from certified weed free sources at Champion Creek will be used. Disturbed areas will be monitored by the SNF botanist for 3 years to ensure they remain weed free. Following construction, the access road width will be reduced to 50 inches, to allow for ATV access while restricting passenger vehicles.

Spur road construction will include repair of an existing wash-out that has flanked the existing weir's right bank abutment. The washout occurs annually and has been caused by the weir's improper design.

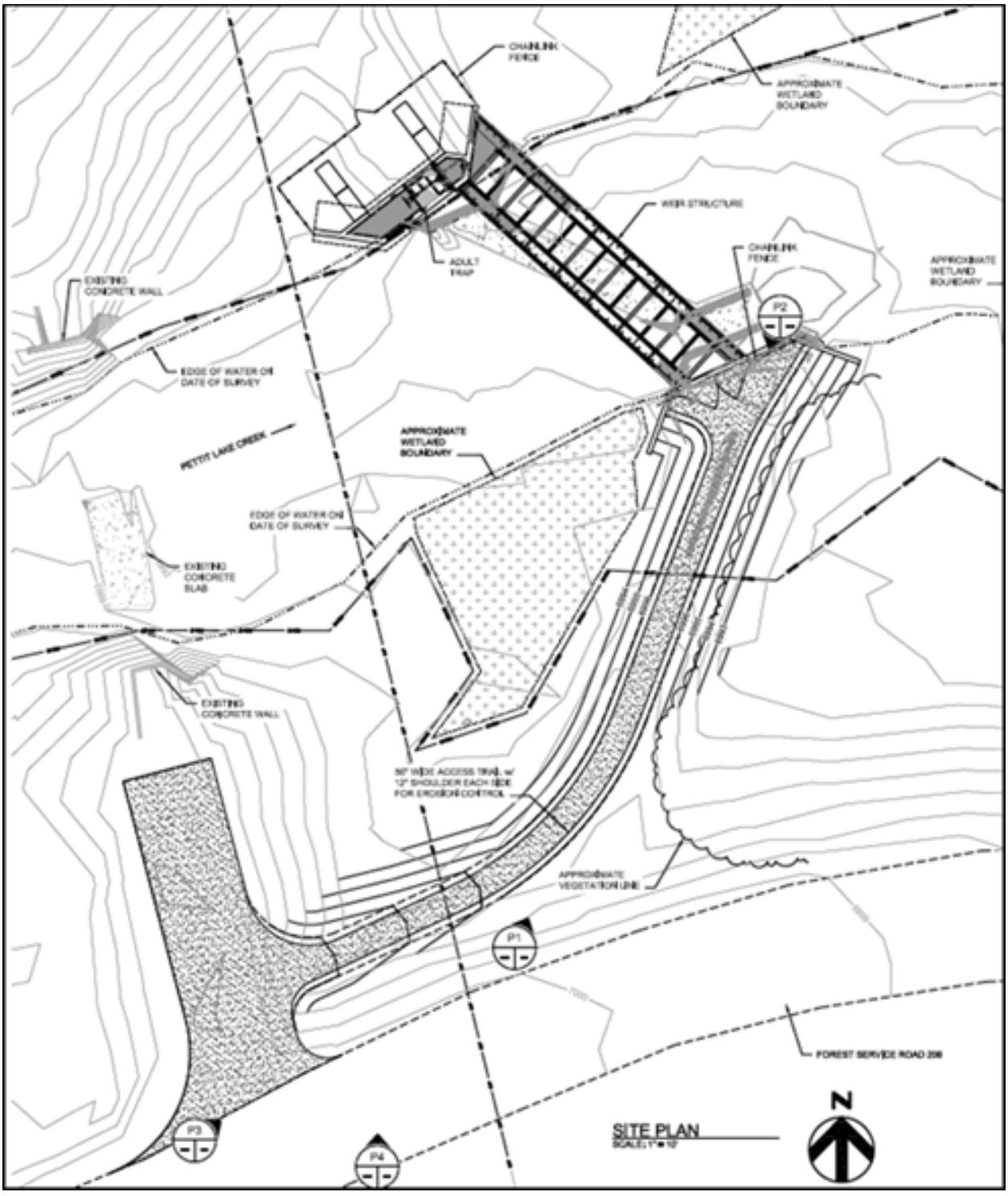

Figure 4. Proposed weir access and layout.

The staging area will be located in a previously-disturbed site near a log deck along Forest Road 362, approximately 375 feet south of the Weir and at least 330 feet from Pettit Lake Creek. The staging area will be used to park construction equipment, store materials and supplies during construction, and temporarily store waste until its ultimate disposal off SNF land at an approved

location. Upon project completion, the site will be restored (de-compacted, planted, and treated for invasive plants), and the access barricaded as it had been prior to this action.

1.3.1.3 Project Layout

The general layout and proposed facility is illustrated in Figure 4 with the new structure constructed generally within the footprint of the existing structure. The design will include a bridge weir within the creek and an adult trap and holding box on the left bank (Figure 5) in preparation for anticipated sampling needs from increased Snake River sockeye spawning returns.

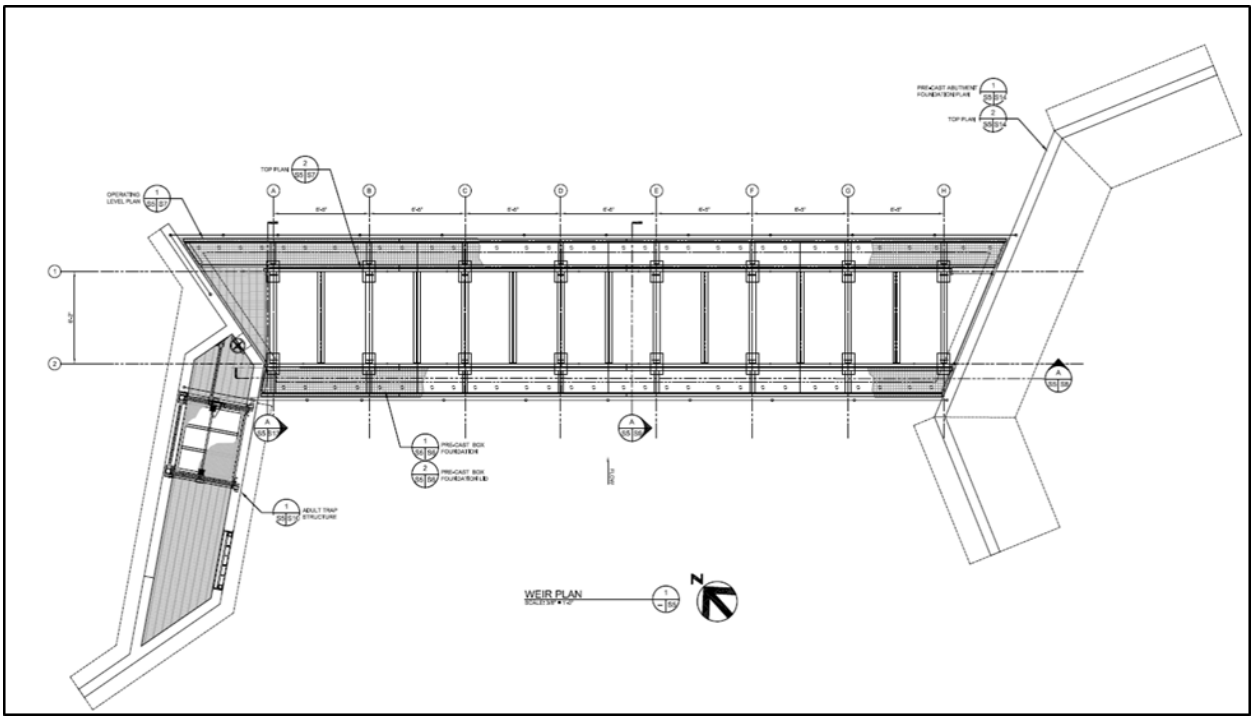

Figure 5. Proposed weir design.

1.3.1.4 Sill (Foundation of Weir)

The weir sill, per NMFS' criteria, will be a uniform concrete surface. The uniform sill provides a solid surface against which the weir panels can seal to prevent fish from going under the trap. The sill consists of a precast concrete box-like section that is filled with native substrate and a lid secured to the channel section. This design's benefit is that the sections and lid can be precast and delivered to the site for easy installation. No field cure time is needed for the concrete. The precast units have a connection system that will allow for ease in securing the lid to the vault. The vault will be constructed with weep holes to prevent buoyancy forces from misaligning the structure over time.

To install the sill, a trench will be excavated in the dewatered channel and the base compacted. The channel sections will be placed in the excavation and the excavation spoil placed back into

the box. The lid will then be placed on top of the channel sections and secured. The structural steel members of the bridge weir will then be anchored to the concrete lid.

1.3.1.5 Bridge Weir

The bridge weir will be fabricated off-site in sections and shipped to the site. The sections will either be connected on the sill or connected on the bank and then set in place with a crane. The structure will be connected to the sill and the abutments. Generally, the bridge span from abutment to abutment is 44 feet long and stands approximately 12 feet high from the bed of the stream. The structural member will be placed within three-quarter inches of the abutment to prevent fish escapement. The bridge will be set at a 10-degree angle perpendicular to the flow, and sloped to achieve a 1-inch drop from the right to the left bank to guide adult sockeye to the trap. The bridge will have a rectangular cross-section with walkways on both upstream and downstream sides of the weir. The bridge will have seven "bays" each housing a smolt collection box and a picket panel. Security gates will be placed at both ends of the bridge weir and adult trap box to prevent public access, and will be designed to meet SNF visual requirements.

1.3.1.6 Smolt Collection Box Design

The boxes will be approximately 6.4 feet wide by 6.2 feet long. The top of the boxes will have a "bar grader" composed of half-inch round sorting bars along the full length with a 1-inch clear spacing. This will allow the smolts to fall through and into the box while debris and larger fish are passed over the bars downstream. Boxes will be aluminum with an anodized finish. A stop log slot will be located immediately upstream of the box to convey the water and smolts into the box. A neoprene flap will be installed to seal the gap between the stop log and the smolt box. The smolt box will be mounted to a winch and pulley system to allow positioning of the box within the bay. During smolt removal, the winch and pulley system will allow the operator to lift each box above the walkway level. Perforations in the side walls of the smolt box will allow water to pass out of the box as it is lifted. During non-collection periods, the boxes can be completely removed or could be secured in the up position for storage, above the 100-year flood level.

The smolt trap is designed to capture a sub-sample of the fish migrating downstream. It is designed to sample only the top 7 to 10 inches of the water column, and will not span the entire width of the stream; upstream and downstream fish passage will be provided at all times below and around the trap boxes when they are in the trapping position.

1.3.1.7 Adult Collection/Picket Panel Weir Design

For adult collection, the smolt boxes will be secured in the up position above the 100-year flood elevation or removed entirely. Picket panels (approximately 6.25 feet wide and 2.33 feet tall) will be placed into a 45-degree guide slot. The guide slot will extend from the walkway down to the stop log slot at the leading edge of the weir. The picket panels will rest on the concrete sill, creating a secure seal to prevent fish from escaping underneath the panel. One short stop log will be placed in front of the panel to ensure that this seal was completed. The picket panels will be fabricated from aluminum with a tube or angle frame and three-quarter inch diameter bars for the

pickets. The clear spacing between the pickets will be five-eighths of an inch. Each panel will be set into the guide slot and lowered into position.

1.3.1.8 Adult Trap Entrance, Water Intake, and Coarse Trash Rack

The adult trap entrance will consist of an 18-inch-high by 12-inch-wide opening to meet NMFS guidance criteria for a ladder-type orifice. The water supply for the holding box will be diverted from the stream at the upstream end of the structure through a coarse trash rack[2]. The intake opening will be 2 feet tall and 4 feet wide. The sill of the opening will be approximately 6 inches above the substrate to help prevent substrate from entering the holding box. At high flows, during non-collection periods, a solid plate can be inserted into the guide slot to prevent substrate from entering the holding box and trap. Water flow through the box and trap will be controlled by the tail water downstream of the weir and the entrance orifice. The coarse trash rack will meet NMFS guidance criteria by providing a 10-inch clear spacing between the trash rack bars. The trash rack, installed over the intake opening in a guide slot, will be fabricated out of aluminum with a rectangular frame and 2-inch diameter tube or pipe for the rack members. The rack will be parallel to the flow, allowing sweeping flows to aid in removal of larger debris. It will be manually cleaned daily during the collection period.

