UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
West Coast Region
800 E. Park Blvd, Plaza IV, Suite 220
Boise, Idaho 83712

https://doi.org/10.25923/3gx3-r350

Refer to NMFS No: WCRO-2022-00023

May 10, 2022

Charles Mark
Forest Supervisor
Salmon-Challis National Forest
1206 S. Challis Road
Salmon, Idaho 83467

Re: Endangered Species Act Section 7(a)(2) Biological Opinion and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Response and Concurrence for Livestock Grazing on the Indian Ridge Cattle and Horse Grazing Allotment in the North Fork Salmon River and Indian Creek-Salmon River Watersheds, HUCs 1706020306 and 1706020307, Lemhi County, Idaho

Dear Mr. Mark:

Thank you for your letter of January 3, 2022, requesting initiation of consultation with NOAA's National Marine Fisheries Service (NMFS) pursuant to section 7 of the Endangered Species Act of 1973 (ESA) (16 U.S.C. 1531 et seq.) for Livestock Grazing on the Indian Ridge Cattle and Horse Grazing Allotment.

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. However, after reviewing the proposed action, we concluded that there are no adverse effects on EFH. Therefore, we are hereby concluding EFH consultation.

In this Biological Opinion (opinion), NMFS concludes that the action, as proposed, is not likely to jeopardize the continued existence of Snake River Basin steelhead and Snake River spring/summer Chinook salmon. NMFS also concurs with the Salmon-Challis National Forest's (SCNF) determination that the action may affect, but is not likely to adversely affect designated critical habitat for Snake River Basin steelhead and Snake River spring/summer Chinook salmon. Rationale for our conclusions is provided in the attached opinion and concurrence determination.

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

Please contact Brad DeFrees, consulting biologist, in the Southern Snake Branch of the Snake Basin Office at (208) 993-1240 or at brad.defrees@noaa.gov if you have any questions concerning this consultation, or if you require additional information.

Sincerely,

Michael P. Tehan
Assistant Regional Administrator
Interior Columbia Basin Office

Enclosure

cc: K. Povirk – SCNF
K. Krieger – SCNF
D. Garcia – SCNF
E. Traher – USFWS
C. Colter – SBT

Endangered Species Act (ESA) Section 7(a)(2) Biological Opinion

Livestock Grazing on the Indian Ridge Cattle and Horse Grazing Allotment

NMFS Consultation Number: WCRO-2022-00023

Action Agency: USDA Forest Service, Salmon-Challis National Forest

Affected Species and NMFS' Determinations:

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

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

Issued By:

Michael P. Tehan
Assistant Regional Administrator

Date: May 10, 2022

TABLE OF CONTENTS

TABLE OF TABLES

TABLE OF FIGURES

ACRONYMS

Allotment	Indian Ridge Grazing Allotment
BA	Biological Assessment
BLM	Bureau of Land Management
CIG	Climate Impacts Group
CR	Conservation Recommendation
DMA	Designated Monitoring Area
DPS	Distinct Population Segment
DQA	Data Quality Act
EFH	Essential Fish Habitat
ESA	Endangered Species Act
ESU	Evolutionarily Significant Unit
FR	Federal Register
FS	Forest Service
GES	Greenline Ecological Status
GGW	Greenline to Greenline Width
HUC	Hydrologic Unit Code
ICBTRT	Interior Columbia Basin Technical Recovery Team
IDEQ	Idaho Department of Environment Quality
IDFG	Idaho Department of Fish and Game
ISAB	Independent Scientific Advisory Board
ITS	Incidental Take Statement
LAA	Likely to Adversely Affect
MIM	Multiple Indicator Monitoring
MFE	Mesic Forb Early
MFMS	Mesic Forb Mid-Seral
MPG	Major Population Group
MSA	Magnuson–Stevens Fishery Conservation and Management Act
NFS	National Forest System
NLAA	Not Likely to Adversely Affect
NMFS	National Marine Fisheries Service
opinion	Biological Opinion
PACFISH	Pacific Fish
PBF	Physical or Biological Feature
PCE	Primary Constituent Element
PNC	Potential Natural Community
RHCA	Riparian Habitat Conservation Area
RMO	River Management Objectives
RPA	Reasonable and Prudent Alternative
RPM	Reasonable and Prudent Measure
SCNF	Salmon-Challis National Forest
USBWP	Upper Salmon Basin Watershed Project
U.S.C.	U.S. Code
USDA-FS	United States Department of Agriculture-Forest Service

USFS	United States Forest Service
USFWS	U.S. Fish and Wildlife Service
USGCRP	U.S. Global Change Research Program
VSP	Viable Salmonid Population
W:D	Width to Depth Ratio

1. INTRODUCTION

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

1.1. Background

National Marine Fisheries Service (NMFS) prepared the biological opinion (opinion) and incidental take statement (ITS) portions of this document in accordance with section 7(b) of the Endangered Species Act (ESA) of 1973 (16 U.S.C. 1531 et seq.), as amended, and implementing regulations at 50 CFR part 402.

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

1.2. Consultation History

On January 3, 2022, NMFS received a letter from the Salmon-Challis National Forest (SCNF) requesting ESA consultation on the effects of authorizing proposed grazing activities on the Indian Ridge Cattle and Horse Allotment (Allotment). The biological assessment (BA) (United States Forest Service [USFS] 2022) accompanying that letter described proposed livestock grazing activities, the environmental baseline, and the potential effects of those activities on Snake River Basin steelhead and Snake River spring/summer Chinook salmon, as well as each species designated critical habitat. In the BA, the SCNF determined that the proposed action "may affect," and is "likely to adversely affect" (LAA) Snake River Basin steelhead and Snake River spring/summer Chinook salmon. The SCNF has also determined that the action "may affect," but is "not likely to adversely affect" (NLAA) Snake River Basin steelhead designated critical habitat and Snake River spring/summer Chinook designated critical habitat.

This biological opinion, including our NLAA determination for effects on Snake River Basin steelhead and Snake River spring/summer Chinook salmon critical habitat, replaces our previously issued biological opinion dated July 18, 2016 (NMFS tracking number WCR-2016-4905). New information regarding Snake River spring/summer Chinook salmon presence within the action area prompted the reinitiation and associated 2022 BA.

The draft BA was submitted to the Level 1 Team for review on November 19, 2021. NMFS provided comments to the SCNF on the draft BA on December 7, 2021. NMFS and the SCNF discussed the draft BA at the December 15, 2021, Level 1 meeting, in which all of NMFS comments were addressed. Both agencies agreed with the approach to submit a final BA, but NMFS reserved the opportunity to request additional information, if necessary, to complete the consultation. The Allotment BA and request for consultation was received by NMFS on January 3, 2023. Consultation was initiated at that time.

NMFS shared the draft proposed action and proposed conservation measures with the SCNF on March 10, 2022. The SCNF suggested revisions to the draft opinion on March 24, 2022. An amendment for the BA was received by NMFS from the SCNF on May 6, 2022. The information provided in the amendment was fully considered and incorporated into this consultation.

The SCNF's proposed authorization of cattle grazing on the Allotment would likely affect tribal trust resources. Because the action is likely to affect tribal trust resources, NMFS contacted the Shoshone-Bannock Tribes pursuant to the Secretarial Order (June 5, 1997). A copy of the draft proposed action and conservation recommendations were sent to the Shoshone-Bannock Tribes on March 14, 2022, with a request for comments. NMFS did not receive any response.

1.3. Proposed Federal Action

Under the ESA, "action" means all activities or programs of any kind authorized, funded, or carried out, in whole or in part, by Federal agencies (see 50 CFR 402.02). For purposes of this consultation, the proposed action involves the permitting of livestock grazing on 50,313 acres of SCNF system lands that comprise the Allotment (USFS 2022). This Allotment is located on the North Fork Ranger District in the fifth field North Fork Salmon River and Indian Creek-Salmon River hydrologic unit codes (HUCs) (HUCs 1706020306 and 1706020307), in Lemhi County, Idaho.

This consultation covers the proposed grazing period from the completion of this signed opinion through the end of the 2036 grazing season, so long as: (1) grazing activities on the Allotment are consistent with the grazing management described in this document; (2) reissuance of permits will be identical to or more conservative than the grazing management described in this document so as to not trigger the need to reinitiate consultation at that time; and (3) other triggers requiring reinitiation of consultation are not exceeded. This consultation covers the issuance of grazing permits following expiration or waiver as long as conditions 1 and 2 above are met. The regulations for consultation require the action agency to reinitiate consultation if certain triggers in condition 3 are met (50 CFR 402.16).

Current Permit: The current Term Grazing Permit for the Indian Ridge Cattle and Horse Allotment authorizes 140 cow/calf pairs to graze from May 23 to October 30 (539 Head Months).

Per direction in FSH 2209.13_10, an extension of grazing may be requested outside the dates on the term grazing permit. Extensions are generally granted for no more than two weeks and can occur at the beginning or end of the permitted grazing season, or in a combination of the two time periods. In considering the request the District Ranger will follow Regional Forester direction as outlined, including compliance with the ESA Section 7 consultation requirements. An approved extension cannot result in more take than would otherwise be allowed. Regional Forester direction also indicates that use of extensions should be an exception rather than a standard practice. On this Allotment it is not expected that a request for an extension will be received more than 4 years in ten. If extensions were to be granted, they would only occur for early season in the Hughes Creek or Hull Creek Units, depending on the rotation.

1.3.1. Grazing System

The Allotment is divided into three units: Hull Creek Unit, Hughes Creek Unit, and Indian Ridge Unit.

Range readiness (bluebunch wheatgrass in the first boot stage or the appearance of Idaho fescue flower stalks) will be monitored as necessary to determine if the on-date is appropriate. Adjustments to the on-date may be made if conditions warrant.

Annual use indicators (Section 1.3.6) will drive when unit moves, or the off-date occurs. Permittees are responsible for moving livestock to meet annual use indicators. The Hull Creek Unit and Hughes Creek Unit are rested every other year, while the Indian Ridge Unit is grazed every year (see Table 1).

Table 1. Unit Rotations.

Approximate Use Period	Year 1 (odd years)	Year 2 (even years)
5/23 – 7/1	Hughes Creek Unit	Hull Creek Unit
7/1 – 10/30	Indian Ridge Unit	Indian Ridge Unit
	Hull Creek Unit (Rest)	Hughes Creek Unit (Rest)

*Note: See Figure 1 for Unit locations

1.3.1.1. Livestock Occupancy (Years 1 and 2):

Hull Creek Unit:

- Chinook salmon: Not present in the Unit.
- Steelhead: Livestock will be in the Unit during spawning and incubation, which runs through the first quarter in July, up to 7 weeks one out of two years, between approximately May 23 and July 7.
- Bull Trout: Not present in the Unit.
- Trailing: Trailing impacts to steelhead could occur in the Unit during trailing onto the Allotment on the lower reaches of Hull Creek one out of two years during supervised trailing. Duration of move is one day. Livestock do not have access to the North Fork Salmon River during trailing onto the Allotment and into the Hull Creek Unit so there are also no impacts to Chinook salmon or bull trout.

Hughes Creek Unit:

- Chinook salmon: Livestock are removed from this Unit prior to August 15 per the grazing rotation. Livestock will be trailing off the Allotment through this Unit during spawning and incubation, which starts the fourth quarter of August, intermittently throughout a 7-week time period every year, between approximately September 15 and October 30.
- Steelhead: Livestock will be in the Unit during spawning and incubation, which runs through the first quarter in July, up to 7 weeks one out of two years, between approximately May 23 and July 7.

- Bull Trout: Livestock are removed from this Unit prior to August 15 per the grazing rotation. Livestock will be trailing off the Allotment through this Unit during spawning and incubation, which starts August 15, intermittently throughout a 7-week time period every year, between approximately September 15 and October 30.
- Trailing: End-of-season trailing impacts to Chinook salmon and bull trout could occur in Hughes Creek in the Hughes Creek Unit every year, between approximately September 15 and October 30, from supervised and unsupervised end-of-season trailing off the Allotment. Trailing will not occur adjacent to Hughes Creek above West Fork Hughes Creek.

Indian Ridge Unit:

- Chinook salmon: Indian Creek, which makes up a border of the Indian Ridge Unit, is designated critical habitat, but livestock do not have access to the stream.
- Steelhead: Livestock will be in the Unit during spawning and incubation, which runs through the first quarter in July, up to one week every year, between approximately July 1 and July 7.
- Bull Trout: Livestock do not have access to Indian Creek or Corral Creek due to steep topography and will not be grazing areas near these streams.
- Trailing: No trailing occurs in this Unit, so there are no associated impacts.

1.3.1.2. Unit Movements

<u>*Entry onto Allotment:*</u>

Livestock enter the Allotment on or after May 23 by either trailing or trucking. Roads referenced for Unit movements are identified in Figure 2. Trailing or trucking will occur one of two ways, consistent with which year (odd or even) in the rotation is authorized:

- *Year 1*: Supervised trailing or trucking of livestock into the Hughes Creek Unit will occur on Forest System (FS) Road #60091, typically occurring over 1 to 2 days.

- *Year 2*: Livestock are trailed down FS Road #60091 (Hughes Creek Road) to Highway 93N. Then, they are trailed down Highway 93N to FS Road #60005 (Hull Creek Road) and then are supervised trailed up the Hull Creek road into the Hull Creek Unit. Alternatively, livestock may be trucked directly into the Hull Creek Unit via FS Road #60005 (Hull Creek Road).

<u>*Exit off the Allotment:*</u>

- All livestock will be removed from the Allotment by October 30. Due to the timbered nature of the Allotment, staggered removal is sometimes required to meet the October 30 off date. Livestock will be trailed from the Indian Ridge Unit on FS Road #60088 (West Fork Hughes Creek Road) and FS Road #60091 (Hughes Creek Road), through the Hughes Creek Unit, and off the forest to private land. There are approximately 3 days each week with supervised trailing through the Hughes Creek Unit and off the Allotment on to private land. Each instance of trailing occurs in a single day.

Total Removal from National Forest System (NFS) Lands:

All livestock will be removed from the Allotment by October 30 unless there is a District Ranger approved extension following the language in Section 1.3 above. It is not expected an end-of-season extension would be requested.

1.3.2. Improvements

New Improvements: There are no new improvements proposed at this time.

Existing Improvements: Existing improvements, as displayed in Figure 1, will be maintained in accordance with the term grazing permit. For example, fences are maintained to serve their intended purpose; and water troughs are maintained to keep the trough functional and water from overflowing the side.

1.3.3. Changes from Existing Management

- Multiple Indicator Monitoring (MIM) site M222Z (Ransack) in the Hughes Creek Unit has been removed from the monitoring list. Due to its location in an exclosure that prohibits livestock grazing, the area is not representative of grazing use and livestock activity, so monitoring is not completed at the site. The designated monitoring site for the Hughes Creek Unit is MIM site M244 (West Fork Hughes Creek).

- The annual use indicators for Hull Creek (M308) have been changed from 20 percent to 30 percent browse utilization and 6-inch to 4-inch greenline stubble height in accordance with the adaptive management strategy.

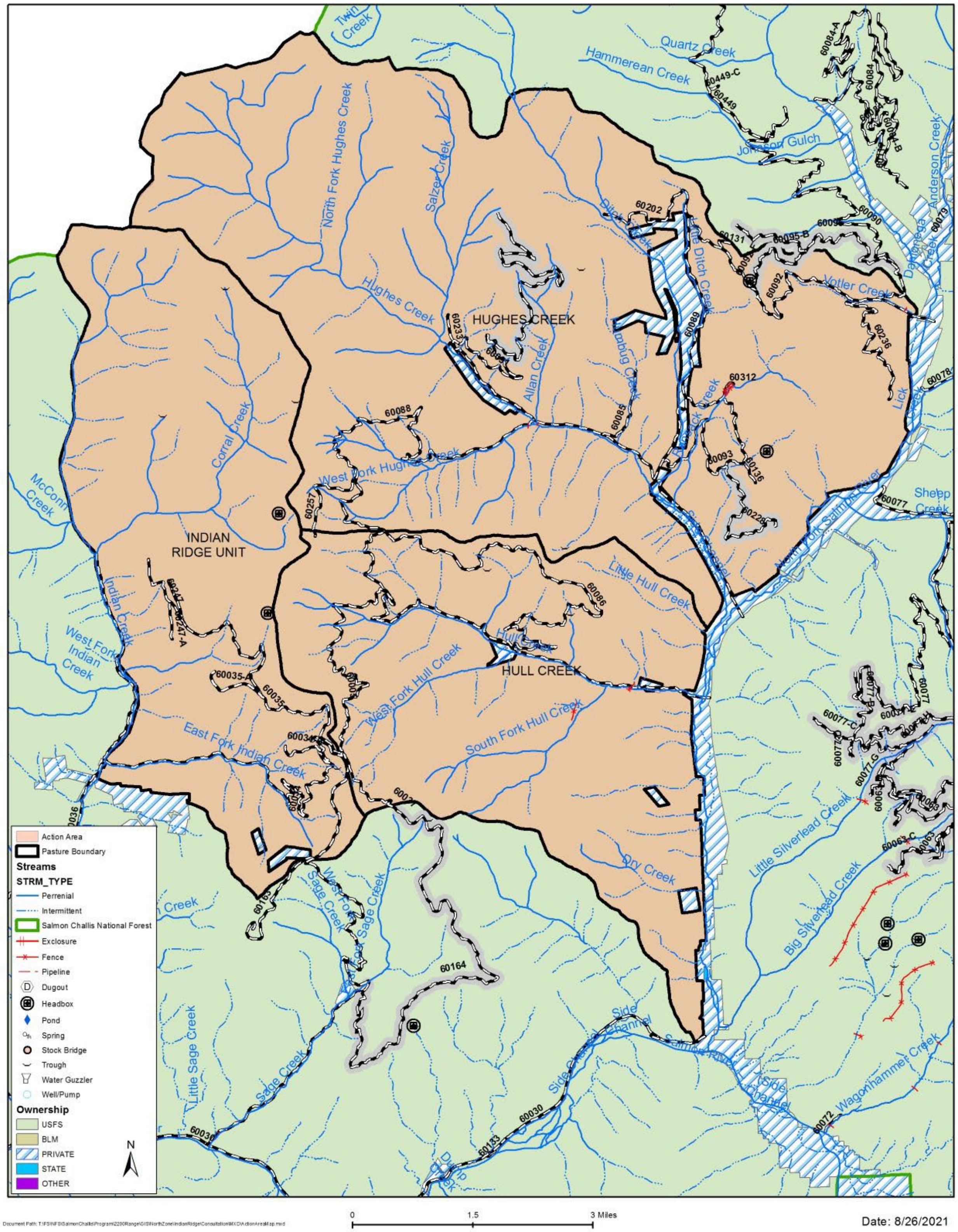


Figure 1. Action Area Map with Roads and Range Improvements

1.3.4. Conservation Measures

The following measures will be described and implemented as part of the term grazing permit(s) on the Indian Ridge Allotment, to avoid and reduce potential impacts to ESA-listed fish and their habitat in the Allotment.

1. The SCNF will follow the Communication Plan - Implementing Livestock Grazing Consultation on the Salmon-Challis NF (Appendix F of the BA). Over the duration of this BA the Communication Plan could be updated to better address livestock grazing management both in the Forest Service (FS) and between the Forest Service and NMFS-USFWS. The desired outcome of this Communication Plan is to conduct livestock grazing in the scope of this BA and subsequent biological opinion or concurrence letter while being consistent and timely in communication when something is observed to the contrary.

2. A rest rotation system will be used on the Hughes Creek and Hull Creek Units.

3. Per the Grazing System (Section 1.3.1) the on-date may vary so livestock will be placed on the Allotment at range readiness.

4. Livestock moves between Units or off the Allotment are made so as to meet the annual use indicators (Section 1.3.1.2).

5. Permittees will continue to salt at least one fourth mile away from all streams.

6. Permittees will continue to distribute livestock away from perennial streams and associated riparian areas by riding at least once every two weeks.

7. Fences and water developments have been located to reduce livestock use on streams and their associated riparian areas (Figure 2). Permittees will maintain improvements associated with their term grazing permit in accordance with the terms and conditions outlined in the permit.

8. Annual bull trout and Chinook salmon redd survey monitoring will continue on the Allotment.

9. The Allotment will continue to be monitored using implementation and effectiveness monitoring described in Section 1.3.6 and results of all monitoring will be provided to the Services by March 1 of the following year.

1.3.5. Resource Objectives and Standards

Resource Objectives and Effectiveness Monitoring: The Allotment is being managed to support the following resource objectives. The first three resource objectives are the most affected by livestock grazing. Resource objectives are the Forest's description of the desired land, plant, and water resources condition in riparian areas in the Allotment. Some resource objectives are Riparian Management Objectives (RMOs) from PACFISH and its corresponding Biological Opinion (NMFS 1995 and 1998). PACFISH is an interim strategy for managing anadromous fish-producing watersheds that was amended into the Salmon National Forest and Challis National Forest Plans in 1995 (USDA Forest Service 1995).

Effectiveness monitoring for resource objectives will be monitored at a minimum of every 5 years at Designated Monitoring Areas (DMAs) using the MIM technical reference (Burton et al. 2011) or other best available science as it becomes available. DMAs are areas representative of grazing use specific to the riparian area being accessed and reflect what is happening in the overall riparian area as a result of on-the-ground management actions. They should reflect typical livestock use where they enter and use vegetation in riparian areas immediately adjacent to the stream (Burton et al. 2011). Results from monitoring will be available at http://www.fs.usda.gov/detail/scnf/landmanagement/resourcemanagement/?cid=STELPRDB5308989.

Resource Objectives:

- Greenline Successional Status: A greenline successional status [a.k.a., GES] value of at least 61 (late seral) or the current value, whichever is greatest (Winward 2000; Burton et al. 2011; Gamett et al. 2008).

- Woody Species Regeneration: The desired condition is to have sufficient woody recruitment to develop and maintain healthy riparian woody plant populations (Winward 2000; Gamett et al. 2008), in keeping with the potential of the site.

- Bank Stability RMO: In the Indian Ridge Allotment, the Hull Creek Unit and Hughes Creek Unit are in a priority watershed (Figure 3 and Appendix C of the BA). In priority watersheds a bank stability needs to be at least 90 percent or the current value, whichever is greatest to meet the RMO (NMFS 1998). The Indian Ridge Unit is not within a priority watershed therefore, a bank stability of at least 80 percent is needed to meet the RMO (NMFS 1998).

- Width to Depth Ratio (W:D) (PACFISH): less than 10, mean wetted width divided by mean depth or by channel type as follows:
    - A Channel: 21
    - B Channel: 27
    - C Channel: 28

- Water Temperature RMO: No measurable increase in maximum water temperature as expressed as the 7-day moving average of daily maximum temperatures measured as the average of the maximum daily temperature of the warmest consecutive 7-day period. For steelhead and Chinook salmon, less than 64°F (17.8°C) in migration and rearing areas. For Chinook salmon and steelhead, less than 60°F (15.6°C) in spawning areas (PACFISH) except in steelhead priority watersheds where the objective is less than 45°F (7.2°C) in steelhead spawning areas during the incubation period (NMFS 1998). For bull trout, less than 59°F (15.0°C) in adult holding habitat and less than 48°F (8.9°C) in

spawning and rearing habitat. This objective was established by INFISH and is being applied to areas occupied by bull trout in the area covered by PACFISH.
- Sediment RMO: less than 20 percent surface fine sediment, which is substrate less than 0.25 in (6.4 mm) in diameter in spawning habitat.

Management Standards (PACFISH):

- GM-1 - Modify grazing practices (e.g., accessibility of riparian area to livestock, length of grazing season, stocking levels, timing of grazing, etc.) that retard or prevent attainment of RMO or are likely to adversely affect listed anadromous fish. Suspend grazing if adjusting practices is not effective in meeting RMOs and avoiding adverse effects on listed anadromous fish (PACFISH).
- GM-2 - Locate new livestock handling and or management facilities outside of Riparian Habitat Conservation Areas (RHCAs). For existing livestock handling facilities inside the RHCAs, assure that facilities do not prevent attainment of RMOs or adversely affect listed anadromous fish. Relocate or close facilities where these objectives cannot be met.
- GM-3 - Limit livestock trailing, bedding, watering, salting, loading, and other handling efforts to those areas and times that will not retard or prevent attainment of RMOs or adversely affect listed anadromous fish.

