UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
West Coast Region
1201 NE Lloyd Boulevard, Suite 1100
PORTLAND, OREGON 97232

Refer to NMFS No.: WCRO-2020-00479

https://doi.org/10.25923/pkn2-3g71

June 25, 2020

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

Re: Endangered Species Act Section 7 Formal Consultation and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Consultation for the Ongoing Grazing Actions on the Forney Allotment: Panther Creek-Porphyry Creek - 170602030903; Musgrove Creek - 170602030904; Moyer Creek - 170602030905; Panther Creek-Porphyry Creek - 170602030903; Panther Creek-Cabin Creek - 170602030902, Lemhi County, Idaho (One project)

Dear Mr. Mark:

Thank you for your letter of February 24, 2020, requesting initiation of consultation with NOAA's National Marine Fisheries Service (NMFS) pursuant to section 7 of the Endangered Species Act of 1973 (ESA) (16 U.S.C. 1531 et seq.) for the Forney Grazing Allotment. This consultation was conducted in accordance with the 2019 revised regulations that implement section 7 of the ESA (50 CFR 402, 84 FR 45016).

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 "not likely to adversely affect" determination for 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.

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 nondiscretionary terms and conditions, including reporting requirements, that the Salmon-Challis National Forest, 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.
NMFS also reviewed the proposed action for potential effects on essential fish habitat (EFH) designated under the Magnuson-Stevens Fishery Conservation and Management Act (MSA),

including conservation measures and any determination you made regarding the potential effects of the action. This review was pursuant to section 305(b) of the MSA, implementing regulations at 50 CFR 600.920, and agency guidance for use of the ESA consultation process to complete EFH consultation. In this case, NMFS concluded the action would not adversely affect EFH. Thus, consultation under the MSA is not required for this action.

Please contact Kimberly Murphy**,** consulting biologist**,** in the Southern Snake Branch of the Snake Basin Office at (208) 756-5180 or at kimberly.murphy@noaa.gov, if you have any questions concerning this consultation, or if you require additional information.

Sincerely,

Michael Tehan
Assistant Regional Administrator
Interior Columbia Basin Office

Enclosure

cc: T. Ford – SCNF
K. Krieger – SCNF
S. Fisher – USFWS
C. Colter – SBT

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

Forney Grazing Allotment

NMFS Consultation Number: 2020-00479

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 steelhead (*Oncorhynchus mykiss*)	Threatened	Yes	No	No	No
Snake River spring/summer Chinook salmon (*Oncorhynchus tshawytscha*)	Threatened	Yes	No	No	No

Fishery Management Plan That Identifies EFH in the Project Area	Does Action Have an Adverse Effect on EFH?	Are EFH Conservation Recommendations Provided?
Pacific Coast Salmon	No	No

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

Issued By: Michael Tehan
Assistant Regional Administrator

Date: June 25, 2020

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ACRONYMS	DEFINITION
Allotment	Forney Grazing Allotment
AOI	Annual Operating Instructions
BA	Biological Assessment
DMA	Designated Monitoring Area
DPS	Distinct Population Segment
DQA	Data Quality Act
EFH	Essential Fish Habitat
ESA	Endangered Species Act
ESU	Evolutionarily Significant Units
FA	Functioning Appropriately
FR	Functioning at Risk
FUR	Functioning at Unacceptable Risk
GES	Greenline Ecological Status
GGW	Greenline-to-Greenline Width
HAPC	Habitat Areas of Particular Concern
HUC	Hydrologic Unit Code
ICTRT	Interior Columbia Technical Recovery Team
IDFG	Idaho Department of Fish and Game
ITS	Incidental Take Statement
MIM	Multiple Indicator Monitoring
MPI	Matrix of Pathways and Indicators
MSA	Magnuson-Stevens Fishery Conservation and Management Act
NMFS	National Marine Fisheries Service
Opinion	Biological Opinion
PBF	Physical or Biological Features
PCE	Primary Constituent Element
PFMC	Pacific Fishery Management Council
PNC	Potential Natural Community
RHCA	Riparian Habitat Conservation Areas
RMO	Riparian Management Objectives
RPM	Reasonable and Prudent Measures
SCNF	Salmon-Challis National Forest
SRKW	Southern Resident Killer Whale
USFWS	U.S. Fish and Wildlife Service
VSP	Viable Salmonid Population
W:D	Width:Depth

1. INTRODUCTION

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

1.1. Background

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

We also reviewed the proposed action for potential effects on essential fish habitat (EFH) consultation on the proposed action designated under the Magnuson-Stevens Fishery Conservation and Management Act (MSA), including conservation measures and any determination you made regarding the potential effects of the action. This review was pursuant to section 305(b) of the MSA, implementing regulations at 50 CFR 600.920, and agency guidance for use of the ESA consultation process to complete EFH consultation. In this case, NMFS concluded the action would not adversely affect EFH. Thus, consultation under the MSA is not required for this action.

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

1.2. Consultation History

On February 24, 2020, NMFS received a letter from the Salmon-Challis National Forest (SCNF) requesting ESA consultation on the effects of authorizing proposed grazing activities on the Forney Allotment (Allotment). The biological assessment (BA) (USFS 2020) accompanying that letter described proposed livestock grazing activities, the environmental baseline, and the potential effects of those activities on Snake River spring/summer Chinook salmon, Snake River Basin steelhead, and their designated critical habitats. In the BA, the SCNF determined that the proposed action "may affect," and is "likely to adversely affect" Snake River spring/summer Chinook salmon and Snake River Basin steelhead. The SCNF has also determined that the action may affect," but is "not likely to adversely affect" designated critical habitat for these species.

The draft BA for the Forney Grazing Allotment was submitted to the Level 1 Team for review on December 3, 2019. NMFS provided comments to the SCNF on the draft BA on December 17, 2019, and discussed comments on the BA at the December 18, 2019, Level 1 meeting. The SCNF indicated that they would address all NMFS comments and submit another draft BA for additional review. A second draft BA was submitted on January 28, 2020. NMFS provided

comments on the draft BA to the SCNF on February 3, 2020. On February 21, 2020, NMFS and the SCNF met to discuss the draft BA. 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 February 24, 2020. NMFS shared the draft proposed action and proposed conservation measures with the SCNF on May 21, 2020. The SCNF suggested revisions to the draft Opinion on June 12, 2020.

Although the SCNF did not make ESA determinations for Southern Resident killer whales (SRKW) (*Orcinus orca*) and their critical habitat[1], NMFS' review of the action's effects on Chinook salmon and steelhead identified potential impacts on the prey availability for the whales. For this reason, and in accordance with NMFS' guidance on marine mammal consultations (Stelle 2013), this document also provides an analysis of effects, concluding with a determination of "may affect, not likely to adversely affect" for SRKW and their critical habitat (Section 2.12).

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 terms and conditions were sent to the Shoshone-Bannock Tribes on May 21, 2020, with a request for comments. NMFS did not receive any response.

1.3. Proposed Federal Action

"Action" means all activities or programs of any kind authorized, funded, or carried out, in whole or in part, by federal agencies (50 CFR 402.02). For purposes of this consultation, the proposed action involves the permitting of livestock grazing on 33,338 acres of SCNF system lands that comprise the Allotment (USFS 2020). This Allotment is located on the Salmon-Cobalt Ranger District in the Upper Panther Creek (1706020309) and Lower Camas Creek (1072060203) 5th field hydrologic unit codes (HUC) in Lemhi County, Idaho. HUC # 1072060203 does not contain any ESA-listed fish or designated critical habitat in the area of grazing activities.

The SCNF currently authorizes two permittees to annually graze up to 266 cow/calf pairs (1,330 Head Months) from June 1 through October 30. Under Forest Service Handbook direction, permittees can request an extension of the grazing season for up to two weeks outside of the permitted season. An extension will not be received more than four years in ten. Extensions will not occur twice in the same year, meaning that if a two-week extension is approved at the beginning of the grazing season, an extension cannot be approved for the end of that same grazing season. Because extensions can only be approved for the beginning or end of the grazing season, extensions will only occur in either the West Side Panther Unit or the East Side Panther Unit as these are the only Units where livestock begin or end the grazing season. Extensions will not occur in the Moyer Creek Unit. Should an extension occur in the East Side Panther Unit at the beginning or end of the grazing season, a combination of drift fences and

[1] The SRKW were listed as endangered on November 18, 2005 (70 FR 69903); critical habitat was designated on November 29, 2006 (71 FR 69054).

topography prevent livestock access into the Moyer Creek Unit. Extensions will not be used to graze the Holding Pasture, as the window of time when the Holding Pasture can be used in conjunction with either the East Side Panther Unit or the West Side Panther Unit does not occur at the beginning or end of the grazing season.

This consultation covers the proposed 15-year grazing period from the completion of signed Opinion through the end of the 2034 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 (see Section 2.11) (50 CFR 402.16).

In order to streamline our Opinion, and focus our analysis on elements of the action that directly relate to ESA-listed anadromous fish and their designated critical habitats, a synopsis of relevant portions of the BA have been included or incorporated by reference. Please reference the BA (USFS 2020) for a complete description of the proposed action.

1.3.1 Grazing System

A deferred rotation grazing system will be used on this Allotment (Table 1). The Allotment is comprised of 5 Units (or Pastures). East Side Panther, Moyer Creek (managed as a subunit of the East Side Panther Unit), West Side Panther, Holding Pasture, and the Panther Creek Riparian Pasture (Figure 1). Typically, the Unit grazed last will be the first Unit grazed the following season. The Holding Pasture may be used in conjunction with the East Side or West Side Panther Units, depending on rotation, between July 14 and August 18 each year. Weaning typically occurs between September 1 and September 15, but has occurred as early as mid-August. The Holding Pasture will only be used in conjunction with one Unit or the other annually; for example, if the Holding Pasture is grazed in conjunction with the West Side Panther Unit, it will not be used again with the East Side Unit. Grazing is not authorized in the Panther Creek Riparian Pasture.

The East Side Panther and Moyer Creek Units are managed partially in conjunction as Moyer Creek itself serves as the boundary between the two Units. Livestock graze in the Moyer Creek Unit and the East Side Panther Unit prior to September 15. After September 15, livestock are moved out of the Moyer Creek Unit into the East Side Panther Unit and a combination of drift fences and topography prevent livestock access to Moyer Creek. After September 15, livestock graze in the East Side Panther Unit until their authorized off-date for that year's rotation unless an extension is granted.

Range readiness (i.e., bluebunch wheatgrass in the first boot stage or the appearance of Idaho fescue flowerstalks) 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 will drive

when unit moves or the off-date occurs. Permittees are responsible for moving livestock to meet annual use indicators.

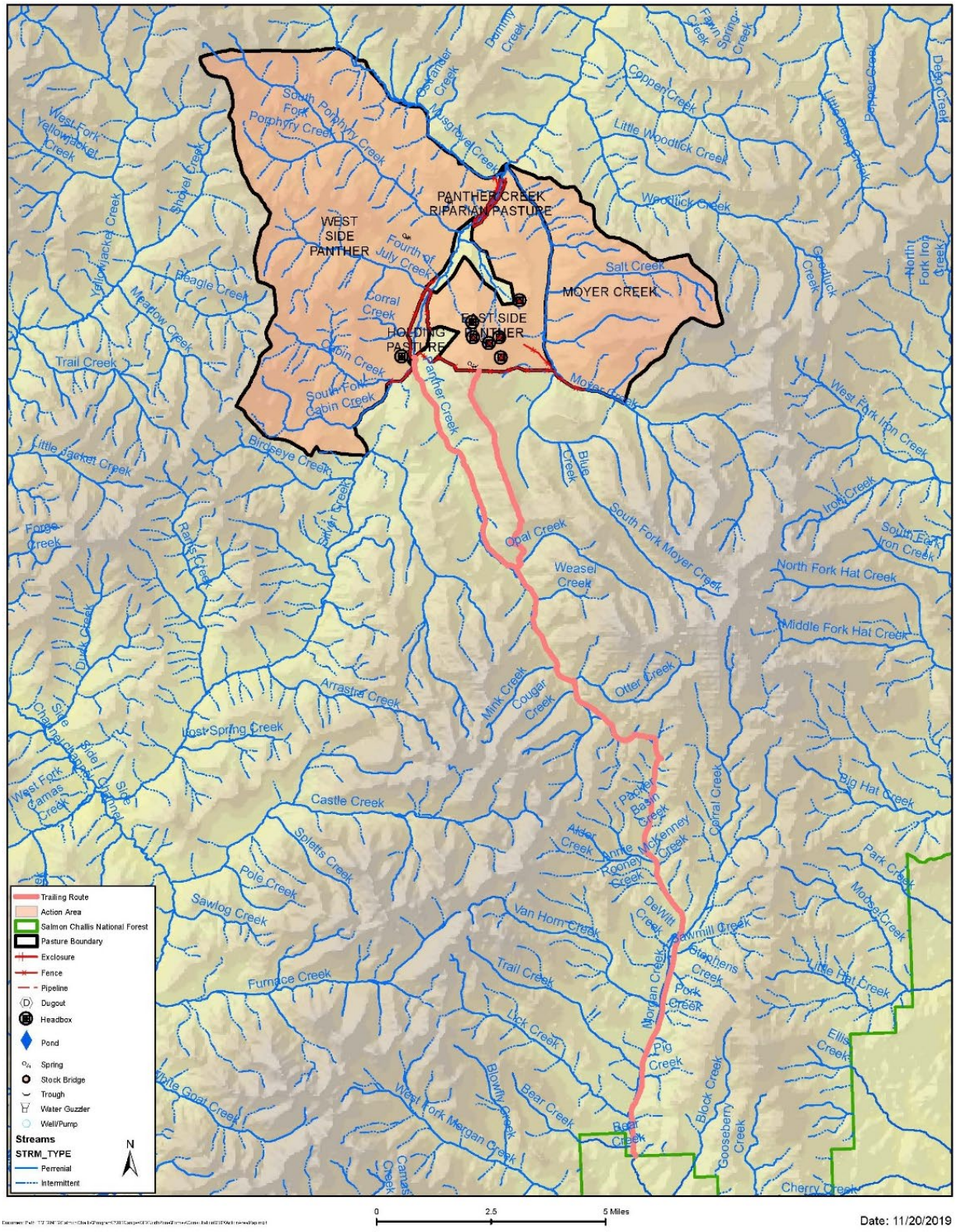


Figure 1. Forney Allotment Action Area

Table 1. Unit Rotations (Figure 1 identifies Unit locations)

Year 1	Year 2
West Side Panther Unit – 28 avg. use days up to 266 pair	East Side Panther – 92 avg. use days up to 134 pair, and Moyer Creek Unit – 92 avg. use days up to 132 pair
Holding Pasture (July 14 – August 18)*	Holding Pasture (July 14 – August 18)*
East Side Panther – 61 avg. use days up to 134 pair, and Moyer Creek Unit 61 avg. use days up to 132 pair	West Side Panther Unit (Weaning) – 14 avg. use days
West Side Panther Unit (Weaning) – 14 avg. use days	East Side Panther Unit – 21 avg. use days up to 266 head
East Side Panther Unit – 41 avg. use days up to 266 head	Westside Panther Unit – 28 avg. use days up to 266 head
Riparian Pasture (Not Grazed)	Riparian Pasture (Not Grazed)

*The Holding Pasture will only be used in conjunction with either the West Side Panther Unit or the East Side Panther Unit every year, but not both Units in one year.

1.3.1.1 Entry/Exit off the Allotment

Entry

Year 1: One permittee actively trails livestock over Morgan Creek Summit onto the Allotment via the Forest Service (FS) Morgan Creek/Panther Creek Road #055 (FS Road #055) entering the West Side Panther Creek Unit near Cabin Creek (Figure 1). Trailing of livestock during entry and exit to the Allotment occurs over the course of approximately five days. Livestock will not cross the Cabin Creek stream channel during this entry. Another permittee trucks livestock onto the Allotment via FS RD #055. Livestock are unloaded on the West Side Panther Unit.

Year 2: Livestock will be trailed on FS Road #055 to FS Trails 6032 and 6035 near Opal Creek, trailing directly into the East Side Panther Unit (Figure 1). Livestock are actively trailed along this route and may overnight near the crossing on Opal Creek until entry onto the Allotment the following day. Another permittee trucks livestock onto the Allotment via FS Road #055 and unloads them in the West Side Panther Unit, then trails the livestock across a designated Panther Creek crossing to access the East Side Panther Unit.

Exit

Year 1: When exiting the Allotment, one permittee's livestock will be trailed out from the East Side Panther Unit by FS Trail 6035 and 6032and then they are trailed home via FS Road #055 (Figure 1). Another permittee trails cattle out of the East Side Panther Unit, across a designated Panther Creek crossing location, into the West Side Panther Unit where cattle are loaded and hauled off of the Allotment.

Year 2: When exiting the Allotment, one permittee's livestock will be trailed out of the West Side Panther Unit to FS #055 (Figure 1). The other permittee gathers livestock and hauls them off the Allotment from the West Side Unit.

Streams that have the potential to be crossed during the exit off the Allotment include: Panther Creek, Porphyry Creek, Fourth of July Creek, and Opal Creek (Figure 1). The specific streams crossed in any year are based on the location of livestock in the last Unit being grazed. Exit off the Allotment is similar to the moves between Units; supervised trailing occurs in large bunches at first and progressively smaller groups over the following days. Opal Creek is the only stream crossed during trailing on and off the Allotment that is in the action area but not within the Allotment boundary.

1.3.1.2 Unit Movements

Stream crossings are necessary for moving livestock between Units. Stream crossings are typically made over the course of one or two days, with the bulk of the herd typically crossing streams with riders (supervised trailing). Following or preceding this, several smaller groups may cross depending on the location of the cows, number of riders, weather, terrain, and any number of other factors. Back riding to pick up animals that were not gathered during the move date would also occur, with subsequent crossings of these smaller groups. It is up to the permittee to gather the last livestock and move them so as to meet annual use indicators.

- During moves before July 14th (steelhead incubation), streams that may be crossed include: Panther Creek on identified stream crossings in the Holding Pasture (Figure 2), Porphyry Creek, Cabin Creek, and Moyer Creek.

- During moves after August 18th (Chinook incubation), streams that may be crossed during Unit moves include: Panther Creek on identified stream crossings in the Holding Pasture (Figure 2), Porphyry Creek, and Moyer Creek.