1.3.2 Project Construction

Standard construction practices, materials, and equipment are anticipated on this project. This includes construction of a cofferdam to divert flows around the instream construction area. Additionally, work conducted on the adult trap and holding box requires the use of sloped excavations and dewatering pumps during construction. Care will be taken when working in or near Pettit Lake Creek to prevent debris, erosion, and spills from entering the waterway.

1.3.2.1. Work Schedule and Instream Work Window Color Key

The entire construction project is anticipated to take 18 weeks from start to finish (see Table 1). Within that 18 weeks there will be a 12-week (**blue**) period of work within the de-watered reach of Pettit Lake Creek. Four weeks (**tan**) of work outside of the stream will precede this 12-week "instream" work period, and two weeks (**tan)** of dry-land-work will follow it. Dry-land construction activities are anticipated to begin in early August, though non-ground-disturbing move-in and staging activities may occur in July over a 2-week (**pink**) period per SNF line officer discretion. No ground disturbing, and/or inwater work will begin until all ESA consultation, National Environmental Policy Act (NEPA), and stream alteration permits are in place.

[2] The SBT will acquire a surface water right (estimated at 1.5 cubic feet per second or less) for this non-consumptive beneficial use from the State of Idaho Department of Water Resources).

Table 1. Construction Schedule and ESA-listed fish presence in action area.

	April		May		June		July		Aug		Sept		Oct		Nov	
ESA-Listed Fish Presence in Action Area																
Adult bull trout migration[1]																
Spring Chinook salmon spawning																
Juvenile out-migration[2]																
Construction Task																
Mobilize to site[3]																
Set up erosion and sediment controls[3]																
Clear and grub construction footprint																
Construct access road to weir																
Install bypass																
Install cofferdams																
Dewater/fish salvage																
Demolish existing weir																
Excavate for weir and abutments																
Place sill boxes and abutments																
Form and pour trap and holding box																
Install prefab weir structures																
Install smolt boxes and picket panels																
Install grating, handrails, fencing, etc.																
Remove cofferdam/re-water																
Final grading																
Site rehabilitation																
Operations																
Spring juvenile sockeye trapping																
In-migrating adult sockeye trapping																

[1] Adult pre-spawn migration to spawning areas in light green; Adult out-migration in dark green.
[2] All ESA-listed juvenile salmonids potentially present (sockeye, bull trout, and Chinook).
[3] This non-ground-disturbing work may be authorized by Sawtooth National Recreation Area (SNRA) line officer to begin in July; otherwise, early August.

1.3.2.2 Construction Sequencing of Bridge Weir and Adult Trap/Holding Box

Contractors will mobilize to the site, set up all erosion and sediment controls, then clear and grub the site where necessary. The stream bypass (two 30-inch diameter, 117-foot long pipes; one of corrugated metal to potentially provide for fish passage, the other smooth plastic to accommodate excess water), will be installed along the right bank at a 2.1% slope. The smooth pipe will be screened to discourage fish from attempting to pass through it; the corrugated pipe will be oriented to be readily locatable to migrating fish. Cofferdams will be installed to route flows out of the current channel and into the bypass. Cofferdams will be constructed using one-yard soil sacks filled with washed gravel, or by using a water-filled bladder dam. Bypass pipes are designed to provide for downstream fish passage only. To provide upstream passage would have required a much larger pipe, which would have required digging much deeper into the bank with excessive damage to both upstream and downstream wetlands, and construction of a new access spur.

Once the site is de-watered, the existing weir will be demolished and removed. The foundations for the new concrete sill and abutments will be excavated and prepared for precast concrete structure placement. All precast concrete and structural components will then be placed and

abutment walls poured. The slab and walls for the holding box and associated structures will then be formed and poured.

Prefabricated bridge structure sections will be installed next. Some flexibility will be included in the design and fabrication to allow for minor adjustments to ensure that the structure is installed correctly. The smolt boxes and picket panels, will also be prefabricated and will be installed as the structural components are completed.

The trap and adult holding box and associated structures will be constructed concurrently with the bridge weir. Excavation of the foundation for the box will begin approximately 1 week after work begins. Once cured, the trap, holding box, access grating, and handrails will be installed.

The cofferdam will then be removed and final grading and site rehabilitation will occur. Once in operation, adjustments or modifications to the structure or its smolt trapping features is anticipated (as needed) to ensure proper functioning of the collection systems and to prevent unforeseen harm or lethal effects on fish. Operational adjustments are addressed in existing section 10 permits.

1.3.2.3 Construction Equipment

The construction sequencing and timeframes outlined above assumed that the following equipment will be mobilized to the site: (1) 300-class excavator; (2) 4-cubic-yard front-end loader; (3) 42-inch drum roller; (4) 140 road grader; (5) water truck; (6) three to four de-watering pumps (with screened intakes); and (7) generator(s). Only the excavator will operate within the de-watered creek bed/footprint of the site. Left bank disturbance will be limited to the installation of the new abutment and construction of the adult trap and holding box. The front-end loader, roller, grader, and water truck will operate only on previously compacted road and parking surfaces.

1.3.2.4 Hazardous Material Handling

Hazardous material, if needed for construction, will not be used in locations where natural drainage or wash water and windblown materials can readily enter Pettit Lake Creek. Storage and use of these materials (e.g., fuel, solvents, hydraulic fluids), if used, will be at the staging area, 330 feet from Pettit Lake Creek. All use will be in compliance with the required Spill Prevention Plan (see Section 1.3.3 Conservation Measures). Off-site disposal (off SNF lands) of all hazardous and waste material is required of contractors and operators.

1.3.2.5 Public Access and Safety

There is significant public recreational use near the proposed facility at Pettit Lake, including a campground, boat launch, trailhead, and numerous recreational residences. Access to these recreational destinations is along Forest Road 208 and will bring the public within view of the rebuilt facility. Public information signs will be placed along Forest Road 208, and adjacent to the facility, to inform the public of the facility's purpose and operations. The SBT will work with the SNF to provide an informative interpretive experience for the passing public.

Temporary restriction of public access, during portions of the day throughout the construction period, will be required to move large equipment in and out of work area, primarily at the beginning and end of the workday. Fencing for public safety and facility security will encompass the entire structure. Security gates will be installed for the protection of both the public and the fish at the weir at both ends of the fencing.

1.3.3 Conservation Measures

Because the project involves working in and near Pettit Lake Creek, near Pettit Lake, and will place and remove fill below the ordinary high water mark (OHWM), proposed conservation measures focus on decreasing chemical contamination, minimizing disturbance to fish, and eliminating erosion and subsequent sedimentation effects during construction. The Corps will require the Applicant (and/or SNF authorized permittee) to comply with applicable 2017 Nationwide Permit (NWP) General Conditions, NWP Regional Conditions, and the Idaho Department of Environmental Quality's 401 Water Quality Certification Conditions for the 2017 NWPs. The following conservation measures will be applied during all phases of construction:

1.3.3.1 Site Preparation

1) Use sediment barriers such as filter fabric fences; weed-free straw matting/bales or fiber wattles as necessary in all work areas sloping toward Pettit Lake Creek to intercept any surface flow that might transport sediment to the stream. Sediment barriers will be biodegradable and will be removed when no longer needed.

    a) Prior to starting work, a temporary filter fabric fence will be installed between all streamside disturbances and the creek to prevent sediment from entering the stream. Accumulated sediments will be removed during the project and prior to removing the filter fence after completion of work.

    b) The type of filter fabric used will be based on soil conditions at the site: for soils that will pass U.S. standard sieve 200, the equivalent opening size (EOS) will be selected to retain 85% of the soil; for all other soil types, the EOS will be no larger than U.S. standard sieve 100.

    c) For standard-strength filter fabric, a wire mesh support fence will be fastened securely to the upslope side of the posts and the fabric stapled or wired to the mesh. If extra-strength fabric is used, the wire mesh fence may be eliminated.

    d) All barriers will be removed once their function is no longer needed.

2) All temporary erosion controls will be in place and appropriately installed downslope of applicable project activities until site restoration is complete.

3) Any large wood, native vegetation, weed-free topsoil or native material displaced during construction will be stockpiled for use in site restoration.

4) Flows and weather conditions will be monitored daily for events that may cause extremely high flows. In such events, all equipment will be removed from the work site until flows have abated.

1.3.3.2 Water Quality Protection

1) The contractor will develop an adequate, site-specific Spill Prevention and Countermeasure or Pollution Control Plan (Spill Plan) which will include: site plan and narrative describing methods of erosion/sediment control; methods for confining/removing/disposing of excess construction materials and measures for equipment washout facilities; a spill containment plan; and, measures to reduce/recycle hazardous and non-hazardous wastes.

2) The Spill Plan will include: notification procedures, specific cleanup and disposal instructions for different products, quick response containment and cleanup measures, proposed methods of disposal of spilled materials, and employee training on spill containment.

3) Uncured concrete and form materials will be treated as a hazardous material with measures taken to avoid contact with the active stream channel. Concrete must be sufficiently cured or dried (48–72 hours depending on temperature) before coming into contact with stream flow.

4) Materials for containment and cleanup will be available onsite during pre-construction, construction and restoration phases of the project.

5) When reintroducing streamflow to a dewatered stream reach or conducting work near stream/instream channel, turbidity will be monitored every 30 minutes at the fully mixed zone. If turbidity levels approach 50 nephelometric turbidity units (NTU) over background, work must cease immediately and actions taken to reduce turbidity must occur before continuing to reintroduce streamflow or work within the stream channel. Monitoring of turbidity levels will continue until levels reduce and reflect near to background levels during the construction timeframe.

6) Equipment will only use hydraulic fluid certified as non-toxic to aquatic organisms.

7) All heavy equipment will be washed prior to entry onto SNF-managed lands. Equipment used for this project will be free of external petroleum-based products. Accumulations of soil or debris will be removed from the drive mechanisms (wheels, tires, tracks, etc.) and undercarriage of equipment prior to its use within 150 feet of any waterbody.

8) Vehicle staging, cleaning, maintenance, refueling, and fuel storage will only occur at the designated staging area.

9) All stationary power equipment such as generators, cranes, or stationary drilling equipment operated within 150 feet of any waterbody will be diapered to prevent leaks unless suitable containment is provided to prevent potential spills from entering the water.

10) All waste material such as construction debris, silt, excess dirt or overburden resulting from this project will be deposited above the limits of floodwater in an approved upland disposal site off SNF lands.

11) Appropriate containers for proper disposal of construction materials will be maintained in the staging areas before being taken to an approved facility off SNF lands.

12) Extreme care will be taken during removal of the existing structure and new construction to ensure that no petroleum products, hydraulic fluid, fresh cement, sediments, sediment-laden water, chemicals, or any other toxic or deleterious materials are allowed to enter or leach into the waterbodies.

1.3.3.3 Construction Operations

1) Equipment and materials will only be staged at the designated staging area; and only during SNF the pre-approved timeframe (Table 1).

2) Operate machinery, to the extent feasible, from the top of the streambank along adjacent uplands and previously cleared areas.

3) Topsoil from the locations of the new temporary access road and the new abutment construction sites will be stockpiled within range of use for site restoration following construction activities.

4) Fuel storage and equipment refueling will only occur in the designated staging area and consistent with best management practices. Staging area will be equipped with appropriate spill containment systems.

5) Water trucks/trailer will apply water to the construction area for dust abatement daily (as needed). All pump intakes will meet NMFS' screen criteria (NMFS 2011) and water will only be pumped from SNF-approved water sources if using a fish-bearing stream.

6) All equipment will be pressure-washed and inspected prior to entering the SNF and after leaving to remove vegetation and soil that may contain noxious weed seeds. Care will be taken to inspect and clean equipment undercarriages. If this equipment leaves the project area and comes back, it will be inspected and cleaned upon return to the site.

7) Machinery will be inspected daily to identify and resolve fuel or lubricant leaks before commencing work activities.

8) Excess excavated materials will be covered and stockpiled away from the creek and flanked with sediment fencing to minimize fine sediment release into Pettit Lake Creek.

9) Excavated surplus materials will be transported off site to an approved receiving location to be determined by the contractor and approved by the SNF.

10) Protect existing riparian vegetation to the extent possible. Large trees will be avoided and protected. If a large tree must be removed, it will be uprooted and left in the floodplain with rootwad attached.

11) No trees will be cleared along the access road to the staging area outside of areas where designated trees marked by SNF staff for removal are identified.

12) Gravel for road maintenance will come from a certified weed-free source approved by the SNF.

13) No camping or overnight use is allowed at the construction site unless authorized by the permit administrator.

1.3.3.4 Instream Construction Environmental Conservation Measures

1) Conduct instream work only during the instream work window identified (and provided) in Table 1. Once all ESA consultation, NEPA, and Stream Alteration Permits are completed and in place, any changes to this "schedule" must first require prior approval by the SNF line officer before any work can commence[3].

