UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
West Coast Region
777 Sonoma Avenue, Room 325
Santa Rosa, California 95404-4731

October 20, 2021 **Refer to NMFS No:** WCRO-2021-01371

Rachel Smith
Forest Supervisor
Klamath National Forest
1711 South Main Street
Yreka, California 96097

Re: Endangered Species Act Section 7(a)(2) Biological Opinion and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Response for the Oak Knoll Range Project in Siskiyou County, California

Dear Ms. Smith:

Thank you for your letter of May 17, 2021, 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 Oak Knoll Range Project. This consultation was conducted in accordance with the 2019 revised regulations that implement section 7 of the ESA (50 CFR 402, 84 FR 45016). NMFS concludes that the action, as proposed, is not likely to jeopardize the continued existence of Southern Oregon Northern California Coast (SONCC) coho salmon. We also concur with the Klamath National Forest's (KNF) determination that the proposed action is not likely to adversely affect designated critical habitat for SONCC coho salmon.

Thank you, also, for your request for consultation pursuant to the essential fish habitat (EFH) provisions in Section 305(b) of the Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C. 1855(b)) for this action. NMFS reviewed the likely effects of the proposed action on EFH and concluded that the action would adversely affect Pacific Coast Salmon EFH, namely Chinook and coho salmon. Therefore, we have included the results of that review in Section 3 of this document, but have not included EFH conservation recommendations, as ESA terms and conditions contained herein adequately avoid, minimize, and mitigate anticipated adverse effects on EFH.

Please contact Roman Pittman at NMFS' Northern California Office in Arcata, California at (707) 825-5167 or email roman.pittman@noaa.gov if you have any questions concerning this consultation, or if you require additional information.

Sincerely,

Alecia Van Atta
Assistant Regional Administrator
California Coastal Office

Enclosure

cc: Brian Thomas, KNF fish biologist, brian.thomas3@usda.gov
ARN 151422WCR2021AR00108

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

Oak Knoll Range Project

NMFS Consultation Number: WCRO-2021-01371
Action Agency: Klamath National Forest (KNF)

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?
Southern Oregon / Northern California coastal coho salmon (*Oncorhynchus kisutch*)	Threatened	Yes	No	No	No

Essential Fish Habitat and NMFS' Determinations:

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

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

Issued By:

Alecia Van Atta
Assistant Regional Administrator
California Coastal Office

Date: October 20, 2021

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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

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

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

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

1.2. Consultation History

On July 11, 2016, NMFS' Don Flickinger participated in a Klamath National Forest (KNF) and Rogue/Siskiyou National Forest (RSNF) joint site visit to the Siskiyou Crest, to observe areas affected by KNF allotment livestock drift over onto the RSNF, namely a meadow just north of Grouse Gap and the McDonald Basin in Jackson County, Oregon.

On October 17, 2018, the KNF's Bobbie Miller and Flickinger visited lower Cow Creek near the Oregon/ California border, to assess KNF allotment livestock impacts along and in Cow Creek and its adjacent side channels – both Southern Oregon/Northern California Coast (SONCC) coho salmon critical habitat. Photographic images were taken that documented fresh/recent and older livestock impacts along lower Cow Creek. When subsequently driving downslope along mainstem Beaver Creek, Miller and Flickinger met up with East Beaver Allotment permittee sub-contractors, who were gathering allotment livestock. This gathering was occurring after the prescribed allotment off date.

The following year, on November 12, 2019, The KNF's Brian Thomas and Flickinger again visited lower Cow Creek, and again observed and photographed both fresh/recent and older allotment livestock impacts in the same reach of lower Cow Creek, as well as at several livestock access points along mainstem Beaver Creek. Thomas and Flickinger then encountered two cows and a calf in the riparian area along Beaver Creek, upstream from the Beaver Creek Corral. A nearby portable corral had been recently constructed and used to hold East Beaver Allotment livestock before transport off the allotment, and it appeared that these three animals had been left

behind. This livestock gathering was occurring well after the prescribed allotment off date. Thomas and Flickinger immediately reported their findings and shared their photo documentation with KNF fisheries and range staff. They also began to formulate plans to address the livestock-related impacts on SONCC coho salmon critical habitat that they had observed.

On March 12, 2020, Flickinger participated in an Oak Knoll Range Project interdisciplinary team and allotment permittee visit to the same areas visited in 2018 and 2019. The group discussed proposed activities that could avoid and/or minimize impacts caused by livestock movement along and within SONCC coho salmon critical habitat, both when entering the East Beaver Allotment in spring and again when returning downslope in the fall. These activities form core elements of the proposed action that are analyzed in this Biological Opinion.

On October 2nd and October 20th, 2020, the KNF provided NMFS with two iterations of a draft biological assessment (BA) on the proposed action for review, to which NMFS provided comments and edits on October 29th, 2020.

On May 24th, 2021, NMFS received a biological assessment and a cover letter from the KNF requesting initiation of formal consultation for the proposed action on the SONCC coho salmon.

On June 4, 2021, NMFS requested additional information from the KNF regarding the proposed action.

On June 9, 2021, the KNF provided the requested information, which initiated formal consultation on the proposed action.

1.3. Proposed Federal Action

Under the ESA, "action" means all activities or programs of any kind authorized, funded, or carried out, in whole or in part, by Federal agencies (50 CFR 402.02). Under MSA, Federal action means any action authorized, funded, or undertaken, or proposed to be authorized, funded, or undertaken by a Federal Agency (50 CFR 600.910).

The KNF proposes to provide for livestock grazing in the East Beaver, Hornbrook, and Ash Creek allotments on the Klamath National Forest from 2022 to 2031. Up to 156 cow-calf pairs for four and one-half months on 42,391 acres in the East Beaver allotment, 89 cow-calf pairs for two and one half months on 5,013 acres on the Ash Creek allotment, and 10 cow-calf pairs for two months on 1,713 acres on the Hornbrook allotment. Activities include conducting range readiness monitoring prior to turn out from April or early May in the lower elevations of allotments. Livestock are either driven or trucked onto each allotment.

Livestock will be removed when Northwest Forest Plan (Forest Plan) (USDA and USDI 2004) standards and guidelines for utilization are reached in wet meadows, uplands, and riparian areas pursuant to the terms outlined in the Environmental Assessment (EA), and generally will be no later than October. Livestock will be removed when percent allowable utilization levels by ecological condition are reached. Rangelands will be monitored in key areas to meet standards identified in the Forest Plan. Livestock removal is determined by monitoring the amount of

forage remaining at the end of the season in "key areas" in upland, wet meadow, and riparian zones. "Key areas" occur within each allotment and have been selected based on typical livestock use of an area. Yearly fluctuations in range condition are primarily associated with rainfall and site conditions; however, key areas have been selected where livestock forage use accounts for these changes as well.