1.3.6. Annual Use Indicators

Annual Use Indicators: Annual use indicators are used to ensure that grazing does not prevent the attainment of the riparian resource objectives directly affected by livestock grazing. Riparian annual use indicators used on the SCNF generally include greenline stubble height, bank alteration, and woody browse. In general, greenline stubble height is used to regulate grazing impacts on GES, bank alteration is used to regulate grazing impacts on bank stability, and woody browse is used to regulate impacts on woody recruitment. The specific indicators selected for a specific unit should be those that correspond with the riparian resources that are most sensitive to the impacts of livestock grazing. For example, if bank stability was the riparian feature most likely to be impacted by livestock grazing in a unit, then bank alteration would be selected as the annual use indicator for that unit.

Based on the guidelines in Sections 1.3.6 and 1.3.8, the available data including results from implementation and effectiveness monitoring, and the professional experience of Forest Service personnel, the annual use indicators for habitat either occupied by ESA-listed fish, or their designated critical habitat - have been established on this Allotment (Table 2, also, Tables 18-26, Figures 5-7 of the BA).

The annual use indicators in Table 2 will be used until the next effectiveness monitoring for GES, woody regeneration, and bank stability (Section 1.3.7) indicate adjustment is needed. Any adjustments, to meet these three resource objectives directly affected by livestock grazing, will be made using Adaptive Management (Section 1.3.8, also Appendix E of the BA).

The annual use indicators in Table 2 drive when unit moves, or the off-date occurs. Permittees are responsible for moving livestock to meet these annual use indicators.

Triggers: Permittees use triggers to determine when livestock need to be moved from a unit to ensure that annual use indicators are not exceeded. A trigger's numerical value varies from unit to unit, and from year to year for any unit based on the season's growing conditions, amount of precipitation received, how long it may take to move livestock from one unit to the next, etc. As such, triggers are informally customized to the specific circumstances of each unit for that year, but typically range from 5 to 7 inches, for example, for the stubble height indicator (see Table 2). While the Forest Service works with the permittees to help them know how to monitor stubble height, bank alteration and woody browse, trigger monitoring by permittees is informal (not documented) and it is not reported. The stated direction in the term grazing permit(s) is for the permittees to ensure annual use indicators are met.

Table 2. Designated Monitoring Area and Annual Use Indicators

Key Area Locations	Unit – Creek	Monitoring Attribute	Annual Use Indicator	Key Species	Trigger
MIM M244	Hughes Creek – West Fork Hughes	Browse use	30%	alder	25%
		Greenline stubble	4 in.	Hydric spp.	5 in.
		Bank alteration	20%	N/A	25%
MIM M308	Hull Creek – Hull	Browse Use	30%	alder	25%
		Greenline stubble	4 in.	Hydric spp.	5 in.
		Bank alteration	20%	N/A	25%
Upland Sites	All Units	Utilization	50%	Upland grass species	45%
Riparian Areas	All Units	Utilization by Key Species	50%	Riparian grass species	45%

Monitoring of Annual Use Indicators presented in Table 2 will be conducted using the MIM protocol (Burton et al. 2011) or other best available science. Monitoring locations identified in Table 2 are key areas, also referred to as DMAs. Each is a representative DMA, and as such is to be located in an area that is representative of streamside livestock use, reflecting typical use of riparian vegetation and streambanks (Burton et al. 2011). DMAs identified in Table 2 are representative of units that have ESA-listed fish and/or designated critical habitat.

Key species are preferred by livestock and are an important component of a plant community, serving as an indicator of change (Burton et al. 2011).

Season-end annual use indicators will be monitored by Forest Service personnel or a person authorized by the Forest Service. For further discussion of monitoring annual use see Monitoring Section 1.3.7.

1.3.7. Monitoring and Reporting

Implementation (Annual) Monitoring:

The monitoring protocol uses the MIM method (Burton et al. 2011) or other best available published science. Implementation monitoring will be conducted at DMAs. Each DMA is to be located in an area that is representative of streamside livestock use, reflecting typical use of riparian vegetation and streambanks (Burton et al. 2011).

The purpose of monitoring annual use indicators is to identify the relationship between this 'allowed use' (Table 2) and attainment of the three riparian resource objectives directly affected by livestock grazing. Per the MIM method, timing of annual use monitoring is based on its purpose. Alteration monitoring is typically conducted in two weeks of livestock having been moved from a Unit. Monitoring residual stubble height, as a protective cover for next spring's flows, is conducted by the end of the grazing season.

Annual use indicators will be monitored by Forest Service personnel or a person trained and authorized by the Forest Service.

Effectiveness (Long-Term) Monitoring:

Effectiveness monitoring for greenline ecological status, woody regeneration and bank stability uses the MIM method (Burton et al. 2011) or other best available science. Effectiveness monitoring will be conducted a minimum of every five years. This monitoring also takes place at the DMAs in Table 2. DMAs are an area representative of grazing use and reflecting what is happening in the overall riparian area as a result of livestock activity (Burton et al. 2011).

The monitoring protocol for the channel geometry is revised from a wetted W:D measurement (range monitoring prior to 2010) and a bankfull W:D metric (watershed monitoring 1993 - 2016) to the greenline-to-greenline width (GGW) measurement as described in the MIM protocol.

Fish Habitat Monitoring:

Stream sediment (depth fines) and water temperature will be monitored at established long-term monitoring sites using established protocols at least once every five years. The established long-term monitoring sites are not necessarily located at the DMAs. Frequency of monitoring varies depending on the trend indicated by monitoring results. At a minimum these two metrics will be monitored twice every ten years.

Fish Population Monitoring:

Fish population monitoring, which will include determining ESA-listed fish presence and density, will be conducted at long-term monitoring sites in the Allotment at least every five years. As required in the U.S. Fish and Wildlife Service (USFWS) Biological Opinion, annual bull trout redd survey monitoring will continue on the Allotment.

Reporting:

Results of monitoring identified above will be electronically emailed to the respective Regulatory Agency, or their offices, by March 1 each year. Results from the annual biological opinion Monitoring Reports will be available at http://www.fs.usda.gov/detail/scnf/landmanagement/resourcemanagement/?cid=STELPRDB5308989

1.3.8. Adaptive Management

The adaptive management strategy described below and depicted in Appendix E diagrams 1.0 (Long-term) and 2.0 (Annual) is intended for allotments requiring consultation. It will be used to ensure: (1) sites at desired condition remain in desired condition; (2) sites not in desired condition have an upward trend or an acceptable static trend to be agreed upon with NMFS, USFWS, and the Forest Service; and (3) direction from consultation with NMFS and the USFWS is met. The overall strategy consists of a long-term adaptive management strategy and an annual adaptive management strategy. The long-term strategy describes how adaptive management will be used to ensure the three resource objectives livestock directly affect are achieved and to maintain consistency with Forest Plan level direction. The annual adaptive management strategy describes how adjustments will be made in the grazing season to ensure annual use indicators and other direction from consultation is met. Both strategies describe when and how regulatory agencies will be contacted in the event direction from consultation is not going to be met (see also Communication Plan, Appendix E of the BA).

Ideally, the value associated with the annual use indicator is customized to the specific circumstances in each Unit and is based on data and experience. However, customizing this value generally requires a significant amount of data and or experience with a particular Unit. When sufficient data and/or experience are not available to establish the annual use indicators values, the SCNF has provided default recommendations for establishing the values. These recommendations will be used until such time as sufficient data and/or experience are available to customize the annual indicator values. The recommendations that apply to this Allotment are:

- Livestock grazing in the uplands and riparian areas will be limited to 50 percent use on key herbaceous species in representative use areas of the Allotment during the grazing season.
- When the greenline ecological status is 61 or greater, the end-of-season median greenline stubble height annual use indicator will be 4 inches.
- When the greenline ecological status is less than 61, the end-of-season median greenline stubble height annual use indicator will be 6 inches.
- When there is sufficient woody recruitment to develop and maintain healthy woody plant populations, the woody browse indicator will be 50 percent woody browse on multi-stemmed species and 30 percent woody browse on single-stemmed species.
- When there is not sufficient woody recruitment to develop and maintain healthy woody plant populations, the woody browse indicator will be 30 percent woody browse on multi-stemmed species and 20 percent woody browse on single-stemmed species.

- In priority watersheds, when bank stability is 90 percent or greater the bank alteration annual use indicator will be 20 percent. Outside of priority watersheds, if bank stability is 80 percent or greater, the annual bank alteration indicator is 20 percent.
- In priority watersheds, when bank stability is 70-89 percent the bank alteration annual use indicator will be 10-20 percent. Outside of priority watersheds, if bank stability is 60-79 percent, the bank alteration annual indicator is 15 percent.
- In priority watersheds, when bank stability is less than 70 percent the bank alteration annual use indicator will be 10 percent. Outside of priority watersheds, if bank stability is less than 60 percent, the bank alteration annual indicator is 10 percent.

We considered, under the ESA, whether or not the proposed action would cause any other activities and determined that it would not.

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 to adversely modify or destroy their designated critical habitat. Per the requirements of the ESA, Federal action agencies consult with NMFS, and section 7(b)(3) requires that, at the conclusion of consultation, NMFS provide an opinion stating how the agency's actions would affect listed species and their critical habitats. If incidental take is reasonably certain to occur, section 7(b)(4) requires NMFS to provide an ITS that specifies the impact of any incidental taking and includes reasonable and prudent measures (RPMs) and terms and conditions to minimize such impacts.

The SCNF determined the proposed action is Not Likely to Adversely Affect (NLAA) Snake River Basin steelhead designated critical habitat and Snake River spring/summer Chinook salmon designated critical habitat. Our concurrence is documented in the "Not Likely to Adversely Affect" Determinations section (Section 2.12).

2.1. Analytical Approach

This biological 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 CFR 402.02). Therefore, the jeopardy analysis considers both survival and recovery of the species.

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

We use the following approach to determine whether a proposed action is likely to jeopardize listed species:

- Evaluate the rangewide status of the species 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 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 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.
- If necessary, suggest a reasonable and prudent alternative (RPA) to the proposed action.

2.2. Rangewide Status of the Species

This opinion examines the status of each species that is likely to be adversely affected by the proposed action. The status is determined by the level of extinction risk that the listed species face, based on parameters considered in documents such as recovery plans, status reviews, and listing decisions. This informs the description of the species' likelihood of both survival and recovery. The species status section also helps to inform the description of the species' "reproduction, numbers, or distribution" for the jeopardy analysis. The Federal Register (FR) notices and notice dates for the species and critical habitat listings considered in this opinion are included in Table 3.

Table 3. Listing status, status of critical habitat designations and protective regulations, and relevant Federal Register decision notices for ESA-listed species considered in this opinion.

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

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

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

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

The following sections summarize the status and available information on the species considered in this opinion based on the detailed information provided by the Recovery Plan for Snake River Spring/Summer Chinook Salmon & Snake River Basin Steelhead (NMFS 2017), Status Review Update for Pacific Salmon and Steelhead Listed under the Endangered Species Act: Pacific Northwest (NWFSC 2015), and 2016 5-year Review: Summary and Evaluation of Snake River Sockeye Salmon, Snake River Spring-summer Chinook, Snake River Fall-run Chinook, Snake River Basin Steelhead (NMFS 2016a). These three documents are incorporated by reference here. Additional information (e.g., abundance estimates) has become available since the latest status review (NMFS 2016a) and its technical support document (NWFSC 2015). NOAA recently issued an updated viability assessment for Pacific salmon as part of the new status review effort (Ford 2022). This latest information (Ford 2022) represents the best scientific and commercial data available and is also summarized in the following sections.

2.2.1. Snake River Spring/Summer Chinook Salmon

The Snake River spring/summer Chinook salmon ESU was listed as threatened on April 22, 1992 (57 FR 14653). This ESU occupies the Snake River basin, which drains portions of southeastern Washington, northeastern Oregon, and north and central Idaho. Large portions of historical habitat were blocked in 1901 by the construction of Swan Falls Dam, on the Snake River, and later by construction of the three-dam Hells Canyon Complex from 1955 to 1967. Dam construction also blocked or hindered fish access to historical habitat in the Clearwater River basin as a result of the construction of Lewiston Dam (removed in 1973 but believed to have caused the extirpation of native Chinook salmon in that sub-basin). The loss of this historical habitat substantially reduced the spatial structure of this species. The production of Snake River spring/summer Chinook salmon was further affected by the development of the eight Federal dams and reservoirs in the mainstem lower Columbia or Snake River migration corridor between the late 1930s and early 1970s (NMFS 2017).

Several factors led to NMFS' conclusion that Snake River spring/summer Chinook salmon were threatened: (1) abundance of naturally produced Snake River spring/summer Chinook runs had dropped to a small fraction of historical levels; (2) short-term projections were for a continued downward trend in abundance; (3) hydroelectric development on the Snake and Columbia Rivers continued to disrupt Chinook runs through altered flow regimes and impacts on estuarine habitats; and (4) habitat degradation existed throughout the region, along with risks associated with the use of outside hatchery stocks in particular areas (Good et al. 2005). On May 26, 2016, in the agency's most recent 5-year review for Pacific salmon and steelhead, NMFS concluded that the species should remain listed as threatened (81 FR 33468). NMFS will publish a new 5-year status review in spring 2022.

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

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

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

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

Spatial structure risk is low to moderate for most populations in this ESU (NWFSC 2015; Ford 2022) and is generally not preventing the recovery of the species. Snake River spring/summer Chinook salmon spawners are distributed throughout the ESU albeit at very low numbers. Diversity risk, on the other hand, is somewhat higher, driving the moderate and high combined spatial structure/diversity risks for some populations. Several populations have a high proportion of hatchery-origin spawners—particularly in the Grande Ronde, Lower Snake, and South Fork Salmon MPGs—and diversity risk will need to be lowered in multiple populations in order for the ESU to recover (ICBTRT 2007; ICBTRT 2010; NWFSC 2015). In the Upper Salmon River MPG, four of the seven populations with sufficient information to directly estimate hatchery contributions had very low hatchery proportions (Ford 2022).

Table 4. Preliminary estimated Snake River spring/summer Chinook salmon abundance most recent 10-year geometric mean (range)) and viability ratings (Ford 2022) and recovery plan role (NMFS 2017) for population potentially affected by the proposed action considered in this opinion.

Population	Abundance/Productivity Metrics [a]				Integrated Spatial Structure and Diversity Risk	Overall Risk Rating	Identified for viable status in ICBTRT Recovery Scenario[b]
	ICBTRT Minimum Threshold	Natural Spawning Abundance	ICBTRT Productivity	Integrated A/P Risk			
Upper Salmon River MPG Populations Affected by Proposed Actions							
North Fork Salmon River	2,000	71 (sd 87)[c]	1.30 (0.23 20/20)	High	Low	High	No

[a] Current abundance and productivity estimates are geometric means. Range in annual abundance, standard error, and number of qualifying estimates for productivities in parentheses.

[b] Populations marked 'yes' must be viable, which is defined as having a 5 percent or less risk of extinction over 100 years. All populations in the MPG must meet criteria for maintained status for the MPG to be viable. Maintained populations have a less than 25 percent chance of extinction in 100 years.

[c] sd = standard deviation

Abundance and Productivity. Historically, the Snake River drainage is thought to have produced more than 1.5 million adult spring/summer Chinook salmon in some years (Matthews and Waples 1991), yet in 1994 and 1995, fewer than 2,000 naturally produced adults returned to the Snake River (ODFW and WDFW 2021). From the mid-1990s and the early 2000s, the population increased dramatically and peaked in 2001 at 45,273 naturally produced adult returns. Since 2001, the numbers have fluctuated between 32,324 (2003) and 4,425 (2017), and the trend for the most recent 5 years (2016–2020) has been generally downward (ODFW and WDFW 2021). Furthermore, the most recent returns (2019) indicate that all populations in the ESU were below replacement for the 2014 brood year (Felts et al. 2019)[1], which reduced abundance across

[1] The return size is not known until 5 years after the brood year. Preliminary results for the 2019 redd counts indicate that the 2014 brood year will be below replacement for the vast majority (possibly all) of the populations in the Snake River spring/summer Chinook salmon ESU.

the ESU. Although most populations in this ESU have increased in abundance since listing, 25 of the 28 extant populations remain at high risk of extinction due to low abundance or productivity. Abundances for some populations are approaching similar levels to those of the early 1990s when the ESU was listed (Ford 2022). Three populations (Minam River, Bear Valley, and Marsh Creek) improved to an overall rating of "maintained" due to an increase in abundance/ productivity when measured over a 10–20-year period (Ford 2022). All currently extant populations of Snake River spring/summer Chinook salmon will likely have to increase in abundance and productivity in order for the ESU to recover (Table 4). The majority of populations in the Snake River spring/summer-run Chinook salmon ESU remained at high overall risk (Ford 2022). Natural-origin abundance has generally decreased over the levels reported in the 2016 5-year review for most populations in this ESU, in many cases sharply. Relatively low ocean survivals in recent years are likely a major factor in recent abundance patterns (Ford 2022).

Snake River Spring/Summer Chinook Populations in the Action Area: The North Fork Salmon River population within the Upper Salmon River MPG, of Snake River spring/summer Chinook salmon is present within the action area. Summary of viability for the North Fork Salmon River population relative to the ICBTRT viability criteria (Ford 2022), shows the natural spawning (i.e., most-recent 10-yr geometric mean (range) is 71 (SD 87) and ICBTRT productivity (i.e. = 20-yr geometric mean for parent escapements below 75 percent of population threshold) is 1.30. The North Fork Salmon River population of the Snake River spring/summer Chinook salmon ESU current status is 'high risk' with a target status of maintained (NMFS 2017). However, relatively few data are available, and there have been substantial anthropogenic effects on population and habitat (e.g., impacts from habitat loss, dams, and development) (NMFS 2017). The population could achieve viable status with improved abundance and productivity (NMFS 2017). However, although the current status review is not yet complete, the available information suggests the population may not be viable in the ICBTRT Recovery Scenario (Ford 2022).

2.2.2. Snake River Basin Steelhead

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

Life History. Adult Snake River Basin steelhead enter the Columbia River from late June to October to begin their migration inland. After holding over the winter in larger rivers in the Snake River basin, steelhead disperse into smaller tributaries to spawn from March through May.

Earlier dispersal occurs at lower elevations and later dispersal occurs at higher elevations. Juveniles emerge from the gravels in 4 to 8 weeks, and move into shallow, low-velocity areas in side channels and along channel margins to escape high velocities and predators (Everest and Chapman 1972). Juvenile steelhead then progressively move toward deeper water as they grow in size (Bjornn and Rieser 1991). Juveniles typically reside in fresh water for 1 to 3 years, although this species displays a wide diversity of life histories. Smolts migrate downstream during spring runoff, which occurs from March to mid-June depending on elevation, and typically spend 1 to 2 years in the ocean.

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

The ICBTRT identified 24 extant populations within this DPS, organized into five MPGs (ICBTRT 2003). The ICBTRT also identified a number of potential historical populations associated with watersheds above the Hells Canyon Dam complex on the mainstem Snake River, a barrier to anadromous migration. The five MPGs with extant populations are the Clearwater River, Salmon River, Grande Ronde River, Imnaha River, and Lower Snake River. In the Clearwater River, the historic North Fork population was blocked from accessing spawning and rearing habitat by Dworshak Dam. Per the original ICBTRT assessment, spatial structure risk ratings for all of the Snake River Basin steelhead populations are “low” or “very low risk” given the evidence for distribution of natural production within populations (Ford 2022). Panther Creek is the only population given a “high risk” rating due to lack of spawning habitat.

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

Diversity risk for populations in the DPS is either moderate or low. Large numbers of hatchery steelhead are released in the Snake River, and the relative proportion of hatchery adults in natural spawning areas near major hatchery release sites remains uncertain (NWFSC 2015; Ford 2022). Moderate diversity risks for some populations are thus driven by the high proportion of hatchery fish on natural spawning grounds and the uncertainty regarding these estimates (NWFSC 2015).

Reductions in hatchery-related diversity risks would increase the likelihood of these populations reaching viable status.

Table 5. Preliminary estimated Snake River Basin steelhead abundance (most recent 10-year geometric mean (range)) and viability ratings (Ford 2022) and recovery plan role (NMFS 2017) for population potentially affected by the proposed actins considered in this.

Population	Abundance/Productivity Metrics [a]				Integrated Spatial Structure and Diversity Risk	Overall Risk Rating	Identified for viable status in ICBTRT Recovery Scenario[b]
	ICBTRT Minimum Threshold	Natural Spawning Abundance	ICBTRT Productivity	Integrated A/P Risk			
Salmon River MPG Populations Affected by Proposed Actions							
North Fork Salmon River	500	3,502 (sd 2,562)[c]	1.88 (0.17 16/20)	Moderate	Moderate	Maintained	Yes

[a] Abundance and productivity values are generated from aggregate steelhead counts at Lower Granite Dam that are subsequently partitioned into four subgroups based on genetic stock identification. The Upper Salmon River stock group includes six populations. The displayed abundance and productivity values are for the entire subgroup, not just the four populations shown.
[b] Populations marked 'yes' must be viable, which is defined as having a 5 percent or less risk of extinction over 100 years. All populations in the MPG must meet criteria for maintained status for the MPG to be viable. Maintained populations have a less than 25 percent chance of extinction in 100 years.
[c] sd = standard deviation

Abundance and Productivity. Historical estimates of steelhead production for the entire Snake River basin are not available, but the basin is believed to have supported more than half the total steelhead production from the Columbia River basin (Mallet 1974, as cited in Good et al. 2005). The Clearwater River drainage alone may have historically produced 40,000 to 60,000 adults (Ecovista et al. 2003), and historical harvest data suggests that steelhead production in the Salmon River was likely higher than in the Clearwater (Hauck 1953). In contrast, at the time of listing in 1997, the 5-year geomean abundance for natural-origin steelhead passing Lower Granite Dam, which includes all but one population in the DPS, was 11,462 adults (Ford 2011). Abundance began to increase in the early 2000s, with the single year count and the 5-year geomean both peaking in 2015 at 45,789 and 34,179, respectively (ODFW and WDFW 2021). Since 2015, the numbers have declined steadily with only 9,634 natural-origin adult returns counted for the 2020 run year (ODFW and WDFW 2021).

The five-year geometric mean abundance estimates for the populations in this DPS all show significant declines in the recent past (Ford 2022). Each of the populations decreased by roughly 50 percent in the past five-year period, with individual population decreases ranging from -15 percent to -78 percent. This decrease has resulted in a near-zero population change in the past 15 years for the three populations (Asotin Creek, Joseph Creek, and Grande Ronde River Upper Mainstem) with sufficiently long data time series (Ford 2022). Hatchery-origin spawner estimates for these populations continue to be low (Ford 2022). Only the 5-year (2014-2018) geometric mean of natural-origin spawners of 1,786 for the Upper Grande Ronde population appears to remain above the minimum abundance threshold established by the ICBTRT (Williams 2020). The status of many of the individual populations remains uncertain, and all five MPGs are not meeting viability objectives (Ford 2022). Overall, the Snake River basin steelhead DPS remains at "moderate" risk of extinction, with viability largely unchanged from the prior review (Ford 2022). In order for the species to recover, more populations will need to reach viable status through increases in abundance and productivity.