2) Conduct excavation for installation of the weir abutments and adult trap/holding box from below the OHWM in the dry (since construction site will be dewatered and construction will occur during base flows). Operate machinery for instream construction from within the de-watered streambed or from previously compacted road and parking surfaces only. No construction equipment will operate atop the left bank.

3) No equipment will operate in active stream flow.

4) Place cofferdam materials (1-yard soil sacks or a water-filled bladder dam) using an excavator working from the right streambank and stockpile cofferdam materials on top of the bank.

5) Tether soil sacks, if used, to prevent cofferdam failure in the event that high flows occur during implementation.

6) Comply with requirements for discharges to waters of the United States under the CWA, as administered by the Corps.

[3] Any change to the proposed schedule must be evaluated to determine if reinitiation of ESA consultation may be required prior to being authorized by any of the federal action agencies.

7) Use diesel or electric sump pumps if needed to capture seepage flow from cofferdam areas. Pumps must be contained and screened as per NMFS criteria to avoid intake of juvenile fish.

8) Capture leakage under the cofferdam, if possible, from the internal upstream face of the cofferdam (using a small caged pump or a trailer-mounted pump with a screened intake to prevent juvenile fish intake) and pump water to a temporary settling basin, bermed pond, a Baker tank or similar structure, or geotextile bags. Biofiltration materials will be used to return pumped water to the creek (e.g., filtration through straw bales). The settling pond, or tank, will be located at a site approved by the SNF.

9) Route silt-laden seepage water that is not feasibly captured to a settling system prior to discharge back to the creek per permit requirements.

10) Implement fish salvage and release operations per NMFS guidance during dewatering for construction of instream project elements as follows:

    a) Ensure safe handling of all fish by having an SBT fishery biologist onsiten who is experienced with work area isolation, to conduct or supervise any required capture and release operation.

    b) Guide adult fish from the area behind the cofferdams to areas upstream or downstream of the construction area.

    c) Use beach seines (herding) and sanctuary nets (solid-bottomed) as part of any dewatering process to herd fish or capture and release (water to water transfer) all fish observed in the area.

    d) Electrofishing equipment will be used for fish salvage, and NMFS' electrofishing guidelines (NMFS 2000) will be followed.

    e) An SBT fisheries biologist will record species and lengths of any ESA-listed fish mortalities encountered, and provide data to NMFS.

11) The dewatered area will be pre-washed to settle fine sediment prior to rewatering the work site.

12) Install and remove cofferdams over several hours to allow streamflow to be reduced and re-watered gradually.

1.3.3.5 Restoration

1) Upon completion of all construction activities, all temporary structures, devices, materials, or equipment will be completely removed from the site and all excess spoils and/or waste materials properly disposed of in compliance with federal, state, and local regulations.

2) To prevent future erosion and stem the invasion of noxious weeds, disturbed areas will be seeded with a native seed mix that will provide wildlife benefit and erosion control. This seed mix will be approved in advance by the SNF botanist.

3) Disturbed areas will be replanted upon project completion using native plant species in a site restoration plan approved by the SNF botanist.

4) The access road to the staging area will be barricaded at the junction of Forest Roads 208 and 362.

5) Rehabilitate temporary roads, staging areas, and the worksite upon departure. Mechanical equipment will be used to de-compact the soil and barriers will be installed to prevent off-road vehicle use. Slash and organic debris (duff and twigs) will be redistributed to aid in organic soil recovery and minimize visual unsightliness.

6) Plant streambanks with species approved by the SNF botanist in areas where riparian shrubs have been removed.

7) Bank stabilization material (i.e., willow clumps, revetment, and rootwads) will be immediately installed following completion of work at disturbed areas upstream and downstream of the weir to withstand 100-year peak flows. Stream gravels, round cobbles, and riprap will not be used as exterior armor. Damaged banks will be restored to a natural slope pattern and profile that is suitable for establishment of permanent woody vegetation.

8) Return displaced substrates to pre-disturbance condition (slope, composition, etc.).

9) Disturbed areas and areas of soil spoils will be graded and covered with at least 2 inches of compost.

10) Coordinate with the SNF Invasive Plant Species program manager for proper noxious weed treatment of project areas.

1.3.3.6 Facility Operational Environmental Conservation Measures[4]

1) Routine maintenance to the weir facility will be conducted during low flow periods in the summer (primarily August), when high instream temperatures minimize use by ESA-listed fish.

2) If non-routine maintenance is necessary outside of the low flow periods, the SBT will consult with the SNF who will in turn consult with NMFS and the FWS as necessary to ensure compliance with federal, state, and local regulations for instream work.

[4] Under the ESA, facility operation and maintenance are part of the environmental baseline as they have previous consultation (see NMFS No. WCR-2017-6413 and NMFS 2020). For this opinion, NMFS has not considered future operation and maintenance effects as they are not consequences of the federal action.

3) Operations will comply with terms and conditions of the SNF SUP.

1.3.3.7 Monitoring Actions

1) Conduct upstream turbidity monitoring prior to construction to determine baseline turbidity. Baseline data will be used to monitor water events that may occur during construction.

2) Conduct turbidity monitoring downstream of construction activities as a condition of the CWA Section 401 Water Quality Certification.

3) Install a temporary turbidity monitoring station approximately 600 feet downstream during construction to record instantaneous turbidity measurements, as required for the CWA Section 404 permit/401 certification, as well as ESA section 7 consultation documents.

4) Project rehabilitation monitoring and evaluation will occur for 2 years. Monitoring shall focus on 75% recovery of desired vegetative cover in riparian habitats and 70% recovery of desired native perennial vegetation in uplands. If vegetative cover is not achieved within 2 years, additional rehabilitation measures will occur.

5) Replace planted shrubs and trees that are not surviving with similar, suitable native species approved by an SNF botanist.

6) Under the annual operating plan, there may be an opportunity to plant native trees in order to further screen the facility for visual quality but will monitored and coordinated between the SNF and SBT as necessary and appropriate.

These conservation measures are integral components of the proposed action and intended to reduce or avoid adverse effects on listed species and their habitats. All proposed project activities will be completed consistent with these measures.

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 non-discretionary reasonable and prudent measures (RPMs) and terms and conditions to minimize such impacts.

The SNF, the lead federal action agency, determined the proposed action is not likely to adversely affect Snake River sockeye salmon. Our concurrence is documented in the "Not Likely to Adversely Affect" Determinations section (Section 2.12). The SNF also determined the action will have "no effect" on Snake River Basin steelhead. "No effect" determinations under section 7 of the ESA are the province of action agencies, which may make such findings without seeking the agreement of NMFS. It is NMFS procedure to not provide any written concurrence with a federal action agency's determination that its action will have "no effect" on any ESA-listed species or designated critical habitat. Therefore, this species is not discussed further in this opinion.

2.1 Analytical Approach

This opinion includes a jeopardy 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 CFR402.02). Therefore, the jeopardy analysis considers both survival and recovery of the species.

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

The designations of critical habitat for species use the term primary constituent elements (PCE) or essential features. The 2016 critical habitat regulations (50 CFR 424.12) replaced this term with physical or biological features (PBFs). The shift in terminology does not change the approach used in conducting a "destruction or adverse modification" analysis, which is the same regardless of whether the original designation identified PCEs, PBFs, or essential features. In this opinion, we use the term PBF to mean PCE or essential feature, as appropriate for the specific critical habitat.

The 2019 regulations define effects of the action using the term "consequences" (50 CFR 402.02). As explained in the preamble to the regulations (84 FR 44977), that definition 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 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 to the proposed action.

2.2 Rangewide Status of the Species and Critical Habitat

This opinion examines the condition of each species that would be adversely affected by the proposed action [i.e., Snake River spring/summer Chinook salmon evolutionarily significant unit (ESU)]. 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" as described in 50 CFR 402.02. The opinion also examines the condition of critical habitat for Snake River spring/summer Chinook salmon, Snake River sockeye salmon, and Snake River Basin steelhead throughout the designated area, evaluates the conservation value of the various watersheds and coastal and marine environments that make up the designated area, and discusses the function of the PBFs that are essential for the conservation of the species. Given similarity in PBFs between the species, critical habitat is discussed in general terms and applies to each of the three designations identified.

NMFS expresses the status of a salmonid ESU 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% risk of extinction within 100 years and "highly viable" as less than a 1% risk of extinction within 100 years. A third category, "maintained," represents a less than 25% risk within 100 years (moderate risk of extinction). To be considered viable, an ESU should have multiple viable populations so that a single catastrophic event is less likely to cause the ESU to become extinct, and so that the ESU may function as a metapopulation that can sustain population-level extinction and recolonization processes (ICTRT 2007). The risk level of the ESU is built up from the aggregate risk levels of the individual populations and major population groups (MPGs) that make up the ESU.

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; 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 informs NMFS' determination of whether additional risk will appreciably reduce the likelihood that the ESU will survive or recover in the wild.

Table 2 summarizes the status and available information on the Snake River spring/summer Chinook salmon ESU, based on the detailed information on the status of individual populations, and the species as a whole provided by their recovery plan (NMFS 2017) and status review update (NMFS 2016). These two documents are incorporated by reference here. The species remains threatened with extinction due to many individual populations not meeting recovery plan abundance and/or productivity targets.

Table 2. Most recent listing classification and date, status summary (including recovery plan reference and most recent status review), and limiting factors for species considered in this opinion.

Species	Listing Status	Status Summary	Limiting Factors
Snake River Spring/summer Chinook Salmon	Threatened 6/28/05	This evolutionarily significant unit (ESU) comprises 28 extant and four extirpated populations, organized into five major population groups (MPGs), none of which are meeting the viability goals laid out in the recovery plan (NMFS 2017). All except one extant population (Chamberlin Creek) are at high risk of extinction (NWFSC 2015). Most populations will need to see increases in abundance and productivity in order for the ESU to recover. Several populations have a high proportion of hatchery-origin spawners—particularly in the Grande Ronde, Lower Snake, and South Fork Salmon MPGs—and diversity risk will also need to be lowered in multiple populations in order for the ESU to recover (NWFSC 2015). Overall adult returns have remained very low over the past 3 years (Nez Perce Tribe 2018; Nez Perce Tribe 2019), and the trend for the most recent 5 years (2014–2018) has been generally downward (ODFW and WDFW 2019).	• Adverse effects related to the mainstem Columbia and Snake River hydropower system and modifications to the species' migration corridor. • Degraded freshwater habitat, including altered streamflows and degraded water quality. • Harvest-related effects. • Predation in the migration corridor. • Potential effects from high proportion of hatchery fish on natural spawning grounds.

The proposed action will occur in and adjacent to Pettit Lake Creek, a perennial tributary to the Alturas Lake Creek, which then flows in the upper reaches of the Salmon River. For Snake River spring/summer Chinook salmon, the area is part of the Salmon River Upper Mainstem Population in the Upper Salmon River MPG.

The action would affect Snake River spring/summer Chinook salmon in the Salmon River Upper Mainstem (above Redfish Lake Creek) population. This spring-run population is one of three

large populations in the Upper Salmon River MPG. Its habitat was historically very productive, and it remains the highest abundance/productivity population in the MPG (NMFS 2017). The proposed recovery goal for this population is Highly Viable (1% risk of extinction over 100 years) (NMFS 2017). The minimum population abundance is 1,000 spawners (10-year geomean) at approximately 2.30 recruits per spawner. As of 2017, the 10-year geomean adult abundance was just 419 fish at 1.22 recruits per spawner (NMFS 2017), well below required levels, and the population is at "high risk". There is some genetic evidence that fish in the Alturas Lake Creek major spawning area, inclusive of the action area, could be distinct from other parts of the population (NMFS 2017). The Salmon River Upper Mainstem population remains at high risk due to low abundance/productivity.

The Salmon River Upper Mainstem Population has very low spatial structure risk since spawning occurs in all three major spawning areas. However, the largest number of spawners occur from the Sawtooth Fish Hatchery Weir to Redfish Lake Creek and only two tributaries (Pole and Alturas Lake Creek) regularly support spawning outside the mainstem Salmon River. Diversity risk is moderate due to risk of homogenization stemming from the large Sawtooth Hatchery program operating here. Substantial numbers of hatchery fish spawn in this population [average of 25% upstream of the Sawtooth Hatchery Weir (ICTRT 2010)]. Improvement in abundance and productivity and reduced genetic diversity risk are necessary for the population to reach the desired highly viable status.