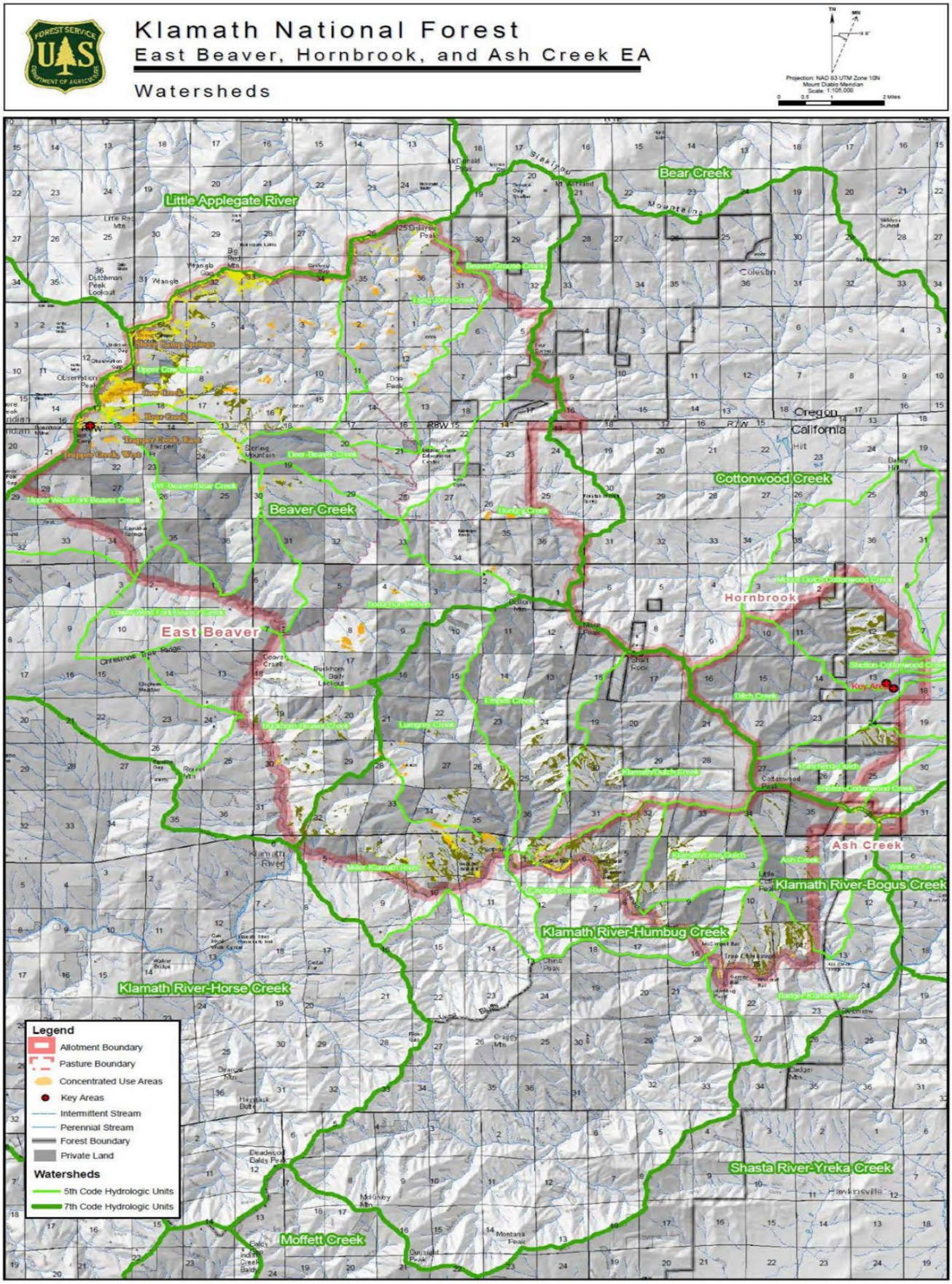
1.3.1 Project Location and Description

The project area is located within the Klamath National Forest, Oak Knoll Ranger District, East Beaver, Hornbrook, and Ash Creek grazing allotments in Siskiyou County, California and in Jackson County, Oregon (Figure 1). The project area covers approximately 85,411 acres total (49,117 acres on National Forest System lands and 36,294 acres in private ownership). The East Beaver Allotment is approximately 67,830 acres (42,391 acres National Forest System lands and 25,440 acres private lands). The Ash Creek Allotment is approximately 8,801 acres (5,013 acres National Forest System lands and 3,791 acres private lands). The Hornbrook Allotment is approximately 8,780 acres (1,713 acres National Forest System lands and 7,067 acres private lands). The project area falls within the Beaver Creek, Cottonwood Creek, and Klamath River-Humbug 5th Field Watersheds. Table 1 shows the ownership acres by allotment and the percent within the Project area.

Table 1. - Allotment Acres by Ownership (Thomas 2021)

Ownership	Allotment			Totals	Percent of Project Area
	Ash Creek	East Beaver	Hornbrook		
USFS	5,013	42,391	1,713	49,117	57.5%
Private/Other	3,788	25,439	7,067	36,294	42.5%
Total Acres	8,801	67,830	8,780	85,411	100%

Figure 1. Ash Creek, East Beaver Creek, and Hornbrook Allotment Boundaries (Thomas 2021)



1.3.2 Design Criteria

Design criteria will be incorporated into allotment management plans and will define the limits of grazing management activities. Design criteria include proposed grazing season, stocking rates, range readiness, and utilization levels as described in detail below.

1.3.2.1 Grazing Season and Stocking Rates

The number of livestock as measured by number of cow-calf pairs and period of use by grazing allotment will be determined yearly as part of the adaptive management plan. The season of use will be set based on results from range readiness checks conducted prior to turn on and utilization levels monitored throughout the grazing season. Stocking rates may be adjusted in order to meet management objectives, resource standards, and desired conditions. Typical on/off dates and number of cow-calf pairs per allotment are listed below in Table 2; however, as previously described, these may be subject to small, annual adjustments. Additionally, these numbers do not include head months of cattle permitted on private land (e.g., land owned by private timber companies) within the allotments as allowed for in the Term Grazing Permits with On/Off Provisions.

KNF proposes to authorize grazing by two permittees on the East Beaver Allotment. The first permittee uses the lowest elevations of the East Beaver Allotment, below stream reaches with coho salmon spawning and emergence areas, during the spring grazing season (April 1 to June 15) in conjunction with the Hornbrook Allotment. These cattle either drift or are herded into the summer range around July 15 after coho salmon fry emergence in March and April. The second permittee hauls cattle to higher elevation and releases them around June 15, also after fry emergence. Driving cattle into the East Beaver Allotment involves cattle crossing and watering at Lower Cow Creek, Lower Grouse Creek and Beaver Creek from the Cow and Grouse Creek confluence to approximately 1.75 miles downstream to the Hungry Creek corral. Permittees are required to herd stray cattle discovered during this migration to the nearest USFS road within two days.

Table 2. Current grazing season and stocking rates (Thomas 2021)

Allotment Name	Maximum Grazing Season	Maximum Permitted Cow-Calf Pairs	Maximum Head Months[1]
East Beaver	April 1 through June 15	32	80
East Beaver	June 16 through October 31	156	708
Ash Creek	April 1 through June 30	89	266
Hornbrook	April 15 through June 15	10	20

[1] Head months are the number of permitted livestock multiplied by the number of months they are out on the federal grazing allotment. (e.g., 100 head x 3 months = 300 head months.

1.3.2.2 Range Readiness

Range readiness is determined prior to annual entry into allotments, or units within allotments, by key species phenology (or growth stage) and soil condition. Range readiness defines the time in the plant growth cycle when grazing may begin without causing permanent damage to vegetation and soil (Heady and Child 1994). The primary factor determining range readiness on the Forest is phenology of forage plant species and soil moisture level; annual climate variation, and forage utilization from the previous season are also considered. Grazing will be delayed until soils are dry enough to carry stock without breaking sod and destroying vegetative cover. Typical turn out dates are designed to allow grazing entrance onto allotments after the range is ready to withstand grazing. Turn out dates may be adjusted annually, and the grazing season would be authorized through the grazing bill.

1.3.2.3 Utilization Levels

Utilization is generally considered to be the percentage of current vegetation removed by grazing animals, or sometimes the converse: the amount of residual vegetation left after grazing. The design criteria for utilization is defined in the Forest Plan and described in terms of the percent of vegetation that can be removed during an annual grazing cycle. This is a short-term monitoring tool; however, long-term monitoring protocols are used to determine if ecological condition is satisfactory or unsatisfactory (Table 3). Moderate to high ecological condition with a stable or upward trend would be designated as satisfactory condition. Low condition, and any plot with a downward trend, would be considered unsatisfactory condition. Ecological condition would then dictate the percent allowable utilization levels for that area (Table 3). For example, if long-term monitoring shows that a wet meadow is in unsatisfactory condition, up to 40 percent of the forage vegetation could be removed that season. Ash Creek and Hornbrook are both managed as a one pasture unit and East Beaver as a four pasture unit. Livestock will be moved from forage areas (or the allotments, when all pasture units have reached allowable use standards) when they reach allowable use standards on herbaceous or woody vegetation (whichever comes first).