Snake River Basin Steelhead Populations in the Action Area: The North Fork Salmon River population within the Salmon River MPG of Snake River Basin steelhead is present within the action area. Summary of viability for the Upper Salmon River MPG relative to the ICBTRT viability criteria (Ford 2022), grouped by MPG shows the natural spawning (i.e., most-recent 10-yr geometric mean (range)) is 3,502 (SD 2,562) and ICBTRT productivity (i.e., = 20-yr geometric mean for parent escapements below 75 percent of population threshold) is 1.88. The North Fork Salmon River steelhead population current status is 'maintained' with a target status of viable or maintained (NMFS 2017). The population has some hatchery influence from out-of-MPG stock (NMFS 2017). Although the current status review is not yet complete, the available information suggests the population may be viable in the ICBTRT Recovery Scenario, with 'maintained' overall risk (Ford 2022).

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

Climate change is affecting aquatic habitat and the rangewide status of Snake River spring/summer Chinook salmon and Snake River basin steelhead. The U.S. Global Change Research Program (USGCRP) reports average warming of about 1.3°F from 1895 to 2011, and projects an increase in average annual temperature of 3.3°F to 9.7°F by 2070 to 2099 (CCSP 2014). Climate change has negative implications for ESA listed anadromous fishes and their habitats in the Pacific Northwest Climate Impacts Group (CIG 2004; Scheuerell and Williams 2005; Zabel et al. 2006; ISAB 2007). According to the Independent Science Advisory Board (ISAB), these effects will cause the following:

- Warmer air temperatures will result in diminished snowpack and a shift to more winter/spring rain and runoff, rather than snow that is stored until the spring/summer melt season;

- With a smaller snowpack, watersheds will see their runoff diminished earlier in the season, resulting in lower flows in the June through September period, while more precipitation falling as rain rather than snow will cause higher flows in winter, and possibly higher peak flows; and,

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

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

Climate change is predicted to cause a variety of impacts to Pacific salmon (including steelhead) and their ecosystems (Mote et al. 2003; Crozier et al. 2008a; Martins et al. 2012; Wainwright and

Weitkamp 2013). The complex life cycles of anadromous fishes, including salmon, rely on productive freshwater, estuarine, and marine habitats for growth and survival, making them particularly vulnerable to environmental variation. Ultimately, the effects of climate change on salmon and steelhead across the Pacific Northwest will be determined by the specific nature, level, and rate of change and the synergy between interconnected terrestrial/freshwater, estuarine, nearshore, and ocean environments.

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

- Direct effects of increased water temperatures on fish physiology;
- Temperature-induced changes to streamflow patterns;
- Alterations to freshwater, estuarine, and marine food webs; and,
- Changes in estuarine and ocean productivity.

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

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

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

The proposed action will therefore likely occur while climate change-related effects are expected to become more evident within the range of the Snake River spring/summer Chinook salmon ESU, Snake River Basin steelhead DPS, and in areas designated as critical habitat for these species. The grazing permit for this Allotment will run through the end of 2036 and we expect continued warmer and drier conditions in much of the Northwest within the term of the proposed action. One of the potential limiting factors in action area streams is water temperature due to yearly variations in seasonal air temperatures, which we expect will continue to rise, and annual snowpack levels, which will decline. Restricting cattle use of riparian areas as described in the proposed action will help minimize the effects cattle have on the shade cover of streams, which will help minimize the effects of climate change on water temperature. Increasing stream temperatures will hinder the recovery of anadromous fish in the action area streams as well as throughout the range of Snake River spring/summer Chinook salmon and Snake River Basin steelhead.

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 Allotment is located within the North Fork Salmon River and Indian Creek-Salmon River 5th field HUCs (HUCs 1706020306 and 1706020307), on the North Fork Ranger District of the SCNF. This location is approximately 20 air miles north of Salmon, Idaho on NFS lands. This Allotment contains 50,313 acres of NFS land. The Allotment is divided into three units on NFS lands: Hull Creek Unit, Hughes Creek Unit, and Indian Ridge Unit.

For purposes of this consultation, the action area is defined as all NFS lands and streams within the Allotment boundary and trailing routes on and off the Allotment (Figure 1). The entire Allotment, with the exception of the area that drains into the Indian Creek watershed, is in a Chinook salmon and steelhead priority watershed. There are some areas of private inholdings within the Allotment that the SCNF does not authorize grazing on (Figure 1). Therefore, these areas are not included in the total acreage of the Allotment, but are within the action area.

Snake River spring/summer Chinook salmon, Snake River Basin steelhead, and their designated critical habitats are both present in the action area. The ESA-listed fish bearing streams within the action area include Allen Creek, Corral Creek, Ditch Creek, Hughes Creek, Hull Creek, Indian Creek, North Fork Salmon River, Salzer Creek, and West Fork Hughes Creek.

2.4. Environmental Baseline

The "environmental baseline" refers to the condition of the listed species or its designated critical habitat in the action area, without the consequences to the listed species or designated critical habitat caused by the proposed action. The environmental baseline includes the past and present impacts of all Federal, State, or private actions and other human activities in the action area, the anticipated impacts of all proposed Federal projects in the action area that have already undergone formal or early section 7 consultations, and the impact of State or private actions, which are contemporaneous with the consultation in process. The consequences to listed species or designated critical habitat from ongoing agency activities or existing agency facilities that are not within the agency's discretion to modify are part of the environmental baseline (50 CFR 402.02).

The action area is used by all freshwater life history stages of threatened Snake River spring/summer Chinook salmon and Snake River Basin steelhead. Habitat conditions have been influenced by several activities occurring within the action area, including but not necessarily limited to: road development, livestock grazing, and recreation (e.g., hunting, fishing, hiking, trail riding, etc.). Environmental baseline conditions in the action area are described further below.

2.4.1 Water Temperature

Water temperature influences many aspects of salmonid fish life history, including reproduction, growth, and migration (Bjornn and Reiser 1991). PACFISH identifies water temperature criteria for salmon and steelhead species of less than 64°F (17.8°C) for rearing, and less than 60°F (15.6°C) for spawning and incubation. In identified steelhead priority watersheds, PACFISH identifies additional water temperature criteria of less than 45°F (7.2°C) during steelhead spawning periods (NMFS 1998).

There are nine streams, with ESA-listed fish and/or designated critical habitat, with seasonal water temperature data collected in the action area. Since the 2016 BA, seasonal water temperature data has collected on six of those streams. The stream temperature graphs for all nine of those streams can be seen in Appendix F of the 2022 BA. The streams, with the years water temperature data was collected include the following: Allen Creek 0.05 miles (2013), Corral Creek 0.05 miles (2015), Ditch Creek 0.6 miles (2010, 2012-2015, 2021), Hughes Creek 3.7 miles (2011-2020), Hull Creek 0.4 miles (2010-2016, 2021), Indian Creek 4.7 miles (2010-2012, 2015, 2016, 2021), North Fork Salmon River 7.0 miles (2010-2016, 2020, 2021), Salzer Creek 1.3 miles (2001, 2002), West Fork Hughes Creek 0.1 miles (2010, 2011, 2013-2015, 2021).

Overall, observed water temperature regimes in the Indian Ridge Allotment have met the PACFISH water temperature criteria to support aquatic species. Short-term temperature exceedances are likely due to yearly variations in seasonal air temperature regimes, winter snowpack levels, wildfires and sediment runoff into streams from adjacent roads rather than due to any identifiable land management-related influences because of each stream's high-quality riparian and instream habitat conditions. Streamside riparian shrubs and over story trees are relatively well developed throughout the streams in the action area. Streamside riparian shrubs and over story trees had been impacted by the 2012 Mustang Complex Wildfire in the action area. The streamside riparian vegetation in the action area is in recovery from the 2012 Mustang Complex Wildfire. In the action area there are no streams listed on the Idaho Environmental Quality 303(d) list of streams with a pollutant, which includes water temperature (IDEQ 2021). The SCNF indicated that water temperature conditions within the action area are Properly Functioning for rearing, spawning, and incubation.

2.4.2. Sediment

Stream sediment conditions can influence fish incubation success as well as rearing habitat quantity and quality, and fish food base productivity (Bjornn and Reiser 1991). The condition of spawning substrate quality affects the biotic potential of the stream, including fish survival and emergence of fish embryos. The SCNF's Watershed Program has collected stream sediment data, using the core sampling methodology, since 1993.

Analysis of core sampling data correlates measured levels of depth fines in spawning habitats to predicted egg incubation success values determined by Stowell, et al. (1983). Results of all assessments are expressed as percent fines less than 1/4-inch in diameter. Analysis of depth fines additionally considers drainage geology. The streams with ESA-listed fish and designated critical habitat in the action area are primarily a quartzite geology. The following are the evaluation criteria for stream sediment based wholly or primarily in quartzite geology:

Less than 20 percent depth fines (less than 1/4-inch diameter) = Properly Functioning

21-25 percent depth fines (less than 1/4-inch diameter) = Functioning at Risk

Greater than 25 depth fines (less than 1/4-inch diameter) = Not Properly Functioning

Core sampling is used in trend monitoring to determine the percent fines in the stream's substrate. Anadromous fish streams receive a 6-inch deep core sample. The percent fines, less than 1/4-inch in diameter, in the substrate is used in determining the stream's biotic potential (Stowell et al. 1983). Biotic potential is the condition of spawning substrate quality, which maximizes survival and emergence of fish embryos.

There are five long-term trend sediment monitoring sites in the action area. These sites were started in 1993 and continue to be periodically surveyed by the SCNF's Watershed Program (see Table 11 in the 2022 BA). Overall, sediment monitoring at these sites indicate streams within the action area are either Properly Functioning or are trending toward this condition at natural rates. Stream sediment data is highly influenced by natural processes such as geology, stream gradient, winter snowpack, springtime runoff, wildfires, summertime high intensity storms, and human impacts associated with roads. An increase in stream sediment throughout the action area since 2012 was likely caused by the 2012 Mustang Complex Wildfire. Additionally, sediment runoff from FS Roads in close proximity to the monitoring sites may contribute to sampling events indicating higher percent fines. The Hull Creek sample site is trending toward Properly Functioning (based on 2017 to 2021 sediment data). Hull Creek sediment data are collected downstream of a small private dam. Hull Creek flows are intermittent to subsurface from the private dam downstream to South Fork Hull Creek, approximately 1.2 miles. Almost all of the 2.5 miles of Hull Creek, below the private dam, is within 164 feet (50 meters) of the main Hull Creek road. Sediment runoff from the Hull Creek Road, and a lack of sediment flushing flows resulting from the dam's influence, are believed to be the major contributing factors to the higher than desired stream sediment levels in Hull Creek. Additionally, recent depth fine measurements (2011 to 2021) at the Hughes Creek site indicate higher than average percent fines since the 2012 Mustang Complex Fire. However, samples at this site have only been collected in two out of the past six years. It is expected that percent depth fines at the site will continue to trend toward Properly Functioning at natural rates, if not already within range of this threshold. The most recent stream sediment data collected at any monitoring site was in 2019, and in some cases 2018 or 2016 (see Section 6.4.3 in the BA for more information).

2.4.3. Greenline to Greenline Width

The GGW is the non-vegetated distance between the green lines (i.e., the first vegetation lines) on each side of the stream. It provides an indication of the width of the channel, reflecting disturbance of the streambanks and vegetation. As stream channel margins are disturbed by trampling or excessive vegetation consumption, streams may erode the streambanks, causing a lateral erosion of the streambank and streamside vegetation. This results in a shifting out, or widening of the distance between green lines within the non-vegetated channel (Burton et al. 2011). The GGW reflects influences of grazing and other disturbances on channel dimensions such as W:D. Because changes rapidly occur at the greenline, the land manager can make an early evaluation of effects (Winward 2000). The GGW has been monitored at DMA MIM sites. While there is no established metric or value associated with stream functionality, GGW indicates trend in channel dimension (i.e., narrowing or widening) when used with greenline composition and bank stability.

The Allotment contains two MIM monitoring sites with GGW data, Hull Creek (M308) and West Fork Hughes Creek (M244). The 2019 GES at the Hull Creek M308 site shows a GES upward trend with a reading of Late Seral/75. Late Seral GES has a reading between 61 to 85. The GGW at West Fork Hughes Creek (M244) shows a reading of 1.91 meters in 2013 and 1.99 meters in 2018. The 2018 GES at West Fork Hughes Creek M244 site shows a GES upward trend with a reading of PNC/89. Potential Natural Communities (PNC) have a reading of 86+. Large portions of stream reaches within the action area are inaccessible or lightly used by livestock. Analysis of recent monitoring reports, stream photos, high bank stability readings, and local knowledge indicate that the GGW is Properly Functioning on streams with ESA-listed fish and designated critical habitat in the action area (see Section 6.4.4 in the BA for more information).

2.4.4. Streambank Condition

Streambank erosion reduces channel stability and the channel's ability to withstand high flows. Eroding streambanks increase turbidity and can contribute large amounts of fine sediment deposition, which degrade fish habitat and cause additional stream channel adjustment. The PACFISH objective is 90 percent or greater bank stability in priority watersheds, which includes the North Fork Salmon River and Indian Creek-Salmon River watersheds. Bank stability is measured using the MIM protocol (Burton et al. 2011). On the Allotment, the SCNF Watershed Program has conducted long-term streambank stability monitoring at two sites since 2016. The MIM data collected at the Hull Creek (M308) site in 2019 had a bank stability reading of 100 percent. The MIM data collected at the West Fork Hughes Creek (M244) site in 2018 had bank stability reading of 94 percent. Previously, from 1993 to 2015, streambank stability was monitored at the five-stream sediment core sampling sites. Bank stability readings at these sites averaged above 90 percent during the 23-year sampling period, except for the Hughes Creek site, which averaged at 83.3 percent bank stability due to low readings between 1997 and 2001. Between 2002 and 2015, the Hughes Creek site averaged 91 percent bank stability (see Section 6.4.5 in the BA for more information).

2.4.5. Riparian Habitat Conservation Areas

The condition of riparian vegetation can strongly influence aquatic habitat quality and fish productivity. Removal of riparian vegetation can result in negative impacts to fish populations (Platts and Nelson 1989). The analysis of RHCAs focuses on GES and woody species recruitment. The SCNF Plan forest-wide GES objective is 61 or greater. The GES is calculated using plant successional status ratings and riparian capability groups; the rating is further adjusted where woody species should be present but are currently not (Burton et al. 2011). An ecological status rating greater than 86 is indicative of a PNC (Winward 2000).

Monitoring sites are located in the Hull Creek and Hughes Creek Units in the Allotment. Cattle do not graze along the two streams with ESA-listed fish and/or designated critical habitat, Corral Creek and Indian Creek, in the Indian Ridge Unit due to steep and rocky terrain. Therefore, no MIM site has been established in the Indian Ridge Unit.

Riparian areas in all Units were impacted by the 2012 Mustang Complex Wildfire. At the time of the 2016 consultation, the 2012 Mustang Complex Wildfire had played a significant role in all MIM sites GES's downward trends. After the 2012 wildfire the SCNF rested the Indian Ridge Unit for one year with no grazing. This more restrictive use criteria, along with the replacement of water developments damaged by the wildfire, were specific adaptive management measures taken because of the wildfire. Both MIM sites continue to improve post-fire as woody vegetation establishes and matures and herbaceous species move from early-seral species that are commonly seen post-disturbance to species that are found in a more stable and established riparian system.

Hull Creek (M308): MIM data has been read at the Hull Creek site since 2014. As the data in Table 27 of the BA indicates, site M308 remained relatively stable from 2014 to 2019. The GES has trended upward from Early Seral to Late Seral, GGW has slightly narrowed, the bank stability has improved, and recruitment of seedling and young woody plants has increased. The site is dominated by woody species, up from 30 percent in 2013 to 45 percent in 2019. Greenline composition from the 2014 data shows dominant species as 8 percent alder, 17 percent *Ribes* spp., and 41 percent mesic forb early (MFE). Greenline composition from 2019 data shows dominant species as 11 percent *Ribes s*pp., 14 percent alder, and 29 percent mesic forb mid-seral (MFM). Plants identified as MFE have low successional and stability ratings as they are typically early pioneering and shallow-rooted species, while plants identified as MFM have more moderate successional and stability ratings. This shift from MFE species to MFM species is indicative of an improving trend. The density of woody species at this site offers limited access to livestock, aiding in stabilization of the streambanks. In 2014, 13 percent of the greenline composition was recorded as bare ground, while none was reported during the 2019 monitoring. Noxious weeds have been encroaching on the site since 1993. Due to the sufficient woody species recruitment and a GES rating of greater than 61, the monitoring attributes used are woody browse with an endpoint indicator of 30 percent and greenline stubble with an endpoint indicator of no less than 4 inches. The streambank alteration monitoring attribute remains the same at an endpoint indicator of 20 percent.

West Fork Hughes Creek (M244): MIM data has been read at the West Fork Hughes Creek site since 2013. The GES at site M244 has trended upward from 61 in 2013 to 89 in 2018 moving from Late Seral to PNC. Woody composition decreased from 56 percent in 2013 to 40 percent in 2018, but this could be due to plants maturing and the difficulty in telling multi-stemmed species apart from one another. Even with the decrease in percent composition, this site is still heavily dominated by woody species, affording very limited access to livestock. In addition, this site has a significant amount of woody debris, measured as part of the greenline composition at 19 percent in 2013 and 8 percent in 2018 that aids in armoring the streambank. Greenline composition in 2014 included 8 percent alder, 10 percent dogwood, and 14 percent *Ribes* spp., while in 2018 measurements included 14 percent alder, 22 percent dogwood, and 17 percent *Ribes* spp. Understory species accounted for in the greenline composition included 8 percent mesic forb late (MFL) and 10 percent mesic grass (MG) in 2013, while 2018 reported 9 percent MFL and 12 percent *Glyceria striata* (fowl manna grass). Plants identified as MFL tend to be deeper-rooted and are later successional, with a stability rating of 8.5. In the 2018 data MG was not reported; this could be due to better plant identification of the *Glyceria* during that years reading. In 2013, 13 percent of the greenline composition was recorded as bare ground, while none was reported during the 2018 monitoring. Due to the sufficient woody species recruitment and a GES rating of great than 61, the monitoring attributes used are woody browse with an endpoint indicator of 30 percent and greenline stubble with an endpoint indicator of no less than 4 inches. The streambank alteration monitoring attribute remains the same at an endpoint indicator of 20 percent (see Section 6.4.6 of the BA for more information).

2.4.6. ESA-listed Fish Presence in the Action Area

Snake River spring/summer Chinook salmon: The SCNF electrofishing and Idaho Department of Fish and Game (IDFG) snorkeling surveys have documented juvenile Chinook salmon in Hughes Creek, and in the North Fork Salmon River in the action area (See Figure 5 and Tables 18-20 in the BA). The North Fork Salmon River is an allotment boundary line, but because of topography and steep terrain permitted livestock are never grazing anywhere near the North Fork Salmon River. There is an estimated 2.57 miles of Chinook salmon presence and spawning habitat in Hughes Creek and an estimated 0.74 miles of Chinook salmon presence and spawning habitat in the North Fork Salmon River in the action area (Figure 2). There is also Snake River spring/summer Chinook salmon designated critical habitat in the action area, which includes an estimated 0.25 miles in Allen Creek, 2.72 miles in Hughes Creek, 0.97 miles in Indian Creek, 0.74 miles in the North Fork Salmon River, 0.25 miles in Salzer Creek and 0.25 miles in the West Fork Hughes Creek; totaling an estimated 5.18 miles of designated critical habitat for Snake River spring/summer Chinook salmon (Figure 2). At present, relatively little is known of the status or trend of adult Snake River spring/summer Chinook salmon populations within the action area. There has been no documentation of spring/summer Chinook salmon spawning in Hughes Creek within the action area. It is unknown where these fish ultimately spawn but connectivity of Hughes Creek during adult migration periods make it possible that Snake River spring/summer Chinook salmon actively spawn within the action area. NMFS has completed the following analysis under this assumption.

The Upper Salmon Basin Watershed Project (USBWP) (2005) identify a general spawning periodicity for Snake River spring/summer Chinook salmon in the North Fork Salmon River ranging from the last week in August through the last week in September. Egg incubation is believed to range from the last week in August through the last week in April.

Chinook salmon have the potential to spawn in suitable spawning habitat within Hughes Creek. However, some stream sections have too steep of a gradient, too large or too small substrate, or other characteristics rendering habitat unsuitable for Chinook salmon spawning. In total, there are 2.57 miles of potential spawning and rearing habitat for Chinook salmon in Hughes Creek within the action area. These stream miles reflect continuous mapping reaches and therefore are likely a significant overestimate of actual spawnable area within the Allotment.

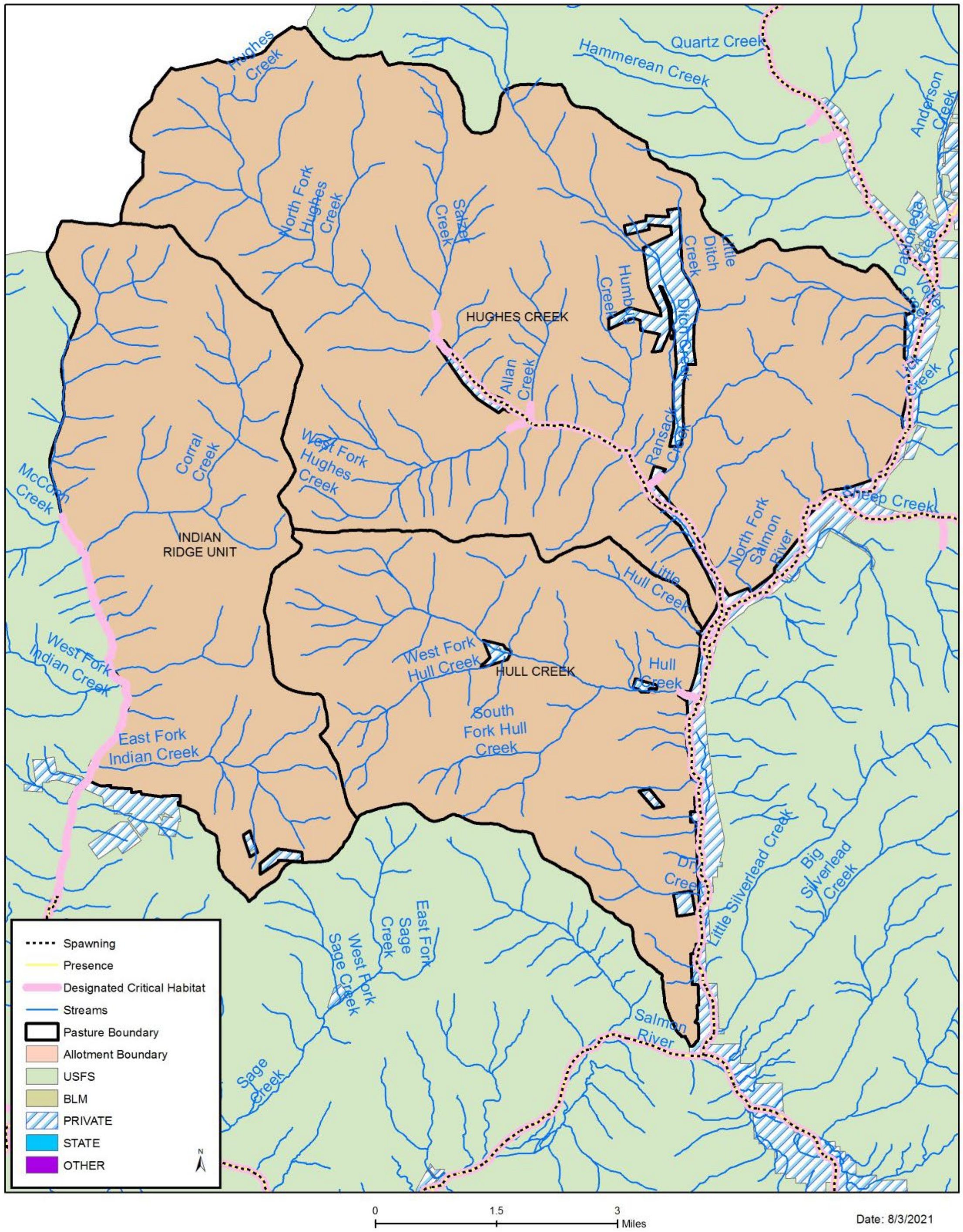


Figure 2. Snake River Spring/Summer Chinook Salmon Presence and Designated Critical Habitat in the Action Area

Snake River Basin Steelhead: The SCNF and IDFG electrofishing surveys have documented juvenile Snake River Basin steelhead present in the North Fork Salmon River, Hughes Creek, Ditch Creek, Allen Creek, West Fork Hughes Creek, Hull Creek, and Indian Creek. The SCNF estimates Snake River Basin steelhead are present in approximately 9.51 miles of stream in the action area, with approximately 9.10 miles containing suitable spawning habitat.