Table 3 summarizes designated critical habitat for Snake River Basin steelhead, Snake River spring/summer Chinook salmon, and Snake River sockeye salmon, based on the detailed information on the status of critical habitat throughout the designation area provided in the recovery plan for each species (NMFS 2017; NMFS 2015) and the status review (NMFS 2016), which is incorporated by reference here. NMFS describes critical habitat in terms of essential PBFs of that habitat to support one or more life stages (e.g., sites with conditions that support spawning, rearing, migration, and foraging). For Snake River Basin steelhead, PBFs include water quality, water quantity, spawning substrate, floodplain connectivity, forage, natural cover, and passage free of artificial obstructions. For Snake River spring/summer Chinook salmon, PBFs include spawning gravel, water quality, water quantity, food, riparian vegetation, water temperature, substrate, water velocity, cover/shelter, space, and safe passage. For Snake River sockeye salmon, PBFs are the same as for spring/summer Chinook salmon, but also include access, and cover/shelter and space do not apply. Across the designations, the current ability of PBFs to support the species varies from excellent in wilderness areas to poor in areas of intensive human land use.

Table 3. Critical habitat, designation date, Federal Register (FR) citation, and status summary for critical habitat considered in this opinion.

Species	Designation Date and Federal Register Citation	Critical Habitat Status Summary
Snake River Spring/summer Chinook salmon	10/25/99; 64 FR 57399	Critical habitat consists of river reaches of the Columbia, Snake, and Salmon Rivers, and all tributaries of the Snake and Salmon rivers (except the Clearwater River) presently or historically accessible to this evolutionarily significant unit (ESU) (except reaches above impassable natural falls, and Dworshak and Hells Canyon Dams). Habitat quality in tributary streams varies from excellent in wilderness and roadless areas, to poor in areas subject to heavy agricultural and urban development (NMFS 2017). Reduced summer stream flows, impaired water quality, and reduced habitat complexity are common problems.
Snake River Basin steelhead	9/02/05; 70 FR 52630	Critical habitat encompasses 25 subbasins in Oregon, Washington, and Idaho. Habitat quality in tributary streams varies from excellent in wilderness and roadless areas, to poor in areas subject to heavy agricultural and urban development (NMFS 2017). Reduced summer stream flows, impaired water quality, and reduced habitat complexity are common problems.
Snake River Sockeye salmon	12/28/93; 58 FR 68543	Critical habitat includes the migration corridor from the Pacific Ocean upstream through and including the Columbia River to the Snake River upstream to the Salmon River upstream to the five Sawtooth Valley lakes (including the lake inlets and outlet streams). Habitat quality in the five lakes is generally excellent as most headwater areas are designated wilderness. Habitat quality through the most of the migration corridor has been heavily degraded from irrigation withdrawals, hydro power development, floodplain and estuary losses in urban areas, and impaired water quality (NMFS 2015).

For all three species, the construction and operation of water storage and hydropower projects in the Columbia River basin, including the run-of-river dams on the mainstem lower Snake and lower Columbia Rivers, have altered biological and physical attributes of the mainstem migration corridor for juveniles and adults. However, several actions taken since 1995 have reduced the negative effects of the hydrosystem on juvenile and adult migrants. Examples include providing spill at each of the mainstem dams for smolts, steelhead kelts, and adults that fall back over the projects; and maintaining and improving adult fishway facilities to improve migration passage for adult salmon and steelhead.

2.2.1 Climate Change Implications for ESA-listed Species

One factor affecting the rangewide status of Snake River salmon and steelhead, and aquatic habitat at large is climate change. Several studies have revealed that climate change has the potential to affect ecosystems in nearly all tributaries throughout the Snake River (Battin et al. 2007; ISAB 2007). While the intensity of effects will vary by region (ISAB 2007), climate change is generally expected to alter aquatic habitat (water yield, peak flows, and stream temperature). As climate change alters the structure and distribution of rainfall, snowpack, and glaciations, each factor will in turn alter riverine hydrographs. Given the increasing certainty that climate change is occurring and is accelerating (Battin et al. 2007), NMFS anticipates salmonid

habitats will be affected. Climate and hydrology models project significant reductions in both total snow pack and low-elevation snow pack in the Pacific Northwest over the next 50 years (Mote and Salathé 2009) changes that will shrink the extent of the snowmelt-dominated habitat available to salmon. Such changes may restrict our ability to conserve diverse salmon life histories.

In the Pacific Northwest, most models project warmer air temperatures, increases in winter precipitation, and decreases in summer precipitation. Average temperatures in the Pacific Northwest are predicted to increase by 0.1 to 0.6°C (0.2°F to 1.0°F) per decade (Mote and Salathé 2009). Warmer air temperatures will lead to more precipitation falling as rain rather than snow. As the snow pack diminishes, seasonal hydrology will shift to more frequent and severe early large storms, changing stream flow timing which may limit salmon survival (Mantua et al. 2009). The largest driver of climate-induced decline in salmon populations is projected to be the impact of increased winter peak flows, which scour the streambed and destroy salmon eggs (Battin et al. 2007).

Higher water temperatures and lower spawning flows, together with increased magnitude of winter peak flows are all likely to increase salmon mortality. The Independent Scientific Advisory Board (ISAB) (2007) found that higher ambient air temperatures will likely cause water temperatures to rise. Salmon and steelhead require cold water for spawning and incubation. As climate change progresses and stream temperatures warm, thermal refugia will be essential to persistence of many salmonid populations. Thermal refugia are important for providing salmon and steelhead with patches of suitable habitat while allowing them to undertake migrations through or to make foraging forays into areas with greater than optimal temperatures. To avoid waters above summer maximum temperatures, juvenile rearing may be increasingly found only in the confluence of colder tributaries or other areas of cold water refugia (Mantua et al. 2009).

Climate change is expected to make recovery targets for salmon and steelhead populations more difficult to achieve. Climate change is expected to alter critical habitat by generally increasing temperature and peak flows and decreasing base flows. Although changes will not be spatially homogenous, effects of climate change are expected to decrease the capacity of critical habitat to support successful spawning, rearing, and migration. Habitat action can address the adverse impacts of climate change on salmon. Examples include restoring connections to historical floodplains and freshwater and estuarine habitats to provide fish refugia and areas to store excess floodwaters, protecting and restoring riparian vegetation to ameliorate stream temperature increases, and purchasing or applying easements to lands that provide important cold water or refuge habitat (Battin et al. 2007; ISAB 2007).

2.3 Action Area

"Action area" means all areas to be affected directly or indirectly by the federal action and not merely the immediate area involved in the action (50 CFR 402.02). The action area includes: Pettit Lake Creek and its incised floodplain, from the location of the current weir upstream to Pettit Lake (~0.25 miles), and downstream 1.2 miles to its confluence with Alturas Creek (Figure 6 and Figure 7). The access route and staging area are also included in the action area.

The areas directly affected by the action are displayed in the yellow outline in Figure 6 and Figure 7, below. This area includes:

- All areas that will be disturbed by the proposed facility construction on and near the banks of Pettit Lake Creek.

- The staging area access spur (currently closed) from its junction with Pettit Lake Creek Road (Forest Road 208) (at Forest Road 208's junction with Forest Road 362), to the staging area, a distance of 420 feet.

- The proposed staging area in the area of the log deck and clearing that is 420 feet from the Junction of Forest Road 208 and Forest Road 362 southeast along the existing closed access road to that old log deck.

The extension of the action area downstream to Pettit Lake Creek's confluence with Alturas Lake Creek is to account for the full effects of construction-generated sediment, and for the potential effects of that sediment on Pettit Lake Creek.

Figure 6. Action Area for the Pettit Lake Creek Weir Replacement Project.

Figure 7. Areas directly affected by the proposed action (yellow outline; Action Area in orange outline).

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 designated critical habitat for Snake River spring/summer Chinook salmon, Snake River Basin steelhead, and Snake River sockeye salmon. The action area primarily serves as migratory habitat for fish moving into or out of Pettit Lake Creek. Sockeye salmon migrate downstream in the spring, but upstream migrations are currently not possible as all adults are captured 15 miles downstream at the Sawtooth Fish Hatchery Weir and incorporated into the captive broodstock program. Although suitable spawning habitat for steelhead and Chinook salmon exists, it is not currently used. Juvenile Chinook salmon rear in the action area, but only in low numbers. A few Chinook salmon smolts are captured at the weir annually, suggesting

migration is a relevant PBF in the action area. Condition of action area habitat is discussed below.

Pettit Lake and Pettit Lake Creek, including all of the action area, are on the SNRA managed by the SNF. Overall, the SNRA is heavily used in the summer for fishing, boating, hiking, picnicking, camping, and livestock grazing. In the winter, the area is used for cross-country skiing, snowmobiling, and other outdoor activities. The SNF manages the action area for developed and dispersed recreation, fish habitat protection, and restoration.

There is little development in the Pettit Lake Creek watershed other than more than 2 dozen recreational residences around Pettit Lake and developed recreation sites [i.e., one campground (12 campsites), a boat ramp, and a day use area]. Developed recreation sites and cabin lots occupy approximately 2 miles of shoreline along the north- and south-eastern shores of the lake—nearly 50% of total shoreline.

The project site is located in a narrow, 15- to 30-foot-wide riparian zone along Pettit Lake Creek, in the lower half of the watershed. This riparian habitat is characterized by low-growing willows and Sitka alder with other small native plants as understory. Although Scattered Douglas fir, Engelmann spruce, and subalpine fir are present along Pettit Lake Creek, no mature or late-seral trees occur at the project site. Current riparian habitat is essentially undisturbed and is functioning properly.

The open road density in the lower Pettit Lake Creek watershed is approximately 2.7 miles per square mile. Forest Road 208 passes through the action area and is within about 75 feet of the stream and weir. With the exception of an upstream bridge over Pettit Lake Creek, this is as close as any road gets to Pettit Lake Creek.

Almost the entire Pettit Lake Creek watershed above Pettit Lake is designated Wilderness or Inventoried Roadless Area with very few impacts to water quality or fish habitat. Pettit Lake Creek is primarily a low-gradient meandering Rosgen (1996) ‘C’ channel. There are no irrigation withdrawals in the action area. The existing weir is a seasonal barrier to fish passage when in operation in the spring. During weir operation, juvenile sockeye salmon are occasionally found impinged on the current weir and those fish are lost from the population. Stream conditions there are believed to be near natural conditions.

Historically, the creek was likely affected by heavy sheep grazing throughout the watershed, and the fish populations were affected by the gamefish actions of the mid-20th century (e.g., IDFG’s roughfish barrier) and introductions of non-native fish. Today, most of the stream is believed to be in near-natural conditions with the exception of the existing weir and the remnant abutments and sill of the removed rough fish barrier. The abutments of that barrier restrict stream flow into a narrower channel than might occur naturally, and the remnant segment of sill directs that flow toward the left bank. Localized bank erosion has occurred at the current weir due to the structure’s inappropriate size diverting flood flows over the right bank. This is a minor sediment source to the action area. Below the existing weir, the stream is again controlled by natural features.

A thorough description of the fish population and environmental baseline conditions for the Pettit Lake Creek watershed was provided as Appendix A of the SNF's June 16, 2020, BA. Given its near-natural condition, 16 of 19 habitat quality indicators (NMFS 1996) are "functioning appropriately." Three indicators (i.e., sediment, chemical contamination, and disturbance history) are "functioning at risk."

For sediment, development along the shoreline of Pettit Lake, and the roadway within the riparian area of Pettit Lake Creek at the weir site are the sole sources of concern. Sediment conditions downstream of the lake are "functioning appropriately."

Heavy human development along Pettit Lake's south- and north-eastern shores, as well as seasonally high motorized watercraft use, results in potential for chemical contamination to occur. The BA suggested recreational and residential development associated with Pettit Lake has likely released chemical and nutrient pollutants and degraded salmonid habitat in the lake and within Pettit Lake Creek. However, no chemical contaminant issues have been reported in the lake or in the outlet stream.

Disturbance history is "functioning at risk," a rating influenced by the extensive development along the south- and north-eastern shores of Pettit Lake. The weir and historic barrier, along with localized bank erosion contribute to this rating. The existing weir reduced fish habitat values within its footprint, and compromised Pettit Lake Creek's connection with its inset floodplain. The berm and former access road (since washed out) served to prevent the creek from flowing across the floodplain at high flows, and reduced floodplain riparian habitats by about 1,875 square feet.

2.4.1 ESA-listed Fish in Action Area

There are no records of Chinook salmon spawning in Pettit Lake Creek, despite almost annual redd occurrences further downstream (out of the action area) in Alturas Lake Creek (SNF 2020). Naturally high water temperatures coming out of the shallow lake are believed to contribute to poor spawning conditions. It is unknown if Chinook salmon spawned in the stream historically. At higher abundance levels, we believe it plausible spawning existed in the action area. There is no record of adult Chinook salmon migrating up Pettit Lake Creek and spawning upstream of the action area, in the inlet stream to Pettit Lake. This practice does occasionally occur in inlets to nearby Alturas Lake.