Table 3. Percent Allowable Utilization Levels by Ecological Condition (USDA 1995)

Ecological Condition	Upland	Wet Meadow	Riparian
Satisfactory	40 – 55 percent[1]	45 – 60 percent 3 – 4 inches[2]	40 – 50 percent 3 – 4 inches
Unsatisfactory	25 – 35 percent	25 – 40 4 – 5 inches	20 – 30 percent 4 – 5 inches
Utilization levels of woody vegetation	45 – 55 percent	45 – 55 percent	35 – 50 percent

[1]This figure represents the percentage of the current year's growth that is acceptable to be removed during a single grazing year (utilization level).

[2]This represents the approximate height of vegetation that will remain on the site after the end of the grazing season. This figure is an estimate, based on a general knowledge of the herbaceous species that occupy these types of sites within the Klamath Province. These figures must be refined based on species composition and growing conditions.

1.3.2.4 Livestock Grazing Authorization

Cattle grazing on the East Beaver, Hornbrook, and Ash Creek allotments will be implemented using term grazing permits with on and off provisions. On and Off Provisions refer to when cattle are released on the allotment and later removed. They are granted when a grazing area

contains both lands under Forest Service administration and private lands. The intent is to promote efficient use of intermingled ownership, while at the same time achieving desired conditions on National Forest System (NFS) lands.

1.3.3 Cow Creek Exclosure and Water Development

The KNF will construct a fence to prevent ongoing cattle access and associated streambank damage to an area of lower Cow Creek, approximately 0.35 miles upstream from the confluence of Cow and Grouse creeks. This section of Cow Creek is currently accessible to cattle for watering opportunities due to low gradient banks and is designated critical habitat for federally listed SONCC coho salmon. The approximate size of the exclosure will be 550 feet long and 150 to 200 feet wide. The fence will be about four to five feet high, depending on materials used.

The proposed exclosure could lead to cattle using springs or other less accessible creek locations in the area and/or damaging the fence while trying to access water. To reduce these risks, a water development will be constructed near the Cow Creek exclosure, adjacent to the roadway and partially within the prism of Forest Road 40S16, where a spring emerges uphill of the road. Water from the spring runs year-round down the hillside to a small ditch adjacent to the road, and eventually into Cow Creek. Approximately three cubic yards (81 cubic feet) of the existing ditch will be further excavated and compacted to hold water for use by cattle and other animals. The area immediately surrounding the water development and the side slope of the ditch will also be compacted to reduce erosion and protect the roadbed. The water development and ditch will be regularly cleaned to remove build-up of sediment and debris. The proposed water development is not expected to measurably decrease the overall flow of water into Cow Creek and will be located downhill of the spring and directly adjacent to where cattle typically travel on the road. The KNF expects that cattle will drink from the water development and will not have incentive to travel upslope to enter the spring area.

A seasonal restriction of October 1st to June 15th will apply to construction of the fence. The fence will be built by hand, with the exception of a hand-held pneumatic post pounder. No mechanized equipment will enter the wetted channel of Cow Creek during both fence construction and post-construction maintenance.

1.3.4 Water Drafting and Corral Use

When cattle are gathered at the corrals during transportation activities, water is typically drafted from the adjacent Beaver Creek channel to water the cattle. Water withdrawal for use by cattle while they are being held at the Hungry Creek corral will occur in an area occupied by coho salmon, Chinook salmon, and steelhead. Water will be drafted using a NMFS-compliant fish screen (NMFS 2001) from mainstem Beaver Creek directly across FS Road 40S16 from the Hungry Creek Corral, and just upstream of the Hungry Creek confluence. Drafting will follow NMFS's Water Drafting Specifications (NMFS 2001) which includes, but is not limited to, the following measures:

A. Drafting will not reduce the stream flow in anadromous fish-bearing reaches by more than 10 percent.
B. When water is drafted from anadromous fish bearing reaches, intakes will be screened with 3/32-inch mesh (for round or square openings).

C. Pumping rate will not exceed 350 gallons per minute or 10 percent of the flow of the anadromous fish-bearing stream. Actual pumping rates will be much less than 350 gallons per minute, as only a small pump (approximately 75 gallons per minute) will be used.
D. Pumping will be terminated when tank is full to prevent erosion at the bank.

Cattle are held at the corral during two time periods. In the late spring when they are transported from their winter range, and in late September-October after they have been moved down from their summer range. The cattle are usually only held at the corral for a few days before they are moved up to their summer range or transported down in livestock trucks to their winter range. Thus, water drafting in Beaver Creek will only occur for a few days in the late spring and in late September-October. During the fall gather, cattle will be held at the Hungry Creek Corral for a period of no more than three days.

1.3.5 Monitoring Strategy

Rangeland monitoring will be used to determine if desired conditions are met and whether adjustments in management actions need to be implemented. Two types of monitoring, implementation and effectiveness, are proposed (Table 4). Monitoring within the Ash Creek and Hornbrook allotments will be limited to the determination of range readiness as part of yearly implementation monitoring due to the limited access, lack of primary rangeland areas within these allotments, and because most riparian areas in these allotments are protected from livestock disturbance by natural barriers or streambanks armored with rocks.

Table 4. Allotment monitoring type and schedule (Thomas 2021)

Allotment	**Implementation Monitoring (Yearly)**	**Effectiveness Monitoring**
East Beaver	Range Readiness Utilization Multiple Indicator Monitoring	Rooted Frequency Best Management Practices Effectiveness Program Multiple Indicator Monitoring
Hornbrook	Range Readiness	None
Ash Creek	Range Readiness	None

1.3.6 Implementation Monitoring

Implementation monitoring (short-term, annual indicator measurements) can include utilization, photo points, streambank sampling, browse measurements, and other aspects such as water quality testing and noxious weed inventory. Implementation monitoring will indicate whether proposed actions are being implemented as planned and that the management requirements, standards, and other design criteria are being met. It will be used annually in key areas to determine range readiness and utilization levels. Key areas include meadows and riparian areas that located within a single plant community, are responsive to management actions, and are indicative of the plant community they are intended to represent (USDI 2006).

1.3.6.1 Range Readiness Monitoring

Range readiness will be monitored using key species phenology and other factors as previously described. Soils will be firm on dry meadows and other dry feed areas. Moist meadows should be

for the most part dry enough to carry stock without breaking sod and destroying vegetative cover. Key species design criteria by range type are detailed in the BA.

1.3.6.2 Utilization Monitoring

Percent herbaceous utilization for the East Beaver allotment will typically be collected using landscape appearance methods in key areas; however, other methods may be used. Woody utilization will be collected using landscape appearance and ocular estimate methods in grazed riparian areas. Current monitoring protocols are found in the technical reference (USDI 2011).

1.3.6.3 Multiple Indicator Monitoring

Multiple indicator monitoring (MIM) provides an efficient and effective approach to monitoring streambanks, stream channels, and riparian vegetation (USDI 2011). MIM will be conducted both during implementation and effectiveness monitoring. This monitoring procedure will be used at designated monitoring areas to help evaluate livestock grazing impacts, to ensure that the vegetation and stream channels are meeting or moving towards desired conditions, and whether the Forest Plan Aquatic Conservation Strategy (ACS) is being met.

MIM will take place in riparian areas to gain understanding about potential riparian impacts of the proposed action, in addition to the ongoing meadow monitoring associated with established permanent plots in pasture units. One MIM plot is currently established in the East Beaver Allotment in the Cow Creek unit and will continue to be used for monitoring.