1.3.1.3 Designated Stream Crossings

As described in the BA (USFS 2020), there are four designated stream crossings through Panther Creek (Figure 2), three in the Holding Pasture, and one in the Riparian Pasture. In the Riparian Pasture, livestock will cross Panther Creek at a location near the upstream boundary of the pasture and depending on Unit rotation, enter the West Side Panther Unit between Musgrove Creek and Porphyry Creek or enter the East Side Panther Unit near Sawmill Gulch. One of the crossings in the Holding Pasture is located approximately 0.70 miles upstream from the lower boundary of the Holding Pasture, between Corral Creek and Fourth of July Creek, and between McGowan Basin and Treloar Gulch. Another designated crossing in the Holding Pasture is located mid-unit on an undeveloped road. This road is not designated as an authorized route in the SCNF Travel Plan, but provides access to private inholdings in McGowan Basin. This route has had a Motor Vehicle Use Permit (MVUP) issued for multiple years to allow residents of the private inholdings access. This route, and the designated crossing associated with it, crosses Panther Creek between Corral Creek and McGowan Basin. A third crossing is located approximately 0.10 miles downstream from the upper boundary of the Holding Pasture. This location at one time had a bridge across the creek, but the bridge is no longer in place.

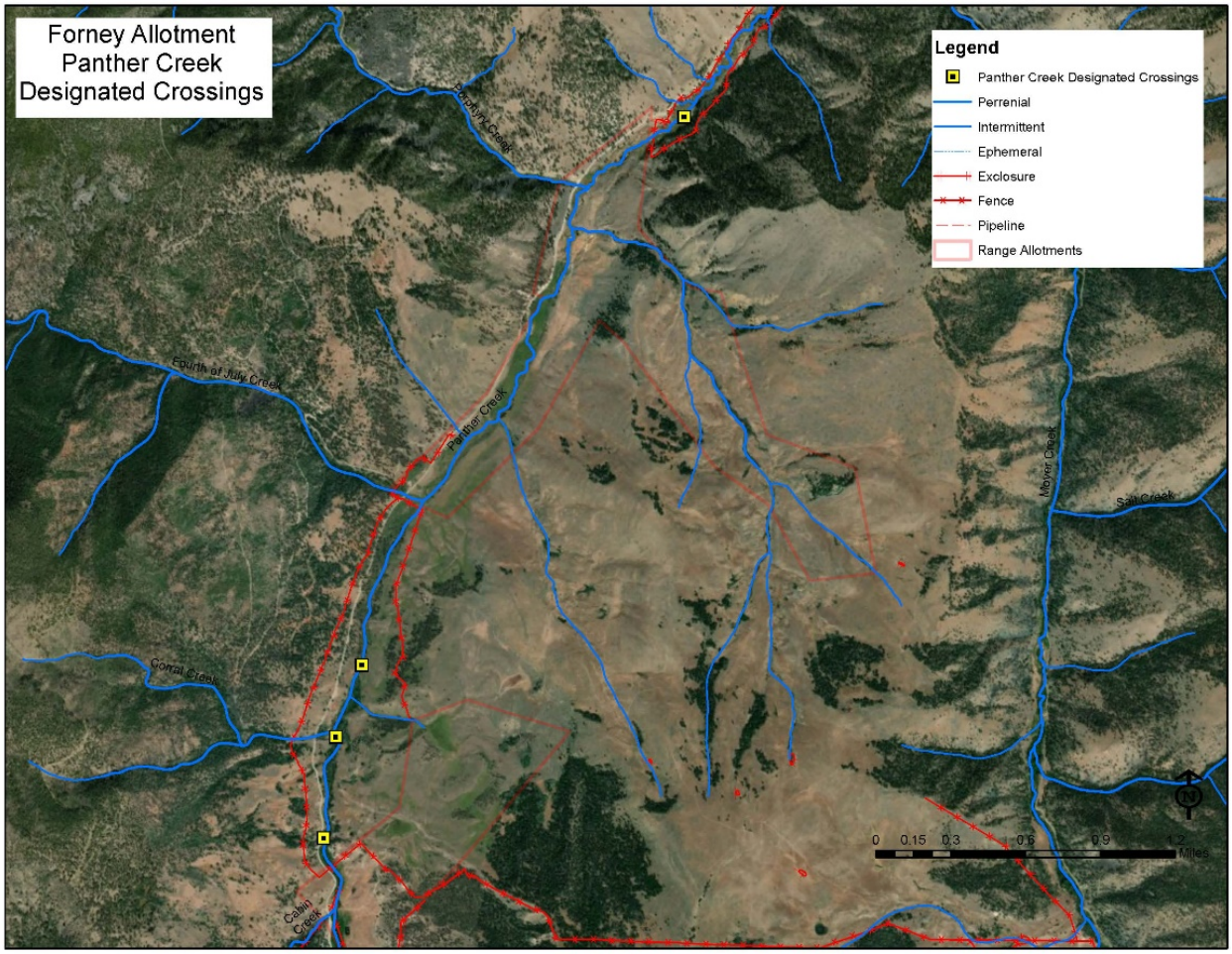


Figure 2. Panther Creek Designated Crossings

1.3.2 Conservation Measures

In addition to the actions described above, the SCNF indicated the following measures will be implemented as part of the Forney's Allotment's annual operating instructions (AOI) to avoid and reduce potential impacts to ESA-listed fish:

1. The Forest will follow the Communication Plan – Implementing Livestock Grazing Consultation on the SCNF (Appendix F of the BA). The Communication Plan could be updated to better address livestock grazing management both within the FS and between the FS, NMFS, and the U.S. Fish and Wildlife Service (USFWS). The desired outcome of this Communication Plan is to conduct livestock grazing within the scope of this BA and subsequent Opinion while being consistent and timely in communication when something is observed to the contrary.

2. When cattle are grazing along Moyer Creek prior to July 14, or along Musgrove, Moyer or Porphyry Creeks after August 18, riding will occur at least twice per week.

3. When cattle are grazing along Moyer Creek after August 18, and five or more Chinook redds have been observed in Moyer Creek above Salt Creek, riding will occur at least three times per week in the Moyer Creek Unit.

4. A deferred rotation grazing system will continue to be used to provide benefits to riparian vegetation and help meet long-term riparian resource objectives for greenline successional status.

5. Livestock grazing will not be authorized within the Riparian Pasture. The Riparian Pasture encompasses approximately 1.25 miles of spawning and rearing habitat for Chinook salmon, steelhead, and bull trout in Panther Creek. The permittees, as described in their permit, are responsible for maintenance of the fences so as to exclude livestock grazing. On infrequent to rare occasion livestock may find a way into the Riparian Pasture. Any livestock found in the Riparian Pasture will be promptly removed by the permittee, and management will address the reasons within their control that allowed livestock to enter (e.g., ongoing fence maintenance). The Communication Plan will be implemented upon all livestock entries into the Riparian Pasture before July 14 and after August 15.

6. The on-date may be varied, if necessary, so that livestock will be placed on the Allotment at range readiness.

7. Livestock moves between units and off the allotment are made so as to meet annual use indicators.

8. Permittees will continue to salt at least one-fourth mile away from streams.

9. Permittees will continue to distribute livestock away from perennial streams and associated riparian areas with regular riding.

10. Permittees will maintain the improvements in accordance with the term grazing permit.

11. Riders will take all practicable measures to keep cattle on established ford crossings during trailing operations between units and off the Allotment.

12. As required, annual Chinook redd survey monitoring will continue on the Allotment. Chinook redd surveys will be conducted weekly when livestock are present.

13. The Allotment will continue to be monitored using implementation and effectiveness monitoring described in Section 3.9 of the BA, and results of all monitoring will be provided to NMFS and the USFWS by March 1st of the following year.

1.3.3 Changes from Existing Management

This proposed action includes the following changes from the management described in the May 29, 2012, BA:

1. Fences along the boundary of the Riparian Pasture and the East Side Panther Unit were constructed in 2014. This Riparian Pasture is now entirely fenced off from livestock access and grazing is not authorized along approximately 1.25 miles of spawning and rearing habitat for Chinook salmon and steelhead in Panther Creek.

2. An additional designated stream crossing has been identified in the Riparian Pasture across Panther Creek in the upper one-third of the Unit. This crossing allows more efficient movement of livestock into and out of the East Side Panther and West Side Panther Units as well as reduces livestock trailing along the Panther Creek Road in route to the established crossings in the Holding Pasture. This crossing will be used between July 14 and August 18 to avoid crossing during incubation and spawning periods. Crossing will occur with small groups of cattle, typically less than 20 head, which will be actively trailed.

3. The Holding Pasture may be used in conjunction with the East Side or West Side Panther Units between July 14 and August 18. The Holding Pasture will not be used in more than one configuration any given year. For example, if the Holding Pasture is grazed in conjunction with the West Side Panther Unit it will not be used with East Side Panther Unit. Livestock will not be actively moved into the Holding Pasture, rather, gates will be opened allowing those livestock that wish to drift into the Holding Pasture the ability to do so. Regular riding will be utilized to distribute livestock away from perennial streams and associated riparian areas. The multiple indicator monitoring (MIM) site in the Holding Pasture, M402, will be monitored for annual indicators each year that the Holding Pasture is grazed. The greenline stubble indicator will initially be set at six inches, the browse use indicator will be 30% for single-stem species and 50% for multi-stem species, and the bank alteration indicator will be 15%. A long-term read will be completed after two grazing seasons to monitor any changes from the results of the most recent long-term monitoring completed in 2017, and adaptive management will be used to adjust indicators accordingly.

4. MIM site M221 on Porphyry Creek in the West Side Panther Unit was relocated in 2017 due to the establishment of a beaver dam at its original location. The MIM site on Porphyry Creek is now designated as M221A. Following the results of the long-term MIM read in 2017, short-term parameters for this designated monitoring area (DMA) will be a greenline stubble height of four inches, a bank alteration limit of 20% and a woody species use indicator of 50% on multi-stem and 30% on single-stem species.

5. MIM site M231 on Fourth of July Creek in the West Side Panther Unit had an established bank alteration indicator of 15% in the 2012 Forney Allotment BA. Following the results of the 2017 long-term MIM read, short-term parameters for this DMA will be a greenline stubble height of four inches, a bank alteration limit of 20%, and a woody species use indicator of 50% on multi-stem and 30% on single-stem species.

6. The annual use indicator for browse use at all MIM sites has changed from 50% for all woody species to 50% for multi-stem and 30% for single-stem species.

7. An extension can be authorized 4 years out of 10. See section 1.3 for extension information.

8. Trailing on and off the Allotment has been added to the analysis area (Figure 1) and described in the proposed action.

1.3.4 Improvements

New Improvements: No new improvements have been proposed at this time.

Existing improvements: Existing improvements include fences, off-channel ponds, and troughs with associated headboxes and pipelines. These improvements 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.

1.3.5 Resource Objectives, Management Standards, and Annual Use Indicators

1.3.5.1 Resource Objectives

The Allotment is being managed to achieve the following resource conditions in riparian areas. 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 within riparian areas in the allotment. Some resource objectives are Riparian Management Objectives (RMOs) from PACFISH and its corresponding Biological Opinion (NMFS 1995). PACFISH is an interim strategy for managing anadromous fish-producing watersheds that was amended into the Salmon and Challis Forest Plans in 1995.

Effectiveness monitoring for resource objectives will be monitored at a minimum of every 5 years at DMAs using the MIM technical reference 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 online.

- Greenline Successional Status: A greenline successional status value of at least 61 (late seral) (Winward 2000; Burton et al. 2011).

- Woody Species Regeneration: Sufficient woody recruitment to develop and maintain healthy woody plant populations. A stable trend at sites with desired condition and an upward trend at sites not at desired condition (Winward 2000; Burton et al. 2011).

- Streambank Stability: Outside priority watersheds, a bank stability of at least 80 percent or the current value, whichever is greatest (USDA 1995). The Forney Allotment is outside a priority watershed.

- Width to Depth Ratio (W:D) (USDA 1995). <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: No measureable increase in maximum water temperature (7-day moving average of daily maximum temperature measured as the average of the maximum daily temperature of the warmest consecutive 7-day period); <64°F in (Chinook, steelhead) migration and rearing areas, and <60°F in spawning areas except in steelhead priority watersheds with a <45°F in spawning area (NMFS PACFISH BO 1998).

- Sediment: <20 percent surface fine sediment, which is substrate <0.25-inch (6.4 millimeter) in diameter in spawning habitat, or <30 percent cobble embeddedness in rearing habitat.

1.3.5.2 Management Standards (PACFISH)

The following PACFISH Resource Standards will be applied to management of the Allotment:

- 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 RMOs [Riparian Management Objectives] 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.

- 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.

1.3.5.3 Annual Grazing 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 greenline ecological status, 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 Section 1.3.5.5 Adaptive Management, the available data including results from implementation and effectiveness monitoring, and the professional experience of FS 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).

The Table 2 annual use indicators will be used until the next effectiveness monitoring for greenline ecological status, woody regeneration, and bank stability (Section 1.3.5.1) indicate adjustment is needed. Any adjustments to meet these three resource objectives directly affected by livestock grazing will be made using adaptive management (Section 1.3.5.5).

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.

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 may typically range from 5 to 7 inches. While the FS 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 is not reported. The stated direction in the term grazing permit(s) is for the permittees to ensure annual use indicators are met.

Monitoring Annual Use Indicators (Table 2) will be conducted using MIM protocol (Burton et al. 2011) or other best available science would be used to monitor grazing use. 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 (USDI Bureau of Land Management 1999). Season-end annual

use indicators will be monitored by FS personnel or a person authorized by the FS. For further discussion of monitoring annual use see Section 1.3.5.4.

Table 2. Designated Monitoring Areas and Annual Use Indicators

Location	Unit – Stream	Monitoring Attribute	Key Species	Annual Use Indicator	Estimated Use Triggers
M402	Holding Pasture Panther Creek	Browse use	Woody spp.	50%/30%	45%/25%
		Greenline stubble	Hydric spp.	6 in.	7 in.
		Bank Alteration	N/A	15%	10%
M213	Moyer Creek Moyer Creek	Browse use	Woody spp.	50%/30%	45%/25%
		Greenline stubble	Hydric spp.	4 in.	5 in.
		Bank Alteration	N/A	20%	15%
M221A	West Side Panther Porphyry Creek	Browse use	Woody spp.	50%/30%	45%/25%
		Greenline stubble	Hydric spp.	4 in.	5 in.
		Bank Alteration	N/A	20%	15%
M231	West Side Panther Fourth of July Creek	Browse use	Woody spp.	50%/30%	45%/25%
		Greenline stubble	Hydric spp.	4 in.	5 in.
		Bank Alteration	N/A	20%	15%

1.3.5.4 Monitoring

Two types of monitoring will be applied to livestock grazing on the Allotment, implementation and effectiveness monitoring. Both qualitative and quantitative measurements will be taken during this effort.

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 allowed use 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 within 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 FS personnel or a person authorized by the FS.

Effectiveness (Long-Term) Monitoring. Effectiveness monitoring for greenline ecological status, woody regeneration, and bank stability will be conducted a minimum of every 5 years at DMAs using the MIM method or other best available science. DMAs are areas representative of grazing use and reflect 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 focus indicator is revised from a wetted width/depth measurement (range monitoring prior to 2010) and a bankfull width/depth metric

(watershed monitoring 1993–2016) to the greenline-to-greenline width measurement as described in the MIM protocol.

Fish Habitat Monitoring. Sediment (depth fines) and water temperature will be monitored at established long-term monitoring sites using established protocols at least twice every 10 years. These sites are not necessarily located at the DMAs.

Fish Population Monitoring. Fish population monitoring, which will include determining ESA-listed fish presence and density, will be conducted at long-term monitoring sites within the Allotment at least every five years. Annual Chinook salmon redd survey monitoring will continue on the Allotment as required.

Results from annual Opinion Monitoring Reports will be electronically emailed to the respective Regulatory Agency, or their offices, by March 1 each year.

1.3.5.5 Adaptive Management

The adaptive management strategy described below and depicted in Appendix A, Diagrams 1 (Long term) and 2 (Annual), is intended for allotments requiring consultation. The adaptive management strategy 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 (after consensus with the NMFS, USFWS, and SCNF); and (3) direction from ESA consultation with NMFS and 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 that 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 within the grazing season to ensure annual endpoint 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 F in 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 indicator values, the Forest has provided general guidelines for establishing the values. The recommendations that apply to this Allotment are:

- When the greenline ecological status is 61 or greater, the end of season average greenline stubble height annual use indicator will be four inches.

- When the greenline ecological status is less than 61, the end of season average greenline stubble height annual use indicator will be six 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.

- Non-priority watersheds, when bank stability is 80 percent or greater, the bank alteration annual use indicator will be 20 percent.

- Non-priority watersheds, when bank stability is 60 percent to 79 percent, the bank alteration annual use indicator will be 10 percent to 20 percent.

- In non-priority watersheds, when bank stability is less than 60 percent, the bank alteration annual use indicator will be 10 percent.

- Livestock grazing in the uplands and riparian areas will be limited to 50% use on key herbaceous species within representative use area of the Allotment during the grazing season.

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

The SCNF determined the proposed action is "not likely to adversely affect" Snake River spring/summer Chinook salmon and Snake River Basin steelhead designated critical habitats. The action is also "not likely to adversely affect" SRKW. Our concurrence with these determinations is documented in the "Not Likely to Adversely Affect" Determinations section (Section 2.12).

2.1 Analytical Approach

This Opinion includes a jeopardy analysis. The jeopardy analysis relies upon the regulatory definition of "jeopardize the continued existence of" a listed species, which is "to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species" (50 CFR402.02). Therefore, the jeopardy analysis considers both survival and recovery of the species.

The 2019 regulations define effects of the action using the term "consequences" (50 CFR 402.02). As explained in the preamble to the regulations (84 FR 44977), that definition does not change the scope of our analysis and in this opinion we use the terms "effects" and "consequences" interchangeably.

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

- Identify the rangewide status of the species and critical habitat likely to be adversely affected by the proposed action.
- Describe the environmental baseline in the action area.
- Evaluate the effects of the proposed action on both species and their habitat using an "exposure-response-risk" approach.
- Describe any cumulative effects in the action area.
- Integrate and synthesize the above factors by: (1) Reviewing the status of the species and critical habitat; and (2) adding the effects of the action, the environmental baseline, and cumulative effects to assess the risk that the proposed action poses to species and critical habitat.
- Reach a conclusion about whether species are jeopardized.
- If necessary, suggest a reasonable and prudent alternative (RPA) to the proposed action.