Juvenile Chinook salmon are occasionally captured at the weir and we assumed they will be present during construction. Although the origin of these fish is not known, juveniles from downstream spawning areas (i.e., Alturas Lake Creek) likely migrate upstream after emergence, finding summer/overwinter refuge in Pettit Lake or its inlet streams and are later collected in the weir during SBT's sockeye trapping efforts. The number of fish captured annually was reported as small. SNF fish surveys in 2007 observed juvenile Chinook salmon about 400 feet downstream of the Pettit Lake outlet. Densities were not reported, but are likely low given lack of proximal spawning and the low numbers of smolts encountered by SBT weir operations.

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. 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 50 CFR 402.17(a) and (b).

2.5.1 Effects to Species

The action will begin in early August 2020, or if delayed, at a similar time in 2021. Work would continue through mid-November (Table 1). This time period overlaps with Chinook salmon spawning timing. There is no record of Chinook salmon redds occurring in Pettit Lake Creek, despite almost annual occurrence further downstream (out of the action area) in Alturas Lake Creek. Similarly, Chinook salmon are not known to spawn upstream of the weir in any Pettit Lake tributaries. The data suggest Chinook salmon redds and adults will not be exposed to construction related impacts. Adult Chinook will not be present due to the spring timing of the proposed action.

Juvenile Chinook are the only species/life stage anticipated to experience adverse effects from the action. The following effects to Chinook salmon may occur and are discussed in more detail:

- Death or injury from dewatering and fish salvage;
- Exposure to short-term turbidity plumes downstream of the project site;
- Exposure to construction noise and activity;
- Exposure to chemical contamination;
- Exposure to increased sediment deposition;
- Temporary loss of food due to worksite dewatering (5-week period); and,
- Upstream fish passage blockage while worksite is dewatered (5-week period).

Replacing the current weir will also eliminate the current bank erosion associated with the right bank abutment caused by the original design. Stabilizing that site will likely reduce sediment delivery to Pettit Lake Creek, potentially having minor benefits to fish downstream. The new weir's adult trap will require the SBT to acquire and exercise a non-consumptive use water right

[estimated quantity of 1.5 cubic feet per second (cfs)] from the State of Idaho. No additional consequences of the proposed action were identified.

2.5.1.1 Fish Harm, Salvage, Disturbance, and Migration Behavior

To construct the Weir, approximately 3,500 square feet of Pettit Lake Creek will be dewatered for about 12 weeks. Equipment is only authorized to enter the streambed within the dewatered area. No stream fords are proposed or anticipated. Channel dewatering, and equipment operation adjacent to watered reaches above and below the dewatered area is likely to cause some level of harassment and/or harm to fish present in Pettit Lake Creek. Fish salvage operations will be performed by qualified fish biologists during dewatering to prevent stranding and crushing of fish that may occupy the work area.

Construction noise or visual stimulus may disturb nearby fish throughout the 18-week construction period. There are no records of adult Chinook spawning in or migrating through the action area and adult Chinook are not expected to be affected by construction or any other element of the action.

A few juvenile Chinook salmon have been observed migrating downstream through the action area in the spring and could occupy the action area throughout construction. All construction activity, but particularly during cofferdam placement, could cause juvenile Chinook salmon to move away from and avoid the worksite. Instream work will occur for about 12 weeks and the 3,500 square feet of channel will be unavailable for that period. An additional brief disturbance may occur during the SNF's future removal of the historic barrier abutments. Inwater work was not proposed for that action and all other proposed mitigations and site reclamation measures apply. For this reason, similar minor disturbances are expected. Only juvenile fish are expected to be exposed to any disturbance, and any in the dewatered area or adjacent to it may be displaced to adjacent upstream or downstream habitats. Displacement may last the entire 18-week construction period or for the few days necessary to remove the historic abutments.

If fish continue to occupy areas immediately upstream or downstream of the dewatered work area they could continue to be disturbed as equipment and construction workers access and move material to and from the Weir location. In these situations, exposed fish will likely temporarily relocate to nearby refugia. Observations of juvenile fish exposed to disturbances have shown that small juvenile fish, the only life-stage expected to be present during construction, temporarily move to refugia, quickly returning to preferred foraging locations to maximize growth potential (Grant and Noakes 1987). At this site, work will occur up to 12 hours per day. Because the stream habitat near the worksite site is relatively uniform and high quality, we expect fish to readily occupy adjacent nearby and suitable habitats if rearing, or continue migrating downstream unharmed. Such displacement is a minor behavioral modification and unlikely to cause biologically meaningful effects to exposed juveniles. Noise from construction equipment (during site preparation, dewatering, and post-dewatered stage) will not rise to the decibel level known to physically harm fish (FHWA 2008; Wysocki et al. 2007). The described minor behavioral impacts to juveniles within the action area could occur for up to 12 hours daily for the entire 18-week construction period. High quality adjacent habitat and low densities of juvenile Chinook throughout the action area suggest affected fish should can quickly locate and exploit

suitable rearing habitat with little effect to growth and survival. A lack of competition and density dependent effects in the available habitat increase or confidence effects will be small.

Installation of the cofferdams and site dewatering (approximately 3,500 square feet) will likely strand some individuals. Most juvenile fish are expected to flee the dewatering area, avoiding harm or harassment. However, it is impossible to determine the number of fish likely to flee or hide in work area substrates. NMFS assumed only 25% of fish present will remain in the dewatered area and 75% of the fish will leave volitionally as disturbance begins and water is slowly drawn down. Remaining fish will likely be harassed and/or injured and potentially killed during the proposed fish salvage. Salvage operations will be conducted according to NMFS' electrofishing guidelines to avoid and/or reduce additional adverse effects. Obviously, some fish will be hazed and/or seined fish out of the dewatered area, and salvaged fish will be netted, held, and transferred by bucket to a safe location.

Approximately 3,500 square feet will be dewatered to rebuild the weir. To calculate the number of fish disturbed, handled, and potentially injured/killed, we applied fish densities[5] for 'poor' quality Chinook habitat to account for the lack of nearby spawning, size of stream, and infrequent detections of juvenile Chinook salmon in the action area. Fish densities for 'poor' habitat were described by Hall-Griswold and Petrosky (1996) and were applied to the dewatered area to calculate fish pre-project fish exposure at the site. Applying this fish density, we estimate up to 45 juvenile Chinook salmon may be directly affected by the proposed dewatering. Of these fish, an estimated 11 juvenile Chinook salmon may be captured during salvage efforts. Remaining fish will likely be displaced from the area, experiencing minor behavioral and/or harassment effects. Assuming 5% of captured fish may die from electrofishing-related injuries (McMichael 1998), we expect salvage related activities could injure/kill no more than one juvenile Chinook salmon (0.56).

In summary, direct effects from dewatering and construction-related disturbances will be limited to an 18-week period with minor behavioral impacts to juvenile Chinook salmon immediately upstream and downstream of the worksite. Salvage of the work area will be performed to reduce mortality of juvenile Chinook salmon. Salvage may still disturb up to 45 juveniles, cause the handling and capture of up to 11 juveniles, and could kill up to one juvenile. Minor behavioral effect to juveniles may also occur for several days when the SNF removes the historic barrier's abutments.

2.5.1.2 Fish Passage

During construction, fish are expected to be able to freely migrate downstream through the bypass culverts. The action requires one smooth and one corrugated culvert for the bypass channel, with the stated intention that fish passage could potentially occur in the corrugated pipe (SNF 2020). Evaluations of velocities in the corrugated pipe as well as the long pipe length suggest upstream fish passage through either pipe will be unlikely, particularly for smaller fish such as juvenile Chinook salmon. Additionally, the smooth-walled pipe will carry more water and fish may try to ascend that pipe. The higher volume and higher velocity of water in the

[5] Hall-Griswold and Petrosky (1996) provided fish density estimates for the carrying capacity of four habitat quality categories.

smooth pipe will likely result in failed passage attempts by any fish attempting this route. The design requires a wire cage be installed around the downstream end of the smooth pipe to discourage fish from attempting this route, which could cause unnecessary harm due to repeated unsuccessful attempts to ascend.

Although the corrugated pipe may allow some passage, it will likely be a barrier for the 5-week period it is in place. According to data from the SBT, an average of three Chinook salmon smolts (spring outmigrants) were captured between 2012 and 2018 (2012 = 3, 2013 = 6, 2014 = 3, 2015 = 0, 2016 = 1, 2017 = 4, 2018 = 4) (K. Tardy, personal communication June 19, 2019, as cited by SNF 2020). This data suggest few juvenile Chinook pass through the action area, but since some smolts are captured at the Weir each spring, some are assumed to pass upstream through the action area after emerging from gravels in Alturas Lake Creek a few miles downstream. Those fish would likely migrate through the action area in early- to mid-summer as water temperatures later in the summer may discourage fish from migrating into and up Pettit Lake Creek, presumably to the lake. The barrier could limit/stop juvenile fish migrations past the weir for up to 12 weeks. Although no Chinook salmon have been documented passing the site, there are no barriers from downstream spawning areas and it remains a possibility. We cannot determine how many fish this passage disturbance may affect as there is no data on the timing or number of upstream fish making this migration. Similarly, we cannot determine what life stage (adult or juvenile) may be affected or what the fate of affected fish may be. After encountering the barrier, fish could continually try to pass the bypass culverts, ultimately using up energy and likely reducing growth and potentially survival. Alternatively, fish could turn back downstream, seeking appropriate habitats elsewhere with little impact, or if unable to locate suitable habitat, they could also experience reduced growth and/or survival (juvenile) or potentially utilize less desirable spawning habitat (adults). Overall, the number of fish exposed is expected to remain small, consistent with the low number of Chinook smolts captured at the weir each year. Adult impacts are not expected to occur, but they cannot be ruled out. NMFS is not aware of any reasonable additional conservation measures that would minimize this risk.

The existing weir does not meet current NMFS guidelines and the SBT reports juvenile sockeye salmon have been killed on the face of the current structure. We assume the same risk applies to Chinook salmon smolts and that replacing the weir will reduce the potential for future impingement and death of migrating smolts. The SBT did not report having observed any dead/injured Chinook on the current weir and the small numbers of fish they handle annually (about three) suggest any beneficial effects will be minor.

2.5.1.3 Turbidity

The effects of increased suspended sediment on salmonids vary based on exposure time and concentration. These effects were reviewed by Newcombe and Jensen (1996) and range from avoidance response, to minor physiological stress from increased rate of coughing, to death. Salmonids are relatively tolerant of low to moderate levels of suspended sediment (Gregory and Northcote 1993). Salmon and steelhead tend to avoid suspended sediment above certain concentrations (Servizi and Martens 1992; McLeay et al. 1987). Avoidance behavior can mitigate adverse effects when fish are capable of moving to an area with lower concentrations of suspended sediment. Researchers have reported thresholds for salmonid avoidance behavior at

turbidities ranging from 30 to 70 NTU (Lloyd 1987; Servizi and Martens 1992; Berg and Northcote 1985). Summer background turbidity here is most often near zero, with minor peaks during summer rain events.

The proposed action incorporates multiple conservation measures aimed at preventing sediment from entering Pettit Lake Creek (see Section 1.3.3 Conservation Measures), thus avoiding or substantially minimizing potential turbidity increases. Key conservation measures include dewatering the in-channel work area, establishing and maintaining effective sediment containment around disturbed areas (including the temporary access route and future removal of the historic barrier abutments), using pumps to maintain the dewatered area, monitoring turbidity during anticipated releases, and temporarily stopping construction when levels approach 50 NTU. For long-term erosion control, the action requires successful recontouring of disturbed areas, replacing topsoil, and effective revegetation of all disturbed sites. Despite implementation of conservation measures, temporary turbidity plumes extending downstream from the construction site are likely when: (1) The cofferdams are set in place to dewater the work area; and (2) when cofferdams are removed and the construction area is rewatered.