Approximately 8.22 miles of those areas are designated critical habitat (Figure 3). However, these lengths reflect continuous mapping reaches and are likely significant overestimates of actual spawning areas within Allotment streams, as not all habitats have suitable spawning characteristics. At this time, there have been no steelhead redd surveys conducted and no documentation of steelhead spawning within the action area. As such, relatively little is known about steelhead spawning areas or the status or trend of adult steelhead populations within the drainage. Steelhead spawning surveys are very difficult to effectively or safely accomplish because of the time of the year steelhead spawn. Steelhead spawn at a time when higher elevation streams on NFS lands are difficult to get to because of snow and ice conditions both on the roads and in the riparian areas. When steelhead are spawning, streams are on the rise, and most of the time, turbid conditions make it difficult to see redds. While it is unknown where these fish ultimately spawn, connectivity of Hughes and Hull Creeks during adult migration periods make it possible that Snake River Basin steelhead actively spawn within the action area. NMFS has completed the following analysis under this assumption.

The USBWP (2005) identify a general spawning periodicity for steelhead in the North Fork Salmon River ranging from the third week of March through the second week of June. Egg incubation is believed to range from the third week in March up to July 7. Snake River Basin steelhead spawning in Indian Creek could begin as early as March 1 and also extends to the second week in June. Similarly, egg incubation in Indian Creek may also occur from March 1 to July 7.

Within the action area, steelhead spawning is most likely to occur in the lower 1.3 miles of Hull Creek, below the South Fork Hull Creek confluence, and in mainstem Hughes Creek from the mouth upstream to the West Fork Hughes Creek. Spawning may also occur in Ditch Creek or West Fork Hughes Creek, but the small size and high gradient of these streams likely provide limited spawning potential for anadromous steelhead. NMFS modeling of intrinsic spawning and rearing habitat confirms this as both streams contain only small amounts of high potential habitat near their mouths and low or no potential further upstream (ICBTRT 2007). In total, there is an estimated 9.10 miles of potential spawning and rearing habitat for steelhead in various streams within the action area.

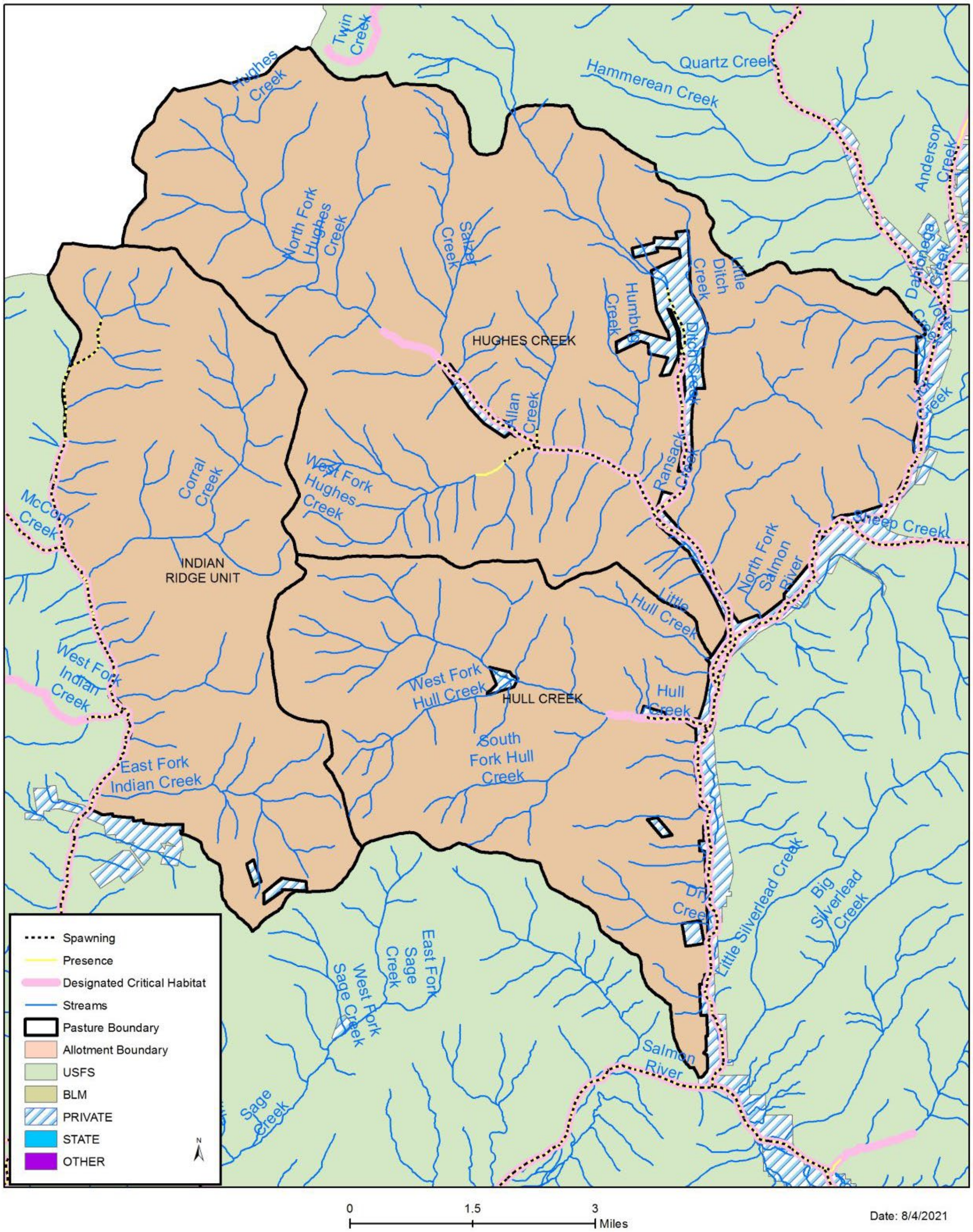


Figure 3. Snake River Basin Steelhead Presence and Designated Critical Habitat in the Action Area

Climate Conditions: As previously stated in Section 2.2.2.1, climate change has the potential to affect ecosystems in nearly all tributaries throughout the Snake River. Given the increasing certainty that climate change is occurring and is accelerating, NMFS anticipates steelhead and their associated habitat within the action area will be affected. Climate change is expected to alter aquatic habitat by impacting streamflow and temperature regimes. These effects, in combination with other baseline conditions within the North Fork Salmon River and Indian Creek-Salmon River watersheds, may lower juvenile salmonid survival rates by impacting juvenile growth, movement, and survival (Walters et al. 2013). Additionally, the effects of climate change are expected to decrease the capacity of habitat within the action area to support successful spawning, rearing, and migration.

The impact of grazing on riparian habitat within the action area has the potential to accelerate stream temperature increases caused by climate change. Overgrazing of riparian vegetation and stream widening due to bank alteration from livestock could result in less shading and shallow stream reaches, therefore causing an increase in water temperature. Additionally, the timeframe for implementing the proposed action will occur while climate change-related effects are expected to become more evident within the range of the Snake River spring/summer Chinook salmon ESU and Snake River Basin steelhead DPS.

2.5. Effects of the Action

Under the ESA, "effects of the action" are all consequences to listed species or critical habitat that are caused by the proposed action, including the consequences of other activities that are caused by the proposed action (see 50 CFR 402.02). A consequence is caused by the proposed action if it would not occur but for the proposed action and it is reasonably certain to occur. Effects of the action may occur later in time and may include consequences occurring outside the immediate area involved in the action (see 50 CFR 402.17). In our analysis, which describes the effects of the proposed action, we considered the factors set forth in 50 CFR 402.17(a) and (b). There are no known additional actions that are expected to occur as a result of this proposed action. This section will evaluate the effects of the action starting from the time of the issuance of this opinion through 2036.

The proposed monitoring and adaptive management approach (Appendix A), which includes an evaluation of annual livestock use, will help the SCNF ensure that the action is being implemented as intended. It will also allow the SCNF to track resource responses to ongoing use. As such, the proposed action relies heavily on the adaptive management strategy to integrate both annual and long-term monitoring data into daily, annual, and long-term grazing management decisions. This strategy was described previously in this opinion (Section 1.3.7), and is generally consistent with the approach discussed in the MIM protocol (Burton et al. 2008) and in Federal regulations (36 CFR 220.3). Should monitoring indicate that implementation is not occurring as described, or that RMOs are not being met, use of the adaptive management strategy should ensure that either the permit administration or the grazing plan will be adjusted as necessary to ensure upward progress toward or maintenance of properly functioning RMOs.

Cattle grazing has the potential to affect ESA-listed fishes and their habitats both directly and indirectly. Cattle have the potential to disturb rearing, holding, and/or spawning salmonids, and also the potential to trample incubating redds as they wade through or cross instream habitats.

Grazing may also affect riparian zone health/composition, streambank stability, and instream channel form.

2.5.1. Effects on Listed Species

As stated above, livestock grazing can affect ESA-listed fish directly and indirectly. When livestock trail along streams, or enter streams to cross or drink, they can disturb individual fish or trample redds (Ballard and Krueger 2005; Gregory and Gamett 2009), which can destroy eggs and embryos. Habitat-related impacts can also result in harm to individuals as habitat becomes less suitable for occupancy or the performance of essential behaviors.

2.5.1.1 Habitat Related Effects

Snake River spring/summer Chinook salmon and Snake River Basin steelhead could be affected by the action if it degrades the available habitat in the action area. Effects of grazing on habitat relate to physical effects on the environment that further inhibit the completion of a specific life stage of the listed species. Because the effects on salmonid habitat (i.e., water quality, substrate, natural cover/shelter, riparian vegetation, and forage) will be minor or very unlikely to occur, the habitat-related effects to species are also expected to be minor and/or very unlikely to occur. These determinations are in large part due to RMOs (bank stability, sediment, and water temperature) currently being met in the areas that have been grazed in the past and that are proposed to be grazed under the proposed action. In addition, the SCNF has included conservative annual use indicators and move triggers that have proven to be effective at maintaining habitat conditions, and an adaptive management process.

The adaptive management strategy, as well as past consultations on the Allotment, further assures us that short-term habitat impacts will be quickly identified with an appropriate management response to avoid repeat exceedances, which may otherwise cause habitat-related harm. Annual reports and discussions with the Level 1 Team demonstrate that where monitoring or use supervision identifies potential implementation issues, the SCNF quickly made changes to grazing administration to ensure problems were corrected. The reports also demonstrate that the SCNF is capable of meeting established use criteria at allotment DMAs and committed to making necessary changes where criteria or grazing instructions are not met. This demonstrates the SCNF's success in implementing the adaptive management and monitoring program over their entire grazing management area and increases our confidence that similar management will continue for the duration of this consultation. For these reasons, it is reasonable to anticipate maintenance of the current conditions, which provide adequate stream habitat for incubating and rearing salmon and steelhead. These management techniques, which will maintain or improve riparian habitat within the action area also protect the proposed action from significantly contributing to the broader adverse effects of climate change to salmon and steelhead. This is principally due to the maintenance of stream widths and riparian vegetation, which will help water temperatures remain suitable for use by Snake River spring/summer Chinook salmon and Snake River Basin steelhead.

2.5.1.2 Disturbance

Cattle grazing adjacent to streams, or when crossing, drinking or loafing near streams, can disturb juvenile or adult fish. Ballard (1999) observed that adult salmon did not appear to change spawning behavior when cattle were within visible range of a redd. She also noted that salmon in her study area were 100 percent spawned during both years of study, implying egg retention by female salmon did not occur as a direct result of cattle presence during the spawning period. Ballard and Krueger (2005) later drafted a follow up paper on this study, making note of adult Chinook salmon drifting and darting to cover periodically in response to cattle presence. Their conclusion in this paper was that the reactions were short-lived (lasting up to 3 to 5 minutes) and did not result in significant stress to Chinook. However, as noted in Gregory and Gamett (2009), the results of this study are based on a relatively small sample size (i.e., the 2-year observation of only six redds, for an average of 36 hours/redd during 28-day grazing periods). Thus, the conclusions from the Ballard and Krueger study should be treated with caution.

As pointed out in Ballard and Krueger (2005), salmon did in fact change their behavior and react to the presence of cattle and their shadows, by either drifting away or darting to cover. For purposes of this analysis, we presume that adult steelhead would behave and react similarly. Under the ESA, reactions such as this can rise to a level constituting harassment-related take, and can rise to the level of lethal take should the relocation result in predation or excess energy expenditure. Although darting only occurred twice during the study, it did occur, and it is the more serious of the two responses. This response could have occurred more frequently had the study observed more redds, if there were more redds present in the study area, or if cows had more frequently wandered closely to adult fish. Although this type of behavioral response would be the same as what would be expected had wildlife interacted with the fish in a similar manner, this reaction occurs solely because of the grazing, and is in addition to, that which would occur in response to wildlife absent the grazing.

Regardless of the type of response, drifting or darting away, repeated disturbance of spawning adults will result in unnecessary energy expenditure. This has the potential to result in adult salmonids already taxed from the long upstream migration dying before having a chance to complete the spawning process. The frequency of these types of interactions will be highly variable by allotment, dependent on: (1) The number of cows present; (2) the length of time grazing overlaps with spawning fish; (3) the accessibility of the stream channel to cattle; and (4) the overall number of spawning adults or redds present. The more redds or cows present in a stream reach combined with the better access or longer time the cows have access to the stream, the more frequently this type of effect would be expected to occur. As previously discussed, grazing in the action area will overlap steelhead spawning and incubation periods for up to 7 weeks. However, an early season extension of grazing (up to two weeks prior to May 23) may occur up to four out of every 10 years in either the Hughes Creek Unit or the Hull Creek Unit. This extension could result in an additional overlap of steelhead spawning and incubation periods for a total of up to 9 weeks (in four out of every 10 years). Additionally, end-of-season trailing of cattle from the Indian Ridge Unit through the Hughes Creek Unit will overlap Chinook salmon spawning and incubation periods for up to 7 weeks (September 15 through October 30). This end-of-season trailing through the Hughes Creek Unit is expected to occur every year, approximately three days each week. Overlap of adult Chinook salmon presence during trailing activities is approximately up to 2 weeks (from the third week in September through the last week in September during Chinook salmon spawning).

Interaction between cattle and staging or spawning adult Chinook salmon would be most likely to occur each year in the Hughes Creek Unit only, when cattle are trailed at the end of the season through the Unit from September 15 through the end September 30 (the end of the Chinook salmon spawning period). Approximately 2.57 miles of Hughes Creek within the action area is potential spawning habitat where adult Snake River spring/summer Chinook salmon presence may overlap with trailed livestock. This trailing occurs through the Unit on FS Road #60088 (West Fork Hughes Creek Road) and FS Road #60091 (Hughes Creek Road). The stream mile calculation of overlap is likely an overestimate, as trailing will not occur adjacent to Hughes Creek above West Fork Hughes Creek, Hughes Creek is inaccessible to cattle in many locations due to dense woody vegetation or fencing, and supervised trailing will occur to maintain cattle presence on the road and away from the riparian area. Additionally, trailing will occur approximately three days each week from September 15 through October 30, with each instance of trailing occurring in a single day with no overnight cattle presence along the stream.

Interaction between cattle and staging or spawning adult steelhead would be most likely to occur each year in the Hughes Creek Unit, which would be grazed every other year. Hughes Creek and its tributaries contain approximately 4.4 miles (2.72 Hughes Creek + 0.43 West Fork Hughes + 1.02 Ditch Creek + 0.23 Allen Creek) of potential spawning habitat where adult Snake River Basin steelhead presence may overlap with livestock for up to 7 weeks. There is little livestock forage available in these streamside areas due to a heavy timber over story and thick riparian vegetation. As a result, livestock use adjacent to these stream areas is associated with crossing and watering and not long-term loitering. Cool spring weather further reduces livestock use of these areas.

Potential steelhead spawning habitat in Hull Creek occurs downstream of a cattle guard and drift fence, which precludes livestock access to lower Hull Creek. Cattle are either trucked in or supervised trailed along FR 60005 when moving into the Hull Creek Unit every other year, but the move occurs in one day and cattle do not have access to the stream during the move. The BA identifies 0.88 miles of potential Snake River Basin steelhead spawning habitat within the Unit, but the short-term supervised trailing through this spawning habitat, as well as fencing, reduces the potential of redd trampling to a negligible amount.

Adult salmonid interactions will be further minimized by proposed measures to keep cattle off stream channels such as fencing, off-channel salting, employment of riders, and natural inaccessibility of stream channels due to steep topography and/or dense riparian vegetation. High water during steelhead spawning greatly reduces visibility, increases available cover for fish, and discourages livestock presence in or near streams. Limited and supervised trailing with riders during Chinook salmon spawning reduces livestock exposure to Hughes Creek. These conditions provide an additional level of protection from potential disturbances to adult salmonids. The proposed measures combined with environmental conditions present during salmonid spawning should ensure that cattle and adult fish interactions are minimal. Causing adult fish to periodically relocate or dart to cover to avoid cattle is not likely to result in a significant disruption of normal behavioral patterns and will not rise to the level of harassment.

Cattle trailing along streambanks and/or wading into a stream also have the potential to startle juvenile salmonids rearing in action area streams. Juvenile salmonids are present in the Allotment year-round, and will likely be exposed to some disturbance from grazing cattle. Ballard (1999) observed that cattle spent approximately six percent of their time on an allotment in riparian areas, where they rested an average of 29 percent of the time, and foraged for 60 percent. However, this is contradicted by information presented by Powell et al. (2000), which suggests not only higher levels of riparian use, but also that use of riparian areas can change dramatically throughout the grazing season and can be influenced by the season of use. Because the amount of time spent in action area streams will likely vary by season and by site-specific riparian conditions, it is presumed in this analysis that juvenile salmonids will be periodically disturbed by cattle use across the Hull and Hughes Creek Units. Because Indian Creek and its fish bearing tributaries receive no cattle use, the risk of juvenile salmonid disturbance from livestock in these locations is unlikely to occur.

For juvenile salmonids, disturbance-causing changes in behavior can result in indirect effects through alteration in feeding success, increased exposure to predators, and/or displacement into less suitable habitat. Although these effects can result in injury or death, fish in the action area would generally be expected to be able to safely access nearby cover and avoid injury or mortality (behavioral effect only). Although these types of responses are similar to those that would occur from wildlife as they walk along the shore or wade into streams, they occur solely because of the proposed action, and are in addition to, that which would occur absent grazing. However, these minor behavioral modifications are expected to be infrequent and are not expected to result in injury or death because the action area habitat conditions are Properly Functioning, providing suitable cover for the short and infrequent disturbances individual or small groups of cattle are likely to present to individual fish. In addition, the SCNF has proposed a series of conservation measures designed to keep cattle away from stream channels (i.e., fencing, off-channel salting, and use of riders). Natural inaccessibility of stream channels due to steep topography and or dense riparian vegetation further limits the potential for these effects to occur.

Although numerous fish bearing streams and their riparian areas occur within the Allotment boundary, steep topography, heavily timbered stream bottoms, mining tailings and limited cattle forage along the majority of those streams greatly reduce livestock use of these areas (NMFS 2016b). The majority of cattle foraging opportunities are located on high elevation sagebrush/grass slopes found on southern exposures and ridgetops. Fencing, steep topography, and vegetative conditions likely result in significant reductions of the miles of stream accessible to cattle. Although the North Fork Salmon River and Indian Creek are considered to be in the action area because they form the Allotment boundary, permitted livestock grazing never occurs anywhere near these stream reaches because of topography, steep terrain and private land fences.

Disturbance Summary. Livestock are reasonably certain to disturb some adult and some juvenile ESA-listed fish while grazing the Allotment. Adult steelhead will be present while cattle are on the Allotment but high spring water levels greatly reduce visibility, increase available cover for fish, and discourage livestock presence in or near streams. Adult Chinook salmon presence will overlap with end-of-season trailing in the Hughes Creek Unit for approximately two weeks, when livestock are removed off the Allotment through a staggered removal process. This process may occur approximately three days per week during the two-week period of overlap. However, dense woody vegetation and fencing, along with supervised trailing will reduce cattle presence in the riparian area. There is very limited livestock forage alongside potential salmonid spawning streams, which reduces the presence of cattle in these areas. These conditions provide an additional level of protection from potential disturbances to adult salmonids. The proposed measures combined with environmental conditions present during spawning should ensure that cattle and adult salmonid interactions are minimal. Causing adult salmonids to periodically relocate or dart to cover to avoid cattle will result in minimal disruption of behavioral patterns and no loss of fitness.

Juvenile ESA-listed salmonids will experience minor and infrequent behavioral modifications. Behavioral modifications are expected to be minimal because the action area habitat conditions are Properly Functioning, which provides suitable escape cover from the risk individual or small groups of cattle are likely to present to individual fish. In addition, measures proposed to keep cattle away from stream channels, such as fencing, off-channel salting, and use of riders to herd cattle away from streams further limits potential interactions. Limited forage along action area streams and natural inaccessibility of stream channels due to topography or dense riparian vegetation further limits the potential for these effects to occur. For these reasons, fish disturbances related to livestock grazing on the Allotment are not expected to result in a reduction in growth or survival.

2.5.1.3 Redd Trampling

Livestock grazing along salmonid spawning streams has the potential to result in trampling of steelhead/Chinook redds and impacts to incubating eggs/embryos. There is no available information on how much mortality would be produced by cattle trampling of redds. However, Roberts and White (1992) reported that a single fisherman wading over trout redds resulted in up to 43 percent embryo mortality. The authors suggested that ‘‘...wading by cattle would result in mortality of eggs and pre-emergent fry at least equal to that demonstrated for human wading.’’ Redd trampling is only likely to occur when livestock grazing overlaps with known spawning and incubation periods in the action area, and where topography and riparian vegetation allow cattle access to a particular stream reach.

Using the spawning and incubation periods identified in the baseline section and the proposed Unit rotation dates, there is potential for steelhead redd trampling between May 23 and July 1. However, unit rotation dates are approximate and grazing could occur through July 7 in some instances, thus extending the potential for steelhead redd trampling through the first quarter of July. There is also potential for Chinook salmon redd trampling between September 15 and October 30. Factors, which can lessen the potential for redd trampling from grazing include active measures to keep cattle off stream channels such as fencing, off-channel salting, employment of riders, supervised trailing, or natural inaccessibility of stream channels due to steep topography or dense riparian vegetation. All these factors either exists in the action area or are being employed to reduce redd trampling potential. An analysis of the likelihood of trampling occurring by species and Unit follows.

Snake River Spring/Summer Chinook Salmon Trampling. Chinook salmon spawning habitat on the Allotment occurs on 2.57 miles in Hughes Creek and 0.74 miles in the North Fork Salmon River.

Based on previously identified spawning and incubation periods and the proposed end-of-season trailing route, livestock could potentially trample Snake River spring/summer Chinook salmon redds every year while being trailed through the Hughes Creek Unit from September 15 through October 30. Trampling could potentially occur on the previously identified 2.57 miles of Hughes Creek (from the SCNF boundary upstream to the confluence of West Fork Hughes Creek) (Table 6). Cattle do not access the spawning habitat in the North Fork Salmon River as this reach lies in an area where cattle guards, private land, fences, and/or steep slopes prevent access. Livestock will be trailed from the Indian Ridge Unit through the Hull Creek Unit on FS Road #60088 (West Fork Hughes Creek Road) and FS Road #60091 (Hughes Creek Road) off the Allotment to private land. There are approximately three days each week that supervised trailing through the Hughes Creek Unit and off the Allotment will occur. This staggered removal process is due to the vegetated nature of the Allotment; this action may result in fewer cows within the Unit at any given time. Each instance of trailing occurs in a single day. This presents up to 7 weeks (approximately 21 days) of livestock overlap with Chinook salmon incubation when trailed through the Unit.