The MIM protocol is designed to integrate annual grazing use and long-term trend indicators. The following indicators can be used to measure streambank stability, vegetation composition condition and trend, woody species use, and channel width/depths:

Annual indicators include:

- streambank alteration,
- woody species browse,
- stubble height.

Long-term indicators include:

- greenline to greenline channel width,
- woody species height class,
- woody species age class,
- greenline vegetation composition,
- streambank stability and cover.

These indicators will provide data to assess the current condition and trend of streambanks, channels, and vegetation. Long-term indicators will generally be taken at five-year intervals. Annual indicators will be recorded during implementation utilization monitoring. If a downward trend occurs, the adaptive management strategy will be implemented to change management actions until conditions meet desired conditions. Annual indicator standards will then be assigned in order to maintain a stable or upward trend according to current monitoring protocols (USDI 2011). The KNF proposes to limit streambank damage to no more than 10 percent over the course of the grazing season for all three allotments (Thomas 2021).

1.3.5.4 Drift Monitoring

Cattle are known to drift from the East Beaver Allotment onto the Rogue River-Siskiyou National Forest along the Siskiyou Crest. Potential cattle drift is known to be a concern outside the north boundary of the East Beaver Allotment; the other two allotments within the project area do not contribute to drift. Cattle drift in this area will be checked regularly throughout the grazing season by the permittees and KNF personnel. Instructions for permittees will be included in the annual operating instructions and checks will be done as often as necessary to prevent and catch drift. KNF staff will also increase monitoring efforts during the summer, in order to reduce the amount of time drift cattle spend in unpermitted areas. Cattle from adjacent Rogue River-Siskiyou National Forest allotments are also known to drift onto KNF lands. KNF staff and permittees also monitor for the presence of Rogue River-Siskiyou National Forest cattle to reduce the amount of time they spend on KNF lands. When cattle are reported or found in any of these areas, positive identification of livestock, location of livestock, time, and date will be noted along with photos. The permittee will be initially notified that livestock must be removed from the restricted area and given the above information by phone by the respective Forest range staff personnel. The permittee(s) will be expected to promptly remove cattle from the area. Those cattle that repeatedly move off the East Beaver Allotment will first be hauled to a different location within the allotment, and then removed from National Forest Lands if drift is still occurring. If the permittee does not comply with instructions concerning drift, permit action will be taken, including possible suspension or revocation of grazing permits.

1.3.6.5 Effectiveness Monitoring

Effectiveness monitoring will be used to determine rangeland health, ecological condition, and trends in key areas within the East Beaver Allotment. The typical methods include rooted frequency vegetation sampling, best management practices effectiveness program (BMPEP), and MIM. Effectiveness monitoring is not proposed within the Ash Creek and Hornbrook Allotments due to the limited access, lack of primary rangelands, and because most riparian areas in these allotments are protected from livestock disturbance through herding, lack of forage, and natural barriers. Permanent plots on key areas have been established in the East Beaver Allotment to provide long-term monitoring of range condition. Monitoring provides ecological classification (vegetative, soil, and hydrologic) and quantitative condition scorecards for meadows. Each plot will be monitored using the rooted frequency method (Weixelman 2014) at intervals no greater than every five to ten years.

1.3.7 Adaptive Management Strategy

If monitoring reveals management actions to be insufficient in meeting standards and desired conditions, changes may be facilitated to best ensure that desired outcomes are met or re-evaluated. An adaptive management strategy is currently implemented on the East Beaver, Hornbrook, and Ash Creek allotments; this strategy is designed to maintain or improve trends in rangeland vegetation condition, stream condition, and forage utilization and to allow flexibility to accomplish this through a variety of management actions.

Adaptive management can include installation of water developments, cattleguards, fences, and exclosures. Responsibilities for the maintenance of such improvements is typically designated in the permit. Examples of administrative and adaptive management options are listed in the BA.

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

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

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

2.1. Analytical Approach

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

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

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

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

We use the following approach to determine whether a proposed action is likely to jeopardize listed species or destroy or adversely modify critical habitat:

- Evaluate the rangewide status of the species and critical habitat expected to be adversely affected by the proposed action.
- Evaluate the environmental baseline of the species and critical habitat.
- Evaluate the effects of the proposed action on species and their habitat using an exposure-response approach.
- Evaluate cumulative effects.
- In the integration and synthesis, add the effects of the action and cumulative effects to the environmental baseline, and, in light of the status of the species and critical habitat, analyze whether the proposed action is likely to: (1) directly or indirectly reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species, or (2) directly or indirectly result in an alteration that appreciably diminishes the value of critical habitat as a whole for the conservation of a listed species.
- If necessary, suggest a reasonable and prudent alternative to the proposed action.

2.2. Rangewide Status of the Species and Critical Habitat

This opinion examines the status of each species that is likely to be adversely affected by the proposed action. The status is determined by the level of extinction risk that the listed species face, based on parameters considered in documents such as recovery plans, status reviews, and listing decisions. This informs the description of the species' likelihood of both survival and recovery. The species status section also helps to inform the description of the species' "reproduction, numbers, or distribution" for the jeopardy analysis. The opinion also examines the condition of critical habitat throughout the designated area, evaluates the conservation value of the various watersheds and coastal and marine environments that make up the designated area, and discusses the function of the PBFs that are essential for the conservation of the species.

2.2.1 Species Description and General Life History

Most coho salmon have a 3-year life history, though some may spend more than one year in freshwater, which can make the analysis challenging on age at return and coho salmon population structure (Bennett et al. 2015). The adults typically migrate from the ocean and into bays and estuaries towards their freshwater spawning grounds in late summer and fall, and spawn by mid-winter. Adults die after spawning. The eggs are buried in nests, called redds, in the rivers and streams where the adults spawn. The eggs incubate in the gravel until fish hatch and emerge from the gravel the following spring as fry. These 0+ age fish typically rear in freshwater for about 15 months before migrating to the ocean. The juveniles go through a physiological change during the transition from fresh to salt water called smoltification. Coho salmon typically rear in the ocean for two growing seasons, returning to their natal streams as 3-year old fish to renew the cycle. Male jacks return at age 2 after spending approximately six months at sea, and provide important genetic material across coho salmon cohorts, such that each coho salmon cohort does not become reproductively isolated from the others.

2.2.2 Status of Species and Critical Habitat

In this biological opinion, NMFS assesses four population viability parameters to help us understand the status of each species and their ability to survive and recover. These population viability parameters are: abundance, population productivity, spatial structure, and diversity (McElhaney et al. 2000). While there is insufficient information to evaluate these population viability parameters in a thorough quantitative sense, NMFS has used existing information, including the Recovery Plan for SONCC coho salmon (NMFS 2014) to determine the general condition of each population and factors responsible for the current status of the Evolutionarily Significant Unit (ESU). We use these population viability parameters as surrogates for numbers, reproduction, and distribution, the criteria found within the regulatory definition of jeopardy (50 CFR 402.02).

2.2.3 Status of SONCC Coho Salmon

Although long-term data on coho salmon abundance are scarce, the available evidence from short-term research and monitoring efforts indicate that spawner abundance has declined since the last status review for populations in this ESU (Williams et al. 2016). In fact, most of the 30 independent populations in the ESU are at high risk of extinction because they are below or likely below their depensation threshold, which can be thought of as the minimum number of adults needed for survival of a population.