A 150-foot long by 50-inch wide ATV trail will remain between Forest Road 208 and Pettit Lake Creek. This route will replace a native surface foot trail and the severely eroding right bank area of the current abutment. The new route will eliminate current erosion sources, but also presents a new potential source of sediment. To reduce sediment delivery risk, the permanent access route was limited to 50-inches in width, and will be surfaced with gravel. The described replanting and slash placement on the temporary portion of the route and all other disturbed areas will provide long-term sediment filtering, reducing sediment delivery to the stream. Given the route's proximity to the stream, small quantities of sediment are still likely to be delivered to Pettit Lake Creek. Delivery will likely be episodic and associated with snow melt and/or summer rainstorms. Stream turbidity is positively correlated with increased runoff, and Pettit Lake Creek's turbidity will likely be elevated during the events causing delivery from the access route. Given the route's short length and the anticipated effectiveness of the described sediment reduction measures, turbidity increases caused by the new route will likely be very minor and likely substantially less than pulses anticipated during construction. Although minor, they may have similar effects to exposed juvenile Chinook as discussed below for construction related pulses.

For this type of construction, when similar conservation measures and construction practices are employed, NMFS has routinely found that turbidity plumes generated during construction may last less than 2 hours (NMFS 2019). Generally, peak turbidity levels do not exceed 50 NTU above background (usually 0 NTU) for more than 2 hours, when measured 600 feet downstream. More typical turbidity pulses last less than 10 minutes, are approximately 20 NTU above background, and affect less than 150 feet of stream downstream of the construction area. Based on our past experience evaluating similar actions, which applied similar conservation measures in similar settings, project-generated turbidity levels are expected to fall within the described range.

Turbidity plumes from construction work persist downstream of the 600-foot measurement point, potentially as far downstream as the as the confluence with Alturas Lake Creek. Beyond this

point, the larger volume of Alturas Lake Creek and the continual deposition of sediment and ever diminishing turbidity levels in Pettit Lake Creek, detection should not be possible.

Comparing these turbidity levels to a severity of effects index (Newcombe and Jensen 1996), anticipated turbidity levels and durations will not cause lethal impacts to exposed fish. Turbidity levels should not exceed 50 NTU above background levels for more than 2 hours at a measurement point approximately 600 feet downstream of the work site. Two pulses are expected during construction, once during cofferdam placement and the other during channel reactivation. Additional smaller pulses could occur if rainstorms occur and sediment containment features do not function as anticipated. Such failures occur rarely, if ever, when containment is installed and maintained appropriately. For these reasons, only minor additional turbidity events are expected. Exposed juvenile Chinook salmon will likely respond by avoiding these plumes, likely seeking temporary refuge in unaffected and adjacent habitats. Fish that do not avoid the plume will experience minor behavioral effects, and potentially, temporary sublethal effects from individual pulses, including future pulses influenced by the new access route. The range of sublethal effects potentially experienced may include: (1) Minor physiological stress and increased rates of coughing and respiration; (2) moderate physiological stress; (3) moderate habitat degradation; (4) impaired homing; (5) short-term indicators of major physiological stress; and (6) potentially, increased foraging behavior. No turbidity-related mortality is anticipated.

2.5.1.4 Chemical Contamination

Use of construction equipment and heavy machinery adjacent to streams poses the risk of an accidental spill of fuel, lubricants, hydraulic fluid, antifreeze, or similar contaminants into the riparian zone, or directly into the water. If these contaminants enter the water, the substances could adversely affect habitat, injure or kill aquatic food organisms, or directly impact ESA-listed species (e.g., Neff 1985; Staples et al. 2001). The proposed action includes multiple conservation measures aimed at minimizing the risk of fuel or oil leakage into the stream, including working from the bank, working in a dewatered work area, using non-toxic hydraulic fluids, locating refueling and staging sites more than 400 feet from the stream, regular equipment inspections, and having appropriate spill containment and cleanup material onsite to implement the Spill Plan. Based on the past success of these types of conservation measures and no known local spills occurring during similar projects, negative impacts to ESA-listed fish from fuel spills or leaks are unlikely.

2.5.1.5 Sediment Deposition

Turbidity plumes from construction work will deposit a small amount of sediment on Pettit Lake Creek substrates downstream of the worksite. Sediment deposition will predominately reflect the area where turbidity is greatest—approximately 600 feet downstream of the work area. However, sediment resuspended sediment will continue downstream as far as turbidity is actually present, possibly as far downstream as the confluence with Alturas Lake Creek. Beyond this point, the larger volume of Alturas Lake Creek and the diminished quantity of suspended sediment should make detection impossible.

Sediment conditions in Pettit Lake Creek are properly functioning and few fish use the available habitat. Only minor quantities of sediment are expected to be deposited on stream substrate, primarily within 600 feet of the work site, but potentially up to 1.2 miles downstream. Given the subject turbidity plumes are expected to be minor (see above discussion), little more than a very thin film of sediment is anticipated to be deposited on stream substrate (SNF 2015). Effects to individual fish could reduce available cover for juveniles or changes to primary and secondary productivity, affecting food supply for affected fish. Such changes could lead to reduced growth and/or survival. As described above in the turbidity section, only small amounts of sediment are expected to be mobilized, thus there will only be a small amount of sediment available for deposition. Because of the expected effectiveness of the proposed sediment control measures, NMFS does not expect that enough sediment deposition will take place to alter salmonid use of the habitat. Additionally, because of the small amount of sediment deposition, it is unlikely that primary or secondary production will be affected. Habitat quality will likely recover as fine sediments are flushed downstream during the next season's high flows. The action's effects on sediment and thus fish response to changes in habitat are temporary and minor, and they are unlikely to harm individual fish that migrate through the action area or rear within it for short periods of time.

As noted previously, the action will stabilize the eroding right abutment of the current weir. Several thousand tons of sediment have likely been liberated from this site in the last few decades. Because the new design accounted for the appropriate hydrology, the structure will now contain the expected streamflows, and ongoing erosion will be nearly eliminated. Halting the current erosion will provide minor improvements to the action area habitats.

Increased sediment levels have a well-established and direct negative relationship on salmonid egg survival (Phillips et al. 1975; Reiser and White 1988; Wu 2000; Jensen et al. 2009). Although turbidity plumes and the associated deposition of fine sediment on Chinook spawning habitat are expected to be infrequent (one season), and of low magnitude, they will still likely occur and egg survival will be reduced to some degree if a redd is present in the downstream action area. The historic lack of Chinook redds in Pettit Lake Creek suggest this potential pathway will not materialize. For this reason no consequences to Chinook salmon redds are expected.

2.5.1.6 Forage Availability

Dewatering 3,500 square feet of stream will temporarily eliminate that area's invertebrate contribution to downstream habitats. Rearing Chinook salmon downstream could potentially encounter fewer prey items, potentially affecting growth and in later life stages, possibly survival. However, the area dewatered is very small relative to the habitat provided in 1.2 miles of stream downstream of the work site (roughly 0.02%). Invertebrate drift from above the worksite will continue for the duration of the work window and downstream prey availability is expected to be largely maintained during this time. Recolonization of the work area will occur within hours after rewatering. Overall, the temporary reduction of about 0.02% of the action area's aquatic food production is expected to have only minor impacts on prey availability. For this reason, Chinook salmon rearing in the lower section of the action area are unlikely to experience any behavioral modification or meaningful loss of forage. Long-term impacts will

also be inconsequential due to the rapid recolonization of the dewatered area after construction and future long-term benefits caused by removal of the historic barrier's abutments from the floodplain.

2.5.1.7 Water Right Effects

The adult fish trap requires approximately 1.5 cfs of water to be diverted into the trap box in order to maintain established criteria for the appropriate water volume and depth for the number of adult fish potentially being held (NMFS 2011). Annually, when the adult trap is first activated, a headgate will be opened and the trap box filled. This process will take a couple of hours to complete as it is conducted in stages to avoid impacting surface flows. Water will then exit the trap box through an outlet pipe and re-enter Pettit Lake Creek at the weir. Approximately 16 feet of channel are affected by the 1.5 cfs removal, all overlapping with the weir structure itself. No loss of water quantity is expected. Water residence time will be minutes in the trap, with no discernable influence on flow rates between the intake and outlet (15.5 feet of channel). NMFS' design criteria (2011) require bar spacing adequate for juvenile fish to freely enter/exit the trap and any juvenile fish entering the trap will be able to freely pass in either direction. Upstream migrating juvenile Chinook salmon are the only fish likely to be entrained given the fall operation for adult Sockeye salmon trapping and the absence of other species/life stages. Because no water will be consumed, and because only 15 feet of Pettit Lake Creek will experience any decrease in water volume, no effects to fish are expected to result from the related issuance of a State water right for adult trap operation.

2.5.1.8 Species Effects Summary

The action's direct and indirect effects on Chinook salmon will occur only during the one work season, affecting one brood year. Up to one juvenile Chinook may die as a result of salvage-related handling, up to 11 may be captured and released, and up to 42 may be affected through minor behavioral modifications as they move away from salvage area. Few juvenile Chinook salmon are known to use Pettit Lake Creek. Those present downstream of the worksite during construction can reasonably be expected to be exposed to two temporary turbidity pulses, each having peaks above 50 NTU for less than 2 hours as measured 600-feet downstream of the worksite. These fish will also be potentially exposed to: (1) Very small turbidity pulses associated with rain events and runoff from the worksite prior to site reclamation; (2) minor levels of sediment deposition downstream of the worksite; and (3) inconsequential forage reductions for up to 12 weeks.

Applying a mean smolt-to-adult return rate of 1.6% from 1997–2012 (Comparative Survival Study Oversight Committee and Fish Passage Center 2015) to the total known project-related mortality estimate of up to one juvenile Chinook salmon equates to a one-time loss of far fewer than one adult equivalent Chinook salmon (0.0.000002) returning to spawn. The loss of fewer than one individual Chinook salmon is a one-time impact. The benefits to future fish survival caused by the action, due to sediment reduction, are also expected to be minor and will not likely improve the population's survival or potential for recovery. Given the highly variable ocean survival rates of juveniles and high variability in annual returns to individual populations, this

one time adverse impact is unlikely to reduce the abundance or productivity of the affected population.

The core of the action area to be disturbed by the proposed action represents a very small proportion of the available habitat for the species in Pettit Lake Creek (0.02%). Additionally, the entirety of Pettit Lake Creek represents about 0.9% of all intrinsic potential habitat for Salmon River Upper Mainstem population. Given the temporary nature of the action (one work season), the low/infrequent use of the action area by Chinook salmon, the small number of fish affected, and the minor type of effect most fish will experience, the project's effects to species are unlikely to have population level effects.

2.5.2 Effects to Critical Habitat

The entirety of Pettit Lake Creek and the area within 300-feet of the OHWM are designated critical habitat for Chinook and Snake River sockeye salmon. Pettit Lake Creek is also designated critical habitat for Snake River Basin steelhead. Critical habitat within the action area has an associated combination of PBFs essential for supporting freshwater spawning, rearing, and migration for Chinook salmon, sockeye salmon, and steelhead. None of these species currently spawn in the action area. Steelhead are not present, adult and juvenile sockeye salmon migrate through the action area, and Chinook juveniles migrate through and may rear there.

The critical habitat PBFs likely to be affected by the proposed action include: (1) Water quality (i.e., turbidity, and chemical contamination); (2) spawning gravel/substrate; (3) riparian vegetation; (4) cover/shelter (Chinook only); (5) safe passage; (6) forage; and (7) space (Chinook only). Modification of these PBFs may affect potential spawning, rearing, or migration in the action area. Proper function of these PBFs is necessary to support successful spawning, migration, rearing, and the growth and development of all three species the action area.

2.5.2.1 Water Quality

The proposed action could negatively affect water quality through chemical contamination or short-term increases in turbidity. As described above in Section 2.5.1.2, we expect the proposed conservation measures will prevent leaks or spills from machinery from entering Pettit Lake Creek during construction. There is no risk of contamination long-term. We expect increases in turbidity upon rewatering and dewatering the construction site exceed 50 NTU over background for up to 2 hours, and visible plumes could extend up to 1.2 miles downstream, to Alturas Lake Creek. Less severe pulses could happen if rain storms occur during the long construction window and if proposed sediment containment and site restoration measures are less effective than anticipated. Turbidity increases will not reduce the conservation value of critical habitat as a whole because the impacts will cover a small area and will be infrequent and temporary.

2.5.2.2 Spawning Gravel/Substrate

Spawning habitat may not be suitable in the action area as no species currently spawn there. The BA indicated no spawning gravel is present in the immediate work site, an observation confirmed by NMFS staff during field visits. As described in Section 2.5.1.4, minor levels of

sediment are expected to drop out of suspension from the anticipated turbidity inputs. This could result in a thin film of surface sediment on some substrates downstream of the work area. Impacts would be largest in the first 600 feet, but little more than a thin film of surface deposits is expected, and should be limited to slow water areas and stream margins. This small amount of sediment will be remobilized during subsequent peak flows and the temporary and minor impact will not affect the conservation value of affected habitat. The new weir structure will replace an existing structure and there are no impacts to the quantity of spawning habitat available at the site scale expected from the action.