2.2 Rangewide Status of the Species

The status of Snake River Basin steelhead and Snake River spring/summer Chinook salmon (Chinook hereafter) is determined by the level of extinction risk the listed species face, based on parameters considered in documents such as the recovery plan, status reviews, and listing decisions. This informs the description of the species' likelihood of both survival and recovery. The species status section also helps inform the description of the species' current "reproduction, numbers, or distribution" as described in 59 CFR 402.02.

The Snake River Basin steelhead distinct population segment (DPS) is composed of 24 individual populations which spawn and rear in different watersheds across the Snake basin. The Snake River spring/summer Chinook evolutionarily significant unit (ESU) consists of 28 extant individual populations, three functionally extirpated populations, and one extirpated population. Having multiple viable populations makes a DPS less likely to become extinct from a single catastrophic event (ICBTRT 2007). NMFS expresses the status of a DPS in terms of the status and extinction risk of its individual populations, relying on McElhany et al.'s (2000) description of a viable salmonid population (VSP). The four parameters of a VSP are abundance, productivity, spatial structure, and diversity. The recovery plan for Snake River spring/summer Chinook salmon and steelhead (NMFS 2017) describes these four parameters in detail and the parameter values needed for persistence of individual populations and for recovery of the DPS/ESU.

Table 3 summarizes the status and available information on the Snake River Basin steelhead DPS and Chinook salmon ESU. The summaries are based on the detailed information on the status of individual populations, and the species as a whole provided by the ESA Recovery Plan for Snake River Spring/Summer Chinook Salmon & Snake River Basin Steelhead (NMFS 2017) and Status review update for Pacific salmon and steelhead listed under the Endangered Species Act: Pacific Northwest (NWFSC 2015). These two documents are incorporated by reference here. Although species' abundance has increased since the time of listing, most individual populations are not meeting recovery plan abundance and productivity targets and both species remain threatened with extinction.

The proposed action will occur in the Panther Creek watershed, a tributary to the Salmon River. For steelhead, the Panther Creek steelhead population, within the Salmon River Major Population Group (MPG), occupies this area.

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 (LGD), 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 & WDFW 2019). Since 2015, the numbers have declined steadily with only 10,592 natural-origin adult returns counted in 2019 (ODFW & WDFW 2020). Even with the recent decline, the 5-year geomean abundance for natural-origin adult returns was 19,400 in 2019 (ODFW & WDFW 2019) which is more than the number at listing and slightly greater than the 5-year geomean of 18,847 tabulated in the most recent status review (i.e., Ford 2011). The 2019 return remains low, with just 12,277 unclipped fish crossing LGD (FPC 2020).

Within the Allotment, steelhead have historically used mainstem Panther Creek, and tributary streams Moyer Creek and Musgrove Creek for spawning and rearing. Other streams within the

Allotment, including Porphyry Creek, Fourth of July Creek, and Cabin Creek, may provide additional seasonal rearing opportunities for juvenile steelhead in their lower reaches. Based upon gradient mapping, Porphyry Creek may additionally provide some potential spawning and rearing habitat for steelhead (USFS 2020). Juvenile steelhead have also been found in lower Cabin and lower Fourth of July Creeks. However, the small size of these two streams and generally unsuitable substrate materials provide little if any spawning habitat for adult steelhead (USFS 2020). Mainstem Panther Creek, Moyer Creek, Musgrove Creek, Porphyry Creek, and lower Cabin Creek have been designated as critical habitat for steelhead in the Panther Creek drainage. All other streams within areas that will be grazed do not contain listed fish or support designated or proposed critical habitat.

For Chinook salmon, the action occurs in and affects the Panther Creek population of the Upper Salmon River MPG. The historical Panther Creek Chinook salmon population was classified as "functionally extirpated" as a result of severely impaired water quality from mining operations that decimated the original stock by the 1950s (NMFS 2011). Therefore, the population does not have a specific recovery goal that it needs to achieve for the MPG to attain viability (NMFS 2017; NWFSC 2015). Since the last status review in 2015, observations of coastal ocean conditions suggest the 2015–2017 outmigrant year classes experienced below average ocean survival during a marine heatwave and its lingering effect, which led researchers to predict a corresponding drop in adult returns through 2019 (Werner et al. 2017). The negative impacts on juvenile salmonids associated with the marine heatwave had subsided by spring 2018, but other aspects of the ecosystem (e.g., temperatures below the 25 meter surface layer) had not returned to normal (Harvey et al. 2019). Recent adult counts at LGD reflect projections of poor marine survival. Adult spring/summer Chinook returns to LGD in 2017-2019 were just 22 percent to 32 percent of the 5-year geomean adult return for the 2009–2013 period, which was already very low compared to historical returns. At the time of the last 5-year status review (2015) natural spawner abundance in Panther Creek was not able to be determined due to insufficient data (NWFSC 2015).

Within the Allotment, Chinook salmon have historically used mainstem Panther Creek, and tributary streams Moyer Creek and Musgrove Creek for spawning and rearing. The majority of Chinook salmon spawning activity occurs in mainstem Panther Creek, but adult spawning has been documented in Moyer and lower Musgrove Creeks (USFS 2020). Other streams within the Allotment, including Porphyry Creek, Fourth of July Creek, and Cabin Creek, may provide additional seasonal rearing opportunities for juvenile salmon in their lower reaches. Based upon gradient mapping, Porphyry Creek may additionally provide some potential spawning habitat for Chinook salmon in its lower reaches, but spawning has not been documented in this stream (USFS 2020).

Table 3. Most recent listing classification and date, status summary (including recovery plan reference and most recent status review), and limiting factors for species considered in this Opinion

Species	Listing Status	Status Summary	Limiting Factors
Snake River Spring/summer Chinook Salmon	Threatened 6/28/05	This ESU comprises 28 extant and four extirpated populations, organized into five MPGs, none of which are meeting the viability goals laid out in the recovery plan (NMFS 2017a). All except one extant population (Chamberlin Creek) are at high risk of extinction (NWFSC 2015). Most populations will need to see increases in abundance and productivity in order for the ESU to recover. Several populations have a high proportion of hatchery-origin spawners—particularly in the Grande Ronde, Lower Snake, and South Fork Salmon MPGs—and diversity risk will also need to be lowered in multiple populations in order for the ESU to recover (NWFSC 2015). Overall adult returns have remained very low over the past 3 years (Nez Perce Tribe 2018; Nez Perce Tribe 2019), and the trend for the most recent 5 years (2014-2018) has been generally downward (ODFW and WDFW 2019).	• Adverse effects related to the mainstem Columbia and Snake River hydropower system and modifications to the species' migration corridor. • Degraded freshwater habitat, including altered streamflows and degraded water quality. • Harvest-related effects. • Predation in the migration corridor. • Potential effects from high proportion of hatchery fish on natural spawning grounds.
Snake River Basin Steelhead	Threatened 1/5/06	This DPS comprises 24 populations organized into five MPGs. Currently, five populations are tentatively rated at high risk of extinction, 17 populations are rated at moderate risk of extinction, one population is viable, and one population is highly viable. Four out of the five MPGs are not meeting the population viability goals laid out in the recovery plan (NMFS 2017a). In order for the species to recover, more populations will need to reach viable status through increases in abundance and productivity. Additionally, the relative proportion of hatchery fish spawning in natural spawning areas near major hatchery release sites remains uncertain and may need to be reduced (NWFSC 2015, most recent species status review). Since 2015, abundance has declined steadily with only 10,717 natural-origin adult returns counted in 2018 (ODFW & WDFW 2019).	• Adverse effects related to the mainstem Columbia and Snake River hydropower system and modifications to the species' migration corridor. • Genetic diversity effects from out-of-population hatchery releases. Potential effects from high proportion of hatchery fish on natural spawning grounds. • Degraded fresh water habitat. • Harvest-related effects, particularly B-run steelhead. • Predation in the migration corridor.

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

One factor affecting the ESA-listed species and critical habitat is climate change. Likely changes in temperature, precipitation, wind patterns, and sea-level height have implications for

survival of Snake River Basin steelhead and Snake River spring/summer Chinook salmon in both its freshwater and marine habitats. As the climate changes, air temperatures in the Pacific Northwest are expected to increase 2°C to 8°C by the 2080s (Mantua et al. 2009). While total precipitation changes are uncertain, increasing air temperature will result in more precipitation falling as rain rather than snow in watersheds across the basin (NMFS 2017). In general, these changes in air temperatures, river temperatures, and river flows are expected to cause changes in salmon and steelhead distribution, behavior, growth, and survival, although the magnitude of these changes remains unclear.

Climate change could affect Snake River Basin steelhead and Snake River spring/summer Chinook salmon in the following ways: (a) Winter flooding in transient and rainfall-dominated watersheds may reduce overwintering habitat for juveniles; (b) reduced summer and fall flows may reduce the quality and quantity of juvenile rearing habitat, strand fish, or make fish more susceptible to predation and disease; (c) timing of smolt migration may change due to a modified timing of the spring freshet; and (d) lethal water temperatures may occur in the mainstem river migration corridor or in holding tributaries resulting in higher mortality rates (NMFS 2017).

Climate factors will likely make it more challenging to increase abundance and recover the species by reducing the suitable rearing areas and leading to a more limited run timing under warmer future conditions. This possibility reinforces the importance of achieving survival improvements throughout the species' entire life cycle, and across different populations since neighboring populations with different habitat may respond differently to climate change. Existing well-connected, high-elevation habitats on public lands will be important to supporting salmon and steelhead survival and recovery as the climate continues to warm (Martin and Glick 2008).

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). For purposes of this consultation, the Forney action area is defined as the Allotment boundary and trailing routes on and off the Allotment (Figure 1).

The action area is used by all freshwater life history stages of threatened Snake River spring/summer Chinook salmon and Snake River Basin steelhead. Streams within the action area are designated critical habitat for Snake River spring/summer Chinook salmon and Snake River Basin steelhead. Designated critical habitat for the Snake River spring/summer Chinook salmon includes all river reaches presently or historically accessible to the species (64 FR 57399) as well as the adjacent 300-foot-wide riparian zone in these reaches. Designated critical habitat for Snake River Basin steelhead includes specific reaches of streams and rivers, as published in the Federal Register (70 FR 52630). The action area, except for areas above natural barriers to fish passage, is also EFH for Chinook salmon (PFMC 1998), and is in an area where environmental effects of the proposed project may adversely affect EFH for this species. The entire Forney Allotment is not within a priority watershed for Snake River spring/summer Chinook salmon and Snake River Basin steelhead (Figure 3). The ESA-listed fish (Snake River spring/summer Chinook salmon, Snake River Basin steelhead) bearing streams within the Forney Allotment action area include: Panther, Moyer, Musgrove Creek, Porphyry, Fourth of July, and

Cabin Creeks. However, only a portion of these cumulative stream miles are occupied by Chinook salmon and steelhead assessed in this Opinion.

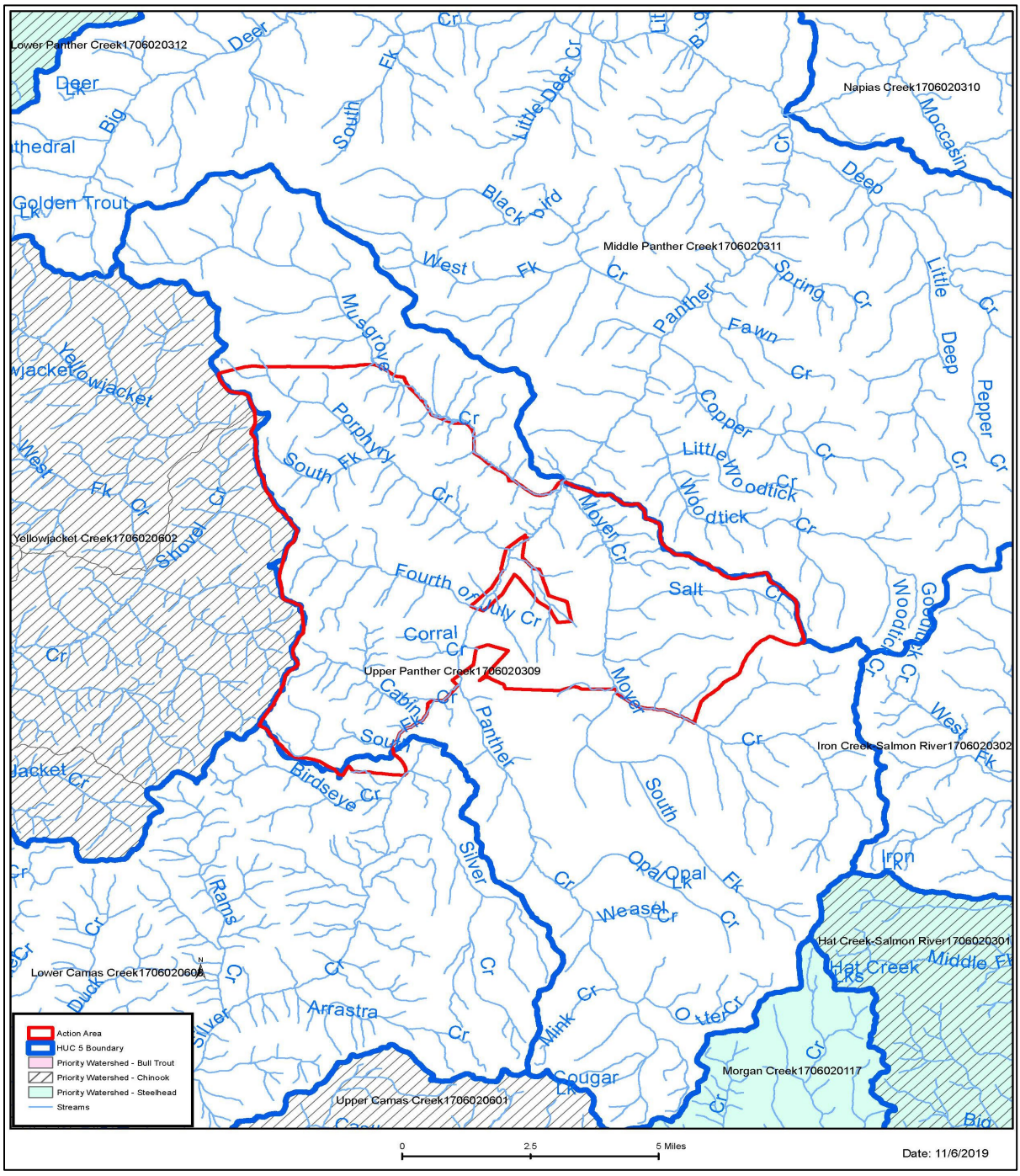


Figure 3. Forney Allotment HUC 5 and Priority Watersheds

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 consultation, and the impact of state or private actions which are contemporaneous with the consultation in process (50 CFR 402.02).

NMFS describes the environmental baseline in terms of the biological requirements for habitat features and processes necessary to support all life stages of each listed species within the action area. Each listed species considered in this Opinion resides in or migrates through the action area. Thus, for this action area, the biological requirements for salmon and steelhead are the habitat characteristics that support successful completion of spawning, rearing, and freshwater migration.

Panther Creek. Panther Creek is a fifth order stream draining about 529 square miles of the Salmon River Mountains in east-central Idaho. Stream flow patterns are typical snowmelt runoff driven, with peaks in May or June and lows in fall and winter. Average annual flow at the mouth of Panther Creek is about 265 cubic feet per second (cfs) with mean monthly flows ranging from 83 to 136 cfs (IDEQ 2001). Panther Creek is the largest stream within the Allotment, with all other streams of the Allotment being tributary to its waters. Approximately 6.0 miles of Panther Creek flows within the Allotment boundaries with 3.43 miles on Forest and 2.57 miles on private land (USFS 2020). Habitat conditions within this area of the Panther Creek drainage are generally considered good. Most NMFS matrix of pathways and indicators (MPI) (NMFS 1996) are "functioning appropriately," and no pathways or indicators are "functioning at unacceptable risk" within the action area (Table 4).

The predominant activity affecting Chinook and steelhead critical habitat within the Panther Creek subbasin has been mining. Stream habitat in Panther Creek was severely degraded by acid and heavy metal drainage from the Blackbird Mine, which operated from 1949 to 1967. The Blackbird Mine site spans the Bucktail Creek and Meadow/Blackbird Creek drainages. These drainages flow into Panther Creek. Acid mine drainage resulted in elevated concentrations of copper in Panther Creek downstream from the mine, which eliminated most aquatic life by the early 1960s. However, extensive mine site reclamation activities over the past 15 years have partially restored water quality in Panther Creek and its tributaries, such that salmonid habitat is improving. This area is located downstream from the Allotment boundary. Active exploration operations indicate mining and possible development could occur within the watershed in the future.

In evaluating current condition and potential future trends in the Panther Creek subbasin, it is important to note that in July, 2000, a lightning-caused wildfire began in the Clear Creek subwatershed that became one of the largest wildfires in Idaho's recent history. The Clear Creek Fire covered approximately 206,379 acres in the heart of the Panther Creek watershed. The fire was considered stand replacing within the upper Big Flat, Big Deer Creek, and Blackbird Mine areas (IDEQ 2001). Thus, the current conditions are changing as the landscape recovers from the fire. In addition, following the fire, there was a series of high intensity rain/thunderstorm events that initiated a series of debris flows and slides affecting Panther Creek.

Table 4. Baseline condition for the Upper Panther Creek 5th field HUCs

Pathway	Indicators	Upper Panther Creek Watershed Baseline Functionality*
Water Quality	Temperature	FA
	Sediment	FA
	Chemical Characteristics	FA
Habitat Access	Physical Barriers	FA
Habitat Elements	Substrate Embeddedness	N/A
	LWD	FR
	Pool Frequency and Quality	FA
	Off-channel Habitat	FR
	Refugia	FA
Channel Condition and Dynamics	Average wetted width/maximum depth ratio	FA
	Streambank Condition	FA
	Floodplain Connectivity	FR
Flow/Hydrology	Change in Peak/Base Flows	FR
	Increase in Drainage Networks	FA
Watershed Conditions	Road Density and Location	FR
	Disturbance History	FA
	RHCAs	FR
	Disturbance Regime	FA
Integration of Species and Habitat Conditions	Habitat Quality and Connectivity	FA

Functioning Appropriately = (FA), Functioning at Risk = (FR) and Functioning at Unacceptable Risk = (FUR)
*See Appendix B-Matrix of Diagnostic Pathways and Indicators in the Panther Creek Allotment BA for explanation of functionality ratings.
Highlighted elements refer to functionality conditions within action area portion of the watershed as identified for Focus Indicators

Moyer Creek. Moyer Creek is a major third order Panther Creek tributary stream. Approximately 6.5 miles of mainstem Moyer Creek waters, from the streams confluence with Panther Creek to a point approximately 1.63 miles above its South Fork confluence, is located within the Allotment boundary. Mainstem Moyer Creek, to a point approximately 0.2 miles above its South Fork, is thought to be historic habitat for Chinook salmon and steelhead (USFS 2020). The stream supports designated critical habitat for Chinook salmon to 0.86 miles above the confluence of the South Fork, and steelhead designated critical habitat (6.5 miles) throughout its length within the Allotment action area. Salt Creek is a small tributary stream to Moyer Creek that runs its entire 3.49 mile length within the Allotment (USFS 2020). Moyer Creek exhibits good overall aquatic habitat quality, and natural processes within the drainage are considered stable (USFS 2020).