There is no available Chinook salmon redd data for Hughes Creek within the action area. Therefore, Snake River spring/summer Chinook salmon spawning (redd) survey data collected by the IDFG from 2000 to 2021 for the North Fork Salmon River was used to estimate Chinook salmon redd density for Hughes Creek within the Allotment. The data used includes redd survey data on the North Fork Salmon River from the Hull Creek confluence (approximately 1.2 miles downstream from the mouth of Hughes Creek) upstream to the Sheep Creek confluence (approximately 2.0 miles upstream from the mouth of Hughes Creek). From overall survey data between 2000 and 2021, NMFS estimated an average density of 1.85 redds per mile for Hughes Creek; from surveys between 2000 and 2010, NMFS estimated an average density of 1.68 redds per mile; and, from surveys between 2011 and 2021, NMFS estimated an average density of 2.74 redds per mile. Based on previous consultations, NMFS has estimated that redd densities are lower in smaller tributaries than in mainstem rivers. However, in an effort not to underestimate the trampling potential, NMFS took a more conservative approach and assumed tributary redd densities in Hughes Creek to be the same as redd densities in the North Fork Salmon River reach adjacent to the Allotment.

Livestock trailing is supervised by multiple riders limiting opportunities for cattle to access riparian areas. Livestock are actively being pushed along the route (maintained roadways) and will not be grazing or loitering along streams for any significant period of time. However, there is still potential for limited numbers of livestock to occasionally access streams during supervised trailing.

Additionally, unsupervised trailing, or drift, could also occur near the end of the grazing seasons as livestock begin to move on their own from the Indian Ridge Unit into the Hughes Creek Unit. This unsupervised trailing, or drifting, typically occurs in the headwaters of West Fork Hughes Creek and along FS Road #60088 (West Fork Hughes Creek Road). The permittee and/or riders will gather the livestock and begin the supervised trailing down FS Road #60088. However, there is still potential for livestock to drift into the riparian area of Hughes Creek prior to the permittee and/or riders gathering them for supervised trailing off the Allotment. Thus, further increasing the potential for the trampling of Chinook salmon redds. Active measures such as fencing and consistent riding prior to trailing, as well as dense riparian vegetation, blowdown of large trees, mining tailings, and steep slopes throughout the action area reduce the likelihood of this scenario.

NMFS does not expect all exposed redds will be trampled simply because they may be accessible to livestock. Gregory and Gamett (2009) reported that cattle trampled 12 percent to 78 percent of simulated bull trout redds while on Federal grazing allotments during their study. They also noted that stocking intensity [(number pairs/suitable grazing acres)/grazing days)] significantly influenced redd trampling rates; with the highest stocking intensity generating the highest observed trampling levels, and vice versa. The Gregory and Gammett 2009 study examined trampling rates for allotments that were actively grazed over longer periods of time, whereas the Hughes Creek Unit is solely utilized for trailing during the Chinook salmon spawning and incubation periods. Because livestock are trailed through the Unit with the supervision of multiple riders, each instance of trailing occurs in a single day, and staggered removal reduces number pairs on the Unit at any given time, the stocking intensity is likely to be much lower, or possibly negligible, compared to those seen in the study. To estimate the Chinook salmon redd trampling risk, NMFS applied a three percent to 10 percent simulated redd trampling rate, below the rates observed for very low stocking intensities (12 percent) (Gregory and Gamett 2009).

Applying the previously described 2.74 redds per mile estimate (the highest estimated redd density utilizing the most recent data) to the miles of potential spawning habitat in Hughes Creek on the Allotment results in an estimate of up to seven redds per year at risk for trampling (Table 6). However, given the active measures of supervised trailing, NMFS believes that the number of redds trampled is not expected to exceed one per year, and that this analysis significantly overestimates the likelihood of redd trampling. NMFS believes that this estimate is a conservative estimate for the following reasons: (1) as previously mentioned, livestock will be trailed through the Hughes Creek Unit with supervision from multiple riders during the Chinook salmon spawning and incubation period. Each instance of trailing occurs in a single day, in which cattle are pushed along the trailing route and will not be grazing or loitering. Thus, making trailed cattle easier to keep track of, significantly reducing the potential for cattle to enter Hughes Creek; (2) this analysis does not account for existing steep topography/dense riparian vegetation, mining tailings, and fencing, which reduces livestock access to Hughes Creek; and (3) the analysis used trampling rates from a study on an actively grazed allotments over longer periods of time, whereas the Hughes Creek Unit will be used solely for daytime trailing during the Chinook salmon spawning and incubation period. NMFS has displayed the entire range of potential trampling to include a very conservative approach to calculating the maximum range of redds potentially trampled by livestock. However, these numbers should be used to gauge the relative size of the potential impact and should not be viewed as absolute numbers that are likely to be achieved.

To determine the potential population level effects from this level of Chinook salmon redd trampling, NMFS converted the number of redds potentially trampled to adult equivalents using reasonable life stage survival estimates. Average Chinook egg-fry survival is approximately 38 percent (Quinn 2005) under natural conditions. Assuming each Chinook redd contains roughly 5,400 eggs (Quinn 2005), egg-fry survival per adult female is estimated at 2,052 fry. If trampling kills at least 10 percent of the eggs in a redd (Roberts and White 1992), each trampling could result in roughly 205 fewer fry. Quinn (2005) estimates Chinook fry to smolt survival at 10.1 percent, which would result in approximately 21 fewer smolts per trampled redd. Smolt-to-adult returns are estimated as 0.031 percent for spring/summer Chinook salmon. Applying this percentage to the calculated number of lost smolts, it is reasonable to assume that the action may result in less than one fewer adult equivalent (0.02) Snake River spring/summer Chinook salmon per redd trampled returning to the action area. However, this number is so low that the likelihood of killing more than one adult equivalent over the 15-year timeframe of the proposed action is unlikely. Because Chinook salmon generally exhibit a four- or five-year life cycle in this region, trampling of a redd from one year to the next will affect different cohorts.

Table 6. Maximum Chinook salmon redds potentially vulnerable to livestock trampling by Unit.

Unit	Miles Potential Spawning Habitat	Estimated Spawning Miles Accessible to Cattle Grazing During Incubation Period	Estimated Max # Chinook salmon Redds in Unit (rounded to whole number)	Estimated Max # Chinook salmon Redds Exposed to Cattle[c]	Est. # Redds Potentially Trampled (Range)[d]
Hughes Creek [a]	3.31[b]	2.57[b]	9	7	0.21-0.70
Hull Creek	0	0	0	0	0
Indian Creek	0	0	0	0	0

[a] Because of the proposed trailing route, the Hughes Creek Unit has potential for Chinook salmon redd trampling each year.
[b] Hughes Creek Unit: 2.57 miles on mainstem Hughes Creek. Remaining 0.74 miles occur in North Fork Salmon River and is inaccessible to cattle.
[c] # Miles cattle have access to spawning habitat * Estimated maximum redd density based on 2.74 redds/mile.
[d] Calculated based on observed bull trout redd trampling rates reported by Gregory and Gamett (2009); then modified for moderate to very low stocking intensity (Gregory and Gamett 2009).

Snake River Basin Steelhead Redd Trampling. Steelhead spawning habitat on the Allotment occurs on 0.23 miles in Allen Creek, 1.02 miles in Ditch Creek, 2.72 miles in Hughes Creek, 0.43 miles in Hull Creek, 3.53 miles in Indian Creek, 0.74 miles in the North Fork Salmon River, and 0.84 miles of presence and 0.43 miles of spawning habitat in the West Fork Hughes Creek.

Based on previously identified spawning and incubation periods and the proposed grazing rotation, livestock could potentially trample Snake River Basin steelhead redds every other year in: (1) 0.43 miles of Hull Creek (between South Fork Hull Creek and the existing cattle guard and drift fence); (2) Hughes Creek from the SCNF boundary upstream to Salzer Creek confluence (2.72 miles); (3) West Fork Hughes Creek (0.43 miles); (4) Ditch Creek (1.02 miles); and (5) Allan Creek (0.23 miles). All these streams are located in the Hughes Creek Unit, except for Hull Creek, which is located in the Hull Creek Unit. Grazing use alternates annually on these two units. Livestock are on each Unit from approximately May 23 to July 1. However, as previously discussed, grazing could occur through July 7 in some instances. This presents up to 7 weeks of livestock overlap with steelhead incubation in each Unit when grazed. Additionally, an early season extension of grazing (up to two weeks prior to May 23) may occur up to four out of every 10 years in either the Hughes Creek Unit or the Hull Creek Unit. This extension could result in an additional overlap of steelhead spawning and incubation periods for a total of up to 9 weeks (in four out of every 10 years).

There are no steelhead redd data available for action area streams. Steelhead spawning (redd) survey information compiled by the IDFG from 1990 to 1998 for A-run steelhead in other portions of the upper Salmon River basin was used to estimate steelhead redd densities for streams within the Allotment. Considering these redd densities, NMFS estimated an average density of 1.3 redds per mile for streams in this Allotment.

Mainstem Hull (0.43 miles) and Hughes Creeks (2.72 miles) are the largest tributaries with perennial connectivity to the North Fork Salmon River within the action area and are anticipated to have the highest spawning likelihood. Therefore, NMFS has applied the 1.3 redds per mile estimate to these distances to calculate the potential number of exposed redds (Table 7). Hughes Creek tributaries could also support Snake River Basin steelhead spawning, but these streams are all small and relatively high gradient. As a result, the majority of habitat in these streams has been rated as having either "low" or no intrinsic potential for steelhead spawning and rearing (ICBTRT 2007). Therefore, NMFS assumes redd densities in these areas are likely to be at least 50 percent lower and has applied a 0.65 redds per mile estimate to these streams. This may still be a slight overestimate but is included to present a worst-case scenario.

Gregory and Gamett (2009) reported that cattle trampled 12 percent to 78 percent of simulated bull trout (*Salvelinus confluentus*) redds while on Federal grazing allotments. However, bull trout are fall spawners, and cattle use of riparian areas is higher in late summer than early spring when steelhead spawn (Parsons et al. 2003; McInnis and McIver 2009). In addition, cattle are less likely to concentrate in riparian areas during spring months because of flooding, and because water and palatable vegetation are readily available in upland areas away from streams (Leonard et al. 1997; Ehrhart and Hanson 1997; Kinch 1989; Parsons et al. 2003; Wyman et al. 2006; and McInnis and McIver 2009). McInnis and McIver (2009) reported cattle presence (hoof prints) along the greenline was 59 percent higher in late summer pastures (90 percent) than in early summer pastures (53 percent).

Because of the high-water level's characteristic of streams in the action area during early summer months and the timbered nature of streamside areas providing little forage, streamside cattle activity during steelhead incubation is largely expected to be limited to watering at the streambanks and occasional crossing of streams. To achieve a realistic redd trampling estimate, NMFS considered lowering potential trampling rates in the Allotment by directly applying the observations of McInnis and McIver (2009). However, this would still overestimate the likelihood of steelhead redd trampling due to the lack of forage in these areas, high water levels, expected cattle aversion to the majority of streams during the incubation period, and cattle preference for upland locations during this period. Cattle typically use the high forage areas located in hillside meadows and ridge tops well above the streams. For this reason, cattle crossing of streams is also expected to be minimal during steelhead incubation and is most likely to occur at shallow crossings and watering areas. Therefore, we reduced the potential trampling rates observed by Gregory and Gamett (2009) by a total of 75 percent for a more realistic estimate of potential steelhead trampling rates in the action area. This results in a range of potential trampling rates from three percent to 20 percent.

Table 7. Calculated maximum number of Snake River Basin steelhead redds and range of potential trampled redds by Unit.

Unit	Miles Potential Spawning Habitat	Estimated Spawning Miles Accessible to Cattle Grazing During Incubation Period	Estimated Max # Steelhead Redds in Unit (rounded to whole number)	Estimated Max # Steelhead Redds Exposed to Cattle[e]	Est. # Redds Potentially Trampled (Range)[f]
Hughes Creek [a]	4.97[b]	4.4[b]	5	5	0.14-0.93
Hull Creek [a]	0.60 [b]	0.43[c]	1	<1 (0.56)	0.02-0.11
Indian Creek	3.53	0.0[d]	5	0	0

[a] Because of proposed Unit rotations, the Hughes and Hull Creek Units have potential for steelhead redd trampling on alternate years only.
[b] Hughes Creek Unit: 2.72 miles on mainstem Hughes Creek. Remaining 1.68 miles occur in Ditch, Allan, and West Fork Hughes Creeks where expected low redd densities and lack of cattle access result in discountable potential for redd trampling. 0.57 miles on North Fork Salmon River are inaccessible to cattle. Hull Creek Unit: 0.43 miles on Hughes Creek. Remaining 0.17 miles on North Fork Salmon River are inaccessible to cattle.
[c] Remaining mile of potential spawning habitat is downstream of an existing cattle guard and thus inaccessible to livestock. Short-term supervised trailing through this spawning habitat, as well as fencing and trucking of cattle, further reduces the potential of redd trampling.
[d] Cattle do not enter Indian Ridge Unit until approximately July 1, overlapping egg incubation by approximately one week (July 1 to July 7). However, cattle do not have access to Indian Creek due to steep terrain and private land fencing.
[e] # Miles cattle have access to spawning habitat * Estimated maximum redd density based on either 1.3 (high potential) or 0.65 (low potential) redds/mile.
[f] Calculated based on observed bull trout redd trampling rates reported by Gregory and Gamett (2009); then modified for season of use according to seasonal cattle use patterns provided by McInnis and McIver (2009), and expected cattle aversion to high flows.

The authors of the redd trampling study also indicated that cover can influence livestock access to streams by reducing trampling where cover is high or riparian vegetation is thick. Area streams are heavily timbered and contain good cover and very little forage likely making the lower end of the identified trampling range more applicable here. However, NMFS has displayed the entire range of potential trampling rates to include a worst-case scenario (Table 7).

Table 7 indicates redd trampling would be near zero in most years, but if the higher range of trampling rates is more accurate, redd trampling is most likely to occur in Year 1 of the rotation where up to one redd (0.93) could be trampled each year the Hughes Creek Unit is grazed. However, these numbers likely still overestimate likely redd trampling for several reasons. First, the stream miles accessible to cattle are based on miles within open grazing areas and were only modified where fences, steep slopes, thick vegetation, or mining tailings are known to prevent access to streams. Second, the redd density estimates were applied equally across all miles of stream within the Allotment. Third, the calculated redd densities include the worst-case scenario of a 20 percent trampling rate despite reports of reduced trampling where cover and riparian vegetation is heavy (Gregory and Gamett 2009). Therefore, these numbers should be used to gauge the relative risk of the potential impact and should not be viewed as absolute numbers that are likely to occur.

To estimate the population level effects of potential redd trampling, NMFS converted these numbers to adult equivalents lost from the population. Roberts and White's (1992) study of angler related trampling documented highly variable egg mortality, dependent on the developmental stage of eggs/pre-emergent fry trampled (Range = 0 percent to 43 percent for single trampling events). Pre-emergent fry, the stage likely to be present during trampling, had approximately 19 percent mortality. Their study evaluated trampling of synthesized trout redds, whose egg burial depth is shallower than steelhead, so their results may or may not be directly germane to anadromous fish exposed to livestock trampling.

For this analysis, NMFS assumes that each steelhead redd contains roughly 5,000 eggs, and steelhead egg-fry survival is estimated to be approximately 29.3 percent under natural conditions (Quinn 2005). If trampling were to kill 19 percent of the pre-emergent fry in a redd (Roberts and White 1992), each trampled redd could result in approximately 278 fewer fry. Assuming fry-to-smolt survival approximates 13.5 percent (Quinn 2005), approximately 38 fewer steelhead smolts would be produced per trampled redd. Applying a conservative smolt-to-adult survival rate of 0.8 percent (USFWS 1998) results in less than one fewer adult equivalent (0.3) per trampled redd. The above analysis estimated between zero and one redds are likely to be trampled annually. Thus, it is estimated that the action may result in no change to adult returns to the action area in most years and up to one (0.3) fewer adult equivalent when the Hughes Creek Unit is grazed and worst-case trampling rates are applied. The low end of this range is expected to be more realistic due to the potential extrapolation errors discussed above.

Trampling Summary. The proposed action both temporally and spatially overlaps spawning and incubation periods of both Snake River spring/summer Chinook salmon and Snake River Basin steelhead. Proposed grazing rotations, mineral placements, use of riders, drift fences, cattle guards, and active trailing on developed roads combine to reduce the risk but do not preclude the potential of cattle trampling of Chinook salmon and steelhead redds. This is primarily due to the broad distribution of Chinook salmon and steelhead spawning habitat lying within areas open to grazing.

NMFS estimated that between zero and one Snake River spring/summer Chinook salmon redd could be trampled each year of the two-year grazing cycle during trailing through the Hughes Creek Unit. NMFS converted the number of Chinook salmon redds potentially trampled to adult equivalents using reasonable life stage survival estimates. Results of those calculations indicate the action could result in approximately zero to less than one (0.02) fewer adult Snake River spring/summer Chinook salmon each year. The proposed permit conditions will ensure that the likelihood of livestock trampling even one redd in each year of grazing is low.

NMFS also estimated that between zero and one Snake River Basin steelhead redd could be trampled on years the Hughes Creek Unit is grazed, and although much less likely, up to one redd could also be trampled (0.01 to 0.08) in years when the Hull Creek Unit is grazed. As previously mentioned, short-term supervised trailing through spawning habitat on Hull Creek, as well as fencing and trucking of cattle, reduces the potential of redd trampling to a negligible amount in the Hull Creek Unit. NMFS converted the number of steelhead redds potentially trampled to adult equivalents using reasonable life stage survival estimates. Results of those calculations indicate the action could result in approximately zero to less than one (0.3) fewer adult Snake River Basin steelhead returning to action streams to spawn for each year the Allotment is grazed. However, the proposed permit conditions will ensure that the likelihood of livestock trampling even one redd in each year of grazing is low.

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 earlier in the discussion of environmental baseline (Section 2.4).

Most of the action area is undeveloped Federal lands, with a few private in-holdings. NMFS is not aware of any definitive plans for additional development of the private lands within the action area (i.e., subdividing), and assumes that future private actions will be at rates similar to those currently occurring and considered in the baseline. However, should the human population in the action area begin to grow; demand for agricultural, commercial, or residential development is also likely to grow and some additional development could occur. However, the extent of this development will be confined to the private land parcels within the action area. The effects of any new development are likely to further reduce the conservation value of the habitat within the action area.

2.7. Integration and Synthesis

The Integration and Synthesis section is the final step in assessing the risk that the proposed action poses to species. 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 biological opinion as to whether the proposed action is likely to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing its numbers, reproduction, or distribution.

Regarding the effects of the proposed action, steelhead in the action area could potentially experience adverse effects associated with redd trampling, disturbance, and habitat-related effects. However, the effects of disturbance are expected to be infrequent and minor because of the proposed conservation measures, limited livestock accessibility to the stream, low stocking density, and ability of fish to find cover within the stream reach if disturbed. The effects of habitat-related impacts are also expected to be minor and/or very unlikely to occur due to RMOs currently being met in the areas proposed to be grazed, as well as application of conservative annual use indicators and move triggers that have proven effective at maintaining habitat conditions, and implementation of an adaptive management process when and where necessary.

The baseline conditions of habitat in the action area are expected to be maintained or to improve over the course of the 15-year action. The main effect to Snake River spring/summer Chinook salmon and Snake River Basin steelhead will be from the potential trampling of redds. The following adverse effects are expected:

- Between zero to one Snake River spring/summer Chinook salmon redd would be trampled each year of the two-year grazing rotation on the Allotment.

- Between zero to one Snake River Basin steelhead redd would be trampled on years the Hughes Creek Unit is grazed first in the two-year grazing rotation on the Allotment.

The environmental baseline conditions within the action area have generally been improving over time and no cumulative effects were identified. The site-specific effects of future climate change cannot be predicted with any certainty. Climate factors will likely make it more challenging to increase abundance and recover the species (NMFS 2017). Climate change is expected to alter aquatic habitat by impacting streamflow and temperature regimes. These effects, in combination with other baseline conditions within the North Fork Salmon River and Indian Creek-Salmon River watershed, may lower juvenile salmonid survival rates by impacting spawning, rearing, and migration for Chinook salmon and steelhead. However, due to management techniques proposed for the action, livestock grazing in the action area is not expected to significantly contribute to the broader adverse effects of climate change to salmonids.

Snake River Spring/summer Chinook ESU. Many individual Chinook salmon populations are not meeting recovery plan abundance and productivity targets, and the species remains threatened with extinction. The North Fork Salmon River population of Snake River spring/summer Chinook salmon is present within the action area. Summary of viability for the North Fork Salmon River population relative to the ICBTRT viability criteria (Ford 2022), shows the natural spawning (i.e., most-recent 10-yr geometric mean (range)) is 71 (SD 87) and ICBTRT productivity (i.e., = 20-yr geometric mean for parent escapements below 75 percent of population threshold) is 1.30. The North Fork Salmon River population of the Snake River spring/summer Chinook salmon ESU current status is ‘high risk’ with a target status of maintained (NMFS 2017). However, relatively few data are available, and there have been substantial anthropogenic effects on population and habitat (NMFS 2017).

The estimated trampling of zero to one (0.7) Snake River spring/summer Chinook salmon redds in each year of grazing could result in less than one fewer adult equivalent (0.02) Snake River spring/summer Chinook salmon per redd trampled returning to the action area. However, this number is so low that the likelihood of killing more than one adult equivalent over the 15-year timeframe of the proposed action is unlikely. Because Chinook salmon generally exhibit a four- or five-year life cycle in this region, trampling of a redd from one year to the next will affect different cohorts. However, the proposed permit conditions will ensure that the likelihood of livestock trampling even one redd in each year of grazing is low. The population scale loss of less than one adult equivalent (0.02) in each year of grazing is not expected to affect the abundance and productivity of the population. Similarly, the effect is not expected to change the spatial structure or diversity of the population. Similarly, the effect at the scale of the MPG

(Upper Salmon River MPG) will not change. The proposed action also supports recovery of this population (and consequently the MPG) because of efforts to improve riparian and instream function over time, which will support increased productivity.

Snake River Basin Steelhead DPS. The North Fork Salmon River population within the Salmon River MPG of Snake River Basin steelhead is present within the action area. Summary of viability for the Upper Salmon River MPG relative to the ICBTRT viability criteria (Ford 2022), grouped by MPG shows the natural spawning (i.e., most-recent 10-yr geometric mean (range)) is 3,502 (SD 2,562) and ICBTRT productivity (i.e., = 20-yr geometric mean for parent escapements below 75 percent of population threshold) is 1.88. The North Fork Salmon River steelhead population current status is 'maintained' with a target status of viable or maintained (NMFS 2017). The population has some hatchery influence from out-of-MPG stock (NMFS 2017).

The estimated trampling of zero to one (0.93) Snake River Basin steelhead will result in approximately zero to less than one (0.3) fewer adult Snake River Basin steelhead annually. This is most likely to occur in Year 1 of the grazing cycle when the Hughes Creek Unit is grazed. However, the proposed permit conditions will ensure that the likelihood of livestock trampling even one redd in each year of grazing is low. The population scale loss of less than one adult equivalent from each year of grazing is not expected to affect the abundance and productivity of the population. Similarly, the affect is not expected to change the spatial structure or diversity of the population; nor will it change the effect at the scale of the MPG (Salmon River MPG). The proposed action also supports recovery of this population (and consequently the MPG) because of efforts to improve riparian and instream function over time, which will support increased productivity.