The distribution of SONCC coho salmon within the ESU is reduced and fragmented, as evidenced by an increasing number of previously occupied streams from which SONCC coho salmon are now absent (NMFS 2001, Good et al. 2005, Williams et al. 2011, Williams et al. 2016). Extant populations can still be found in all major river basins within the ESU (70 FR 37160 (June 28, 2005)). However, extirpations, loss of brood years, and sharp declines in abundance (in some cases to zero) of SONCC coho salmon in several streams throughout the ESU indicate that the SONCC coho salmon's spatial structure is more fragmented at the population-level than at the ESU scale. In spite of recent SONCC coho salmon spawning activity in strongholds like the Klamath River tributaries of Horse, Middle, and Seiad creeks (Dennis et al. 2019), and the Scott River (NMFS 2014) the genetic and life history diversity of populations of SONCC coho salmon is generally low and is inadequate to contribute to a viable ESU, given the significant reductions in abundance and distribution. A viable ESU contains populations that exist as a metapopulation that as an entity is naturally self-sustaining into the foreseeable future, no longer needs the protection of the Endangered Species Act, and therefore can be “delisted” – taken off the list of threatened and endangered species.

2.2.4 Status of Critical Habitat

The condition of SONCC coho salmon critical habitat, specifically its ability to provide for their conservation, has been degraded from conditions known to support viable salmon populations. NMFS has determined that present depressed population conditions are, in part, the result of the following human-induced factors affecting critical habitat: overfishing, artificial propagation, logging, agricultural, mining, urbanization, stream channelization, dams, wetland loss, and water withdrawals (including unscreened diversions for irrigation). Impacts of concern include altered stream bank and channel morphology, elevated water temperature, lost spawning and rearing habitat, habitat fragmentation, impaired gravel and wood recruitment from upstream sources,

degraded water quality, lost riparian vegetation, and increased erosion into streams from upland areas (Weitkamp et al. 1995, 64 FR 24049, 70 FR 37160, 70 FR 52488). Diversion and storage of river and stream flow has dramatically altered the natural hydrologic cycle in many of the streams within the ESU. Altered flow regimes can delay or preclude migration, dewater aquatic habitat, and strand fish in disconnected pools, while unscreened diversions can entrain juvenile fish.

2.2.5 Factors Responsible for the Decline of Species and Degradation of Critical Habitat

The factors that caused the decline of SONCC coho salmon and its critical habitat include hatchery practices, ocean conditions, habitat loss due to dam building, degradation of freshwater habitats due to a variety of agricultural and forestry practices, water diversions, urbanization, over-fishing, mining, climate change, and severe flood events exacerbated by land use practices (Good et al. 2005, Williams et al. 2016). Sedimentation and loss of spawning gravels associated with poor forestry practices and road building are particularly chronic problems that can reduce the productivity of salmonid populations. Late 1980s and early 1990s droughts and unfavorable ocean conditions were identified as further likely causes of decreased abundance of SONCC coho salmon (Good et al. 2005). From 2014 through 2016, the drought in California reduced stream flows and increased temperatures, further exacerbating stress and disease. Ocean conditions have been unfavorable in recent years (2014 to present) due to the El Nino in 2015 and 2016. Reduced flows can cause increases in water temperature, resulting in increased heat stress to fish and thermal barriers to migration.

One factor affecting the range wide status and aquatic habitat at large is climate change. Information since these species were listed suggests that the earth's climate is warming, and that this change could significantly impact ocean and freshwater habitat conditions, which affect survival of all three species of listed salmonids subject to this consultation. In the coming years, climate change will influence the ability to recover some salmon species in most or all of their watersheds. Coho salmon are particularly vulnerable to climate change due to their need for year-round cool water temperatures (Moyle 2002). Through effects on air temperatures and stream flows, climate change is expected to increase water temperatures to the detriment of coho salmon. Climate change effects on stream temperatures within Northern California are already apparent. For example, in the Klamath River, Bartholow (2005) observed a 0.5°C per decade increase in water temperature since the early 1960s, and model simulations predict a further increase of 1-2°C over the next 50 years (Perry et al. 2011).

In coastal and estuarine ecosystems, the threats from climate change largely come in the form of sea level rise and the loss of coastal wetlands. Sea levels will likely rise exponentially over the next 100 years, with possibly a 50-80 cm rise by the end of the 21st century (IPCC 2019). This rise in sea level will alter the habitat in estuaries and either provide increased opportunity for feeding and growth or in some cases will lead to the loss of estuarine habitat and a decreased potential for estuarine rearing. Marine ecosystems face an entirely unique set of stressors related to global climate change, all of which may have deleterious impacts on growth and survival while at sea. Overall, the effects of changing climate on marine ecosystems are not well understood given the high degree of complexity and the overlapping climatic shifts that are already in place (e.g., El Niño, La Niña, Pacific Decadal Oscillation) and will interact with

global climate changes in unknown and unpredictable ways. Climate change is believed to represent a growing threat, and will challenge the resilience of salmonids in Northern California.

2.3. Action Area

"Action area" means all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action (50 CFR 402.02).

The action area for the proposed action encompasses all three allotments, the roads and trail network used by allotment livestock when moving up to and then down from these three allotments, and downslope and downstream to areas that include designated SONCC coho salmon critical habitat (i.e., lower Cow Creek, mainstem Beaver Creek, Cottonwood Creek, and the Klamath River - ending at the confluence of Beaver Creek and the Klamath River; Figure 1).

2.4. Environmental Baseline

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

2.4.1 Status of SONCC coho in the Action Area

Coho salmon occurring in the action area belong to the Upper Klamath River population of the SONCC coho salmon ESU (NMFS 2014). While the Status of SONCC coho salmon section discussed the viability of the SONCC coho salmon ESU as a whole, this section provides a more in-depth discussion of the extinction risk of the populations that may be exposed to effects of the proposed Project. Coho salmon were once numerous and widespread within the Klamath River basin (Snyder 1931). However, the small populations that remain occupy degraded habitat within tributary watersheds and in the mainstem Klamath River below Iron Gate Dam (CDFG 2002, NRC 2004). Coho salmon use of freshwater habitat is largely based on life-stage and season (Sandercock 1991, Quinn 2005). However, habitat use can also be influenced by the quality of existing habitat and watershed function, factors which will likely play a large role in determining coho salmon survival in the future.

Within the action area, watersheds have steep soil-covered hillslopes that are highly prone to landslides, based on KNF cumulative watershed effects modeling results (Thomas 2021). Climate, biology, and lithology continue to determine both local hillslope soil production and erosion rates. Local hillslope stability is regulated by rainfall, hillslope steepness, frictional and cohesive/strength properties of the soils and roots, and subsurface hydrology (Hales et. al. 2009).

Creek channels in the action area contain a variety of step-pool and bar-pool-riffle reaches, as well as incised bedrock gorges created by upstream-propagating nick points. Stream channel form is strongly influenced by channel gradient and hillslope processes (Cover et al. 2010).

Portions of the Upper Klamath River coho salmon population may be affected by the proposed action during all freshwater life history stages while individuals from the Shasta River population may be affected only when passing through the Klamath River as it borders the Ash Creek Allotment during their smolt and adult migrations.

2.4.1.1 Upper Klamath River Coho Salmon Population

The Upper Klamath River population currently occupies approximately 64 miles of mainstem habitat and numerous tributaries to the Klamath River, extending upstream of Portuguese Creek to Iron Gate Dam. Historically, the population could be found upstream of the site of Iron Gate Dam to Spencer Creek (Hamilton et al. 2005). Today, the Upper Klamath River coho salmon population is at high risk of extinction (NMFS 2014) and utilizes the action area for spawning, rearing, and migration. Juvenile coho salmon may migrate through the action area during summer and fall redistribution periods when seeking non natal refugial habitats. Smolts outmigrate during the spring and adult coho salmon inmigrate during the fall and winter, utilizing the mainstem reaches within the action area. Tributaries downstream of the action area (i.e., Horse Creek and Seiad Creek) provide sources of cold water where juvenile coho salmon can be found over summering and low velocity reaches and off channel habitat features that provide low velocity refugia during the winter rearing period.