2.5.2.3 Riparian Vegetation

In total, less than 0.5 acres of riparian disturbance will occur. Several small-diameter, streamside, lodgepole pine trees are likely to be removed during construction, potentially reducing long-term LWD recruitment at the site-scale. The access route will also eliminate future riparian growth from about 625 square feet in Pettit Lake Creek's riparian area. The proposed action includes a conservation measure highlighting that removal of large trees will be avoided. Approximately 400 square feet of streamside wetland habitat will be temporarily filled to bypass streamflow around the worksite. The action requires restoration of this area and wetland habitat, and vegetation is expected to recover within 2 years. Proposed monitoring of revegetation success ensures replanting will occur if stated recovery rates are not achieved. Minor quantities of riparian vegetation will also be disturbed during access/construction of the new weir but all disturbances will be mitigated through replacement of top soil and revegetation with native species. The new weir footprint will permanently convert about 50 feet of each native bank (800 to 1,000 square feet per bank) to the new structure. Riparian vegetation will be effectively eliminated from a maximum total area of 2,625 square feet (0.06 acres), forever. Restoration plantings are expected to mitigate long-term losses this vegetation might have provided in terms of shade, cover, or food sources at a site-scale. Action area baseline condition for riparian vegetation is properly functioning, with little to no disturbances being present outside the weir area. Given the current high quality of riparian habitat, the loss of this small quantity of riparian vegetation is not expected to reduce the conservation value of the action area.

In the future, the SNF's proposed removal of remnant abutments from the IDFG passage barrier will likely improve floodplain connectivity. Increased riparian vegetation and vigor is expected to result.

2.5.2.4 Cover/Shelter

Installation of the weir will primarily replace the existing structure. The current weir footprint has no prospect for vegetation to return in the future, so rebuilding in the same location will have no additional consequence to cover. The new weir is slightly larger than the prior weir, a change required due to faulty designs in the original structure. Approximately 800 to 1,000 square feet of each stream bank will be permanently converted from native vegetation to the new structure. As described above, restoration plantings are expected to mitigate long-term losses this vegetation might have provided in terms of shade, cover, or food sources at a site-scale. Cover and shelter elsewhere in the action area is properly functioning and the loss of this small area, at

an already disturbed location, will not reduce the conservation value of critical habitat in the action area.

In the future, the SNF's proposed removal of remnant abutments from the IDFG passage barrier will likely improve floodplain connectivity. Increased riparian vegetation and vigor is expected to result. Vegetative improvements will likely increase cover/shelter at the site scale.

2.5.2.5 Safe Passage

During construction the bypass culverts are not expected to provide upstream fish passage (see Section 2.5.1.2). This condition will last for about 12 weeks, while the work area is dewatered. Downstream passage will be possible throughout construction. Habitat conditions downstream of the affected area are near pristine and expected to provide suitable forage opportunities during this temporary delay in passage. The new weir's improvements are expected to improve upstream and downstream fish passage conditions for all life stages/species. The temporary blockage of upstream passage will not reduce the conservation value of the action area.

Adult trap box entrance/exits were designed to meet NMFS criteria (2011), and juvenile Chinook are expected to pass freely between the bars while the trap is ran. Adult Chinook are not known to be present and thus will not be affected. No water will be consumed by the diversion and thus no impacts to passage will result from use of the associated State of Idaho water right.

2.5.2.6 Forage

As described in Section 2.5.1.5, minor temporary reduction in invertebrate drift may occur during construction. About 3,500 square feet of channel will be dewatered for 12 weeks before flow is returned. Invertebrate recolonization is anticipated to occur within hours and normal drift rates are expected to return to pre-action conditions quickly. The described minor loss of streamside vegetation may also reduce terrestrial forage inputs. But, the small size of the impact (0.02% of action area extent) and the overall properly functioning condition of the action area lead us to conclude the effect will be minor. Water diversion will not reduce the quantity of water or forage available in the action area since it passes straight through the adult trap and no water is lost. Additionally water retention time in the trap is expected to be too brief to influence water temperature and thus forage is not expected to be affected by use of the associated State of Idaho water right. Future removal of the historic barrier abutments may have minor benefits to forage as riparian and bankside habitats improve. The described effects will not reduce the conservation value of the action area.

2.5.2.7 Space

Similar to the forage discussion above, dewatering will temporarily reduce the amount of habitat, and exercising the State water right will marginally reduce space within about 15.5 feet of Pettit Lake Creek. For construction, this impact will last 12 weeks before current conditions and space return. This brief and small impact will not reduce the conservation value of the action area. Over the long term, water right use will have a minor reduction in space for about 15.5 feet of channel each year. This space reduction will only occur while the adult trap is being fished (a

few weeks annually). Substantial quantities of high quality habitat are present upstream and downstream of this site and the amount of space in the action area is not expected to be appreciably reduced.

When funds become available, the SNF's removal of the historic barrier abutments may provide a minor increase in available space. This small benefit would most likely only occur during peak flows.

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 vs. cumulative effects. Therefore, all relevant future climate-related environmental conditions in the action area are described in the environmental baseline (Section 2.4).

There are no other known future state or private activities anticipated in the action area. The action area is managed entirely by the SNF and all ongoing and future activities there are likely to require federal approval and thus future ESA consultation. For these reasons, no cumulative effects are expected in the action area.

2.7 Integration and Synthesis

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

2.7.1 Species

Although Snake River spring/summer Chinook salmon abundance has increased since the time of listing, increases are minor and most individual populations are not meeting recovery plan abundance and productivity targets. The species remain threatened with extinction. Current abundance/productivity estimates for the Salmon River Upper Mainstem population of Chinook salmon place it at high risk; spatial structure/diversity risk is low. The Salmon River Upper

Mainstem Chinook population remains at high risk of extinction for low abundance/productivity (NWFSC 2015). Climate factors will likely make it more challenging to increase abundance and recover the species into the future (NMFS 2017). Recent poor adult returns at the MPG and individual population levels, which are likely tied to ocean conditions (Werner 2017; Harvey et al. 2019), highlight this challenge. Habitat in the action area is generally of high quality with little human impact. Limiting factors for the ESU (NMFS 2017) are not limiting in the action area and the action will have almost no impact on these factors.

Small numbers of juvenile Chinook salmon in the action area could potentially experience adverse effects associated with turbidity/sediment, loss of space, forage reduction, cover reduction, and fish passage impacts. These effects are expected to be minor and with the exception of permanent small loss in cover/riparian vegetation, impacts will be temporary and occur for just one late-summer/fall period. The action does attempt to mitigate for lost cover by prescribing reclamation and revegetation measures and accompanying monitoring/repeat planting to optimize post-project conditions. Both the small size of the effects and their temporary nature are attributed to: (1) The anticipated effectiveness of proposed conservation measures; (2) location, short duration, and scale of the project; (3) the dewatered inwater project area; and (4) the ability of most juvenile fish to move away from the project/action area during construction. Some minor benefits to Chinook salmon may occur from long-term sediment reductions and improved smolt passage conditions. Dewatering and required fish salvage efforts will result in a small number of fish being hazed, handled, and possibly injured or killed.

NMFS did not identify any indirect or direct consequences of the action that will occur due to weir replacement (e.g., related actions that would only occur because of the proposed action). Scientific research and fish trapping/handling at the weir are part of the environmental baseline and would occur regardless of the weir project being considered. The new weir will actually reduce potential for smolt impingement on the weir and improve safety for weir staff. No cumulative effects from future state or private activities are anticipated to affect the species and or action area's habitat. The absence of action-related consequences and cumulative effects are expected to largely maintain properly functioning baseline habitat conditions, and thus maintain current effects to individuals that use the action area now and for those that will use it in the future.

The following one-time adverse effects are expected:

- Up to 34 juvenile Chinook salmon may be displaced by the proposed dewatering.
- Eleven juvenile Chinook salmon may be captured and handled during electrofishing salvage efforts.
- No more than one juvenile Chinook may be killed from fish salvage activities.
- Fish rearing or migrating through the action area could be exposed to two temporary turbidity pulses of high enough intensity (greater than 50 NTU over background) to generate sublethal impacts or temporary displacement to adjacent habitat. Plumes

exceeding the 50 NTU increase are expected to last less than 2 hours when measured 600 feet below the worksite.

- Upstream fish passage will be blocked for up to 12 consecutive weeks in one work season.

As discussed in the effects to species summary (2.5.1.6) project impacts are expected to result in the loss of fewer than one Chinook salmon adult equivalent and the impact will occur one time. There are minor beneficial effects to the species from sediment reduction and fish passage during future weir operation. Neither the adverse effects nor the small benefits are large enough to influence population level VSP criteria for the affected population. Cumulative effects in the action area are not expected. Climate change, and its impacts on the environmental baseline will continue to influence the species survival and recovery. Combining the effects of the action with the environmental baseline, and cumulative effects, we do not anticipate a change in the viability of the Salmon River Upper Mainstem Chinook population. The proposed action will not likely reduce the survival of the ESU or negatively affect the species' probability of recovery.

2.7.2 Critical Habitat

As identified in Section 2.2, the action will affect critical habitat for three separate designations (i.e., Chinook salmon, sockeye salmon, and steelhead). The designations are similar for each species and the action affects PBFs for each species in the same way. The new weir is slightly larger and will permanently remove 1,600 to 2,000 square feet of streamside habitat (Section 2.5.2), and the permanent ATV access route will also remove about 625 square feet of potential riparian vegetation. The action will temporarily impact space, cover, fish passage, and water quality. Temporary impacts will be brief (no more than 12 weeks) before pre-action conditions return. One exception is the annual small reduction in space associated with removing up to 1.5 cfs of water from about 15.5 feet of Pettit Lake Creek. Permanent impacts on space, cover/shelter, and riparian vegetation PBFs, from the streambank and riparian conversion, are minor and limited to site-scale impacts. Action area habitat conditions are largely functioning appropriately, and the minor impacts will not reduce the conservation value of critical habitat for the three species that may depend on this habitat for survival and recovery.

As described above, the effects on critical habitat for all three species are minor and will not reduce the conservation value of the action area. With no long-term reduction in the conservation value of the action area habitat, the action will also not affect conservation value at the designation scales.

2.8 Conclusion

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

critical habitat for Snake River sockeye salmon, Snake River spring/summer Chinook salmon, or Snake River Basin steelhead.

2.9 Incidental Take Statement

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

2.9.1 Amount or Extent of Take

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

- **Fish handling.** We anticipate that up to 11 juvenile Chinook salmon may be salvaged, handled, injured, and that up to one juvenile Chinook salmon may be killed during dewatering activities. The amount of take will be exceeded if more than 11 juvenile Chinook salmon are handled or more than one is killed during fish salvage.

- **Turbidity**. Establishing a cofferdam and rewatering the 3,500 square foot work area after weir construction are each expected to produce individual turbidity pulses capable of causing sublethal effects to exposed juvenile Chinook salmon. Because the number of fish exposed to individual plumes cannot be measured in the field we use a surrogate (turbidity) to describe the extent of incidental take, pursuant to 50 CFR 402.14[I]. The extent of take is directly related to the intensity, and duration of turbidity pulses. In this instance, the extent of take will be exceeded if: (1) Any project-related turbidity pulse, when measured 600-feet downstream of the source exceeds a 50 NTU increase above background for more than 2 continuous hours. Additionally, the extent of take will be exceeded if more than two turbidity pulses exceed the 50 NTU over background threshold believed to trigger sublethal effects.

- **Fish Passage.** Adverse effects on upstream fish passage will be occur as long as the bypass channel remains activated. The action agencies anticipate no more than 12 weeks of instream work are required to complete the action. The number of fish affected by passage blockage cannot be determined, so we describe the extent of incidental take, pursuant to 50 CFR 402.14[I]. In this case, the extent of take will be exceeded if the

bypass channel blocks upstream fish passage for more than 12 weeks. Although coextensive with the proposed action, the number of weeks is directly related to the anticipated harm and can be monitored in real-time. For this reason it is an acceptable surrogate for the harm and a reasonable take limit.

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.

2.9.3 Reasonable and Prudent Measures

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

The SNF, BPA, and the Corps shall:

1. Minimize incidental take from construction activities and implement all of the proposed conservation measures.

2. Ensure completion of a monitoring and reporting program to confirm that the terms and conditions in this ITS were effective in avoiding and minimizing incidental take from permitted activities and that the extent of take was not exceeded.