The action area occurs entirely on Federal land, and all future activities in the action area will likely be implemented, permitted, or funded by the SCNF and will require separate consultation pursuant to section 7 of the ESA. Therefore, there will be no cumulative effects for the proposed action.

When considering the status of the species, environmental baseline, and cumulative effects, adding in the potential effects from the proposed action will not appreciably increase the risk of extinction for any populations included in the Snake River spring/summer Chinook salmon ESU and the Snake River Basin steelhead DPS. Because the VSP criteria for the populations will not be negatively influenced, neither the current viability nor the recovery potential of the MPGs and ESU/DPS will be appreciably diminished.

2.8. Conclusion

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

2.9. Incidental Take Statement

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

2.9.1. Amount or Extent of Take

In the biological opinion, NMFS determined that incidental take is reasonably certain to occur because: (1) livestock will graze alongside streams during the redd incubation periods for steelhead; and (2) livestock will be trailed alongside streams during the redd incubation periods for Chinook salmon. In the opinion, NMFS determined that incidental take is reasonably certain to occur from redd trampling.

2.9.1.1. Steelhead Redd Trampling

Although the proposed Unit rotation, location of cattle guards and fences, routine riding, salt placements, and move-triggers/annual use standards will be applied during Snake River Basin steelhead spawning/incubation reduce the potential for livestock trampling, the proposed rotations and timing of grazing make it reasonably certain that zero to one steelhead redd may be trampled annually.

Steelhead redd trampling rates are expected to be near zero in years cattle graze the Hull Creek Unit (0.02 to 0.11 redds), compared to alternate years when the Hughes Creek Unit is grazed (0.14 to 0.93 redds). Redd trampling is most likely to occur in the Hughes Creek Unit, as it has the most, and likely the best, spawning habitat overlapping with cattle grazing.

Redd trampling rates are expected to differ slightly between years, ranging from zero in some years, to one in other years. Despite NMFS estimating the number of redds that could be trampled in the preceding opinion, the number of trampled redds will not be used to establish the amount of take for steelhead in this opinion, as it cannot be readily monitored by field personnel within this Allotment due to restricted access early and in the middle of the spawning season. Steelhead redds are constructed in the early spring, and while some redds may be visible early in the season, peak flows occur approximately during the middle of the spawning period. Ice shelves along stream margins, high flows, and turbid water may potentially make redd inventory in the action area inaccurate and impractical to complete. In addition, substrate around and in any redds identified before peak flows are likely to be reorganized or covered by substrate deposits following runoff, making redds essentially invisible after flows drop. Thus, it would be impractical to determine how many redds are present in the action area, let alone accurately determine how many of those redds are trampled by cattle each grazing season. Because circumstances causing take are likely to arise, but cannot be quantitatively measured in the field, NMFS identifies a surrogate for incidental take, consistent with 50 CFR 402.14(i).

Similarly, it is difficult for NMFS to quantify the extent of take for steelhead. There is no known forage utilization or channel measurement indicator that directly correlates to redd trampling rates. However, redd trampling is most likely to occur when cattle concentrate in riparian areas, with trampling occurring when cows cross or enter streams to water. Streambank alteration provides an indication of the amount of time cattle spend in riparian zones, increasing with both the number of livestock present and with the time spent by those livestock in riparian areas. Similarly, the likelihood of redd trampling increases with both the number of livestock present and with the time spent by those livestock in riparian areas. Streambank alteration is already proposed as both a move-trigger and annual use indicator. As such, alteration levels will be measured during routine Allotment monitoring along green lines within the Unit DMAs and elsewhere in the Allotment. Therefore, NMFS will use percent streambank alteration as the surrogate for take of steelhead in this opinion.

The SCNF proposed bank alteration limits of less than 10 percent, 15 percent, or 20 percent, depending on how close bank stability levels are to RMOs within individual Units. The proposed action indicates that the permittee should begin moving cattle at identified move-trigger points, which will be set at levels five percent below the limit to ensure the end of season value meets maximum allowed use levels (Table 2). In this opinion, NMFS determined that the proposed move-triggers and annual use standards would help reduce cattle presence in streamside areas such that trampling would be limited to no more than one Snake River Basin steelhead redd per year. Therefore, NMFS has established the extent of incidental take limit as:

> In the Hughes Creek Unit, during periods of spawning and incubation (May 23 to July 7), bank alteration shall not exceed: (1) 10 percent where bank stability is less than 70 percent; (2) 15 percent where bank stability is 70 percent to 89 percent; or (3) 20 percent where the bank stability RMO is being met (i.e., greater than 90 percent).

This extent of take is not coextensive with the proposed action, because grazing is not intended or expected to reach the specified extent of streambank alteration (i.e., due to monitoring and move triggers). In addition, bank alteration monitoring is typically conducted within two weeks of livestock having been moved from a Unit, which means regular monitoring for bank alteration occurs at the end of a Unit's grazing, which could take place several weeks or months after the completion of steelhead spawning and incubation. This incidental take limit requires that real-time, early season bank alteration levels be monitored where grazing overlaps the steelhead spawning and incubation period to ensure exceedances do not occur. Therefore, bank alteration monitoring should occur no later than the July 8th conclusion of steelhead redd incubation. This monitoring is in addition to bank alteration monitoring typically conducted within two weeks of livestock being removed from a Unit.

2.9.1.2. Chinook Redd Trampling

For incidental take of Chinook salmon associated with redd trampling, the number of redds trampled will be used as the amount of take, as it can be effectively monitored by field personnel within this Allotment. Chinook salmon redds are constructed in the fall, are comparatively large, clearly visible, and constructed during low stream flows and at times when streams are readily accessible by field personnel. Therefore, it is reasonable to determine how many redds are present in the action area, at which time surveyors should be able to determine how many, if any, of those redds have been trampled by cattle each grazing season.

NMFS estimated that 0.21 to 0.70 (i.e., up to one) Snake River spring/summer Chinook salmon redds could be trampled in the mainstem of Hughes Creek in each year of grazing (during trailing from the Indian Ridge Unit through the Hughes Creek Unit). This considered, trampling of redds could result in zero to one fewer adult Chinook salmon returning to the action area, and the corresponding loss of up to one returning adult for each year of the grazing cycle avoided jeopardy. Therefore, the amount of take authorized for Chinook salmon on the Allotment will be exceeded if the number of cattle trampled redds exceeds one in any given year of grazing.

Allotment monitoring will be critical to ensure: (1) all assumptions used to develop this take statement are accurate; (2) the SCNF does not exceed the amount of take authorized; and (3) implementation of the action results in the intended effects and allows for rapid change in grazing management when effects differ from what was anticipated. The BA indicated annual monitoring reports would be available online at:
http://www.fs.usda.gov/detail/scnf/landmanagement/resourcemanagement/?cid=STELPRDB5308989

If at any time the level or method of take exempted from take prohibitions in this opinion is exceeded, reinitiation of consultation is required. Reinitiation of consultation is also required if any of the proposed or required monitoring of this incidental take statement are not readily available at the above website or by request of NMFS.

2.9.2. Effect of the Take

In the biological 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 measures that are necessary or appropriate to minimize the impact of the amount or extent of incidental take (50 CFR 402.02).

NMFS believes that full application of conservation measures included as part of the proposed action, together with use of the RPMs and terms and conditions described below, are necessary and appropriate to minimize the impact of incidental take of listed species due to completion of the proposed action.

The SCNF shall:

1. Minimize incidental take resulting from livestock grazing on the Allotment.

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

2.9.4. Terms and Conditions

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

1. The following terms and conditions implement RPM 1:

    a. The extent of incidental take is not exceeded by ensuring streambank alteration levels, along streams where Snake River Basin steelhead redd trampling is expected to occur (Hughes Creek, West Fork Hughes Creek, and Ditch Creek), do not exceed the following levels at any time during the identified Snake River Basin steelhead incubation period for the action area (May 23 to July 7):

        i. 10 percent in Units where streambank stability conditions are less than 70 percent;

        ii. 15 percent in Units where bank stability conditions are 70 to 89 percent;

        iii. 20 percent in Units where the bank stability RMO is being met (i.e., less than 90 percent).

    b. Appropriately trained SCNF staff will monitor streambank alteration levels, using the same protocols identified in the proposed action, at the Allotment's DMAs. The monitoring shall occur within three weeks of moving cattle off the Units.

    c. To further reduce steelhead redd trampling potential on the Allotment within the Hughes Creek Unit, the SCNF shall implement the following:

        i. Immediately trigger the proposed adaptive management process (Appendix A) if streambank alteration at the end of the Snake River Basin steelhead incubation period (July 7) in the Hughes Creek Unit is: (1) greater than 5 percent when bank stability is less than 70 percent; (2) greater than 10 percent when bank stability is 70 to 89 percent; or (3) greater than 15 percent when bank stability RMO is being met (i.e., less than 90 percent).

ii. Once triggered, the adaptive management strategy shall be used to further reduce the potential for cattle/steelhead redd interactions, including but not limited to adjusting in-season move-triggers, season of use, cattle numbers, and/or implementation of additional minimization/avoidance measures.

d. The Allotment permittee or their employees shall receive training to appropriately implement the move triggers identified in the proposed action.

e. Annual meetings shall be conducted with the permittee to discuss specific actions necessary to protect vulnerable spawning areas in stream reaches with the highest potential for cattle interaction with: (1) spawning Snake River spring/summer Chinook salmon and/or redds (mainstem Hughes Creek), and (2) Snake River Basin steelhead and/or redds (mainstem Hughes Creek, Hull Creek, Ditch Creek, and West Fork Hughes Creek).

f. Riding shall occur (at least once every two weeks) to encourage livestock distribution away from potential Snake River Basin steelhead spawning habitats, whenever cattle are grazing the Hughes Creek Unit during the steelhead incubation period (May 23 to July 7).

g. Chinook salmon redd surveys shall be conducted once per year along accessible reaches of suitable spawning habitat in Hughes Creek when the probability of redd detection is highest (the second week of September).

h. To further reduce Chinook salmon redd trampling potential within Hughes Creek, the following measures will be implemented: (1) Redds found during the annual survey will be flagged and the permittees will be notified of locations so that increased riding efforts concentrate on the highest risk areas during end-of-season trailing.

i. Riders shall take all practicable measures to keep cattle on existing roadways during trailing operations between Units and on/off the Allotment, especially during end-of-season trailing through the Hughes Creek Unit (September 15 to October 30) to reduce likelihood of cattle interaction with spawning Snake River spring/summer Chinook salmon and/or their redds.

j. The SCNF and their permittees shall ensure all exclosures, drift fences, and water developments that reduce cattle use adjacent to streams with ESA-listed fish are properly maintained and functioning as intended.

The following terms and conditions implement RPM 2:

a. Each Unit's DMA or key area is annually monitored to determine compliance with all identified annual use indicators in the proposed action. The report shall also identify any modifications to move-triggers or annual indicators that result from implementing the adaptive management strategy.

b. An end-of-year report is available to NMFS by March 1 of each year. The following shall be included in the report:

   i. Overview of proposed action and actual management (livestock numbers, on- and off-dates for each Unit, etc.).

   ii. Date and location of any specific SCNF implementation monitoring data collected, including monitoring required under term and condition 1 above.

   iii. Results from all implementation and effectiveness monitoring identified as part of the proposed action and this opinion, including required annual use indicator monitoring (e.g., stubble height, riparian shrub utilization, and streambank alteration), photo point monitoring, seral condition, streambank stability, water temperature, sediment, and GGW.

   iv. Discussion of any unauthorized use and/or any maintenance issues related to fences or water developments as it pertains to Units with ESA-listed fish species or designated critical habitat.

   v. Brief review of Allotment management and compliance successes and failures as it pertains to Units with ESA-listed fish species or designated critical habitat.

   vi. Any relevant information that becomes available regarding Snake River Basin steelhead or Snake River spring/summer Chinook salmon habitat trends and/or spawning locations that would modify the assumptions made in this opinion or result in effects not considered.

   vii. A clear description of compliance with the terms and conditions and any exceedances of the extent of take contained in this ITS.

   viii. Any management recommendations for subsequent years.

(c) The SCNF shall submit post-project report to:

- nmfswcr.srbo@noaa.gov

  Or:

  National Marine Fisheries Service
  Attention: WCRO-2022-00023
  800 East Park Boulevard
  Plaza IV, Suite 220
  Boise, Idaho 83712-7743

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" (CR) are suggestions regarding discretionary measures to minimize or avoid adverse effects of a proposed action on listed species or critical habitat or regarding the development of information (50 CFR 402.02).

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

2. Require permittee to routinely evaluate and document resource conditions (e.g., bank alteration, stubble height, shrub utilization) in each Unit and begin moving livestock at the appropriate move trigger such that an annual use indicator exceedance is avoided.

3. Continue to work with the permittee to adjust the timing of the Allotment to better protect accessible stream reaches during steelhead and Chinook salmon spawning/incubation periods. Where feasible, give preference to grazing areas with inaccessible stream reaches (i.e., less accessible because of steep topography or dense riparian vegetation) during these critical timeframes. If feasible, request permittee to utilize alternate trailing routes that reduce cattle interaction with spawning adult Chinook salmon and steelhead and/or redds.

4. During the spawning and incubation periods for Chinook salmon, while cattle are on the Allotment (August 24 – October 30), the SCNF employees should spot check high risk and high priority areas for cattle proximity whenever traveling along the Hughes Creek Road; if spot checks observe cattle in close proximity to any flagged redds, methods to protect those redds (e.g., temporary fencing) should be implemented so long as fish are not occupying or actively building. Increased concentrated riding and regular spot checks will continue until cattle are fully removed from the Allotment.

5. To mitigate the effects of existing roads on sediment conditions in the action area, particularly in Hull Creek, evaluate current road maintenance schedules and methods and capitalize on opportunities for reducing sediment inputs.

6. Water quantity is a limiting factor for anadromous fish in the Upper Salmon River drainage. Both the overall production and productivity of ESA-listed fish and their habitat are affected by the number and length of streams, volume and quality of flow among stream reaches, and volume of the underlying aquifer. Changes in the consumptive use of water can affect ESA-listed salmonids and their habitat in downstream reaches. The SCNF should continue to utilize their authorities to conserve and recover aquatic habitats throughout the Upper Salmon River drainage to support species recovery.

7. Riding should occur two or more days per week to encourage livestock distribution away from potential Snake River Basin steelhead spawning habitats, whenever cattle are grazing the Hughes Creek Unit during the steelhead incubation period (May 23 to July 7).

8. Chinook salmon redd surveys should be conducted once per week along accessible reaches of suitable spawning habitat in Hughes Creek during the spawning and incubation periods while cattle are on the Allotment (August 24 to October 30).

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

2.11. Reinitiation of Consultation

This concludes formal consultation for the Indian Ridge Cattle and Horse Grazing Allotment.

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

2.12. "Not Likely to Adversely Affect" Determinations

The SCNF determined that the proposed action may affect, but is NLAA designated critical habitats for Snake River spring/summer Chinook salmon and Snake River Basin steelhead.

The designations of critical habitat for ESA-listed species use the terms primary constituent element (PCE) or essential features. The 2016 critical habitat regulations (50 CFR 424.12) replaced these terms with physical and biological features (PBFs). The shift in terminology does not change the approach used in conducting our analysis, whether the original designation identified PCEs, PBFs, or essential features. In this document, we use the term PBF to mean PCE or essential feature, as appropriate for the specific critical habitat.

The Allotment contains three different Units, and each unit contains designated critical habitat for Snake River Basin steelhead and Snake River spring/summer Chinook salmon. Table 8 displays the miles of designated critical habitat for Snake River basin steelhead and Snake River spring/summer Chinook salmon by Unit and stream.

Table 8. Miles of Snake River Basin Steelhead and Snake River Spring/summer Chinook Salmon Critical Habitat by Grazing Unit. Note: "N/A" means no designated critical habitat in the associated stream.

Grazing Unit	Stream Name	Steelhead Critical Habitat (Miles)	Chinook Salmon Critical Habitat (Miles)
Indian Ridge	Indian Creek	**2.08**	**0.97**
Hughes Creek	Hughes Creek	**3.50**	**2.72**
	North Fork Salmon River	**0.57**	**0.57**
	Ditch Creek	**1.02**	**N/A**
	Allen Creek	**N/A**	**0.25**
	Salzer Creek	**N/A**	**0.25**
	West Fork Hughes Creek	**N/A**	**0.25**
Hull Creek	North Fork Salmon River	**0.17**	**0.17**
	Hull Creek	**0.88**	**N/A**
Allotment Total		**8.22**	**5.18**

Table 9 describes the geographical extent within the Snake River of critical habitat for Snake River spring/summer Chinook salmon and Snake River Basin steelhead. Critical habitat includes the stream channel and water column with the lateral extent defined by the ordinary high-water line, or the bankfull elevation where the ordinary high-water line is not defined. In addition, Snake River spring/summer Chinook salmon critical habitat includes the adjacent riparian zone, which is defined as the area within 300 feet of the line of high water of a stream channel or from the shoreline of standing body of water. The riparian zone is critical because it provides shade, streambank stability, and organic matter input. It also helps regulate sediment, nutrient, and chemical inputs.

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

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

Critical habitat within the action area has an associated combination of PBFs essential for supporting freshwater rearing, migration, and spawning for Chinook salmon and steelhead (Table 10). The critical habitat elements potentially affected by the proposed action include water quality (temperature and/or turbidity), substrate, cover/shelter, riparian vegetation, and food.

Although there are significant lengths of stream designated as critical habitat within the Allotment, livestock typically do not occupy riparian areas along the majority of these stream reaches during any given year. For example, cattle do not occur along the following critical habitat stream reaches: All 2.08 miles in Indian Ridge Unit; 0.57 miles of North Fork Salmon River in Hughes Creek Unit; and 0.17 miles of North Fork Salmon River in Hull Creek Unit. These reaches lie in areas where cattle guards, private land, fences, and steep slopes prevent access. As a result there are only approximately 5.4 miles of Snake River Basin steelhead critical habitat and 3.47 miles of Snake River spring/summer Chinook salmon critical habitat that receive any grazing pressure in the action area; the majority of these miles overlap for both species, for a total of 6.15 miles of combined accessible critical habitat. These reaches contain heavy timber over story with woody shrub understory, as well as steep slopes, blowdown of woody debris, and fencing; these features provide very little cattle forage and access along the valley bottom. As a result, livestock use is small within these habitats.

Table 10. Types of sites and essential physical and biological features designated as PBFs, and the species life stage each PBF supports.

Snake River Basin Steelhead[a]		
Freshwater spawning	Water quality, water quantity, and substrate	Spawning, incubation, and larval development
Freshwater rearing	Water quantity & floodplain connectivity to form and maintain physical habitat conditions	Juvenile growth and mobility
	Water quality and forage[b]	Juvenile development
	Natural cover[c]	Juvenile mobility and survival
Freshwater migration	Free of artificial obstructions, water quality and quantity, and natural cover[c]	Juvenile and adult mobility and survival
Snake River Spring/summer Chinook Salmon		
Spawning & Juvenile Rearing	Spawning gravel, water quality and quantity, cover/shelter, food, riparian vegetation, and space	Juvenile and adult
Migration	Substrate, water quality and quantity, water temperature, water velocity, cover/shelter, food[d], riparian vegetation, space, safe passage	Juvenile and adult

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

2.12.1. Effects on Critical Habitat

Numerous publications have documented the potential detrimental effects of livestock grazing on stream and riparian habitats (Johnson et al. 1985; Menke 1977; Meehan and Platts 1978; Cope 1979; American Fisheries Society 1980; Platts 1981; Peek and Dalke 1982; Ohmart and Anderson 1982; Kauffman and Krueger 1984; Clary and Webster 1989; Gresswell et al. 1989; Kinch 1989; Chaney et al. 1990; Belsky et al. 1997). These publications describe a series of synergistic effects that can occur when cattle over-graze riparian areas, including: (1) woody and hydric herbaceous vegetation along a stream can be reduced or eliminated; (2) streambanks can collapse due to livestock trampling; (3) streambanks can erode when vegetation is eliminated because it can no longer slow water velocities, hold the soil, and retain moisture; (4) the stream can become wider and shallower, and in some cases down cut into the bed; (5) the water table can drop; and (6) hydric, deeply rooted herbaceous vegetation can die out and be replaced by upland species with shallower roots and less ability to bind the soil. The resulting reductions in riparian vegetation and natural cover, increased summer water temperature, loss of pools and habitat adjacent to and connected to streambanks, and increased substrate fine sediment and cobble-embeddedness may potentially affect the functioning of Chinook salmon and steelhead critical habitat in the action area.

When grazing activities are well managed, stream and riparian impacts can be greatly reduced, and recovery can occur over time. The focus of the proposed action is to meet the SCNF's multiple use mission, in this case providing cattle forage, while maintaining proper functioning ecologic conditions or improving conditions, which is the current situation within the Allotment.

This is consistent with the intent of NMFS 1995 and 1998 consultations on PACFISH. The proposed action, including established pasture rotations, range improvements, in-season move triggers, annual utilization standards, and adaptive management strategy have been established specifically for the Allotment with the intent that PACFISH standards and objectives will be met and the above described potential adverse effects to critical habitat will be avoided. Before analyzing potential effects on the PBFs of critical habitat, a brief summary of key elements of the proposed action that were designed specifically to avoid habitat-related effects follows.

Effects of Trailing on Critical Habitat. Livestock trailing is supervised by multiple riders limiting opportunities for cattle to access riparian areas. Livestock are actively being pushed along the route and will not be grazing or loitering along streams for any significant period of time. If livestock enter streams during trailing, a small turbidity pulse is likely to occur following each instance. However, each short duration and low intensity turbidity pulse will have insignificant effects on water quality and will resuspend or introduce only minor levels of sediment. Given water quality is high, and sediment levels are Properly Functioning or trending in that direction throughout most of the watershed, any entrance of livestock into streams during trailing will have short-term insignificant effects on short stretches of critical habitat (i.e., a few meters). Although livestock are likely to occasionally access streams along the route and are likely to trample small areas of bank, introducing small quantities of sediment, the brief nature and limited occurrences of livestock reaching water will result in only insignificant effects to water quality in spawning and rearing areas along the trailing routes.

Monitoring and Adaptive Management Strategy. The proposed action includes a monitoring and adaptive management program to evaluate annual livestock use. This program will help the SCNF ensure that the action is being implemented as intended. The program will also allow the SCNF to quantitatively track resource responses to ongoing use through the remaining term of the consultation. Perhaps even more importantly, the strategy should result in rapid modification of existing management to minimize potential for repeat or long-term negative effects. As such, the adaptive management strategy is critical to integrate both annual and long-term monitoring data into daily, annual, and long-term grazing management decisions. Should monitoring indicate that implementation is not occurring as described (i.e., annual use criteria are not met, permit terms and conditions, or RMOs are not being met), use of the adaptive management strategy is expected to ensure that either the permit administration or the grazing plan will be quickly and appropriately adjusted. Doing so should ensure RMOs are maintained and/or achieved during the term of the proposed action.

The SCNF has committed to regular Allotment use supervision. Their staff will work directly with the permittee's rider, who is onsite regularly throughout the grazing season. This permittee presence is likely to quickly identify potential grazing issues and result in rapid on-the-ground changes in Allotment administration. Over the past several years, the SCNF has provided NMFS with annual grazing reports for allotments across the Forest. Those reports and discussions with the Level 1 Team demonstrate that where monitoring or use supervision identifies potential implementation issues, the SCNF quickly made changes to grazing administration to ensure problems were corrected. The reports also demonstrate that the SCNF is capable of meeting established use criteria at allotment DMAs and committed to making necessary changes where criteria or grazing instructions are not met. This demonstrates the SCNF's success in implementing the adaptive management and monitoring program over their entire grazing management area and increases our confidence that similar management will continue for the duration of this consultation.