Musgrove Creek. Musgrove Creek is also a major third order Panther Creek tributary. Approximately 1.81 miles is located within the Allotment boundary (USFS 2020). The full length of the stream within the Allotment is considered designated critical habitat for Chinook salmon and steelhead. Overall, aquatic habitat conditions within the Musgrove Creek drainage are considered good. This drainage is the only area within the Allotment to be impacted by the 2000 Clear Creek Fire and is at a high risk of cumulative watershed effects due mainly to impacts from the fire.

Porphyry Creek. Porphyry Creek is a moderate sized third order Panther Creek tributary with most of its mainstem length, along with its South Fork waters, within the Allotment. Approximately 3.7 miles of mainstem waters are designated critical habitat for steelhead and the lower 0.68 miles of the stream the SCNF intrinsic habitat mapping identifies as critical habitat for Chinook salmon (USFS 2020). Overall, aquatic habitat conditions in Porphyry Creek are good, although 0.6 miles of roads within the Panther-Porphyry subwatershed encroach on adjacent floodplains, affecting stream shading, large woody debris recruitment, floodplain access and sediment delivery (USFS 2020).

Fourth of July Creek. Fourth of July Creek is a small third order Panther Creek tributary located entirely within the Allotment. Due to its small size, habitat for anadromous species appears to be limited to providing supplemental seasonal thermal rearing opportunities. A portion of lower Fourth of July Creek was fenced in 2007 in response to observations of livestock impacts to riparian and aquatic habitats. Connectivity has been maintained with Panther Creek despite the presence of one small diversion in the lower reach of the stream.

Cabin Creek. Cabin Creek is a small third-order Panther Creek tributary with the entire length of its mainstem and its South Fork within the Allotment. Due to its small size, habitat for anadromous species appears to be limited to providing supplemental seasonal thermal rearing opportunities within the mainstem reach below the confluence of its South Fork. The lower 0.61 mile of Cabin Creek, to the South Fork confluence, is designated as critical habitat for steelhead. The SCNF intrinsic habitat has additionally identified the lower 0.18 mile of Cabin Creek as critical habitat for Chinook salmon (Table 5). Replacement of the Cabin Creek culvert in 2001 improved connectivity of Cabin Creek with Panther Creek and access into the drainage (USFS 2020).

The BA documented baseline conditions for the action area by applying NMFS' MPI (1996). Although the author reported conditions for all indicators in the MPI, the analysis concentrated on six "focus indicators" agreed to during the Level I streamlining process. These focus indicators are believed to represent measures best suited for evaluating grazing impacts on individuals and PBFs of critical habitat. The six focus indicators for the action area have been identified by the SCNF as "functioning appropriately," which is discussed in more detail in the following narrative.

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).

Since the previous consultation, seasonal water temperature regimes have been monitored on six streams within the action area. The SCNF indicated that water temperature conditions within the action area are *Functioning Appropriately* for rearing, spawning, and incubation, which is in all areas of the Allotment except the lowermost reach of mainstem Panther Creek at the lower end of the Allotment. This reach of Panther Creek exceeds spawning and rearing temperature criteria during the hottest months of the season. The monitoring data from Moyer, Musgrove, and Porphyry Creeks indicates that these tributary streams are meeting all temperature criteria for rearing, spawning, and incubation, and are not contributing to warming of mainstem Panther Creek through the Allotment reach. The elevated summer water temperatures in Panther Creek are likely due to natural causes as tributary streams are not contributing to warming of the water.

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.

Within the action area, stream sediment levels have been monitored at long-term sites on mainstem Panther, Moyer, Musgrove, and Porphyry Creeks (refer to the BA Appendix C Figures C94-C98 and C102-C109). Functionality criteria for instream sediment reflect goal levels identified in the Salmon National Forest Plan, as modified by geologic setting. Core sampling is used in trend monitoring to determine the amount of percent fines within the stream's substrate. Anadromous streams receive a 6-inch deep core sample and results of all assessments are expressed as percent fines less than one-fourth inch in diameter. 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). Analysis of depth fines also considers drainage geology. The following are the evaluation criteria for stream sediment based wholly or primarily in volcanic and quartzite geologies:

≤25 percent depth fines (<1/4-inch diameter) = FA

26–29 percent depth fines (<1/4-inch diameter) = FR

>30 percent depth fines (<1/4-inch diameter) = FUR

All sites monitored since 2010 are *Functioning Appropriately* because they all fall below the <25% depth fines goal.

2.4.3 Width:Depth Ratio

Stream W:Ds influence available living space within stream habitats. Stream channel widening, typically represented by an increasing W:D, results in shallower depths, which reduce habitat suitability (Platts and Nelson 1989). Livestock grazing primarily impacts W:D in areas that are grazed by livestock. PACFISH/INFISH requires the Forest to monitor streams W:D using the stream's wetted width. However, Forest rangeland MIM operations on the Allotment do not include W:D measurements. Greenline to greenline width (GGW) is measured at these sites.

The GGW is defined as the non-vegetated distance between the greenlines 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 greenlines 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 provides an indication of the width of the channel, reflecting disturbance of the streambanks and vegetation. The GGW will be 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 SCNF will also continue to monitor stream sediment, bank stability and greenline vegetation. Current Allotment GGWs recorded were: M217 Panther Creek – 6.6; M213 Moyer Creek – 6.4; M231 Fourth of July Creek – 3.0; M402 Panther Creek – 4.8; and M221A Porphyry Creek – 3.5 have an established reading in 2017. There is an increase in greenline-to-greenline width in Moyer Creek M213 from 2012-2017. Bank stability is above the forest objective and greenline ecological status is 68/LS. There is no evidence on the ground that this stream is widening (USFS 2020).

2.4.4 Streambank Condition

Streambank condition can influence the overall stability and resilience of stream channels. Eroding streambanks increase turbidity and can contribute large amounts of fine sediment deposition, which degrade fish habitat and cause additional stream channel adjustment. Within the action area, long-term streambank stability monitoring has been conducted on mainstem Panther Creek, Moyer Creek, Musgrove Creek, and Porphyry Creek by Forest hydrology monitoring crews. Based on information provided in the BA, all monitored streams within the Allotment are meeting the general PACFISH RMO of 80% or greater streambank stability and are *Functioning Appropriately*.

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 riparian conservation areas focuses on greenline ecological status (GES) and woody species recruitment. The SCNF Plan forest-wide GES objective is 61 or greater. An ecological status rating greater than 86 is indicative of a potential natural community (PNC) (Winward 2000).

Riparian monitoring sites were established on the Allotment in the early-to-late 1990s, with current MIM sites located on Panther Creek, Moyer Creek, Porphyry Creek, and Fourth of July Creek. The most recent survey data is as follows:

- Moyer Creek MIM site (M213) GES was identified at late-seral (68) with a 95 percent bank stability during its most recent baseline reading in 2017.

- Panther Creek – Riparian Pasture MIM site (M217) was identified at mid-seral (57) in 2017 with a bank stability of 88 percent with a downward trend due to high flow event that washed out several beaver dams. This area is not authorized to be grazed and livestock are excluded from this area by permanent fencing.

- Fourth of July MIM (M231) GES site was identified at mid-seral stage (45) and a 93 percent bank stability during its most recent baseline reading in 2017. This area is not impacted by grazing. Livestock access is limited from this area by fencing, topography, and thick riparian vegetation.

- Porphyry Creek MIM (M221A) GES site was identified at late-seral stage (69) with a 96 percent bank stability during its most recent reading in 2017.

- Panther Creek (402) – Holding Pasture MIM GES site was identified at late-seral stage (67) with a 100 percent bank stability during its most recent reading in 2017.

2.4.6 Chinook Salmon Presence in Action Area

Within the Allotment, Chinook salmon have historically used mainstem Panther Creek, and tributary streams Moyer and Musgrove Creeks for spawning and rearing. The majority of Chinook salmon spawning activity occurs in mainstem Panther Creek, but adult spawning was additionally documented in Moyer and Musgrove Creeks (USFS 2020). Other streams within the Allotment, including Porphyry, Fourth of July, and Cabin Creeks, may provide additional seasonal rearing opportunities for juvenile salmon in their lower reaches. Based upon gradient mapping, Porphyry Creek may additionally provide some potential spawning habitat for Chinook salmon in its lower reaches, but spawning has not been documented in this stream (USFS 2020). In total, there is an estimated 10.46 miles of Chinook salmon rearing habitat (Table 5) and 9.88 miles of Chinook salmon spawning habitat within the action area. Figure 4 is an illustration of what the SCNF considers the starting and ending points for Chinook presence and spawning habitat.

Table 5. Miles of Chinook presence and spawning habitat in grazing Unit

Grazing Unit	Stream Name	Chinook Presence (Miles)	Spawning Habitat (Miles)
East Side Panther Unit	Moyer Creek	2.33	2.33
	Panther Creek	0.46	0.46
	Musgrove	0.05	0.05
Holding Pasture Unit	Panther Creek	1.56	1.56
Moyer Creek Unit	Moyer Creek	3.36	3.36
Riparian Pasture	Panther Creek	1.40	1.40
West Side Panther	Cabin Creek	0.18	0.00
	Musgrove Creek	0.74	0.58
	Porphyry Creek	0.38	0.13
Subtotal		**10.46**	**9.88**

2.4.7 Snake River Basin Steelhead Presence in Action Area

Within the Allotment, steelhead have historically used mainstem Panther Creek, and tributary streams Moyer and Musgrove Creeks for spawning and rearing. The highest density of steelhead in the upper Panther Creek watershed has been documented in Moyer Creek (Rose 2012). Other streams within the Allotment, including Porphyry, Fourth of July, and Cabin Creeks, may provide additional seasonal rearing opportunities for juvenile steelhead in their lower reaches. Based upon gradient mapping, Porphyry Creek may additionally provide some potential spawning and rearing habitat for steelhead (USFS 2020). Juvenile steelhead have also been found in lower Cabin and lower Fourth of July Creeks. However, the small size of these two streams and generally unsuitable substrate materials provide little if any spawning habitat for adult steelhead (USFS 2020). In total, there is an estimated 12.92 miles of steelhead rearing and 12.58 miles of spawning habitat within the action area (Table 6). Figure 5 is an illustration of what the SCNF considers the starting and ending points for steelhead presence and spawning habitat.

Table 6. Miles of steelhead presence and spawning habitat by grazing Unit

Grazing Unit	Stream Name	Steelhead Presence (Miles)	Spawning Habitat (Miles)
East Side Panther Unit	Moyer Creek	2.33	2.33
	Panther Creek	0.46	0.46
	Musgrove Creek	0.05	0.05
Holding Pasture Unit	Panther Creek	1.56	1.56
Moyer Creek Unit	Moyer Creek	3.36	3.36
Riparian Pasture	Panther Creek	1.40	1.40
West Side Panther	Cabin Creek	0.42	0.42
	Musgrove Creek	1.76	1.76
	Porphyry Creek	1.23	1.23
	Fourth of July Creek	0.34	0.00
Subtotal		**12.92**	**12.58**

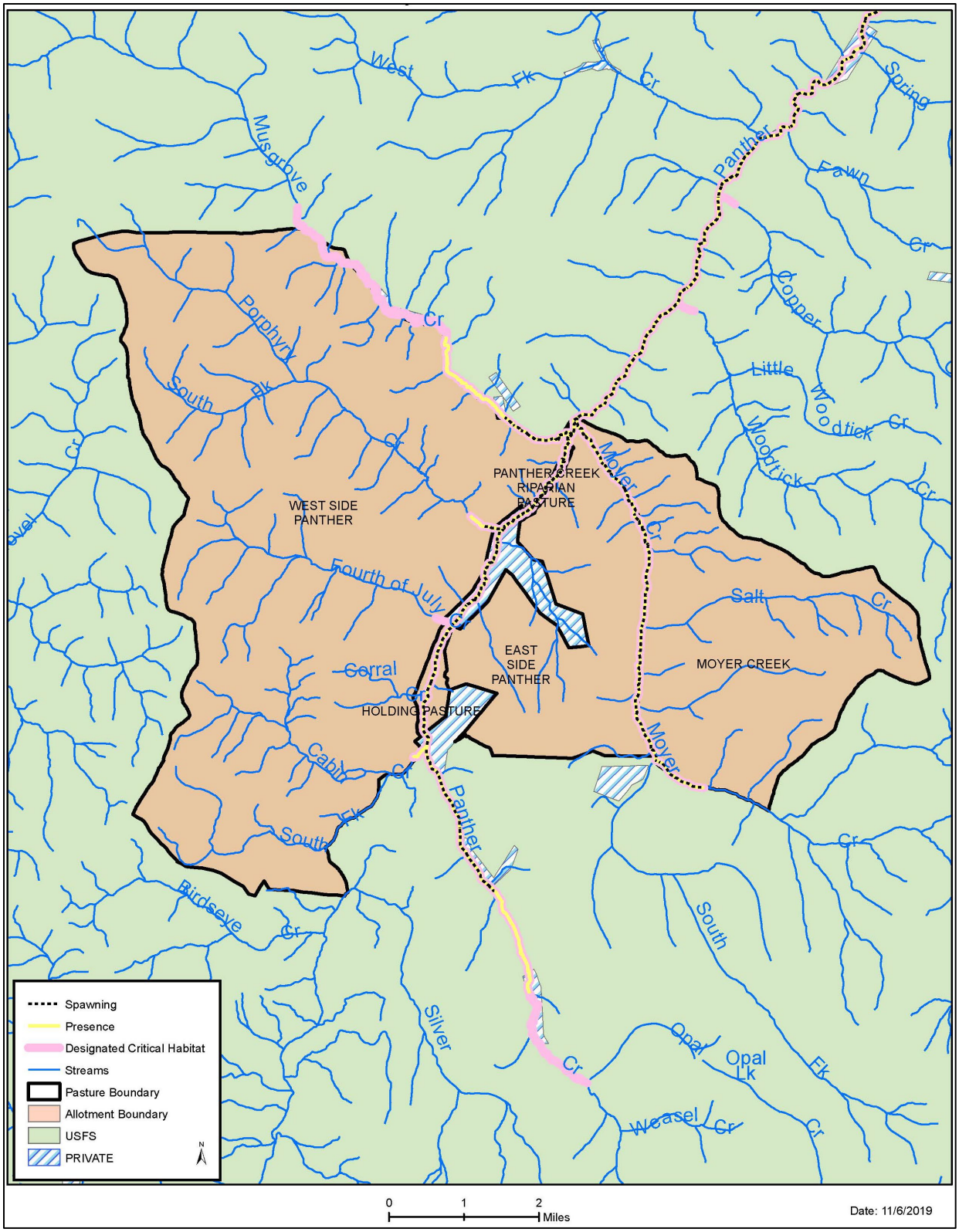


Figure 4. Presence, spawning, and designated critical habitat for Chinook salmon in the Forney Allotment

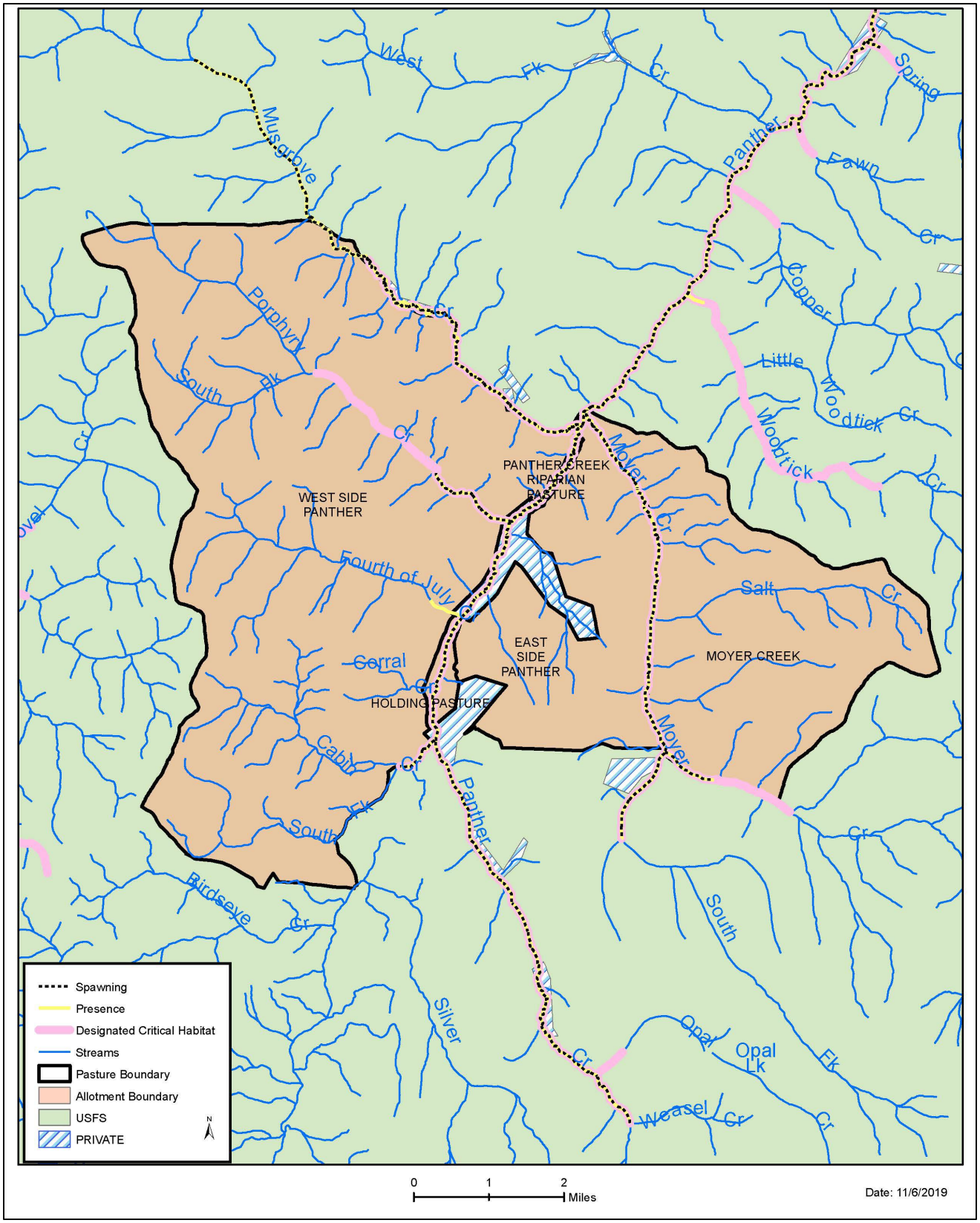


Figure 5. Presence, spawning, and designated critical habitat for Chinook salmon in the Forney Allotment

2.5 Effects of the Action

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

2.5.1 Effects on Listed Species

Cattle grazing has the potential to affect ESA-listed fishes by disturbing rearing, holding, or spawning salmonids, and also by trampling incubating redds as cows wade through or cross instream habitats. Adult steelhead may be present within Allotment streams when cattle arrive on the Allotment on or after June 1 of the grazing season. Therefore, there is potential for livestock to disturb adult steelhead that may be holding or spawning in streams within the Allotment, particularly in Panther, Porphyry, Moyer, Musgrove, and Cabin Creeks. The proposed action therefore has the potential to affect steelhead adults, juveniles, and redds. Spring/summer Chinook spawning and incubation period occurs mid-August to mid-September. The proposed action therefore has the potential to affect Chinook adults, juveniles, and redds. Although the proposed action also has the potential to affect steelhead and Chinook through impacts to habitat, habitat-related effects are all expected to be minor or unlikely to occur for this Allotment as described below and in Section 2.12.