2.9.4 Terms and Conditions

The terms and conditions described below are non-discretionary, and the SNF, BPA, the Corps, and any applicants, must comply with them in order to implement the RPMs (50 CFR 402.14). The action agencies or any applicant have 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. To implement RPM 1 (minimize take from construction activities), the SNF, BPA, and the Corps, through their respective authorities shall ensure the following occurs:

    a. The SNF's and the Corps's permits authorizing the work and site occupancy shall ensure the permittee (SBT) (and identified contractors) implement the proposed action, including all described conservation measures and monitoring, as described in the BA (SNF 2020) and proposed action section of this opinion. This shall be ensured by sufficiently conditioning the CWA and SUP permits to make all the proposed conservation measures mandatory for implementation.

b. Ensure site dewatering and rewatering of the worksite is done in a slow and controlled fashion to maximize volitional fish movement out of the area prior to salvage.

c. Require, by permit or authorization condition, final fish salvage be completed with electrofishing gear to reduce potential for juvenile fish to be stranded and killed in stream substrates.

    i. Ensure all electrofishing complies with NMFS' guidelines (2000).

    ii. Ensure the construction contractor immediately ceases activities and contacts NMFS if more than 11 juvenile Chinook salmon are handled and/or if more than one is killed during fish salvage.

d. Ensure equipment working outside the dewatered work area remain above the OHWM at all times.

e. In the event a third turbidity pulse exceeds 50 NTU over background, the contractor or applicant shall complete or otherwise stabilize the turbidity producing activity and contact NMFS to determine how or if the project shall proceed.

f. Duration of bypass culvert use is monitored as necessary to ensure no more than 12 weeks of upstream passage blockage occurs.

2. To implement RPM 2 (monitoring and reporting), the SNF, as the lead action agency shall complete or require the authorized permittee (SBT) complete the following:

    a. Within 8 weeks of project completion, submit a monitoring report (with information on fish salvage and turbidity plumes) to: Snake River Basin Office email: nmfswcr.srbo@noaa.gov. The report shall include the following:

        i. Dates action was completed, including dates of dewatering, rewatering, and any additional turbidity events observed.

        ii. The number and species of fish handled, injured, or killed during fish salvage (amount of take).

        iii. Results of turbidity monitoring, measured in NTU with a calibrated turbidity meter, measured approximately 600 feet downstream of the source and at a reference site upstream of all activities. Downstream measurements shall be taken every 30 minutes during individual pulses and background levels shall be recorded once daily before work begins and augmented as necessary in response to storms. Turbidity shall also be visually monitored on occasion to document the downstream extent of visible pulses, their intensity, and their duration.

b. NOTICE: If a salmon becomes sick, injured, or killed as a result of project-related activities, and if the fish would not benefit from rescue, the finder should leave the fish alone, make note of any circumstances likely causing the death or injury, location and number of fish involved, and take photographs, if possible. If the fish in question appears capable of recovering if rescued, photograph the fish (if possible), transport the fish to a suitable location, and record the information described above. Adult fish should generally not be disturbed unless circumstances arise where an adult fish is obviously injured or killed by proposed activities, or some unnatural cause. The finder must contact NMFS Law Enforcement at (206) 526-6133 as soon as possible. The finder may be asked to carry out instructions provided by Law Enforcement to collect specimens or take other measures to ensure that evidence intrinsic to the specimen is preserved.

2.10 Conservation Recommendations

Section 7(a)(1) of the ESA directs federal agencies to use their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of the threatened and endangered species. Specifically, conservation recommendations are suggestions regarding discretionary measures to minimize or avoid adverse effects of a proposed action on listed species or critical habitat or regarding the development of information (50 CFR 402.02).

1. The SNF and the Corps, as a condition of their SUP and CWA permits, should require the Applicant (SBT) to provide an operational and maintenance plan for the new weir to ensure it is adjusted, operated, and maintained consistent with the original design specifications. The plan should identify responsible parties for evaluating the structures as well as a method for documenting inspections and adaptive measures are implemented as described.

   Prior to its implementation, NMFS should receive adequate time to review and comment on the guide, as necessary.

2.11 Reinitiation of Consultation

This concludes formal consultation for the Pettit Lake Creek Weir Reconstruction Project.

As 50 CFR 402.16 states, reinitiation of consultation is required and shall be requested by the federal agency or by NMFS where discretionary federal agency involvement or control over the action has been retained or is authorized by law and if: (1) The amount or extent of incidental taking specified in the ITS is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect on the listed species or critical habitat that was not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action.

2.12 "Not Likely to Adversely Affect" Determinations

The previous discussion focused on the action's adverse effects to Chinook salmon and designated critical habitats for sockeye salmon, Chinook salmon, and steelhead. The SNF determined the proposed action may affect, but will not likely adversely affect endangered Snake River sockeye salmon (58 FR 68543; December 28, 1993).

2.12.1 Sockeye Salmon

Sockeye salmon currently migrate downstream through the action area as smolts each spring. Under the sockeye captive broodstock program, all adult sockeye returning to the Sawtooth Fish Hatchery weir (about 15 miles downstream) are captured and integrated into the broodstock program under existing scientific research permits. After genetic evaluations, some adult fish are released to spawn in Pettit Lake in addition to adults from the captive brood program. All releases occur upstream of the action area. Because no adult sockeye migrate through the action area, none will be exposed to the effects of the construction activities. Any future capture of adults at the weir is covered by existing scientific permits and is thus not addressed in this document. The new weir does not contribute to new effects, more effects than currently occur, or a longer period of effect for operations. Fish spawning in Pettit Lake are more than 0.25 miles away and will also not be affected by construction activities as no stressors are expected that far upstream. Thus, effects of the proposed action on adult Snake River sockeye salmon are discountable.

Juvenile sockeye salmon rear exclusively in Pettit Lake, typically for 1 to 3 years before migrating to the Pacific Ocean as smolts in late April through May (Bjornn et al. 1968). This life history and migration timing eliminates the potential for juvenile sockeye to be present in the action area during construction, which is limited to late-summer and fall. For this reason, no consequences to sockeye are expected during new weir construction and the effects of construction on juvenile Snake River sockeye salmon are discountable.

Although not a consequence of the action, one of the goals of the new weir is to address design problems that result in adverse effects to sockeye during operation of the current weir. Specifically, the current weir design results in some sockeye salmon smolts being impinged on and killed by the weir. The new design meets NMFS' criteria (2011) and was approved by NMFS engineers (memo in record). Additionally, the current weir is undersized for the actual peak stream flows and has resulted in bank erosion on the right bank abutment. That erosion subsequently results in backwatering adjacent to the weir and some additional juvenile sockeye salmon are routinely observed in these areas where they can experience predation and or be stranded as water levels drop. The new structure is expected to reduce some of the adverse effects associated with its current operation and maintenance, all of which are covered under NMFS' consultation on the sockeye salmon program (see NMFS No.WCR-2017-6413 and NMFS 2020). Weir reconstruction supports the sockeye captive broodstock program, which is designed to increase sockeye sub-population size, and the weir/monitoring are necessary elements to support survival and recovery. Continued implementation of the captive broodstock program and the specific task of weir replacement/improvement are key elements of the Sockeye salmon recovery plan (NMFS 2015).

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. 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) also requires NMFS to recommend measures that can be taken by the action agencies to conserve EFH. Such recommendations may include measures to avoid, minimize, mitigate, or otherwise offset the adverse effects of the action on EFH [CFR 600.905(b)].

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

3.1 Essential Fish Habitat Affected by the Project

The proposed action and action area for this consultation are described in Section 1.3 of this document. Juvenile (rearing and migratory) spring/summer Chinook salmon EFH is present in the action area. The action will have minor effects on the action area's EFH caused by at least two turbidity pulses (including sedimentation), a 12-week passage impediment, up to 2,625 square feet of riparian area loss, and temporary impacts to riparian vegetation and wetlands. Approximately 87 acres of EFH occur in the action area. This area is identical to the spring/summer Chinook salmon critical habitat affected and discussed in Section 2.5.2 of the preceding opinion.

The affected EFH possesses areas containing the features and habitat function consistent with habitat areas of particular concern (HAPC). Identifying HAPCs helps focus conservation efforts on particular habitats that are of high ecological importance. The HAPCs NMFS identified in the action area include floodplain habitats. Chinook spawning is not known to occur in the action area and that HAPC is not believed to be present, despite suitable gravels.

The action area includes about 1.2 miles of Pettit Lake Creek, but the bulk of impacts occur at the immediate work site, where approximately 0.5 acres of total disturbance are expected. As discussed in Section 2.2, the action area habitat conditions are largely properly functioning, with

little human impacts. Riparian vegetation is essentially at natural conditions, with the only minor disturbance being at the existing weir and at the old IDFG roughfish barrier. Both of these structures also have site-scale impacts on floodplain access. Fish passage is obviously affected by current weir operations. Overall, the action area supports complete expression of habitat forming processes important to create and maintain diverse fisheries habitat. Juvenile Chinook salmon use the action area, but data indicates use is infrequent and at low densities with an average of just three smolts being collected at the weir annually.

3.2 Adverse Effects on Essential Fish Habitat

1. Proposed activities have potential to generate temporary turbidity pulses when cofferdams are installed and removed, potentially during rain events while construction is occurring, and possibly during rain/snowmelt events' impact on the permanent ATV route. During dewatering, pulses measured 600 feet downstream of the worksite are not expected to exceed 50 NTU over background for more than 2 hours. Turbidity could be visible for about 1.2 miles downstream before returning to baseline. Sediment delivery during rain events overlapping with construction are unlikely given the proposed design criteria's anticipated effectiveness. If such events do occur, they would be minor, expected to be shorter in duration and intensity than pulses tied to dewatering. For the permanent ATV route, the small size of the route, gravel surfacing, and restored adjacent riparian vegetation should result in minor pulses. Those pulses will overlap with naturally high turbidity levels and there should be no discernable difference from background turbidity. See Section 2.5.1.2 of the above opinion for additional information.

2. Although suitable gravel appears to be present in the action area, Chinook spawning does not occur there. The minor quantities of sediment deposition resulting from described turbidity pulse fallout has little potential to affect substrate quality. Quantities of sediment deposited on substrates should be limited to a thin surface film, which would likely disappear after the first significant rise in discharge.

3. Upstream fish passage will be blocked by the proposed bypass pipes for up to 12 weeks. After construction, the new weir will provide improved passage during trap operations, relative to the existing weir. Temporary passage obstruction is minor and data on fish utilization suggest few fish will be affected.

4. The action will permanently remove up to 2,625 square feet (0.06 acres) of riparian vegetation. Total disturbance includes less than 0.5 acres, including about 400 square feet of wetland impacts. With the exception of the access route, a 150-foot long ATV route from parking area to weir, all disturbed areas will be reclaimed by recontouring, replacing staged topsoil, and replanting with native vegetation. Vegetation monitoring is required and the action includes follow-up planting as needed to restore vegetation. Vegetation recovery is expected within 2 years. See Section 2.5.2 for additional information.

3.3 Essential Fish Habitat Conservation Recommendations

1. To minimize effects of project-generated turbidity and sediment deposition on EFH (bullets 1 and 2 above) the SNF, the Corps, and the BPA should implement the following Conservation Recommendations:

    a. The SNF's and the Corps's permits authorizing the work and site occupancy should ensure the SBT/contractors implement the proposed action, including all described conservation measures and monitoring, as described in the BA (SNF 2020) and proposed action section of the opinion. This can be ensured by sufficiently conditioning the CWA and SUP permits to make all the proposed conservation measures mandatory for implementation.

    b. The action agencies should use their authorities to ensure site dewatering and rewatering of the worksite is done in a slow and controlled fashion minimize turbidity frequency, intensity, and duration.

2. To minimize permanent riparian and wetland impacts, the action agencies should require the applicant to pre-mark all proposed disturbance areas and ensure those boundaries are not violated during construction.

Fully implementing these EFH conservation recommendations would protect, by avoiding or minimizing the adverse effects described in Section 3.2, above, approximately 0.5 acres of designated EFH for Pacific Coast salmon.

3.4 Statutory Response Requirement

As required by section 305(b)(4)(B) of the MSA, the SNF, the Corps, and BPA 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 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 agencies must explain their 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 action agencies must reinitiate EFH consultation with NMFS if the proposed action is substantially revised in a way that may adversely affect EFH, or if new information becomes available that affects the basis for NMFS' EFH Conservation Recommendations [50 CFR 600.920(l)].

4. DATA QUALITY ACT DOCUMENTATION AND PRE-DISSEMINATION REVIEW

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

4.1 Utility

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

4.2 Integrity

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

4.3 Objectivity

Information Product Category: Natural Resource Plan

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

Best Available Information: This consultation and supporting documents use the best available information, as referenced in the References section. The analyses in this opinion 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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