Coho salmon within the Upper Klamath River population spawn and rear primarily within several of the larger tributaries between Portuguese Creek and Iron Gate Dam, including Horse and Seiad creeks. Coho salmon presence was confirmed in six surveyed tributary streams in or near to the Project action area, including Horse, Seiad, Grider, West Grider, Walker, and O'Neil creeks (Garwood 2012). In surveys from 2014 to 2017, KNF fisheries staff routinely observed 100s of young-of-the-year juvenile coho salmon in lower Horse and Seiad creeks (Grunbaum 2018). Lower Horse and Seiad creeks, located downstream of the action area, are important for non-natal rearing of juvenile coho salmon, and also for spawning and rearing of natal fish. There have been no observations of coho salmon in Salt Gulch, a tributary to lower Horse Creek. The Karuk Tribe, KNF, and the Mid Klamath Watershed Council observed adult coho salmon spawning in Horse, Seiad, Fort Goff, and Grider creeks during surveys in 2013-2014 (Corum 2014, USFS and Karuk Tribe 2014) and in Horse, Seiad, and Middle creeks in 2014-2015 (Hentz and Wickman 2016). The Intrinsic Potential (IP) of habitat in the lower reaches of these streams is moderate to high (NMFS 2014) with spawning habitat ubiquitous along the lower six to seven miles of Horse Creek, and lower three to four miles of Seiad Creek. It is likely that approximately 40 adults return annually to Horse Creek, as well as to neighboring Seiad Creek. 2015/2016 spawning surveys resulted in 39 and 59 observations of live adult coho salmon, along with 40 and 34 observations of coho salmon redds, in Horse and Seaid creeks, respectively (Hentz and Wickman 2016).

2.4.2 Status of Critical Habitat in the Action Area

Lands in the action area are used primarily for timber production, grazing on allotments, gold mining, and recreation. The action area is mostly undeveloped, but it has received a great number

of management activities in the past. A few homes are established on private property, generally along creeks and rivers at lower elevations. Fish habitat in the action area has been affected by: sediment erosion and passage barriers from wildland fires and road-derived sediment mobilization; loss/confinement of floodplains from streamside roads; alteration of stream banks; reduction of shade and large wood debris recruitment to streams from past logging activities; and alteration of stream flows from PacifiCorp dams that are located on the mainstem Klamath River upstream from the action area.

The East Beaver, Hornbrook and Ash Creek allotments have all been used for grazing cattle or sheep since the 1860s. The numbers of grazing animals were comparatively much higher than today. Grazing activities in the action area during the late 1800s and early 1900s often involved repetitive, season-long grazing of large numbers of cattle. Riparian areas in the action area were probably impacted from these historic grazing practices. Over-grazing in riparian areas typically leads to a loss in stream bank stability which results in sediment inputs, widening of stream channels, and reduction in stream water depth (Platts 1991) and canopy cover. Over-grazed meadows may have affected peak and base flows and increased surface erosion and bank failures during storm events. Grazing had major impacts on erosion rates in the past (USDA 1996) and these historic impacts continue into the present (Thomas 2021). NMFS (2010) consulted with the KNF on a similar grazing project in Oak Knoll in 2010 for a period of ten years. NMFS agreed with KNF's finding that the project would have insignificant or discountable effects on SONCC coho salmon and their critical habitat due in part to sufficient herding resources allocated to prevent livestock from entering any stream reaches designated as SONCC coho salmon critical habitat. However, as stated in section 1.2, permittees have been inconsistent in removing cattle by prescribed allotment off dates.

The KNF has obliterated or rehabilitated miles of forest roads and numerous road/stream crossings, conducted trail work, and stream restoration in the Project action area as part of the Facility Maintenance and Watershed Restoration Project (FMWRP) of 2005. The FMWRP replaced and/ or upgraded 83 culverts, although only the Kelly Gulch site was located in critical habitat occupied by SONCC coho salmon. Improvement of this culvert was expected to restore upstream access to all life stages of SONCC coho. Additionally, the FMWRP included the cleaning and maintenance of two spawning channels on Kelsey and Indian Creeks While construction activities may have crushed or stranded a few coho salmon, this project likely reduced long term introduction of fine sediment into project area stream channels (NMFS 2005). Wildland fires have grown in size and severity over the past several decades, affecting much of the Klamath River corridor. A significant portion of lower Beaver Creek burned in the 2014 Beaver Creek Fire. The KNF conducted salvage harvest, reforestation, fuels reduction, hazard tree removal, and treatment of legacy sediment sites as part of the Westside Fire Recovery Project. However, salvage harvest was not conducted in Beaver Creek watershed and the only area where Project and private salvage harvest impacts may have overlapped was in the mainstem Klamath River downstream from Beaver Creek (Thomas 2021). Although project activities produced incidental take within other watersheds of the project area, NMFS (2015) did not identify any proposed action as rising to the level of take for coho salmon in Beaver Creek watershed. Project-related effects mobilized downslope and downstream to the mainstem Klamath River were expected to be insignificantly small and undetectable from those associated

with effects from both the environmental baseline and actions on private lands that have occurred since the 2014 Beaver Fire.

2.5. Effects of the Action

Under the ESA, "effects of the action" are all consequences to listed species or critical habitat that are caused by the proposed action, including the consequences of other activities that are caused by the proposed action (see 50 CFR 402.02). A consequence is caused by the proposed action if it would not occur but for the proposed action and it is reasonably certain to occur. Effects of the action may occur later in time and may include consequences occurring outside the immediate area involved in the action (see 50 CFR 402.17). In our analysis, which describes the effects of the proposed action, we considered the factors set forth in 50 CFR 402.17(a) and (b).

The Klamath River and all accessible tributaries contain SONCC coho salmon critical habitat. Accessible streams for coho salmon in the action area include; the mainstem Klamath River, Beaver Creek, Cow Creek, lower Long John Creek, lower Grouse Creek, Lumgrey Creek, Klamath/Ditch Creek, and Empire Creek. All life stages of SONCC coho salmon, except emergent fry, will be present during grazing activity and may be affected.

Emergent SONCC coho salmon fry will not be exposed because timing of cattle grazing in the East Beaver allotment avoids interaction with areas of spawning and emergence. The first East Beaver permittee uses the lowest areas of the allotment during the spring (April 1 to June 15), below spawning and emergence areas, and their cattle either drift or are herded into the summer range around July 15 after fry emergence in March and April. The second permittee hauls cattle to higher elevations and does not releases them until June 15th, also well after fry emergence.

2.5.1 Livestock Grazing in Riparian Areas

The proposed allotments will produce light to moderate grazing intensity due to low numbers of cattle, grazing strategy, and large allotment area available for grazing. Upon reaching allotments, livestock generally graze together in small herds, each spreading out into the forested areas that contain a sparse and well distributed forage base. Cattle grazing in forested areas, which comprise the majority of acreage in the allotments, is dispersed and minimal and will not measurably affect aquatic habitat or watershed processes. Areas outside of capable rangelands, which are areas that provide sufficient forage to sustain livestock grazing, receive only incidental use, if any, as cattle are moving from one area to another. Non-capable rangelands receive so little use that livestock effects there are extremely light, and range managers confirm previous cattle impacts to be undetectable.

High elevation meadows will be exposed to the majority of grazing impacts. These meadows (defined as Concentrated Use Areas [CUA]) are in the upper elevation headwater portions of the action area watersheds. CUAs total 229 acres or 0.5 percent of lands within the allotments. About 149 acres of CUAs are within rangelands that have been identified as capable. All CUAs are located at least 2.3 to 3.5 miles upstream of SONCC coho salmon critical habitat. Apart from Lower Cow Creek, Lower Grouse Creek, and Beaver Creek, the proposed action would result in a minor amount of direct exposure to other perennial channels, with only limited segments of perennial streams likely to be exposed to detectable, or measurable, impacts from cattle grazing

in proposed allotments. Stream reaches of concern are primarily meadow streams within CUAs, which are at least 2.3 miles upstream of SONCC coho salmon critical habitat (Thomas 2021).