2.5.1.1 Habitat-related Effects

ESA-listed fish 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. Effects to habitat and the physical and biological features (PBFs) are thoroughly discussed in Section 2.12 below. Because the effects on critical habitat 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 currently being met, or very close to being met in the areas proposed to be grazed. In addition, the SCNF has included annual use indicators and move triggers that are tied to an adaptive management process, fencing, and changes to Unit rotations. These measures are more restrictive to cattle use and also require more focused monitoring attention than previous grazing use. The adaptive management strategy 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. For these reasons, it is reasonable to anticipate maintenance of the current proper functioning conditions while also allowing for continued upward trends at near natural rates.

2.5.1.2 Disturbance

Cattle grazing adjacent to streams, or when crossing, drinking, or loafing near streams, are reasonably certain to startle or disturb juvenile steelhead or Chinook salmon rearing in the action area. The SCNF and permittees will employ the following measures to reduce the amount of time cows spend in riparian areas: maintaining off-stream water sources; placing salt at least ¼-mile from streams; weekly herding of cows out of riparian areas; using road bridges and designated fords in most cases to move livestock across streams when changing pastures; maintaining fencing, and adhering to riparian utilization standards. Despite these measures, cows are likely to spend time adjacent to unfenced, accessible streams reaches on the Allotment, particularly in later summer.

For juvenile steelhead and juvenile/adult Chinook salmon, disturbance can lead to behavioral changes that can result in indirect effects through alteration in feeding success, increased exposure to predators, or displacement into less suitable habitat. Although these effects can result in injury or death, we expect the juveniles affected by this action to be able to access nearby cover and avoid injury or death (behavioral effect only). Within the action area bank, stability is generally high, indicating that sufficient escape cover to protect fish in the short term is likely available from overhanging banks. NMFS expects behavioral modifications will be infrequent and minor because habitat conditions in the action area should provide suitable escape cover.

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. Factors which can lessen the degree of effects from grazing include active measures to keep cattle off stream channels such as fencing, off channel salting, employment of riders, or natural inaccessibility of stream channels due to topography or dense riparian vegetation. All these factors either exist in the action area or are being employed to reduce redd trampling potential. A discussion regarding the likelihood of trampling occurring by species and pasture follows.

Snake River Basin Steelhead Redd Trampling. In Year 1 of the grazing rotation, livestock trampling of steelhead redds could occur along portions of Musgrove, Cabin, and Porphyry Creeks from June 1 through mid-July (Table 7). During Year 1, the SCNF estimates that livestock grazing within the West Side Panther Unit could occur for up to five weeks within the steelhead egg incubation period. In Year 2 of the grazing rotation, livestock trampling could occur along portions of Moyer Creek for up to six weeks within the steelhead egg incubation period (Table 7). Fencing installed along Panther Creek within the East Side Panther Unit

excludes grazing access to Panther Creek. Therefore, the potential for livestock impacts to spawning adults or egg incubation along this reach of Panther Creek in Year 1 or Year 2 is not expected to occur.

Approximately 12.58 miles of steelhead spawning and incubation habitat occur within the Allotment. However, fencing, private lands, steep topography, and/or dense riparian vegetation preclude cattle access to most of this steelhead-spawning habitat (USFS 2020). Using information presented in the BA, NMFS estimates that potential for livestock trampling of steelhead redds could occur in approximately 2.46 stream miles of the Allotment within Year 1, and 2.38 miles in Year 2 (Table 7). In addition to random trampling events while grazing, livestock also have the potential to trample redds when being intentionally trailed through streams in the Allotment.

In Year 1, livestock are moved from the West Side Unit to the East Side Panther Unit, crossing Panther Creek at one of the pre-established crossing sites in the upper reaches of the Allotment. This one or two-day move would typically occur prior to the mid-July conclusion of steelhead egg incubation. The BA indicates this designated site has been determined not to support substrate conditions conducive to salmonid spawning and would not be expected to have any impacts on egg incubation in Panther Creek. Localized short-term increases in turbidity in association with these crossing activities would not be expected to produce any measureable impact to sediment levels at downstream Panther Creek spawning/incubation sites. Therefore, in the following analysis, NMFS did not consider these crossings as steelhead spawning habitat. Trailing of livestock through streams in the Allotment in Year 2 are conducted after the July 15 conclusion of steelhead incubation, and would not likely result in any effects to steelhead incubation.

In order to conduct the jeopardy analysis, NMFS estimated the number of steelhead redds that will potentially be exposed to trampling under the proposed action. There is currently no record of steelhead redd data for action area streams. Therefore, steelhead spawning (redd) survey information compiled by the Idaho Department of Fish and Game (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 with the highest quality steelhead spawning habitat, and 0.65 redds/mile for streams with lesser quality habitat. Although Musgrove, Cabin, Porphyry, Panther, and Moyer Creeks, have been identified as having medium to high intrinsic potential for steelhead spawning habitat, NMFS has applied the lower 0.65 redds per mile estimate to these streams because of lower anadromous fish densities and degraded water quality (mining impacts) in the Panther Creek subbasin. However, it is important to note that NMFS believes that these densities are likely an overestimate for these streams, but have been used to ensure that NMFS uses a worst-case scenario in this effects analysis.

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% to 78% 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. This Allotment has a moderate to very low stocking intensity, which translates to a trampling rate less than 33%. This estimate may still be high as bull trout are fall spawners, and cattle use of riparian areas is higher in late summer than early spring when steelhead spawning (Parsons et al. 2003; McInnis and McIver 2009) overlaps with grazing.

Table 7. Steelhead Spawning Habitat Accessible to Livestock in the Forney Allotment

Year	Grazing Unit Name	Stream Name	Total Spawning Habitat (mi.)	Livestock Access (mi.)[1]
1	West Side Panther	Musgrove Creek	1.76	1.12
		Cabin Creek	0.42	0.11
		Porphyry Creek	1.23	1.23
	East Side Panther	Panther Creek	0.46	0
		Moyer Creek	2.33	0
Year 1 Totals:			**9.55**	**2.46**
2	East Side Panther	Panther Creek	0.46	0
		Moyer Creek	2.33	0
	Moyer Creek Unit	Moyer Creek	5.68	2.38[2]
	West Side Panther	Musgrove Creek	1.76	0 [3]
		Cabin Creek	0.42	0 [3]
		Porphyry Creek	1.23	0 [3]
Year 2 Totals:			**9.55**	**2.38**

[1] Access based on estimates provided by SCNF.
[3] Livestock grazing redd trampling risk is more likely to occur above Salt Creek based on livestock use.
[4] Livestock grazing will not overlap with steelhead spawning or incubation in the West Side Panther Unit in Year 2.

Cattle tend not to concentrate use in riparian areas in spring and early summer when riparian areas are colder, wetter, and have lower forage palatability than uplands. High water levels and the dense riparian vegetation further limit streamside cattle activity during steelhead incubation period. Therefore, cattle use during the steelhead redd incubation period is largely expected to be limited to watering at streambanks and the occasional crossing of streams, typically repeated at the same sites. To conservatively estimate the redd trampling risk; NMFS applied a 12 to 33% simulated redd trampling rate for moderate stocking intensities (Gregory and Gamett 2009). This approach is believed to overestimate potential redd trampling because it does not: (1) Consider the reduced riparian use during the proposed spring grazing; (2) factor in reduced livestock access to streams during high water conditions present during proposed grazing; and (3) account for existing steep topography/dense riparian vegetation, which reduces livestock access to action area streams. In addition, redd density estimates were also applied equally across all miles of stream within the Allotment, despite redds more typically being concentrated in only the highest quality habitat. For these reasons, the 33% chance of trampling redds annually should be used to gauge the relative risk of the potential impact and should not be viewed as an absolute number that is likely to occur. Applying these rates to the steelhead spawning streams within the Allotment, NMFS estimated the maximum number of steelhead redds potentially vulnerable to livestock trampling by Unit and year within the Allotment. NMFS estimates one (0.5) redd could be annually trampled under the proposed action (Table 8).

NMFS analysis indicates the greatest potential for redd trampling exists along Moyer Creek in the Moyer Creek Unit. Although the analysis estimated up to two steelhead redds could be

trampled over the 2-year grazing rotation in the Allotment, the potential *annual* impacts from livestock trampling is more pertinent to steelhead conservation and recovery. In Year 1, steelhead redds are vulnerable to trampling for up to five weeks in the West Side Panther Unit (Musgrove, Porphyry, and Cabin Creeks). Steelhead redds in Moyer Creek within the Moyer Creek Unit are vulnerable to trampling during steelhead incubation for up to six weeks during Year 2. Consequently, a different cohort of steelhead would potentially be affected each year that redds are vulnerable to trampling by livestock. For this reason, NMFS estimated the trampling potential and effects by Unit and year to better gauge the potential impacts to the Panther Creek steelhead population.

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. Therefore, with one steelhead redd likely being trampled each year, we estimate that this will result in about one fewer returning adult steelhead (0.3 adult equivalent x 3 years = 0.9 adult equivalent) for every three years the Allotment is grazed.

Table 8. Maximum Steelhead redds potentially vulnerable to livestock trampling by Unit

Year	Grazing Unit Name	Stream Name	Total Spawning Habitat (mi.)	Spawning Habitat Accessible to Livestock (mi)	Max. Density Redds (#/mi.)	Maximum # Redds Per Stream Segment	Maximum # Redds Vulnerable Per Unit	Potential Range of Redd Trampling (%)[1]	Max. # Redds Trampled per Year
1	West Side Panther	Musgrove Creek	1.76	1.12	0.65	0.73	1.6	12 to 33	0.5
		Cabin Creek	0.42	0.11		0.07			
		Porphyry Creek	1.23	1.23		0.79			
1	East Side Panther	Panther Creek	0.46	0		0	0		0
		Moyer Creek	2.33	0		0			
2	East Side Panther	Panther Creek	0.46	0		0	0		0
		Moyer Creek	2.33	0		0			
2	Moyer Creek Unit	Moyer Creek	5.68	2.38		1.5	1.5		0.5
2	West Side Panther[2]	Musgrove Creek	1.76	0		0	0		0
		Cabin Creek	0.42	0		0			

Year	Grazing Unit Name	Stream Name	Total Spawning Habitat (mi.)	Spawning Habitat Accessible to Livestock (mi)	Max. Density Redds (#/mi.)	Maximum # Redds Per Stream Segment	Maximum # Redds Vulnerable Per Unit	Potential Range of Redd Trampling (%)[1]	Max. # Redds Trampled per Year
		Porphyry Creek	1.23	0		0			

[1] Gregory and Gamett (2009). [2] SCNF. Livestock grazing will not overlap with steelhead spawning or incubation in the West Side Panther Unit in Year 2.

Chinook Salmon Trampling. In Year 1 of the grazing rotation, livestock could be up to two weeks in the West Side Panther Unit (weaning only) and four weeks in the Moyer Creek Unit during Chinook salmon spawning/egg incubation periods (USFS 2020). By applying the accessibility estimates provided by the SCNF, NMFS estimated that potential for livestock trampling of Chinook salmon redds could occur in approximately 2.38 miles of Moyer Creek above Salt Creek (Moyer Creek Unit), 0.25 miles of Musgrove Creek (West Side Panther Unit), and 0.13 miles of Porphyry Creek (West Side Panther Unit) (Table 9).

In Year 2 of the grazing rotation, livestock trampling of Chinook salmon redds could occur along portions of Musgrove, Porphyry, and Moyer Creeks. The SCNF estimates that livestock grazing within the Moyer Creek Unit could occur for up to four weeks and in the West Side Panther Unit for approximately eight weeks after the August 18 initiation of Chinook salmon spawning/egg incubation. Trampling potential is limited to approximately 2.38 miles of Moyer Creek (Moyer Creek Unit), 0.25 miles of Musgrove Creek (West Side Panther Unit), and 0.13 miles of Porphyry Creek (West Side Panther Unit) (Table 9).

Stream crossings would occur during Chinook salmon spawning and egg incubation, but are not expected to result in impact to Chinook salmon spawner disturbance or trampling of Chinook salmon redds due to the use of pre-established designated crossing sites. The sites were chosen based on the lack of suitable habitat for spawning salmon. Localized short-term increases in turbidity in association with these crossing activities would not be expected to produce any measureable impact to sediment levels at downstream Panther Creek spawning/incubation sites. Therefore, in the following analysis, NMFS did not consider the designated crossings as Chinook salmon spawning habitat.

There is no long-term, consistent, and comparable record of Chinook salmon redd data for Allotment action area streams. Redd surveys conducted between the early 1950s and late 1960s show a significant decline in observed redds, a trend that can be directly correlated to mining wastes.

Aerial Chinook salmon spawning (redd) surveys completed by IDFG are available for Panther Creek since 2001. Since the late 1980's water quality restoration projects were implemented that have contributed to a general improvement in water quality. Currently, however, water quality remains poor in the Panther drainage within and downstream of Blackbird, Napias, and Deer Creeks. Similarly, redd counts of Chinook salmon numbered in the hundreds during the 1950s, fell to zero for years during the sixties and seventies, then have increased into the dozens in the past decade (Table 10).

In June and July 2001, the IDFG planted 1,064 hatchery Chinook salmon adults at four sites in Panther Creek for harvest. In the fall of 2001, over 80 redds were observed by various groups in Panther Creek and were suspected to be attributed to the planted fish. The highest number of documented redds within the Allotment in recent years were 24 Chinook salmon redds in mainstem Panther Creek in 2010, and 32 redds in this reach during 2011 (Rose 2012). The majority of the observed 2011 mainstem Panther Creek spawning activity occurred between Moyer Creek and Cabin Creek, significantly upstream of the run's historic use area. This reach is approximately 5.5 miles long, which equates to an average of approximately 5.05 redds counted per mile during the 2010/2011 survey timeframe. The IDFG also observed one redd in 2004, and seven redds in 2005, while conducting aerial surveys along the approximately 3.36 mile reach between Moyer and Fourth of July Creeks. The average number of redds observed by mile over these four survey years on mainstem Panther Creek is approximately 3.14 redds per mile.

The current extent of Chinook salmon spawning use within the Moyer Creek and Musgrove Creek drainages is largely unknown, but is considered to be infrequent and generally limited to the lower reaches of these streams. However, in 2019 one redd was observed by the Shoshone-Bannock Tribe approximately 5.24 miles up in Moyer Creek, above the Salt Creek confluence, the highest point in Moyer Creek in which redds have been documented in recent years. This is also the first documented redd found in this reach of Moyer Creek. Although Chinook salmon spawning may also occur in lower Porphyry Creek, none has been documented in recent spawning surveys.

Table 9. Chinook Spawning Habitat Accessible to Livestock in the Forney Allotment

Year	Grazing Unit Name	Stream Name	Total Spawning Habitat (mi.)	Livestock Access (mi.)[1]
1	West Side Panther (weaning portion only)	Musgrove Creek	0.58	0.25
		Porphyry Creek	0.13	0.13[2]
	Moyer Creek	Panther Creek	0.46	0 [3]
		Moyer Creek	5.68	2.38
	Holding Pasture	Panther Creek	1.56	0 [4]
	East Side	Moyer Creek	2.33	0 [1]
		Musgrove Creek	0.05	0 [1]
		Panther Creek	0.46	0 [1]
	Panther Creek Riparian	Panther Creek	1.40	0 [3]
Year 1 Totals:			**12.65**	**2.78**
2	Moyer Creek	Panther Creek	0.46	0 [3]
		Moyer Creek	5.68	2.38
	West Side Panther	Musgrove Creek	0.58	0.25
		Porphyry Creek	0.13	0.13[2]
	Holding Pasture	Panther Creek	1.56	0 [4]
	East Side	Moyer Creek	2.33	0 [1]
		Musgrove Creek	0.05	0 [1]
		Panther Creek	0.46	0 [1]
	Panther Creek Riparian	Panther Creek	1.40	0 [3]
Year 2 Totals:			**12.65**	**2.78**

[1] Access based on estimates provided by SCNF.[2] Unit will be grazed at a time when Chinook salmon are spawning in the action area. SCNF identified suitable spawning habitat but there has never been documented spawning on this reach.[3] This stream reach is fenced and no trailing during spawning.[4] The Holding Pasture reach of Panther Creek is not grazed during spawning and incubation.