Below is a brief summary of the key elements of the proposed strategy, which were designed to reduce effects on PBFs to insignificant levels.

In-Season/End-of-Season Grazing Use Criteria and Permit Terms and Conditions. The SCNF will monitor the stubble height of grasses, sedges and rushes, riparian woody shrub use, and streambank alteration levels to determine when cattle should be moved from individual Units (see Section 1.3). Literature presented in the BA and summarized here indicates that the proposed use standards can reasonably be expected to limit significant resource damage while still allowing for recovery of annual grazing disturbances prior to the next years grazing. Therefore, this should promote maintenance of properly functioning conditions where RMOs are already being met or promote achievement of properly functioning conditions over time. The proposed MIM and adaptive management strategy should avoid instances where an improper or insensitive standard is continually met and yet still leads to a downward trend in one of the RMOs and, ultimately, degraded habitat conditions. For example, Ehrhart and Hansen (1997) found mixed success when only one-use standard/management objective was applied on an allotment, but noted improved success when multiple indicators were employed. By concurrently monitoring multiple annual indicators the SCNF is able to require the permittee to move cattle based on the most sensitive indicator for a given year. This is important as annual variability in precipitation and air temperature can cause wide discrepancies in forage availability and thus annual livestock foraging habits. Therefore, employing a suite of environmental monitoring indicators is expected to enable the SCNF and the permittee to remove cattle from a particular Unit in response to the most sensitive indicator for that year. This process is expected to prevent substantial negative riparian impacts from occurring and should maintain current conditions where they are Properly Functioning and allow indicators that are functioning at risk to recover at near natural rates.

Compared to recent grazing implementation, no changes in the number of cattle, timing and duration of use are proposed for the Allotment. Past grazing management has resulted in achieving or maintaining RMOs within the action area where grazing occurs. Because the proposed action would graze the same intensity, duration, and times as previously occurred, it is reasonable to assume future grazing will have similar or smaller effects on riparian and stream conditions. The proposed action includes three resource-based move triggers and annual use indicators (i.e., greenline stubble height, percent streambank alteration, and percent browse use). These measures are expected to effectively control cattle distribution, and are expected to maintain current fish habitat conditions within the Allotment, while preventing degradation and allowing for some improvements over time.

Stubble height has a direct relationship to the health of herbaceous riparian plants and the ability of the vegetation to provide streambank protection; to filter out and trap sediment from overbank flows; and in small streams to provide overhead cover (University of Idaho Stubble Height Review Team 2004; Roper 2016; Saunders and Fausch 2007). On monitoring sites across 17 FS and four Bureau of Land Management (BLM) units in the Interior Columbia River basin, Goss

(2013) found a linear relationship between increasing stubble height and multiple components of high-quality salmonid habitat: increasing residual pool depth, increasing streambank stability, increasing percent undercut banks, and decreasing streambank angle. This suggests that across stream and riparian conditions evaluated within the Interior Columbia River basin, the higher the stubble height the greater the likelihood stream conditions favored by salmonids will be present (Goss 2013).

Multiple studies have evaluated minimum stubble heights necessary to protect stream habitat from the impacts of livestock grazing. Most studies have reported stubble height of the entire greenline graminoid and herbaceous community—as opposed to a subset of key plant species—because it is simpler to evaluate, avoids controversy, over which species to monitor, and is likely more informative of actual streambank conditions than knowing the height of a subset of plant species (Roper 2016). Using the PACFISH-INFISH opinion monitoring data from Federal lands in the Columbia basin, Goss (2013) found that stubble height was related to streambank disturbance, and streambank disturbance began to increase substantially when stubble heights fell below 10 inches. Bengeyfield (2006) found that a 4-inch stubble height did not initiate an upward trend in stream channel morphology at sites on the Beaverhead-Deerlodge National Forest in Montana, based on seven to nine years of monitoring. Clary (1999) found that while 5-inch stubble height at the end of the growing season resulted in improvements in most measured aquatic and riparian conditions in an Idaho meadow after 10 years, 6.5-inch stubble height was needed to improve all measured habitat metrics. Pelster et al. (2004) found that during summer and fall grazing greater than 40 percent of cattle diets were willow when stubble heights were less than eight inches; they suggested that stubble heights greater than eight inches were needed to reduce willow consumption during these critical periods. Willows enhance salmonid habitat by providing fish with cover, modulating stream temperatures, and contributing leaf detritus and terrestrial insects that expand food sources (Bryant et al. 2006; Clary and Leininger 2000; Murphy and Meehan 1991). This reinforces the idea that higher stubble heights lead to improved fish habitat.

After reviewing the available scientific literature, including all of the studies mentioned above, Roper (2016) strongly recommended six inches as a starting point for a stubble height objective, measured at the end of the growing season, for small to medium sized cold-water streams inhabited by salmon and trout. This is consistent with Clary and Webster (1989), who suggested a 6-inch starting point for stubble height objectives in the presence of ESA-listed or sensitive fish. Roper (2016) acknowledges that four inches or eight inches could be appropriate stubble height objectives for some stream sites, but that site-specific data would be necessary to support these more liberal or conservative objectives. The scientific literature therefore suggests that the SCNF's proposed stubble height objective of four inches will likely be effective in minimizing livestock damage to streambanks on the Allotment, if permittee compliance rates remain high, because streambank conditions are currently meeting RMOs.

Riparian vegetation controls bank stability, sediment input, and terrestrial invertebrate inputs (forage) to action area streams. Cattle grazing can adversely affect riparian vegetation, and thus indirectly affect these indicators if managed poorly. Research shows plant health is maintained at moderate use levels, but repeated heavy to extreme grazing use is detrimental to plant health (Cowley and Burton 2005). The SCNF developed the proposed move triggers/endpoint indicators with this in mind. Triggers/indicators are variable depending upon whether the RMO for woody species is being met and whether the species present are single- or multi-stemmed. For example, willows, which are generally multi-stemmed, will have move triggers/endpoint indicators of 50 percent when RMOs are being met and 30 percent when not meeting the RMO. Single-stemmed species such as alders will have move triggers/endpoint indicators of 30 percent when RMOs are being met and 20 percent when not meeting the RMO. Exceeding 50 percent nipping is likely to reduce vegetation vigor and modify normal growth form and age class structure, which could subsequently affect habitat conditions. Successful monitoring at DMAs, which by definition are representative of conditions across the Units, within and between years should result in cattle moving to the next Unit prior to exceeding established standards. As such, the expected riparian shrub use should not affect long-term health of riparian vegetation and should be insignificant.

Hall and Bryant (1995) suggested livestock start to shift their preference to willows and other woody species at a 3-inch stubble height. This level of utilization equates to roughly 65 percent use. This level of use is greater than the move triggers/endpoint indicators allow for key upland and riparian areas, regardless of the seral status of the area. As a result, cattle use of woody species within riparian areas is expected to be minimal. Late summer pastures are limited to the Indian Ridge Unit. Forage is limited to upland meadows on south facing slopes and ridgetops in this Unit and cattle stay in these areas. Watering occurs at upland springs where there is no potential to influence anadromous fish habitat several miles downstream. Fish bearing streams are inaccessible to cattle while on the Indian Ridge Unit due to topography and no measurable impacts to riparian vegetation is expected on streams in this Unit. For these reasons, riparian shrub use is expected to be insignificant across the action area.

Streambank alteration is another move trigger/endpoint indicator that is being used across the Northwest to manage allotments. Streambank alteration provides an indicator of the amount of time livestock spend in riparian zones, increasing with both the number of cows present and the time spent by those cows in riparian areas. The streambank alteration standard measures the amount of annual bank disturbance caused by livestock grazing, the levels, of which can then be related to streambank stability and riparian vegetation conditions within the greenline (Cowley et al. 2006). Excessive bank trampling can lead to increased channel widths, decreased depths, and slower water velocity. These channel changes can cause mid-channel sediment deposition, which can further erode and reduce water storage in streambanks, resulting in vegetation transitioning from willows and sedges to drier species. These impacts all reduce the quality of fish habitat. Bengeyfield (2006) found bank alteration levels to be the most sensitive annual indicator of those they used. On streams over-widened by historical overgrazing, they noted that between forage utilization, stubble height, and streambank alteration, streams managed for streambank alteration were the only streams consistently showing significant improvement after a 4- to 6-year period. They concluded that streambank alteration was the only standard that initiated the upward trend in stream channel shape that they believed was necessary to achieve riparian function. However, their study streams were predominantly meadow systems. The Allotment contains very few meadow streams, as the majority of streams are heavily timbered and lie in highly confined valley bottoms with steep side slopes. Therefore, the use of a combination of move triggers/endpoint indicators is more appropriate for this Allotment.

Cowley (2002) suggested that the maximum allowable streambank alteration that maintains streambank stability is 30 percent, and that applying a 20 percent streambank alteration standard should allow streambanks meeting desired conditions to recover. Cowley (2002) cited additional studies to support a recommendation that "Ten percent or less alteration would seem to allow for near optimal recovery and should not retard or prevent attainment of resource management objectives." The SCNF proposes a 20 percent maximum streambank alteration standard during in-season and end-of-season grazing. Based on Cowley (2002) and baseline data showing that streambanks in the Allotment are in the desired condition, we expect this standard to effectively minimize negative impacts to streambanks from grazing; maintaining properly functioning conditions in streams and riparian areas on the Allotment. Other conservation measures will also aid in ensuring effects to streambank stability are inconsequential. For example, adjusting the cattle on date according to range readiness will allow soil moistures to decrease resulting in decreased susceptibility of streambanks to alteration, shearing, and widening. No more than 20 percent bank alteration would be allowed at any site regardless of current status.

Proposed monitoring, including adoption of appropriate in-season move triggers and annual use indicators, will enable the SCNF to move cattle off Allotment Units before excessive cattle use could initiate bank instabilities or lead to other potential adverse habitat effects. However, it is important to note that a one-time exceedance of an annual use indicator does not automatically mean that adverse effects have occurred. If an exceedance occurs, the SCNF will first determine why the indicator was not met, and secondly determine if any effects not previously considered occurred as a result of the exceedance. If and when such an exceedance occurs, the SCNF proposes to modify Allotment administration through the identified adaptive management process (Appendix A). Allotment modifications would be designed to reduce the likelihood of an additional exceedance. Should an exceedance result in effects not considered in this consultation, NMFS expects the SCNF will pursue reinitiation of consultation.

Although specific changes to Allotment administration are impossible to identify before a problem occurs, typical changes can include modifying stocking rates, changing seasons of use, mineral site adjustments, or increased riding or fencing of site-specific problem areas during subsequent season(s). Successful implementation of adaptive management can reasonably be anticipated to modify grazing practices such that the magnitude of potential adverse effects is sufficiently minimized to an insignificant amount.

In general, grazing can adversely affect streams and riparian areas where they have access. Cattle can directly trample streambanks while trailing, feeding, or loafing in streamside areas and cattle can over utilize riparian vegetation. Riparian vegetation influences stream shade, streambank stability, water retention, and primary production of the adjacent streams. The effects of these modifications can include streambank damage, removal of shade-providing vegetation, reduced primary productivity, widening of stream channels, introduction of fine sediment, and channel incision. The SCNF has structured the proposed action, including multiple conservation measures, to reduce the potential for these adverse effects to occur. Under the proposed action, adverse grazing impacts will be avoided by implementing the proposed grazing rotation and other conservation measures, successful monitoring and implementation of the annual use standards, and subsequent adaptive management to ensure RMOs are consistently achieved or maintained.

Livestock effects to critical habitat are directly tied to the amount of time they spend in riparian areas, with effects increasing with the amount of time spent there. To minimize use of riparian areas, the SCNF developed the proposed grazing rotation and conservation measures. The grazing rotation was designed to capitalize on the natural features of the Allotment that preclude cattle use, and to take advantage of cattle preferences for upland areas during early spring to reduce time spent near streams where topography does not constrain use (Leonard et al. 1997; Ehrhart and Hanson 1997; Kinch 1989; Parsons et al. 2003; Wyman et al. 2006; and McInnis and McIver 2009). The proposed conservation measures, including the use of part time riders, deploying mineral supplement, fencing, and application of annual use standards all further reduce time spent in riparian areas. The following discussion on PBFs applies to potential effects of the proposed action on salmonid freshwater spawning, rearing, and migration sites within the action area.

<u>Physical and Biological Features - Freshwater Spawning, Rearing and Migration Sites.</u>

Water Quality – Habitat impacts associated with this Allotment are likely to include a few areas of denuded streambank on the Hull and Hughes Creek Units. These areas will be small and limited to a few feet in width where cattle access streams to drink or cross. Early in the season cattle do not loiter in riparian areas and they are expected to access streams to drink or cross in the same areas as previous years to avoid breaking new trail.

Denuded areas associated with watering and crossing sites are likely to result in a slight increase in turbidity for a short distance downstream during rainstorms or runoff events. However, given background levels of turbidity during runoff events, it will not likely be possible to distinguish between turbidity resulting from these minor grazing impacts and background turbidity. Cattle waste is likely to lead to a slight increase in nutrients; however, impacts will be localized and immeasurable as a result of proposed measures designed to limit cattle use in riparian areas, limited forage availability within action area stream riparian areas, and wide distribution of cattle across the Allotment. In addition, each Unit is grazed every other year, allowing riparian vegetation to trap and utilize nutrients deposited in riparian areas preventing the majority of waste from entering the water column.

Shade provided by vegetation can be important in keeping stream temperatures cool for salmonids (Zoellick 2004). Li *et al.* (1994) and Zoellick (2004) found that trout abundance decreased as solar input and water temperature increased. Water temperature is primarily affected by stream shade and channel geometry. Livestock grazing can directly increase water temperature if riparian vegetation removal results in increased solar exposure. Indirect effects could occur if livestock remove significant quantities of vegetation, either through foraging or trampling. Reduced riparian vegetation can result in increased streambank instability, which in turn leads to over-widened streams. Over-widened streams, or high W:D, expose a greater surface area of shallower water to the sun. This can further increase water temperatures.

Within the Allotment, riparian conditions, W:D, bank stability, and water temperature are generally static and meeting RMOs. The available data suggest recent livestock grazing within the Allotment has not resulted in detectable effects to water temperatures within the action area.

As the proposed action is nearly identical to past actions, it is reasonable to assume these conditions will be maintained for the duration of the proposed action.

The proposed action includes measures, including bank alteration standards, salting, and use of riders to minimize livestock impacts to stream reaches. These should continue to limit the potential for livestock to impact stream temperatures in the action area. Proposed annual use standards serve to reduce potential livestock impacts to insignificant levels by minimizing riparian vegetation use and livestock impact to streambanks. Further, successful use of the described adaptive management program is expected to prevent site-specific impacts or a onetime exceedance of an annual use standard from leading to long-term habitat degradation. For these reasons, the proposed action is expected to have only insignificant effects on water quality in the action area.

***Substrate* –** Available data from grazed portions of the action area indicate sediment levels in gravels are meeting SCNF standards for quartzite geologies in Hughes Creek and slightly exceeding standards in Hull Creek. The Hull Creek Unit contains just 0.88 miles of critical habitat accessible to livestock. Slightly high sediment levels in this reach are believed to be related to a riparian road and the lack of flushing flows caused by the private dam upstream of the monitoring site. This reach is located at the downstream end of the Unit. Livestock use here is low due to the heavy timber, thick riparian vegetation, and every-other-year use along this reach. For these reasons, cattle typically move through this 0.88-mile reach in route to more suitable foraging sites on south facing slopes and along roadways higher in the drainage. Therefore, the risk of impacts to sediment levels in Hull Creek is discountable.

Cattle will cross, water, and graze along some stream reaches in the Hughes Creek Unit. Consequently, there will undoubtedly be minor instances of sediment introduction at crossings, watering sites, or where foraging activities result in low levels of bank alteration. These sediment introductions are likely to cause minor and temporary increases in substrate fine sediment in low velocity areas immediately downstream. As the available monitoring data suggest, these increases are small and not expected to be measurable. In addition, the use of riders, mineral deployment, and the described annual use indicators are expected to prevent measurable degradation of streambank conditions, which would otherwise lead to elevated sediment levels. These measures should ensure that the existing Properly Functioning sediment conditions within the Hughes Creek Unit are retained. NMFS also anticipates a long-term reduction in sedimentation as riparian conditions and streambank stability continue improving over time. Observed maintenance of stream sediment, streambank stability, and other RMOs over the recent grazing history provide support for these determinations.

***Forage* –** More than half of some fish's food originates from terrestrial sources (Baxter *et al*. 2005; Saunders and Fausch 2007). Their remaining food is aquatic, with many of their prey species feeding on terrestrial leaf litter. Aquatic invertebrates, another major fish food source, also depend heavily on terrestrial vegetation inputs. Riparian vegetation, therefore, is critical to fish growth and survival in natal streams. Saunders and Fausch (2007) reported grazing management can influence terrestrial invertebrate inputs and demonstrated that short duration high-intensity grazing management resulted in large growth and abundance increases in fish when compared to season-long grazing management. Saunders and Fausch (2009) observed no difference in invertebrate biomass entering streams between sites managed for rotation grazing and ungrazed sites. The proposed action utilizes a rotational grazing scheme with moderate intensities over short durations. As a result, the action is expected to have effects consistent with the cited literature and thus will have insignificant impacts to forage.

Natural Cover – Salmonids appear to prefer spawning in close proximity of overhead cover (Bjornn and Reiser 1991), and overhead cover protects juvenile salmonids from predation. Cover can also influence livestock access to streams reducing trampling where cover is high or riparian vegetation is thick (Gregory and Gamett 2009). There will be a slight, short-term reduction in overhead vegetative cover at each access point and in individual riparian areas, which receive actual grazing use. However, these sites have strict riparian vegetation utilization standards and are rested an entire year before receiving additional use. Vegetation is expected to grow back prior to the next season of use. Effects to cover are expected to be highly localized and not influence cover on a stream reach scale in any measurable way. Vegetation is currently meeting RMOs across the Allotment and available literature indicates the proposed utilization levels will allow maintenance of these conditions and likely continued improvement. Because riparian conditions have shown demonstrable improvements or maintenance of appropriately functioning conditions in the action area under past grazing, these patterns should continue and the action will have only insignificant effects on cover.

No information currently exists documenting the amount or locations of undercut banks available to fish as cover in the action area. However, current bank stability ratings are meeting RMOs in all areas accessible to livestock use. This suggests that recent grazing activities have not reduced the available quantity of undercut banks providing cover for ESA-listed fish in the action area. NMFS anticipates the application of the proposed annual use indicators to maintain this condition for the term of the proposed action and any reduction of undercut banks that does occur is expected to be site specific and insignificant at the stream reach or watershed scales.

Riparian Vegetation – Similar to those PBFs described above, riparian vegetation impacts from the proposed livestock grazing are expected to be insignificant. Although cattle will consume and trample some riparian vegetation, the proposed conservation measures and move-triggers/ annual utilization standards should greatly limit potential disturbance. Cattle use of riparian vegetation will be limited to 50 percent browse on multi-stemmed species, and 30 percent browse on single-stemmed species when the RMO for woody species is being met. A more restrictive 30 percent browse on multi-stemmed species will be applied to units when the RMO is being met and 20 percent on single-stemmed species when the RMO is not being met. All DMAs are currently meeting RMOs for riparian vegetation and will utilize the higher utilization standard. This level of use has been consistently demonstrated to allow for a stable trend where currently at PNC, or a trend toward late seral status where not at PNC (Holechek et al. 2004). In addition, heavily timbered riparian areas within action area RCAs provide little forage and cattle use there will be nominal.

The SCNF's other conservation measures are also expected to help maintain late seral status or PNC. Waiting for appropriate range conditions to turn livestock out (range readiness) will result in less potential impacts to soils and better distribution of livestock. For example, soil moisture will have decreased when range conditions are adequate, resulting in less soil disturbance. At the same time, herbaceous plants in the uplands should still be highly palatable, resulting in livestock spending less time in riparian areas. Salting at least one-fourth mile away from creeks and riding for improved distribution of livestock will also help minimize cattle presence and potential impacts along streams and in riparian areas. Salt placed away from creeks will tend to encourage cattle to utilize other areas of the Allotment besides riparian areas. Riding will also serve the same purpose. These measures are expected to reduce impacts on riparian vegetation to insignificant levels.

As conditions in riparian areas improve, fish habitat is expected to become more complex, largely due to increases in overhanging vegetation and downed large woody debris. As vegetation increases, roots stabilize streambanks and stems and foliage slow water velocities, trap fine sediment, provide overhead cover for fish, provide shade that may aid in keeping stream temperatures cool, and provide surfaces for macroinvertebrates to inhabit.

Information obtained from annual indicator monitoring will provide data and information to determine whether the current season’s livestock grazing is meeting the intended criteria for livestock use in riparian areas. These data will provide information needed to refine and make annual changes to livestock grazing management practices necessary to continue to meet RMOs (adaptive management).

2.12.2. Summary

In summary, 6.15 miles of critical habitat are actually exposed to grazing under the action. Heavily timbered riparian areas with woody shrub understory, as well as steep slopes, blowdown of woody debris, and fencing provide little livestock foraging opportunities or incentive for livestock use in these areas. As a result, livestock use is small within these habitats. The effects of grazing on proposed critical habitat PBFs will be limited to: (1) insignificant, short-term turbidity increases when cattle cross or water from action area streams; (2) immeasurable and insignificant shade reductions, for less than one growing season; and (3) insignificant impacts on forage and natural cover as a result of minor riparian vegetation utilization; and (4) insignificant amounts of bank alteration. Proposed Unit rotations, adherence to the annual move-triggers and long-term RMOs, successful adaptive management, and use of minerals, riders, drift and exclosure fences, and active trailing all contribute to limiting the potential effects of the action on critical habitat PBFs to insignificant levels. In the long term (years to decades), all critical habitat PBFs are expected to continue to improve since grazing is being implemented with closely monitored move-triggers, and subsequent adaptive management decisions that will continue allowing riparian vegetation and stream channels to recover to appropriate conditions. Thus, the proposed action will allow gradual increase in the conservation value of critical habitat.

Based on the best available information and successful implementation of conservation measures described in the BA, NMFS concurs with the SCNF's finding that the subject action is NLAA designated critical habitat for Snake River spring/summer Chinook salmon and Snake River Basin steelhead.

3. 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.

3.1. 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 SCNF and the Allotment permittees. Individual copies of this opinion were provided to the SCNF. The document will be available within 2 weeks at the NOAA Library Institutional Repository [https://repository.library.noaa.gov/welcome]. The format and naming adhere to conventional standards for style.

3.2. 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.

3.3. 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 NMFS ESA Consultation Handbook, ESA regulations, 50 CFR 402.01 et seq., and the MSA implementing regulations regarding EFH, 50 CFR part 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 implementation, and reviewed in accordance with West Coast Region ESA quality control and assurance processes.

4. References

American Fisheries Society. 1980. Western Division. Position paper on management and protection of western riparian stream ecosystems. 24 p.

Ballard, T. M. 1999. Interactions of Cattle and Chinook Salmon. Master's thesis. Oregon State University, Corvallis.

Ballard, T. M. and W. C. Krueger. 2005. Cattle and salmon II: interactions between cattle and spawning spring Chinook salmon (*Oncorhynchus tshawytscha*) in a northeastern Oregon riparian ecosystem. Rangeland Ecology and Management 58:274–278.

Battin, J. and coauthors. 2007. Projected impacts of climate change on salmon habitat restoration. Proceedings of the National Academy of Sciences of the United States of America 104(16):6720-6725.

Baxter, C. V., K. D. Fausch, and W. C. Saunders. 2005. Tangled webs: reciprocal flows of invertebrate prey link streams and riparian zones. Freshwater Biology 50:201-220.

Belsky, J., A. Matzke, and S. Uselman. 1997. Survey of livestock influences on stream and riparian ecosystems in the western United States. Oregon Natural Desert Association. 38 p.

Bengeyfield, P. 2006. Managing cows with streams in mind. Rangelands, 28(1). pp. 3-6.