Livestock grazing could impact critical habitat through fine sediment input in CUAs. Localized fine sediment inputs could result from disturbed banks and from impacts to riparian vegetation. The majority of any mobilized sediment is expected to settle in low gradient CUAs near the source. Because CUAs are in the upper elevation headwater portions of the action area watersheds, located well upstream of SONCC coho salmon CH, any sediment potentially mobilized out of grazing areas is expected to be so minor that it would be undetectable at the watershed scale and in anadromous fish habitat downstream.

Cattle are free to move throughout allotments and they could potentially enter anadromous habitat. However, capable rangeland is high in the watershed, and SONCC coho salmon spawning and rearing habitat is located further downstream from capable rangeland and all CUAs. Based on allotment livestock movement while up on their summer range in prior years, there have been no known instances of movement downslope entering into SONCC coho salmon critical habitat. Therefore, there is a low probability of SONCC coho salmon or their habitat being directly affected by cattle entering anadromous fish bearing streams while on their summer range.

Riparian areas outside of CUAs have banks naturally armored by large boulders, are generally inaccessible to cattle due to steep slopes and rocky areas, and are therefore not expected to be affected (Thomas 2021). The exceptions to this are the lower reach of Cow Creek, where the Project livestock exclosure is designed to preclude future livestock access and impacts from Beaver Creek at the Cow Creek and Grouse Creek confluence down to the Hungry Creek Corral, and Grouse Creek from the confluence with Monte Creek to the confluence with Cow Creek. Only in areas where cattle are directly accessing and crossing streams is there potential for localized effects to streambanks, shading, and water quality. These areas will be monitored annually and at least a 3- to 4-inch stubble height will be retained, producing a low probability that grazing will reduce undercut banks or change channel width-to-depth ratio. Moderate intensity grazing has not shown significant stream bank damage (Buckhouse et al. 1981) and bank collapse and channel widening in response to grazing pressure (Clary and Webster 1989). Limiting streambank damage to less than 10 percent is expected to minimize adverse changes to stream morphology. Delaying grazing until soils are relatively dry further minimizes damage to streambanks and riparian soils that are largely naturally armored. Maintaining streambanks will also protect shade producing vegetation and impacts to stream temperature are therefore expected to be minimal.

While the Klamath River serves as the southern border of the East Beaver and Ash Creek allotments, steep slopes prevent cattle from grazing near the river. There is no evidence that East Beaver or Ash Creek allotment livestock have occasion to enter the Klamath River during their seasonal movements within the allotment. Livestock access to the Klamath River is difficult due to the presence of Highway 96 adjacent to the Klamath River. Even if livestock might occasionally gain access to the Klamath River, little to no palatable browse are available there (Thomas 2021). Therefore, coho salmon and it's critical habitat in the Klamath River mainstem are not likely to be disturbed by the proposed action.

For the preceding reasons, effects to riparian areas will be so localized and minor that any impacts to watershed processes would not be detectable or discernable from background conditions. Cattle accessing riparian reserves, crossing streams, and heading up to FS Road 40S16 may cause negligible adverse effects to riparian reserves in localized areas. These minor effects would not result in detectable effects to SONCC coho salmon and their critical habitat.

2.5.2 Cow Creek Exclosure and Water Development

Construction of the Cow Creek cattle exclosure can only occur from June 15 to October 1, so any juvenile young of the year (YOY) SONCC coho salmon will have already emerged from the gravel by the time construction of the exclosure takes place. Any juvenile YOY SONCC coho salmon that might be present where construction of the cattle exclosure crosses Cow Creek will be able to flee the area. Habitat at the two crossings is not conducive to juvenile salmon rearing, and no salmonids of any kind have been observed previously at these two sites (Thomas 2021). The sections of the exclosure running parallel to the left and right banks of Cow Creek will be located on the outer edge of the floodplain (or upslope from it) and no vegetation contributing to stream shade will be removed. Effective canopy shade at the two locations where exclosure fencing will be constructed across Cow Creek will not be reduced. Fence installation will be done by hand, with the exception of a hand-held pneumatic post pounder and chainsaws. No mechanized equipment will enter the wetted channel of Cow Creek during fence installation. All post-construction maintenance of the exclosure will be done by hand, with no mechanized equipment entering the wetted channel of Cow Creek. The livestock exclosure on Lower Cow Creek will reduce livestock impacts to the channel and riparian areas, since cattle access will be denied, allowing the area to recover.

The water development will be located downhill of the spring and directly adjacent to where cattle typically travel on the road. This will likely prevent excluded cattle from seeking and damaging other areas of the stream, or uphill spring source, for water use. Hardening of the area surrounding the water development and periodic cleaning will reduce erosion and any potential input of fine sediment into the channel. The flow of water into Cow Creek will not be measurably reduced as livestock consumption of water will be episodic and short-lived. The proposed precautions in construction of the exclosure and water development will prevent any meaningful impact to coho salmon or their critical habitat.

2.5.3 Water Drafting and Corral Use

When cattle are gathered at the corrals during transportation activities, water is typically drafted from the adjacent Beaver Creek channel to water the cattle. Water withdrawal for use by cattle at the Hungry Creek corral will occur in an area occupied by coho salmon. Water will be drafted using a NMFS-compliant fish exclusion screen (NMFS 2001) from mainstem Beaver Creek directly across FS Road 40S16 from the Hungry Creek Corral, and just upstream of the Hungry Creek confluence. Water drafting in Beaver Creek will only occur for a few days in the late spring and in late September-October, and is expected to be less than 10% of the unimpaired flow (e.g., relatively minimal drafting and most of the creeks upstream of the drafting location are remote and undeveloped). Richter et al. (2011) stated that daily flow alterations up to 10 percent of unimpaired flows provide a high level of protection to riverine function and ecosystem.

Juvenile coho salmon may be impinged against intake hose screens during water drafting operations. However, there is a very low probability of impingement of juvenile fish against the screening due to the low pumping rate and volumes (approximately 75 gallons per minute or 10% of flow), which will allow adult and juvenile anadromous fish to flee water intake. By following NMFS water drafting guidelines and considering the unfettered mobility of fish in these creeks, impingement of coho salmon is highly unlikely.

Given the low pumping rate and limited time frame of water usage, there is also little likelihood that water drafting will have any measurable effect on stream temperature, available refugia, or exacerbate any barriers to migration. The effects of water drafting are so localized and minor that any impacts to coho salmon and their critical habitat would not be detectable.

2.5.4 Instream Trampling from Annual Livestock Movement

As stated earlier, cattle could potentially enter streams throughout the project area that contain anadromous fish. However, since the capable rangeland is high in the watershed, SONCC coho salmon spawning, emergence and rearing habitat is at least 2.3 miles from capable rangeland and all CUAs, and a lack of livestock movement downslope while on their summer range in prior years, there is a low probability of SONCC coho salmon exposure to trampling by cattle on the majority of the project area. Apart from Lower Cow Creek, Lower Grouse Creek, and Beaver Creek, the Project will result in a minor amount of direct exposure to other perennial channels, with only limited segments of perennial streams likely to be exposed to the potential effects of trampling.

Driving cattle into the East Beaver Allotment requires that the permittee actively push the cattle up roads and trails from vehicle access points to the forage areas in the late spring. Cattle will cross and water at Lower Cow Creek, Lower Grouse Creek and Beaver Creek from the Cow and Grouse Creek confluence to approximately 1.75 miles downstream to the Hungry Creek corral. SONCC coho salmon exposure is expected to be brief (up to two days) at these channel crossings during the migration to summer rangelands. Permittees are required to herd stray cattle discovered during this migration to the nearest USFS road within two days. SONCC coho salmon redds may be trampled by cattle crossing occupied channels later in the season as well.