For purposes of estimating the quantity of Chinook salmon redds that may be present within the Allotment, NMFS considered recent data, the Shoshone-Bannock Tribes 2010/2011 spawning survey data from mainstem Panther Creek within the Allotment boundary, and 2004/2005 IDFG aerial redd data. The resulting estimate in mainstem Panther Creek was a maximum density of approximately 3.14 redds per mile for Chinook salmon. Data from those four years were chosen because transect length information was available, where in other years that information was not readily available.

The majority of Chinook spawning occurs in mainstem Panther Creek with limited spawning occurring in tributary streams. Based on available redd survey information, NMFS could estimate that redd densities in the tributaries are approximately 20% of those in mainstem Panther Creek. However, in an effort not to underestimate the trampling potential, NMFS took a more conservative approach and assumed tributary redd densities at 25% (0.78 redds per mile) of the Panther Creek densities for this analysis. Therefore, this redd density estimate will be applied to Moyer, Musgrove, and Porphyry Creeks due to the limited spawning information available for those streams.

Using this information, NMFS estimated the number of Chinook salmon redds that are potentially vulnerable to livestock trampling by Unit. Although unknown, some to all of the Chinook redds in Panther Creek could occur within the Riparian Exclosure or in the Holding

Pasture and as such would not be subjected to any potential trampling. Also, the redd density used was based on the maximum observed spawning rates in the basin, a density that has only occurred two other times since surveys began in the early 1950s, and a density only likely to occur infrequently during higher Chinook return years (Table 10). NMFS has displayed the entire range of potential trampling to include a conservative scenario 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.

As described for steelhead redd trampling, NMFS does not expect all (100%) redds to be trampled simply because they may be accessible to livestock. The Allotment has a moderate to very low stocking intensity, which translates to a trampling rate of less than 33%. NMFS has calculated the entire range of redds potentially trampled by livestock to include a conservative trampling rate of 12 to 33%.

Applying the previously described 3.14 (mainstem Panther Creek) or 0.78 (tributaries) redds per mile estimate to the miles of potential spawning habitat in the Allotment results in an estimate of up to three redds per Year 2 at risk for trampling (Table 11). Applying the same conservative approach and assumptions described above, NMFS estimated that the risk of Chinook salmon redd trampling would be the same in both Years 1 and 2 of the rotation, ranging anywhere from zero to three redds a year (Porphyry - 0.03, Moyer – 0.59, and Musgrove - 0.06) (assuming the higher range of 33% livestock trampling). However, given the very low risk identified in Porphyry and Musgrove Creeks, 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 several reasons: (1) Porphyry Creek was included in the calculations and resulted in up to one (0.03) redd potentially trampled in both years, even though spawning habitat is marginal along this short reach of livestock accessible habitat (0.13 miles) and no documented spawning has occurred there; (2) the Panther Creek redd density used was based on some of the maximum observed spawning rates ever recorded in the basin, a density that's only occurred two other times (1953, 1957) since surveys began in the early 1950s, and a density only likely to occur infrequently during higher Chinook return years; and (3) very low adult Chinook returns that currently occur. 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% (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% 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%, which would result in approximately 21 fewer smolts per trampled redd. Smolt-to-adult returns are estimated as 0.031% 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 one fewer adult spring/summer Chinook salmon per redd trampled returning to the action area. This considered, trampling of redds could result in up to one fewer (0.05, 0.03, 0.5) adult in Year 1, and Year 2 returning to the action area four to five years after trampling. 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 10 Spring/summer Chinook salmon spawning surveys in Panther Creek, Idaho. All data are from IDFG reports cited in Streamnet, Reiser 1986, or SCNF 2020, in parentheses if different

Year	# Chinook Redds	Notes
1952	71	
1953	103	
1954	(12)	No survey, 200 adult Chinook killed by acid dump, Streamnet; Reiser 1986, Corley 1967
1955	(25)	No survey, Streamnet; Reiser 1986
1956	18 (55)	Streamnet; Reiser 1986
1957	135	
1958	92 (115)	Streamnet; Reiser 1986
1959		Water too turbid for counts
1960		Water too turbid for counts
1961	6 (4)	Streamnet; Reiser 1986
1962	10	Short ground count near mouth
1963	0	Short ground count, no survey upper
1964	0	Short ground count, no survey upper
1965	0	Short ground count, no survey upper
1966		No survey
1967	0	Aerial count, Streamnet; no survey, Reiser 1986
1968	(0)	No survey, Streamnet; aerial count, Reiser 1986
1969-1977	(0)	No counts, Streamnet; no redds in periodic surveys, Reiser 1986
1978-2000		No counts
2001	10	Aerial counts
2002		No counts
2003		No counts
2004	1	Aerial counts
2005	18	Aerial counts
2006	16	Aerial counts
2007	11	
2008	5	
2009	14	
2010	102	No aerial counts; Shoshone–Bannock Tribes
2011	76	No aerial counts; Shoshone–Bannock Tribes
2012	2	SCNF 2020
2013	5	SCNF 2020
2014	7	SCNF 2020
2017	0	SCNF 2020
2018	0	SCNF 2020

Table 11. Maximum Chinook salmon redds potentially vulnerable to livestock trampling by Unit

Year	Grazing Unit Name	Stream Name	Total Spawning Habitat (mi.)	Spawning Habitat Accessible to Livestock (mi)	Max. Density Redds (#/mi.)	Maximum # Redds Per Stream Segment	Potential Range of Redd Trampling (%)[1]	Max. # Redds Trampled per Year
1	West Side Panther (weaning only)	Musgrove Creek	0.58	0.25	Panther Creek 3.14[2] or Tribs 0.78[3]	0.20	12 to 33	0 to 0.59
		Porphyry Creek	0.13	0.13		0.10		
	Moyer Creek	Panther Creek	0.46	0		0		
		Moyer Creek	5.68	2.38		1.8		
	Holding Pasture	Panther Creek	1.56	0		0		
	East Side Panther	Moyer Creek	2.33	0		0		
		Musgrove Creek	0.05	0		0		
		Panther Creek	0.46	0		0		
	Panther Creek Riparian	Panther Creek	1.40	0		0		
2	Moyer Creek	Panther Creek	0.46	0		0		0 to 0.59
		Moyer Creek	5.68	2.38		1.8		
	West Side Panther	Musgrove Creek	0.25	0.25		0.20		
		Porphyry Creek	0.13	0.13		0.10		
	Holding Pasture	Panther Creek	1.56	n/a3		0		
	East Side Panther	Panther Creek	3.45	0		0		
		Moyer Creek	0.25	2.38		0		
	Panther Creek Riparian	Panther Creek	1.40	0 3		0		

[1] Gregory and Gamett (2009).[2] Based on the 2010 and 2011 Shoshone- Bannock and IDFG redd count survey information provided in the BA (page C – 32).[3] Based on redd observations described in the BAs (USFS 2020) and (Rose 2012).

Summary. As previously described, the proposed action both temporally and spatially overlaps spawning and incubation periods of Snake River Basin steelhead and Snake River Chinook salmon. Proposed mineral placements, use of riders, temporary and permanent fences, and application of annual use indicators combine to minimize the likelihood of redd trampling by cattle. However, these proposed measures do not completely ensure that steelhead and Chinook redds will not be trampled by cattle on this Allotment.

NMFS estimated that up to two Snake River Basin steelhead redds could be trampled during the two year grazing cycle, one per year. This will result in approximately one fewer adult steelhead returning every three years from grazing under the proposed action. Using recent data available from the 2011 status review (Ford 2011), the maximum loss of up to one adult steelhead every three years from the Panther Creek population represents less than 1% of the generic 10-year geometric mean A-run population size (556), and is too low to influence population abundance.

NMFS estimated that one Snake River spring/summer Chinook salmon redd is likely to be trampled each year during the two year grazing cycle. This will result in up to one fewer returning adult per year of grazing. A status assessment and 10 year geometric mean was unable to be completed for the Panther Creek spring/summer Chinook population due to inadequate data on abundance, productivity, or diversity. However, NMFS has estimated the potential impact to this population by considering available redd survey data collected over the past 10 years (2007 to 2018, data were not available for 2015 and 2016). NMFS calculated a mean average of 22 redds over this period of record, and expects the annual impact to the population from losing one adult equivalent a year to trampling represents approximately 0.02% of the return spawners annually, a number too low to influence the population abundance.

2.6 Cumulative Effects

"Cumulative effects" are those effects of future state or private activities, not involving federal activities, that are reasonably certain to occur within the action area of the federal action subject to consultation (50 CFR 402.02 and 402.17(a)). Future federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the ESA.

Some continuing non-federal activities are reasonably certain to contribute to climate effects within the action area. However, it is difficult if not impossible to distinguish between the action area's future environmental conditions caused by global climate change that are properly part of the environmental baseline *vs.* cumulative effects. Therefore, all relevant future climate-related environmental conditions in the action area are described in the environmental baseline (Section 2.4).

There are two private agricultural land inholdings along the east side of Panther Creek, and one tract of private property along Musgrove Creek. Agricultural activities have occurred on these lands in past years, and are likely to continue to occur in future years. Activities on the private lands within the Musgrove Creek drainage are primarily associated to seasonal utilization of the property as a hunting base camp (Rose 2012). Patented mining lands are also located along the north side of Musgrove Creek just outside of the Allotment boundary. No known mining or

exploration activities have occurred on these properties in recent years (Rose 2012). The current effects will likely remain constant throughout the life of the grazing permit. The cumulative effects will be minimal given there are no known or proposed actions on private lands.

2.7 Integration and Synthesis

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

Species. The number of fish affected is expected to be too small (i.e., approximately one adult equivalent every three years for steelhead and one per year for Chinook) and the type of habitat-related effects too minor to produce any observable effect on the VSP parameters of either of the ESA-listed species. This is true given wide annual variability in adult and juvenile returns and seasonal variations in habitat use. Additionally, impacts to the Chinook salmon and steelhead populations will be spread amongst at least 15 year classes. This further reduces the likelihood of any appreciable population level impacts on the VSP parameters. The action will not modify the VSP parameters for the affected populations of Snake River spring/summer Chinook salmon or Snake River Basin steelhead. The action will also not appreciably reduce the likelihood of survival and recovery, abundance and productivity, or spatial structure/diversity of the Snake River spring/summer Chinook salmon ESU or the Snake River Basin steelhead DPS. Furthermore, the Snake River spring/summer Chinook salmon Panther Creek population is considered functionally extirpated and is not necessary for recovery of the MPG; the loss of one adult per year will not likely affect recovery at the MPG and ESU levels. The Snake River Basin steelhead Panther Creek population is targeted for viability and has the potential to become very productive because the watershed is publically owned and has fewer water withdrawals than other populations. The loss of one adult steelhead equivalent every three years will not likely affect recovery at the MPG and DPS levels.

Climate change has been affecting environmental conditions in the action area for at least 50 years. We determine that the available data regarding environmental conditions relied upon to describe the environmental baseline for this consultation capture that change caused by global processes that has already occurred and its impacts on ESA-listed salmonids and their designated critical habitats. Climate change cannot be meaningfully predicted for such a time scale given the intrinsic climate fluctuations that occur on inter annual-to-decadal timescales masking any signal from climate change over that time. Thus, the effects of the proposed action described in this opinion fully incorporate our consideration of climate change for application of the ESA jeopardy and critical habitat standards.

2.8 Conclusion

After reviewing the current status of the listed species and their designated critical habitat, the environmental baseline within the action area, the effects of the proposed action, and cumulative effects, it is NMFS' Opinion that the proposed action is not likely to jeopardize the continued existence of Snake River Basin steelhead or Snake River spring/summer Chinook salmon.

2.9 Incidental Take Statement

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

2.9.1 Amount or Extent of Take

The proposed action is reasonably certain to result in incidental take of ESA-listed species. NMFS is reasonably certain the incidental take described here will occur because livestock will graze alongside streams during the redd incubation periods for steelhead and Chinook salmon. In the Opinion, NMFS determined that incidental take is reasonably certain to occur from redd trampling.

NMFS expects behavioral modifications of juvenile steelhead and Chinook in response to cows grazing alongside streams. However, these effects will be minor because this disturbance should be infrequent, and habitat conditions in the action area should provide adequate escape cover to mitigate for localized disturbance. Effects due to disturbance of individual juvenile steelhead and Chinook are not expected to rise to the level of take.

2.9.1.1 Steelhead Redd Trampling

Despite our estimate of the number of steelhead 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. Steelhead redds are constructed in the early spring, and while some redds may be visible early in the season, access to these streams by SCNF personnel is extremely difficult this time of year due to snow and ice. Peak flows occur approximately during the middle of the

spawning period. Ice shelves along stream margins, high flows, and turbid water 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. Therefore, 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 subsequently trampled by cattle each grazing season. Because circumstances causing take are likely to arise, but cannot be quantitatively measured in the field, the extent of incidental take for steelhead is described, pursuant to 50 CFR 402.14[I].

Although there is no known forage utilization or channel measurement indicator that directly correlates to redd trampling rates, trampling is most likely to occur when cattle concentrate in riparian areas and 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 cows present and with the time spent by those cows 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 greenlines within individual Unit DMAs and elsewhere in individual Units. Therefore, NMFS will use percent streambank alteration as the extent of take for steelhead in this Opinion.

The SCNF proposed bank alteration limits of less than 20 percent or less, 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 5 percent below the limit to ensure the end of season values meet 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 of the grazing rotation. Therefore, NMFS has established the extent of incidental take limit authorized by this Opinion as: (1) <10 percent in Units where bank stability is <60%; (2) <15 percent in Units where bank stability is 60% to 79%; or (3) <20 percent in Units where the bank stability RMO is being met (i.e., >80%). 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.

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 streamflows and at times when stream 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.

In this Opinion, it was determined that the annual trampling of a Chinook salmon redd would translate to approximately one fewer adult Chinook salmon returning to the action area, and the corresponding the 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 Opinion, NMFS determined that the amount or extent of anticipated take, coupled with other effects of the proposed action, is not likely to result in jeopardy to the species.

2.9.3 Reasonable and Prudent Measures

"Reasonable and prudent measures" are nondiscretionary measures that are necessary or appropriate to minimize the 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 the potential for incidental take resulting from trampling of redds due to 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

The terms and conditions described below are non-discretionary, and the SCNF or any applicant must comply with them in order to implement the RPMs (50 CFR 402.14). The SCNF, or any applicant, has a continuing duty to monitor the impacts of incidental take and must report the progress of the action and its impact on the species as specified in this ITS (50 CFR 402.14). If the entity to whom a term and condition is directed does not comply with the following terms and conditions, protective coverage for the proposed action would likely lapse.

1. To implement RPM #1, the SCNF shall ensure that:

   a. The proposed action, including all described conservation measures, monitoring, and adaptive management processes are implemented as described in the BA and proposed action section of this Opinion.

   b. The extent of incidental take is not exceeded by ensuring **s**treambank alteration levels, along streams where Snake River Basin steelhead redd trampling is expected to occur (West Side Panther and Moyer Creek Units), does not exceed the following levels at any time during the identified Snake River Basin steelhead incubation period for the action area (March 15 to July 14):

      (1) 10% in Units where streambank stability conditions are less than 60%;

      (2) 15% in Units where bank stability conditions are 60% to 79%;

      (3) 20% in Units where the bank stability RMO is being met (i.e., >80%).

   c. Appropriately trained SCNF or contract staff will monitor streambank alteration levels, using the same protocols identified in the proposed action, at each Unit's DMA. The monitoring shall occur within two weeks of moving cattle off each Unit.

   d. To further reduce steelhead redd trampling potential, especially along Moyer Creek within the Moyer Creek Unit, the SCNF shall implement the following:

      (1) Immediately trigger the proposed adaptive management process (Appendix A) if streambank alteration at the end of the Snake River Basin steelhead incubation period (July 14) is: (1) >5% when bank stability is less than 60%; (2) >10% when bank stability is 60% to 79%; or (3) >15% when bank stability RMO is being met (i.e., >80%).

         (a) 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.

e. The Allotment permittee or their employees receive training to appropriately implement the move triggers identified in the proposed action and in these Terms and Conditions.

f. Annual meetings are conducted with the permittee to discuss specific actions necessary to protect vulnerable spawning areas in stream reaches with the most potential for cattle interaction with spawning Snake River Basin steelhead and/or their redds (i.e., Moyer, Musgrove, and Porphyry Creeks).

g. Riders take all practicable measures to keep cattle on established crossings during trailing operations during steelhead and Chinook salmon spawning and incubation periods.

h. The SCNF and their permittees shall ensure that all exclosures, fences, and water developments that reduce cattle use adjacent to streams with ESA-listed steelhead and Chinook spawning habitat are properly maintained and functioning as intended.

i. Turnout dates, move triggers, and end-point indicators, as well as responsible parties, are outlined in the grazing permit's annual operating instructions to the permittee.

j. The amount of incidental take is not exceeded by conducting Chinook salmon redd surveys to ensure trampling does not exceed one redd per year in any year of the Allotment's grazing rotation.

k. Chinook salmon redd surveys shall be conducted once per week along livestock accessible reaches of suitable spawning habitat in Moyer and Musgrove Creeks when these areas are grazed after August 18, and ending after cattle have been removed from each Unit.

l. To further reduce Chinook redd trampling potential within mainstem Moyer and Musgrove Creeks, the following measures will be implemented: (1) Redds found during weekly surveys will be flagged and the permittees will be notified of locations (at a minimum weekly if not more frequently) so that increased riding efforts concentrate on the highest risk areas. Forest personnel will spot check high risk and high priority areas (Moyer and Musgrove) for cattle proximity three times per week at a minimum; (2) if spot checks observe cattle in close proximity to any flagged redds, temporary fencing will be installed to protect redds so long as fish are not occupying or actively building. Increased concentrated riding and three spot checks/week will continue until cattle are removed from the Unit. Temporary electric fencing is not required in areas where there is no risk of livestock trampling.

m. Annual meetings are conducted with the permittee to discuss specific actions necessary to protect vulnerable spawning areas in stream reaches with the potential for cattle interaction with Snake River Basin Chinook salmon spawning fish and/or redds (Moyer and Musgrove Creeks).

n. An annual Chinook salmon redd survey will be conducted on the lower 0.13 miles of Porphyry Creek the first or second week of September. If a Chinook redd is detected, then this reach will be added to the annual, weekly redd survey schedule for future years as identified in Term and Conditions 1.k and 1.l.