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

Bryant, L., W. Burkhardt, T. Burton, W. Clary, R. Henderson, D. Nelson, W. Ririe, K. Saunders, and R. Wiley. 2006. Using stubble height to monitor riparian vegetation. Rangelands 28(1): 23-28.

Burton, T. A., S. J. Smith, and E. R. Cowley. 2008. Monitoring Stream Channels and Riparian Vegetation – Multiple Indicators. U.S. Forest Service and Bureau of Land Management Interagency Technical Bulletin, Version 5.0, April 2008. http://www.blm.gov/id/st/en/info/publications/technical_bulletins/tb_07-01.html

Burton, T. A., S. J. Smith, and E. R. Cowley. 2011. Riparian area management: Multiple indicator monitoring (MIM) of stream channels and streamside vegetation. Technical Reference 1737-23. BLM/OC/ST-10/003+1737+REV. U.S. Department of the Interior, Bureau of Land Management, National Operations Center, Denver, CO. 155 pp.

Chaney, E., W. Elmore, and W. S. Platts. 1990. Livestock grazing on western riparian areas. Report prepared for U.S. Environmental Protection Agency by Northwest Resource Information Center, Inc., Eagle, Idaho. 45 p.

Clary, W. P. and B. F. Webster. 1989. Managing grazing of riparian areas in the Intermountain Region. General Technical Report INT-263, U.S. Dept. of Agriculture, USFS, Intermountain Research Station, Ogden, Utah. 11 p.

Clary, Warren P. 1999. Stream channel and vegetation responses to late spring cattle grazing. Journal of Range Management, Vol. 52, No. 3 (May, 1999), pp. 218-227.

Clary, W. P and W. C. Leininger. 2000. Stubble height as a tool for management of riparian areas. Journal of Range Management. 53 (6): 563-573.

CCSP (Climate Change Science Program). 2014. Climate Change Impacts in the United States. Third National Climate Assessment. U.S. Global Change Research Program. DOI:10.7930/J0Z31WJ2.

CIG (Climate Impacts Group). 2004. Overview of Climate Change Impacts in the U.S. Pacific Northwest, 7/29/2004.

Cope, O. B. (ed.). 1979. Proceedings of the forum - grazing and riparian/stream ecosystems. Trout Unlimited. 94 p.

Cowley, E. R. and T. Burton. 2002. Monitoring the current year streambank alteration. USDI, BLM, Idaho State Office. Boise, ID. March 2002

Cowley, E. R., T. A. Burton, and S. J. Smith. 2006. Monitoring streambanks and riparian vegetation—multiple indicators. Boise, ID, USA: U.S. Department of Interior, Bureau of Land Management. Technical Bulletin No. 2005-2. 29 p.

Cowley, E. R. and T. A. Burton. 2005. Monitoring Streambanks and Riparian Vegetation – Multiple Indicators. Tech. Bull. No. 2005-002. USDI, BLM, Idaho State Office. Boise, ID. http://www.id.blm.gov/techbuls/05_02/doc.pdfCowley, E.R. 2002. Monitoring Current Year Streambank Alteration. Idaho State Office, Bureau of Land Management. 16p.

Crozier, L. G., R. W. Zabel, and A. F. Hamlet. 2008a. Predicting differential effects of climate change at the population level with life-cycle models of spring Chinook salmon. Global Change Biology 14:236-249. DOI: 10.1111/j.1365-2486.2007.01497.x.

Crozier, L. G., A. P. Hendry, P. W. Lawson, T. P. Quinn, et al. 2008b. Potential responses to climate change for organisms with complex life histories: evolution and plasticity in Pacific salmon. Evolutionary Applications 1:252-270. DOI: 10.1111/j.1752-4571.2008.00033.x.

Ecovista, Nez Perce Tribe Wildlife Division, and Washington State University Center for Environmental Education. 2003. Draft Clearwater Subbasin Assessment, Prepared for Nez Perce Tribe Watersheds Division and Idaho Soil Conservation Commission. 463 p. http://www.nwcouncil.org/fw/subbasinplanning/clearwater/plan/Default.htm

Ehrhart, R. C. and P. L. Hansen. 1997. Effective cattle management in riparian zones: a field survey and literature review. USDI, Bureau of Land Management, Montana State Office. November.

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

Felts, E. A., B. Barnett, M. Davison, C. J. Roth, J. R. Poole, R. Hand, M. Peterson, and E. Brown. 2019. Idaho adult Chinook Salmon monitoring. Annual report 2018. Idaho Department of Fish and Game Report 19–10.

Ford, M. J. (ed.). 2011. T. Cooney, P. McElhany, N. J. Sands, L. A. Weitkamp, J. J. Hard, M. M. McClure, R. G. Kope, J. M. Myers, A. Albaugh, K. Barnas, D. Teel, P. Moran, and J. Cowen. 2011. Status review update for Pacific salmon and steelhead listed under the Endangered Species Act: Pacific Northwest. U.S. Dept. Commerce, NOAA Tech. Memo. NMFS-NWFSC-113, 281 p.

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

Gamett, B., B. Diage, J. Purvine, B. Rieffenberger, G. Seaberg. 2008. A Strategy for Managing Livestock Grazing Within Stream Riparian Communities on the Salmon-Challis National Forest. Unpublished document on file at Salmon-Challis NF Supervisor’s Office, Salmon, ID. 42p.

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

Goss, L. M. 2013. Understanding the relationship between livestock disturbance, the protocols used to measure that disturbance and stream conditions. All Graduate Plan B and other Reports. Paper 258.

Gregory, J. S. and B. L. Gamett. 2009. Cattle trampling of simulated bull trout redds. North American Journal of Fisheries Management 29:361.

Gresswell, R. E., B. A. Barton, and J. L. Kershner (eds.). 1989. Practical approaches to riparian resource management: an educational workshop. May 8 -11, 1989, Billings, Montana. USDI Bureau of Land Management: BLM-MT-PT-89-001-4351. 193 p.

Hall, F. C. and L. Bryant. 1995. Herbaceous stubble height as a warning of impending cattle grazing damage to riparian areas. Gen. Tech. Rep. PNW-GTR-362. Portland, OR. U.S. Department of agriculture, Forest Service, Pacific Northwest Research Station. 9 p.

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

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

Holechek, J. L., R. D. Pieper, and C. H. Herbel. 2004. Range Management Principles and Practices. 5th Edition, Prentice-Hall, Upper Saddle River, NJ.

ICBTRT (Interior Columbia Basin Technical Recovery Team). 2003. Independent Populations of Chinook, Steelhead, and Sockeye for Listed Evolutionarily Significant Units within the Interior Columbia River Domain (July 2003).

ICBTRT. 2007. Viability Criteria for Application to Interior Columbia Basin Salmonid ESUs, Review Draft March 2007. Interior Columbia Basin Technical Recovery Team: Portland, Oregon. 261 pp. http://www.nwfsc.noaa.gov/trt/col/trt_viability.cfm

ICBTRT. 2010. Status Summary – Snake River Steelhead DPS. Interior Columbia Basin Technical Recovery Team: Portland, Oregon.

IDEQ, (Idaho Department of Environmental Quality). 2021. Idaho's 2018/2020 Integrated Report, Final. IDEQ. Boise, Idaho. 142 p. October 2020

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

Johnson, R. R., C. D. Ziebell, D. R. Patton, P. F. Folliet, and R. H. Hamre (Tech. Coordinators). 1985. Riparian ecosystem and their management: reconciling conflicting uses; first North America riparian conference; April 16-18. Tucson, Arizona. USDA Forest Service Gen. Tech. Rpt. Rm-120. 523 p.

Kauffman, J. B. and W. C. Krueger. 1984. Livestock impacts on riparian ecosystems and streamside management implications - a review. Journal of Range Management 37(5):430-438.

Kinch, G. 1989. Riparian area management: grazing management in riparian areas. U.S. Bureau of Land Management, Denver, Colorado. Tech. Ref. 737-4. 44 p.

Leonard, S., G. Kinch, V. Elsbernd, M. Borman, and S. Swanson. 1997. Riparian area management. TR 1737 14. Grazing management for riparian wetland areas. USDI Bureau of Land Management and USDA Forest Service. 63 p.

Li, H. W., G. A. Lamberti, T. N. Pearsons, C. K. Tait, J. L. Li, J. C. Buckhouse. 1994. Cumulative Effects of Riparian Disturbances along High Desert Trout Streams of the John Day Basin, Oregon. Transactions of the American Fisheries Society 1994; 123: 627-640.

Martins, E. G., S. G. Hinch, D. A. Patterson, M. J. Hague, S. J. Cooke, K. M. Miller, M. F. Lapointe, K. K. English, and A. P. Farrell. 2011. Effects of river temperature and climate warming on stock-specific survival of adult migrating Fraser River sockeye salmon (Oncorhynchus nerka). Global Change Biology 17(1):99–114. DOI:10.1111/j.1365-2486.2010.02241.x.

Martins, E. G., S. G. Hinch, D. A. Patterson, M. J. Hague, S. J. Cooke, K. M. Miller, D. Robichaud, K. K. English, and A. P. Farrell. 2012. High river temperature reduces survival of sockeye salmon (*Oncorhynchus nerka*) approaching spawning grounds and exacerbates female mortality. Canadian Journal of Fisheries and Aquatic 69:330–342. DOI: 10.1139/F2011-154.

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

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

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

McInnis, M. L. and J. D. McIver. 2009. Timing of Cattle Grazing Alters Impacts on Streambanks in an Oregon Mountain Watershed. Journal of Soil and Water Conservation. Volume 64, No. 6.

Meehan, W. R. and W. S. Platts. 1978. Livestock grazing and the aquatic environment. Journal of Soil and Water Conservation November - December 1978:274-278.Menke, J. (ed.). 1977. Symposium on livestock interactions with wildlife, fish and the environment. Sparks, Nevada. USDA Forest Service Pacific Southwest Forest and Range Experiment Station. Berkeley, California.

Menke, J. (ed.). 1977. Symposium on livestock interactions with wildlife, fish and the environment. Sparks, Nevada. USDA Forest Service Pacific Southwest Forest and Range Experiment Station. Berkeley, California.

Mote, P. W., E. A. Parson, A. F. Hamlet, et al. 2003. Preparing for Climatic Change: The Water, Salmon, and Forests of the Pacific Northwest. Climatic Change 61:45-88.

Murphy, M. L. and W. R. Meehan. 1991. Stream ecosystems. Pages 17-46. In: Meehan, editor. Influences of forest and rangeland management on salmonid fishes and their habitats. American Fisheries Society Special Publication 19, Bethesda, MD.

NMFS (National Marine Fisheries Service). 1995. Endangered Species Act Section 7 Consultation Biological Opinion for Implementation of Interim Strategies for Managing Anadromous Fish-producing Watersheds in Eastern Oregon and Washington, Idaho, and Portions of California (PACFISH). January 23, 1995

NMFS (National Marine Fisheries Service). 1998. Section 7 Consultation on the Effects of Continued Implementation of Land and Resource Management Plans on Endangered Species Act Listed Salmon and Snake River Basin steelhead in the Upper Columbia and Snake River Basins (PACFISH). Northwest Region. Seattle, Washington.

NMFS (National Marine Fisheries Service). 2016a. 2016 5-year review: Summary and evaluation of Snake River sockeye, Snake River spring-summer Chinook, Snake River fall-run Chinook, Snake River basin steelhead. NOAA Fisheries, West Coast Region. 138 p.

NMFS (National Marine Fisheries Service). 2016b. Endangered Species Act Section 7(a)(2) Biological Opinion, and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Consultation for the Indian Ridge Cattle and Horse Allotment, Hughes Creek.

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

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

ODFW and WDFW, (Oregon Department Fish and Wildlife) (Washington Department of Fish and Wildlife), 2021. Joint Staff Report: Stock Status and Fisheries for Spring Chinook, Summer Chinook, Sockeye, Steelhead, and other Species. Joint Columbia River Management Staff. 107 pp.

Ohmart, R. D. and B. W. Anderson. 1982. North American desert riparian ecosystems. P. 433-466. In: G. L. Bender, ed., Reference Handbook on the Deserts of North America. Greenwood Press, Westport, Connecticut.

Parsons, C. T., P. A. Momont, T. Delcurto, M. McInnis, and M. L. Porath. 2003. Cattle distribution patterns and vegetation use in mountain riparian areas. Journal of Range Management. Volume 56: 334-341.

Peek, J. M. and P. D. Dalke. 1982. Wildlife - livestock relationships symposium; Proceedings 10. (ed). April 20-22, 1982, Coeur d'Alene, Idaho. Univ. of Idaho Forest, Wildlife, and Range Experiment Station. Moscow, Idaho.

Pelster, A. J., S. Evans, W. C. Leininger, M. J. Trlica, and W. P. Clary. 2004. Steer diets in a montane riparian community. Journal of range management. 57: 546-552.

Platts, W. S. 1981. Influence of forest and rangeland management on anadromous fish habitat in western North America -effects of livestock grazing. USDA Forest Service Gen. Technical Report PNW-124. 25 p.

Platts, W. S and R. L. Nelson. 1989. Stream Canopy and its relation to salmonid biomass in the Intermountain West. North American Journal of Fisheries Management 9:446-457.

Powell, G. W., K. J. Cameron, and R. F. Newman. 2000. Analysis of livestock use of riparian areas: literature review and research needs assessment for British Columbia. Res. Br., B.C. Min. For., Victoria, B.C. Work. Pap. 52/2000. http://www.for.gov.bc.ca/hfd/pubs/docs/wp/wp.htm.

Quinn, T. P. 2005. The Behavior and Ecology of Pacific Salmon & Trout. University of Washington Press.

Roberts, B. C. and R. G. White. 1992. Effects of angler wading on survival of trout eggs and pre-emergent fry. North American Journal of Fisheries Management 12:450–459.

Roper, B. B. 2016. Setting stubble height standards for riparian areas grazed by cattle in areas with Endangered Species Act listed or sensitive salmon and trout species. National Stream and Aquatic Center, USDA Forest Service. 7pp.

Saunders, W. C. and K. D. Fausch. 2007. Improved Grazing Management Increases Terrestrial Invertebrate Inputs that Feed Trout in Wyoming Rangeland Streams. Transactions of the American Fisheries Society 2007; 136: 1216-1230.

Saunders, W. C. and K. D. Fausch. 2009. A Field Test of Effects of Livestock Grazing Regimes on Invertebrate Food Webs that Support Trout in Central Rocky Mountain Streams. Department of Fish, Wildlife, and Conservation Biology Colorado State University Fort Collins, CO. September 2009.

Scheuerell, M. D. and J. G. Williams. 2005. Forecasting climate-induced changes in the survival of Snake River spring/summer Chinook salmon (*Oncorhynchus tshawytscha*). Fisheries Oceanography 14:448-457.

Stowell, R., A. Espinosa, T. C. Bjornn, W. S. Platts, D. C. Burns, and J. S. Irving. 1983. Guide for Predicting Salmonid Response to Sediment Yields in Idaho Batholith Watersheds. August 1983.

University of Idaho Stubble Height Review Team. 2004. University of Idaho Stubble Height Study Report. Submitted to Idaho State Director BLM and Regional Forester Region 4, U.S. Forest Service. University of Idaho Forest, Wildlife and Range Experiment Station Moscow, ID. 33p.

USDA-FS (United States Department of Agriculture-Forest Service). 1995. Goals, objectives, and standard and guidelines as described in the EA and subsequent FONSI and DN and DR for the Interim Strategies for Managing Anadromous Fish Producing Watersheds on Federal Lands in eastern Oregon, Washington, Idaho, and Portions of California, PACFISH (February 24, 1995).

USBWP (Upper Salmon Basin Watershed Project Technical Team). 2005. Upper Salmon River Recommended Instream Work Windows and Fish Periodicity. For River Reaches and Tributaries Above the Middle Fork Salmon River Including the Middle Fork Salmon River Drainage. Revised November 30, 2005.

USFS (U.S. Forest Service). 2022. Aquatic Species Biological Assessment for the Indian Ridge Cattle & Horse Allotment. North Fork Ranger District, Salmon-Challis National Forest, Lemhi County, Idaho. January 2022.

USFWS (U.S. Fish and Wildlife Service). 1998. Proceedings of the Lower Snake River Compensation Plan Status Review Symposium. Boise Idaho. February 3-5, 1998. Compiled by USFWS, LSRCP Office, Boise ID.

Wainwright, T. C. and L. A. Weitkamp. 2013. Effects of Climate Change on Oregon Coast Coho Salmon: Habitat and Life-Cycle Interactions. Northwest Science 87(3):219-242.

Walters. A. W., K. K. Bartz, and M. M. McClure. 2013. Interactive effects of water diversion and climate change for juvenile Chinook salmon in the Lemhi River Basin. Conservation Biology, December 2013.

Williams, M. 2020. Geomean data sheet with five year averages for Interior salmon and steelhead populations (UCR and MCR steelhead, Chinook, SR steelhead, sockeye, fall Chinook). Communication to L. Krasnow (NMFS) from M. Williams (NOAA Affiliate, NWFSC), 2/14/2020.

Winward, A. H. 2000. Monitoring the vegetation resources in riparian areas. General Technical Report RMRS-GTR-47. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 49 pp.

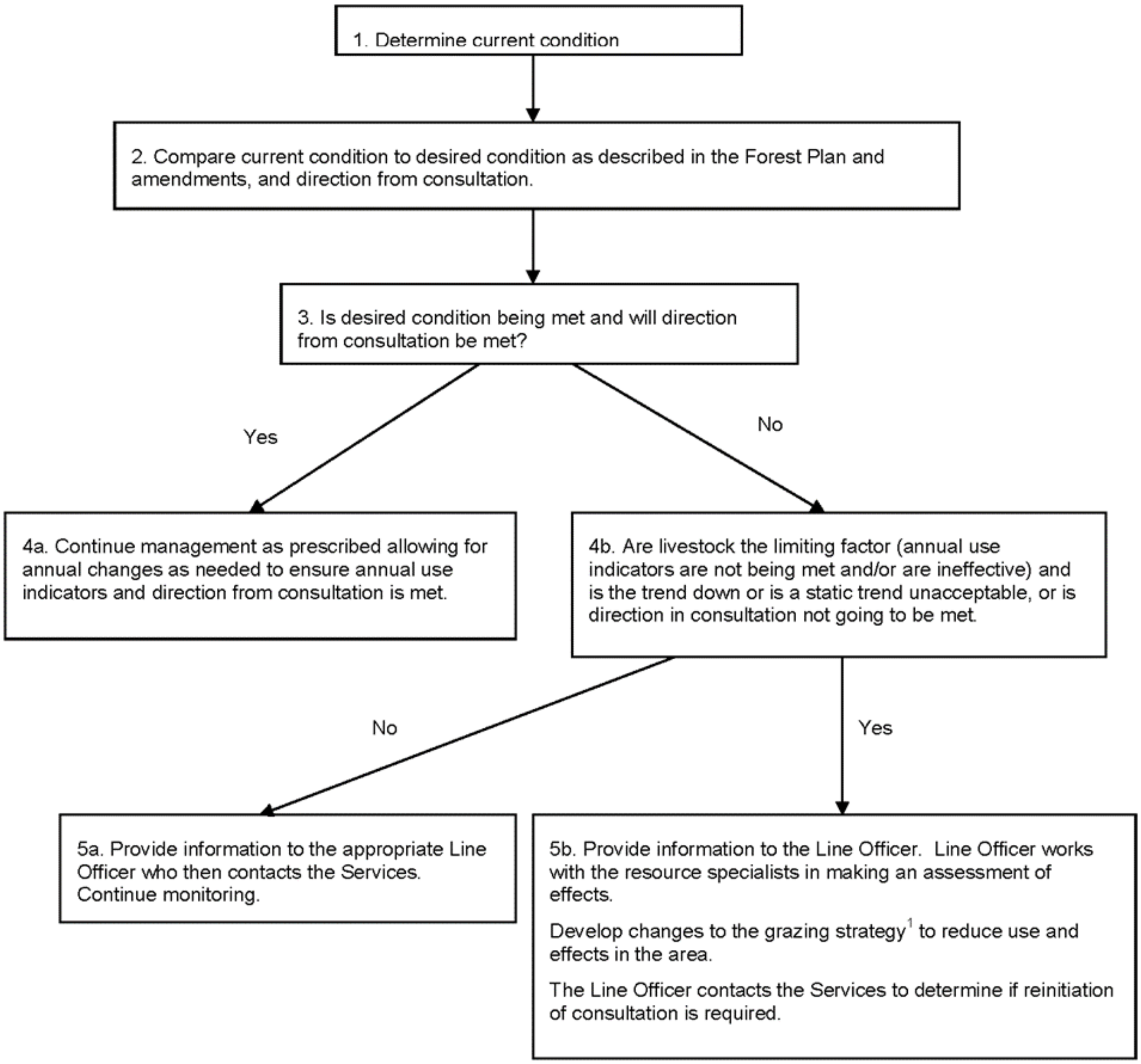
Wyman, S., D. Bailey, M. Borman, S. Cote, J. Eisner, W. Elmore, B. Leinard, F. Reed, S. Swanson, L. Van Riper, T. Westfall, R. Wiley, and A. H. Winward. 2006. Riparian area management: grazing management processes and strategies for riparian-wetland areas. U.S. Department of the Interior, Bureau of Land Management, National Science and Technology Center, Technical Reference 1737-20. BLM/ST/ST-06/002+1737, Denver, Colorado

Zabel, R. W., M. D. Scheuerell, M. M. McClure, and J. G. Williams. 2006. The interplay between climate variability and density dependence in the population viability of Chinook salmon. Conservation Biology 20:190-200.

Zoellick, B. W. 2004. Density and biomass of redband trout relative to stream shading and temperature in southwestern Idaho. Western North American Naturalist. 64(1). pp. 18-26.

5. Appendix A

Diagram 1.0 – Implementation of Long-Term Adaptive Management Strategy for Allotments Requiring Consultation.



[1]Management actions will initially reduce use in the area. It is expected this may occur in any number of ways including but not limited to changing the season of use, reducing numbers, changing amount of use on annual indicator, changing herding practices, changing salting practices and/or reconstructing/constructing range improvements. If use can't be reduced and livestock continue to be the limiting factor total removal of livestock from the area may be necessary. Effectiveness of changed management will be monitored through adjusted annual use indicators and effectiveness monitoring.

Diagram 2.0 – Implementation of Annual Adaptive Management Strategy for Allotments Requiring Consultation.

1. The appropriate annual use indicator is indicated in the Proposed Action. The subsequent Biological Opinion or Letter of Concurrence direct the grazing management. Monitor as required through consultation.

2. Is the annual use indicator being achieved and is direction from consultation being met?

Yes

No

3a. Continue current management and monitoring, following the direction from consultation.

3b. Determine why the annual use indicator or other direction from consultation is not being met, including discussing issue with permittee. Is the failure outside the permittee's control, for example: a grazing design problem, a changed condition outside the control of the permittee, or inappropriate annual use indicator[1]? Review factors contributing to the failure.

Yes

No

4a. Assess if there were any effects to the resource. Develop adaptive management actions with permittee, fisheries biologist and rangeland management specialist for next year's grazing season to respond to the cause (e.g. oversight in design, inappropriate use indicator) and any effects to the resource.

4b. Assess if there were any effects to the resource. Relay findings – both the resource effects and failure within permittee control - to the permittee. Follow regional guidance regarding non-compliance. Change management as needed to address effects that occurred.

5. Contact the line officer with a recommendation for change(s) to occur next grazing seaon. Line officer will work with biologist and rangeland management specialist in verifying whether effects are outside direction from consultation.

6. Line Officer contacts the Services to update them on the situation.

[1] An inappropriate annual use indicator is an indicator that does not most accurately identify the weak link or first attribute that would indicate excessive livestock impacts. In this situation, reviewing the monitoring location and/or changing to a more appropriate indicator will help achieve tor maintain desired conditions