2. To implement RPM #2 (monitoring and reporting), the SCNF shall ensure that:

a. The DMA or key area on each Unit authorized for use is annually monitored to determine compliance with all identified annual use indicators identified 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 provided to NMFS by March 1 of each year. The following shall be included in the report:

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

(2) Date and location of any specific SCNF implementation monitoring data collected, including monitoring required under term and conditions 1 and 2 above.

(3) 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, streambank alteration), monitoring photos, seral condition, streambank stability, water temperature, sediment, and GGW.

(4) Discussion of any unauthorized use and/or any maintenance issues related to fences, temporary fencing for flagged redds, or water developments.

(5) Brief review of Allotment management and compliance successes and failures.

(6) Any relevant information that becomes available regarding changes in Snake River Basin steelhead or spring/summer Chinook salmon habitat trends, fish distribution, and/or spawning locations from that described in the BA.

(7) A clear description of compliance with the terms and conditions contained in this ITS.

(8) Any management recommendations for subsequent years.

2.10 Conservation Recommendations

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

The following recommendation is a discretionary measure that NMFS believes is consistent with this obligation and therefore should be carried out by the SCNF:

1. To mitigate the effects of climate change on ESA-listed salmonids, follow recommendations by the Independent Scientific Advisory Board (2007) to plan now for future climate conditions by implementing protective tributary habitat measures. Implement measures to protect or restore riparian buffers, wetlands, and floodplains; remove stream barriers; and ensure late summer and fall tributary streamflows.

2. Continue to work with the permittees to adjust the timing and/or rotation of Allotment Units to better protect accessible stream reaches during periods of steelhead and/or Chinook salmon spawning/incubation periods. Where feasible, give preference to grazing Units with inaccessible stream reaches (i.e., fenced, or less accessible because of steep topography or dense riparian vegetation) during these critical timeframes.

2.11 Reinitiation of Consultation

This concludes formal consultation for the Forney Creek Grazing Allotment. As 50 CFR 402.16 states, reinitiation of consultation is required and shall be requested by the federal agency or by the NMFS where discretionary federal agency involvement or control over the action has been retained or is authorized by law and if: (1) The amount or extent of incidental taking specified in the ITS is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the 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 (4) a new species is listed or critical habitat designated that may be affected by the action. To reinitiate consultation, contact NMFS Southern Snake Branch Office and refer to consultation number: WCRO-2020-00479.

2.12 "Not Likely to Adversely Affect" Determinations

2.12.1 Effects on Critical Habitat

The designations of critical habitat for species use the term primary constituent elements (PCE) or essential features. The new critical habitat regulations (81 FR 7414) replace this term with PBFs. The shift in terminology does not change the approach used in conducting our analysis, which is the same regardless of whether the original designation identified PCEs, PBFs, or essential features. In this section, we use the term PBF to mean PCE or essential feature, as appropriate for the specific critical habitat.

2.12.1.1 Snake River Basin Steelhead and Snake River Spring/summer Chinook Designated 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) without vegetation to slow water velocities, hold the soil, and retain moisture, erosion of streambanks can result; (4) the stream can become wider and shallower, and in some cases downcut; (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 Chinook salmon and steelhead critical habitat in the action area.

However, 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 are currently *at risk*. 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. There are four designated crossing areas on Panther Creek. Other streams that also have the potential to be crossed include: Porphyry, Cabin, Moyer, and Fourth of July Creeks. Livestock trailing is supervised by multiple riders limiting opportunities for cattle to access riparian areas outside of the areas identified for stream crossing.

As livestock cross streams, a small turbidity pulse is likely to occur. This short duration and low intensity turbidity plume 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 functioning appropriately throughout most of the watershed, minimal use of fords by supervised trailing will have insignificant effects on critical habitat. Livestock are actively being pushed along the route and will not be grazing or loitering along streams for any significant period of time. 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 critical habitat along the trailing route.

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, NMFS believes 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 should 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 consultation term.

The SCNF has committed to regular Allotment use supervision. Their staff will work directly with the permittee's rider, who is onsite weekly during spawning and incubation periods. This increased 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 habitat-related effects 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 1.3.3.3). 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.

Erhart 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 functioning appropriately and allow indicators that are functioning at risk to recover at near natural rates.

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 2009). On monitoring sites across 17 National Forest and four Bureau of Land Management 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 eightinches 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 to six inches will likely be effective in minimizing livestock damage to streambanks on the Allotments if permittee compliance rates remain high.

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 RMOs, respectively. 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 more 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 from late spring to early summer. Riders, salt, and fences help keep cattle on upland ridges and further minimize riparian vegetation use.

For these reasons riparian shrub use is expected to be insignificant across the action area and the high quality ecological condition of action area riparian zones should be maintained or improved.

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.

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 10 to 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.

Streambank alteration is used to evaluate the amount of annual disturbance caused by livestock grazing, the levels of which can then be related to streambank stability and riparian vegetation conditions within the greenline (Cowley and Burton 2005). Bank trampling can lead to increased channel widths, decreased depths, and slower water velocity. These channel changes can cause sediment deposition mid-channel, which can further erode streambanks, reduce water storage in streambanks, resulting in changes to vegetation composition from willows and sedges to drier species. These impacts all reduce the quality of fish habitat. Bengeyfield (2006) reported that bank alteration levels were the most sensitive annual indicator they employed. 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 predominately meadow systems. The Allotment contains a combination

of meadow, wooded, and narrow valley streams. Therefore, use of a combination of move triggers/endpoint indicators will be appropriate for this Allotment.

Proposed monitoring, including adoption of appropriate in-season move triggers and annual use indicators, will enable the SCNF to move cattle off the Allotment 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.

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

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 overutilize 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 potential adverse effects to occur. Under the proposed action, 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). 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 salmon and steelhead freshwater spawning, rearing, and migration sites within the action area.

PBF's - Freshwater Spawning, Rearing, and Migration Sites.

Water Quality – Habitat impacts associated with this Allotment are likely to include a few areas of denuded streambank on each Unit up to a few feet wide where cattle access streams to drink or cross. Early in the season, cattle do not typically loiter in riparian areas and they are expected to access streams to drink or cross in the same areas 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 would be very difficult to distinguish between turbidity resulting from these minor grazing impacts and background turbidity. Cattle grazing 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 and the wide distribution of cattle across the Allotment over each year. In addition, recovering riparian vegetation will function 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 are generally static, and W:D are within the natural range of variability. Water temperatures are meeting RMOs across all tributary streams in the Allotment with the exception of mainstem Panther Creek periodically exhibiting short-term exceedances. These data suggest recent livestock grazing within the Allotment has not resulted in detectable effects to water temperatures within the action area.

The proposed action includes measures (including salting, and use of riders to keep livestock away from critical stream reaches), which should result in livestock having even less potential to impact stream temperatures than has occurred in the past. Proposed annual use standards serve to reduce potential livestock impact on water temperatures by minimizing riparian vegetation use and livestock impact to streambanks to insignificant levels within the Allotment. Further, successful use of the described adaptive management program is expected to prevent site-specific impacts or a onetime 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.

Forage – More than half of some fish's food originates from terrestrial sources (Baxter et. al. 2005; Saunders and Fausch 2007). Their other food source is aquatic with many prey species feeding on terrestrial leaf litter. Aquatic invertebrates also depend heavily on terrestrial vegetation inputs. Therefore, riparian vegetation is very important 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 of 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 impacts to this PBF will be insignificant.

Substrate – Available data from grazed areas of the action area indicates sediment levels in gravels are meeting SCNF standards for volcanic and quartzite geologies. Because the proposed action is nearly identical to the grazing that has occurred during the recent past, it is reasonable to anticipate similar effects in the future. Cattle will cross, water, and graze along some stream reaches in the Allotment and there will undoubtedly be minor instances of sediment introduction at crossings, watering sites, or where foraging activities result in low levels of streambank alteration. These 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 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 functioning appropriately sediment conditions within grazed areas of the Allotment are retained. NMFS also anticipates a long-term reduction in sedimentation as riparian conditions, as well as streambank stability, continue improving over time. Any short-term effects would be insignificant.

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 (one to six months) reduction in overhead vegetative cover at each access point and in individual riparian areas receiving actual grazing use. However, these effects are expected to be very localized, and not at a scale that would influence cover on a stream reach scale. Also, considering the prescribed riparian vegetation utilization standards, grazed riparian vegetation is expected to grow back prior to the start of the following grazing season. Available literature indicates the proposed utilization levels will allow maintenance of vegetation where currently meeting RMOs. Where riparian areas are not meeting RMOs, the SCNF proposes more restrictive utilization standards be applied, which should result in improvement of riparian conditions at near natural rates in these areas. Because riparian conditions have shown demonstrable improvements or maintenance of appropriately functioning conditions in the action

area under past grazing, it is reasonable to assume these patterns will 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 this condition to persist for the term of the proposed action and any reduction of undercut banks that does occur would be minor 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 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 and 20 percent browse on single-stemmed species will be applied to Units when the RMO is not being met. Almost all DMAs are currently meeting RMOs for riparian vegetation and will utilize the higher utilization standards. This level of use has been consistently demonstrated to allowing for a stable trend where currently at PNC, or a trend toward late seral status where not at PNC.

The SCNF has incorporated several conservation measures (e.g., fencing, off-stream water sources and salt placement, established pasture rotations, herding, and forage utilization standards and monitoring) into grazing management on the Allotment in order to limit the impacts of livestock on designated critical habitat. Based on available scientific literature, NMFS expects that the proposed 15 to 20 percent maximum streambank alteration standard and 6-inch minimum stubble height will allow for stream habitat recovery and an upward trend at near natural rates for degraded PBFs.

The SCNF's other conservation measures are also expected to help maintain or achieve late seral status or PNC. A deferred rotation grazing system should ensure no one site is consistently grazed early or late in the season. This will allow for benefits of early and late grazing season to occur regularly, and ensure any detrimental impacts due to early or late season grazing are minimized. For example, when a Unit is grazed first, browse on willows will be less (Hall and Bryant 1995; Kovalchik and Elmore 1991), and when the Unit is deferred the following season, upland and riparian herbaceous plants will be allowed to achieve maximum growth before grazing. 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 moistures 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 fairly 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

would also serve the same purpose. These measures are expected to reduce negative impacts on riparian vegetation to insignificant levels while continuing to improve their seral status.

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 (through adaptive management).

NMFS anticipates that only insignificant effects to critical habitat are likely to occur under the proposed action. Primary reasons for this conclusion include: (1) Habitat and riparian conditions are functioning at or near potential in almost all SCNF-managed reaches, which have been under less restrictive grazing practices in the recent past; (2) stream channels most sensitive to livestock grazing are generally excluded from grazing or occur in Units where late season grazing is not proposed; (3) the SCNF has demonstrated their ability to effectively apply the proposed monitoring and adaptive management strategy to identify potential livestock overutilization and prescribe effective management responses; and (4) there is limited livestock access to sensitive stream reaches designated as critical habitat (due to topography and existing fences). Limiting the action's impacts to the minor levels described will maintain habitat conditions where they currently meet objectives and allow continued improvement in the limited sites that are below objectives. As a result of successfully implementing the proposed action, including conservation measures and monitoring, as described in the BA and this Opinion and based on the best available information, NMFS concurs with the SCNF's findings that the subject action is not likely to adversely affect designated critical habitat for Snake River spring/summer Chinook salmon and Snake River Basin steelhead.

2.12.2 Effects on Southern Resident Killer Whales (*Orcinus orca*)

On November 18, 2005, NMFS listed the SRKW DPS as endangered under the ESA (70 FR 69903). The SRKW DPS (*Orcinus orca*) is composed of a single population that ranges as far south as central California and as far north as Southeast Alaska. Although the entire DPS has the potential to occur along the outer coast at any time during the year, occurrence along the outer coast is more likely from late autumn to early spring. The SRKW have been repeatedly observed feeding off the Columbia River plume in March and April during peak spring Chinook salmon runs (Krahn et al. 2004; Zamon et al. 2007; Hanson et al. 2008; and Hanson et al. 2010). For this reason, the eastern Pacific Ocean, where SRKW overlap with Chinook salmon from the Columbia River basin is also included in the action area due to potential impacts on the whale's prey base.

The final listing rule identified several potential factors that may have resulted in the decline or may be limiting recovery of SRKW including: quantity and quality of prey, toxic chemicals which accumulate in top predators, and disturbance from sound and vessel traffic. The rule further identified oil spills as a potential risk factor for the small population of SRKW. The final recovery plan includes more information on these potential threats to SRKW (73 FR 4176).

NMFS designated critical habitat for the SRKW DPS on November 29, 2006 (71 FR 69054). Designated critical habitat for SRKW includes approximately 2,560 square miles of Puget Sound, excluding areas with water less than 20 feet deep relative to extreme high water. The SRKWs spend considerable time in the Georgia Basin from late spring to early autumn, with concentrated activity in the inland waters of Washington State around the San Juan Islands, and typically move south into Puget Sound in early autumn (NMFS 2008). While these are seasonal patterns, SRKW have the potential to occur throughout their range (from Central California north to the Queen Charlotte Islands) at any time during the year.

Southern Resident killer whales consume a variety of fish species (22 species) and one species of squid (Ford et al. 1998; Ford et al. 2000; Ford and Ellis 2006; Hanson et al. 2010; Ford et al. 2016), but salmon are identified as their primary prey. Southern Residents are the subject of ongoing research, including direct observation, scale and tissue sampling of prey remains, and fecal sampling. Scale and tissue sampling from May to September indicate that their diet consists of a high percentage of Chinook salmon (monthly proportions as high as >90 percent) (Hanson et al. 2010; Ford et al. 2016). The diet data also indicate that the whales are consuming mostly larger (i.e., older) Chinook salmon. Deoxyribonucleic acid (DNA) quantification methods are also used to estimate the proportion of different prey species in the diet from fecal samples (Deagle et al. 2005). Ford et al. (2016) confirmed the importance of Chinook salmon to the Southern Residents in the summer months using DNA sequencing from whale feces. Salmon and steelhead made up to 98 percent of the inferred diet, of which almost 80 percent were Chinook salmon. Coho salmon (*O. kisutch*) and steelhead are also found in the diet in spring and fall months when Chinook salmon are less abundant. Specifically, coho salmon contribute to over 40 percent of the diet in late summer, which is evidence of prey shifting at the end of summer towards coho salmon (Ford et al. 1998; Ford and Ellis 2006; Hanson et al. 2010; Ford et al. 2016). Less than 3 percent each of chum salmon (*O. keta*), sockeye salmon (*O. nerka*), and steelhead were observed in fecal DNA samples collected in the summer months (May through September). Prey remains and fecal samples collected in inland waters during October through December indicate that Chinook and chum salmon are primarily contributors to the whales' diet (NWFSC unpubl. data). Observations of whales overlapping with salmon runs (Wiles 2004; Zamon et al. 2007; Krahn et al. 2009), and collections of prey and fecal samples have also occurred in the winter months. Preliminary analysis of prey remains and fecal samples sampled during the winter and spring in coastal waters indicated that the majority of prey samples were Chinook salmon (80 percent of prey remains and 67 percent of fecal samples were Chinook salmon), with a smaller number of steelhead, chum salmon, and halibut (NWFSC unpublished data). The occurrence of K and L pods off the Columbia River in March suggests the importance of Columbia River spring-run stocks of Chinook salmon in their diet (Hanson et al. 2013) at that time of year. Chinook salmon genetic stock identification from samples collected in winter and spring in coastal waters included 12 U.S. west coast stocks, and over half of the Chinook salmon consumed originated in the Columbia River (NWFSC unpublished data) for the K and L pods (primarily fall-run stocks). Based on genetic analysis of feces and scale samples, Chinook salmon from Fraser River stocks dominate the diet of Southern Residents in the summer (Hanson 2011).

The proposed action will not have any direct effects on SRKW; however, it may indirectly affect the quantity of prey available to them. As described in the above Opinion and ITS, the proposed

action may result in the loss of up to one returning Chinook salmon every year of the grazing rotation. The ocean range of Snake River spring/summer Chinook salmon (Weitkamp 2010) overlaps with the known range and designated critical habitat of SRKW. The loss of up to one returning adult Chinook salmon annually from any given brood year could reduce the SRKW's available prey base when the affected brood would otherwise have been present in the Pacific Ocean.

Given the total quantity of prey available to SRKWs, the reduction in prey due to the proposed action will be extremely small in any given year. Because so few of the SRKW prey will be affected by the action, the effect to the prey base PBF is insignificant. The above Opinion did not identify any potential for the proposed action to influence the quality (size) and/or quality (contaminant levels) of Chinook salmon. NMFS finds that the proposed action will not have anything more than minimal effects on productivity, diversity, or distribution of ESA-listed Chinook salmon, and therefore the effects to the quantity of prey available to the whales in the long term across their vast range is expected to be very small. For these reasons, the proposed action will have an insignificant effect on SRKW, and therefore, NMFS finds that the proposed action may affect, but is not likely to adversely affect SRKW.

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 the SCNF and the Forney Creek Allotment permittees. Individual copies of this Opinion were provided to the SCNF. The format and naming adheres 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, and 50 CFR 402.01 et seq.

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

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

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

4. REFERENCES

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

Bakun, A., B. A. Black, S. J. Bograd, M. García-Reyes, A. J. Miller, R. R. Rykaczewski, and J. Sydeman. 2015. Anticipated Effects of Climate Change on Coastal Upwelling Ecosystems. Current Climate Change Reports 1:85-93. DOI: 10.1007/s40641-015-0008-4, 3/7/2015.

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.

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.

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.

Bjornn, T. C. 1978. Survival, production, and yield of trout and Chinook salmon in the Lemhi River, Idaho. University of Idaho, College of Forestry, Wildlife and Range Sciences Bulletin 27, Moscow, Idaho, USA.

Buckhouse, J.C., J.M. Skovlin, and R.W. Knight. 1981. Streambank erosion and ungulate grazing relationships. Journal of Range Management 34(4). 2p.

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.

Chapman, D., W. Platts, D. Park and M. Hill. 1990. Status of Snake River sockeye salmon. Final Report to PNUCC, June 26. Don Chapman Consultants Inc.: Boise, Idaho. 96 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, W. P. 1999. Stream channel and vegetation responses to late spring cattle grazing. Journal of Range Management 52:218-227.

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.

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

Coutant, C. C., and R. R. Whitney. 2006. Hydroelectric system development: effects on juvenile and adult migration. Pages 249-324 *in* R. N. Williams, editor. Return to the River- Restoring Salmon to the Columbia River. Elsevier Academic Press, Amsterdam.

Cowley, E. R. 2002. Guidelines for Establishing Allowable Levels of Streambank Alteration. Bureau of Land Management. Idaho State Office. March, 2002

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.

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.

Deagle, B. E., D. J. Tollit, S. N. Jarman, et al. 2005. Molecular scatology as a tool to study diet: analysis of prey DNA in scats from captive Steller sea lions. Molecular Ecology 14:1831-1842. DOI: 10.1111/j.1365-294X.2005.02531.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.

Fish Passage Center (FPC). 2020. Online data query for 2019 adult steelhead returns to Lower Granite Dam. Accessed April 20, 2020. http://www.fpc.org/web/apps/adultsalmon/Q_adultcounts_annualtotalsquery.php

Ford, J. K. B., G. M. Ellis, L. G. Barrett-Lennard, et al. 1998. Dietary specialization in two sympatric populations of killer whales (*Orcinus orca*) in coastal British Columbia and adjacent waters. Canadian Journal of Zoology 76:1456-1471.

Ford, J. K. B., G. M. Ellis, and K. C. Balcomb. 2000. Killer whales: the natural history and genealogy of Orcinus orca in British Columbia and Washington. Second edition. UBC Press, Vancouver, British Columbia.

Ford, J. K. B. and G. M. Ellis. 2006. Selective foraging by fish-eating killer whales Orcinus orca in British Columbia. Marine Ecology Progress Series 316:185-199. DOI: 10.3354/meps316185, 7/3/2006.

Ford, M.J. (ed.). 2011. Status review update for Pacific salmon and steelhead listed under the Endangered Species Act: Pacific Northwest. U.S. Dept. Commer., NOAA Tech. Memo. NMFS-NWFSC-113, 281 p.

Ford, M. J., J. Hempelmann, M. Hanson, et al. 2016. Estimation of a Killer Whale (Orcinus orca) Population's Diet Using Sequencing Analysis of DNA from Feces. PLoS ONE 11(1):e0144956. DOI: 10.1371/journal.pone.0144956, 1/6/2016.

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. 2013. Understanding the relationships between livestock disturbance, the protocols used the 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.

Hanson, M. B., and C. K. Emmons. 2008. Annual residency patterns of Southern Resident killer whales in the inland waters of Washington and British Columbia. October 2, 2008. Unpublished report. NWFSC, Seattle, Washington.

Hanson, M. B., R. W. Baird, J. K. B. Ford, J. Hempelmann-Halos, D. M. Van Doornik, J. R. Candy, C. K. Emmons, G. S. Schorr, B. Gisborne, K. L. Ayres, S. K. Wasser, K. C. Balcomb, K. Balcomb-Bartok, J. G. Sneva, and M. J. Ford. 2010b. Species and stock identification of prey consumed by endangered Southern Resident killer whales in their summer range. Endangered Species Research 11:69–82. DOI: 10.3354/esr00263.

Hanson, B. 2011. Southern Residence Killer Whale diet as determined from prey remains and fecal samples. In: Evaluating the Effects of Salmon Fisheries on Southern Resident Killer Whales: Workshop 1, September 21-23, 2011. NOAA Fisheries and DFO (Fisheries and Oceans Canada) Seattle, Washington.

Hanson, M. B., J. A. Nystuen, and M. O. Lammers. 2013. Assessing the coastal occurance of endangered killer whales using autonomous passive acoustic recorders. Journal of the Acoustical Society of America 134(5):3486-3495. DOI: 0001-4966/2013/134(5)/3486/10/, 11/1/2013.

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.

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

ICTRT. 2007. Viability Criteria for Application to Interior Columbia Basin Salmonid ESUs, Review Draft March 2007. Interior Columbia Basin Technical Recovery Team: Portland, Oregon. 261 pp. https://www.nwfsc.noaa.gov/research/divisions/cb/genetics/trt/trt_documents/ictrt_viability_criteria_reviewdraft_2007_complete.pdf

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

IDEQ. (Idaho Department of Environmental Quality). 2001. Middle Salmon River-Panther Creek Subbasin Assessment and TMDL. Boise, Idaho. 114 p.http://www.deq.state.id.us/water/data_reports/surface_water/tmdls/salmon_river_middle_panther/salmon_panther_pref.pdf

IDEQ. 2011. Idaho's 2010 Integrated Report, Final. IDEQ: Boise, Idaho. 776 p.

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

Idaho Department of Fish and Game (IDFG). 2007. Annual returns to Lower Granite Dam, Idaho Department of Fish and Game data provided to NMFS by Peter Hassemer, December 2007. IDFG: Boise, Idaho.

IDFG. 2016. "Hatchery and Wild Chinook Salmon Return to Lower Granite Dam." Follow Idaho Salmon Home (F.I.S.H) website, http://216.206.157.62/idaho/web/apps/MAIN_LGRchinadultreturn_spsu_wild.php, accessed 6-3-16.

Independent Scientific Advisory Board (ISAB). 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.

Joint Columbia River Management Staff. 2014. 2014 Joint Staff Report: Stock Status and Fisheries for Fall Chinook, Coho Salmon, Chum Salmon, Summer Steelhead, and White Sturgeon, January 14, 2014. Oregon Department of Fish & Wildlife, Washington Department of Fish and Wildlife. 88 p.

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.

Rose, Robert. 2012. Aquatic Species Biological Assessment for Livestock Grazing on the Forney Allotment. Salmon-Cobalt Ranger District. Salmon-Challis National Forest. Lemhi County, Idaho. May 28, 2012.

USDA, Forest Service, 1995. Goals, objectives, and standard/guidelines as described in the EA and subsequent FONSI and DN/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).

USFS. 2020. Aquatic Species Biological Assessment for Livestock Grazing on the Forney Allotment. Salmon-Cobalt Ranger District. Salmon-Challis National Forest. Lemhi County, Idaho. February 24, 2020.

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.

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.

Kovalchik, B. L., and W. Elmore. 1991. Effects of cattle grazing systems on willow dominated plant associations in central Oregon. ln: Proceedings-Symposium on ecology and management of riparian shrub communities. Compiled by Warren P Clary, E. Durant McArthur, Don Bedunah, and Carl L.Wambolt. May 29-31 1991, Sun Valley, ID. USDA Forest Service General Technical Report INT-289, Intermountain Research Station, Ogden, UT. pp. 111-119.

Krahn, M. M., M. J. Ford, W. F. Perrin, P. R. Wade, R. P. Angliss, M. B. Hanson, B. L. Taylor, G. M. Ylitalo, M. E. Dahlheim, J. E. Stein, R. S. Waples. 2004. 2004 Status Review of Southern Resident Killer Whales (*Orcinus orca*) under the Endangered Species Act. US Department of Commerce, NOAA Tech. Memo. NMFS-NWFSC-62, Seattle, WA, xvii+73pp.

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.

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

Martin J. and P. Glick. 2008. A great wave rising: Solutions for Columbia and Snake River salmon in the age of global warming. Light in the River Reports. 28 p. https://www.sierraclub.org/sites/www.sierraclub.org/files/sce-authors/u7661/AGreatWaveRising.pdf

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.

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.

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

NMFS. 1996. Making Endangered Species Act Determinations of Effect for Individual and Grouped Actions at the Watershed Scale. Habitat Conservation Program, Portland, Oregon.

NMFS. 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. 2008. Recovery plan for southern resident killer whales (Orcinus orca). Prepared by the National Marine Fisheries Service, Northwest Regional Office. https://www.westcoast.fisheries.noaa.gov/publications/protected_species/marine_mammals/killer_whales/esa_status/srkw-recov-plan.pdf

NMFS. 2017. ESA Recovery Plan for Snake River Spring/Summer Chinook Salmon (Oncorhynchus tshawytscha) & Snake River Basin Steelhead (Oncorhynchus mykiss) November 2017. Prepared by National Marine Fisheries Service West Coast Region. 284 p. http://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

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

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.

Oregon Department of Fish and Wildlife and Washington Department of Fish and Wildlife (ODFW and WDFW). 2019. 2019 Joint Staff Report: Stock Status and Fisheries for Spring Chinook, Summer Chinook, Sockeye, Steelhead, and other Species. Joint Columbia River Management Staff. 97 pp.

Pacific Fishery Management Council (PFMC). 1998. Description and identification of essential fish habitat for the Coastal Pelagic Species Fishery Management Plan. Appendix D to Amendment 8 to the Coastal Pelagic Species Fishery Management Plan. Pacific Fishery Management Council, Portland, Oregon. December.

PFMC. 2008. Management of krill as an essential component of the California Current ecosystem. Amendment 12 to the Coastal Pelagic Species Fishery Management Plan. Environmental assessment, regulatory impact review & regulatory flexibility analysis. Pacific Fishery Management Council, Portland, Oregon. February.

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

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.

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.

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.

Stelle, W. 2013. Memo to Northwest Region Assistant Regional Administrators Re: Guidance on ESA Consultation for Southern Resident Killer Whales and Other Listed Marine Mammals. National Marine Fisheries Service, Seattle Washington.

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.

United States Forest Service (USFS). 2020. Aquatic Species Biological Assessment for Livestock Grazing on the Forney Allotment. Salmon-Cobalt Ranger District. Salmon-Challis National Forest. Lemhi County, Idaho. February 24, 2020.

Weitkamp, L. A. 2010. Marine Distributions of Chinook Salmon from the West Coast of North America Determined by Coded Wire Tag Recoveries. Transactions of the American Fisheries Society 139:147-170.

Wiles, G. J. 2004. Washington State Status Report for the Killer Whale. Washington Department of Fish and Wildlife, Olympia, 3/1/2004.

Winward, A. H. 2000. Monitoring the vegetation resources in riparian areas. Gen. Tech. Rep. RMRS-GTR-47. Fort Collins, CO: U.S. Department of Agriculture Forest Service. April, 2000.

Wyman, S., D. Bailey, M. Borman, S. Cote, J. Eisner, W. Elmore, B. Leinard, S. Leonard, F. Reed, S. Swanson, L. Van Riper, T. Westfall, R. Wiley, and A. Winward. 2006. Riparian area management: grazing management processes and strategies for riparian-wetland areas. United States Department of the Interior, Bureau of Land Management, Technical Reference 1737-20:1–105.

Zamon, J. E., T. J. Guy, K. Balcomb, and D. Ellifrit. 2007. Winter observation of southern resident killer whales (*Orcinus orca*) near the Columbia River plume during the 2005 Chinook salmon (*Oncorhynchus tshawtscha*) spawning migration. Northwestern Naturalist, 88(3): 193-198.

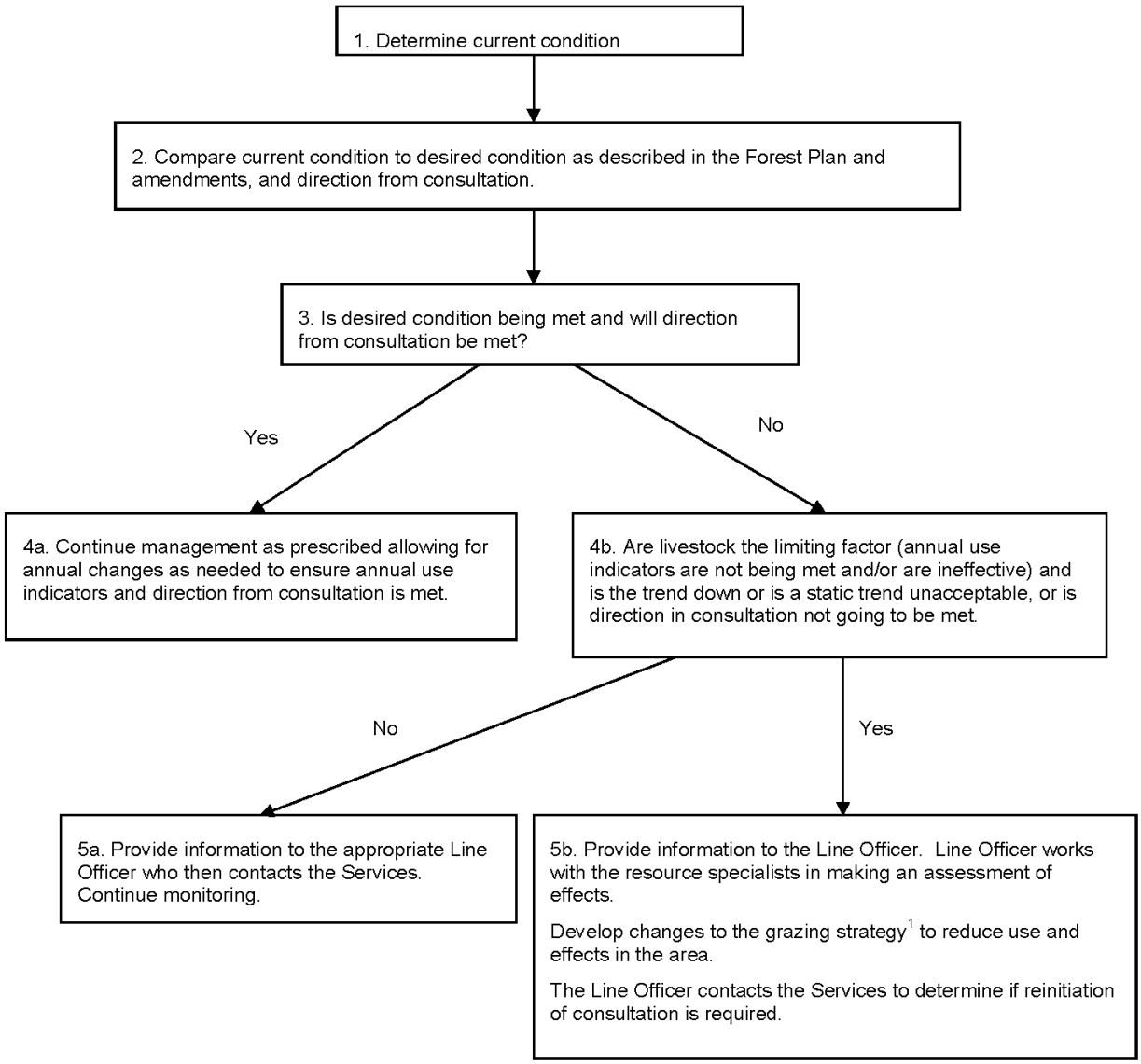
Zoellick, B. W. 2004. Density and biomass of redband trout relative to stream shading and temperature in southwestern Idaho. Western North American Naturalist. 64(1). pp. 18-26

5. Appendix A

Salmon Challis National Forest

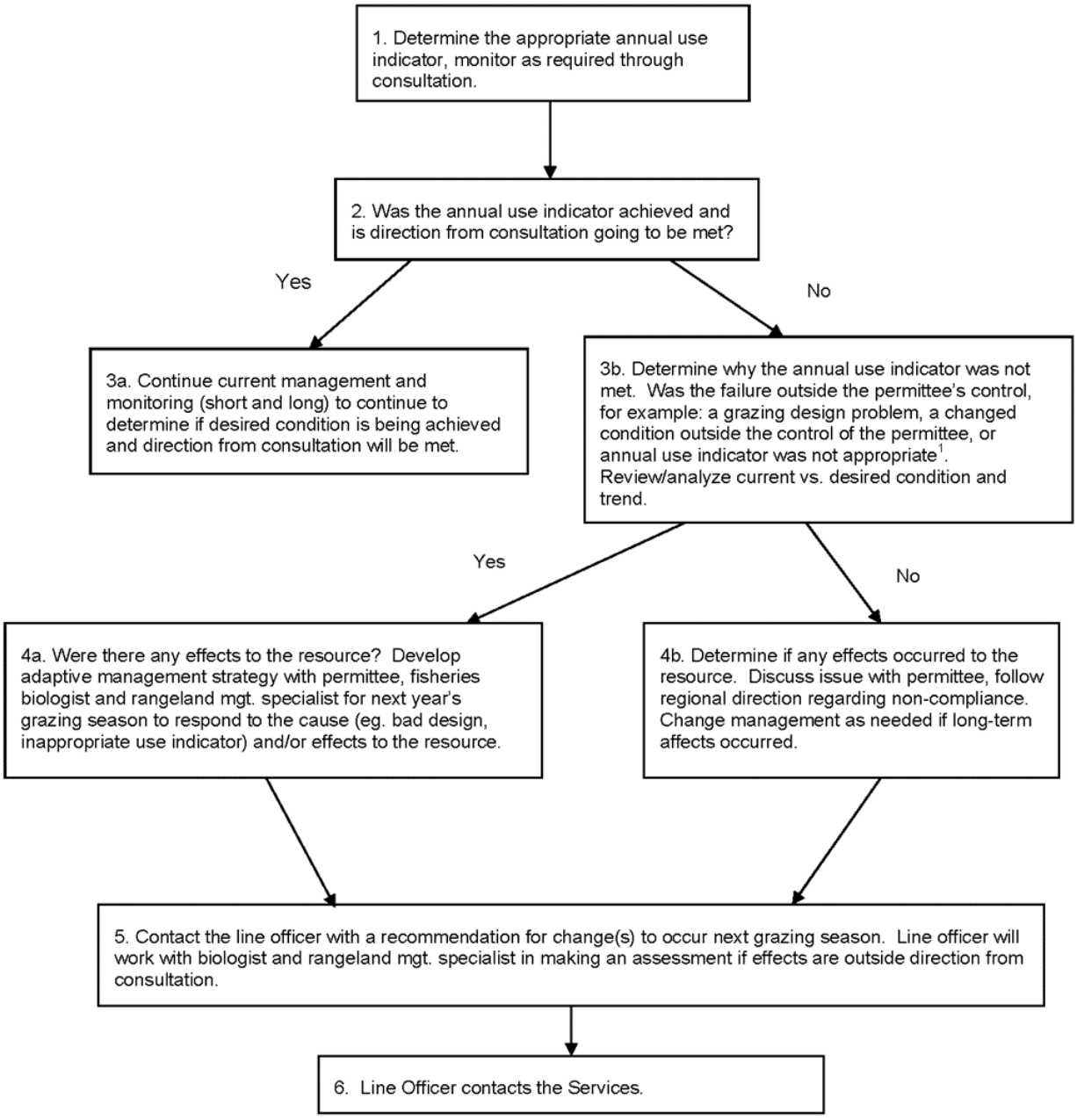
Adaptive Management Strategy for Grazing Allotments

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]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, changing to a more appropriate indicator will help achieve or maintain desired conditions.