When cattle are gathered at the end of the grazing season to be transported to their winter range, they are herded or sometimes walk unattended down to the Hungry Creek corral where they are to be held for no more than three days. During this time, some of the cattle go down livestock trails leading down from FS Road 40S16 and are able to access Cow Creek and Beaver Creek, where they may enter habitat occupied by coho salmon. Cattle have entered and are likely to enter during the proposed allotment period, Lower Cow Creek downstream of the FS Road 40S16 bridge, Lower Grouse Creek downstream of the Monte Creek confluence, and sections of Beaver Creek downstream of the Cow Creek/Grouse Creek confluence. If they are not removed in the vicinity of Hungry Creek Corral at the end of the season, the cattle may remain in the riparian reserves adjacent to these stream channels for over 3 days before they move downstream to the Hungry Creek corral. As mentioned in section 1.2, NMFS and KNF personnel have observed cattle remaining in the Beaver Creek area after permittee gathering operations ceased at the prescribed allotment off date of October 31. Therefore, it is not unreasonable to expect that

some cattle may be left in the allotment in November of each year before being discovered and moved out of the allotment.

Cattle crossing of channels within the proposed allotments may result in redd trampling and crushed eggs. This could occur if stray cattle are left behind and are still moving through the riparian reserves/stream channels in the section of Beaver Creek adjacent to the Hungry Creek corral in early December.

Recently observed adult coho salmon spawning in the Beaver Creek watershed has been uncommon (i.e., four observed SONCC coho salmon redds in West Fork Beaver Creek in 2016 fall/early winter, and seven such redds in the mainstem Klamath River (MKWC 2017)). These local surveys indicate that the total number of adult coho salmon present in the Beaver Creek watershed during the time that late descending livestock would be moving down is very small, perhaps no more than 20 fish, and these individuals are widely distributed in the system (Thomas 2021). Lacking site specific spawning date, we assume that given similar habitat, redd production is proportional by area between drainages within the Beaver Creek watershed. West Fork Beaver Creek drainage is approximately 20,000 acres, and the remainder of the Beaver Creek watershed is about 30,000 acres (WGISC 2008). With a rough proportion of 2:3, we can assume 8 coho salmon spawners in the West Fork and 12 coho salmon spawners in the rest of Beaver Creek watershed. Under a worst case scenario, with all coho salmon adults outside of the West Fork sub-watershed (roughly 12) spawning near the aforementioned crossings and Hungry Creek Corral, up to six coho salmon redds may be present and subject to cattle trampling during the October migration to the Hungry Creek Corral and potentially by a few stray cattle in the area in November.

For juvenile coho 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 coho salmon juveniles affected by this action to be able to access nearby cover and avoid injury or death (behavioral effect only). NMFS expects behavioral modifications for juveniles will be infrequent and minor because habitat conditions in the action area should provide suitable escape cover.

Any adult coho salmon spawners in the Beaver Creek watershed that are disturbed by stray or left-behind cattle will be more physically capable of avoiding injury than smaller juveniles and have sufficient space to flee cattle if necessary. Proposed project measures are expected to limit possible cattle left behind to no more than a few individuals. Disturbance by these few individual cattle to widely dispersed redds will not be sustained long enough during winter channel crossings or reach a level of intensity sufficient to interfere with migration to upstream spawning grounds or redd construction. Therefore, NMFS expects no discernable effects to adult coho salmon spawning activity or gonad viability.

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

2.6.1 Hatchery Influence

While there are several hatcheries in the Klamath Basin, only the Iron Gate Hatchery's Chinook salmon program is a future non-Federal action. Chinook salmon from the Iron Gate Hatchery (IGH) migrate and rear in the Klamath River with coho salmon from the action area. Until approximately eight years after the Klamath Dams are removed, IGH Chinook salmon are expected to adversely affect naturally produced coho salmon through competition in the Klamath River. Suitable freshwater habitat availability for juvenile coho salmon rearing and migration is expected to decrease in the future due to climate warming (Mote et al. 2014, Battin et al. 2007). Thus, competition for limited thermal refuge areas among salmonids will increase. However, hatchery releases are expected to remain constant during this period of shrinking freshwater habitat availability. This may increase the detrimental impacts to naturally produced coho salmon from density-dependent mechanisms in the freshwater environment.

2.6.2 Agriculture

Agriculture activities are expected to continue to degrade water quality through reductions in flow, excessive nutrient introduction, herbicide and pesticide use, and increased water temperatures downstream of the action area. Continuing cattle grazing and dairy farming can also degrade or reduce suitable habitat for coho salmon by increasing erosion and sedimentation, as well as introducing nitrogen, ammonia, and other nutrients into streams in the action area.

2.6.3 Unscreened Water Diversions

Water diversions for irrigated agriculture, municipal and industrial use, and managed wetlands are found throughout the action area and downstream. Thousands of water diversions exist along the Klamath River basin and many of them remain unscreened. Depending on the size, location, and season of operation, these unscreened diversions entrain and kill many life stages of aquatic species, including juvenile listed anadromous species (Mussen et al. 2013; Mussen et al. 2014).

2.6.4 Cannabis Regulation

In 2018, the State of California legalized the recreational use of cannabis, as well as the cultivation and manufacture of cannabis plants and products. The state's regulatory framework is in place or under development and is likely to reduce the number of illegal cannabis farms, and cannabis farms that cause detrimental impacts to salmonid habitat. There are many cannabis farms that cumulatively reduce flow volume and increase discharge of waste and pollutants in streams, which affects water quantity and water quality along migration routes in the action area.

Presently, there is no landscape scale evaluation of the effects of cannabis farming in or upstream/upslope of the action area. NMFS expects that continued operation of cannabis farms throughout and upstream or upslope of the action area will continue to negatively impact SONCC coho salmon.

2.6.5 Timber Harvest

Although there are no planned timber harvest operations on state or private lands within the action area, increased wildfire activity with climate change and associated salvage harvest is likely to occur in the future. Private commercial salvage harvest activities have the potential to cause substantial effects, since private salvage harvest that has occurred or will occur may not follow many of the precautionary and resource protective measures that are part of federal projects.

2.7. Integration and Synthesis

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

Climate change will continue to shrink the amount of habitat available to coho salmon in the action area and throughout their respective range. This will likely reduce the number of successful offspring produced per adult spawner, and challenge the resiliency of coho salmon in various ways including the exacerbation of competition with hatchery produced fish. Pending removal of impoundments on the Klamath River will restore access to upstream habitat and likely improve water quality in the mainstem Klamath River, but water withdrawal and other agricultural activities will continue to degrade habitat. The legalization of cannabis in California is likely to have a beneficial effect to the species, as production of cannabis shifts from areas within the SONCC ESU, to parts of the state more suitable to agriculture or indoor growing. Nonetheless, illegal cannabis cultivation and associated ill effects of water withdrawal and increased sedimentation is expected to linger for some time. Private commercial salvage harvest activities often lack the protective measures of federal projects and the likely increase of large wildfires associated with a warming climate may exacerbate harvest related erosion issues throughout watersheds within the project area.

The SONCC coho salmon ESU is currently considered likely to become endangered within the foreseeable future in all or a significant portion of its range (Williams et al. 2016). Williams et al. (2016) found that there has been no trend toward recovery of SONCC coho salmon since their listing in 1997. The lack of increasing abundance trends across the ESU for the populations with adequate data are of concern (e.g., Shasta River). Moreover, the loss of population spatial scale estimates from coastal Oregon populations is of great concern. The new information since Williams et al. (2011) while cause for concern, does not appear to suggest a change in extinction

risk at this time. While some improvements in factors affecting population units in the action area have improved habitat in some areas (e.g., improvements in hatchery practices), populations in the action area overall have not trended toward recovery.

Currently accessible salmonid habitat throughout the action area. Intensive land and stream manipulation during the past century (e.g., logging, agricultural/livestock development, mining, urbanization, unscreened diversions, and impoundments) has modified and eliminated much of the historic anadromous fish habitat in the Klamath Basin. Although the current conditions of salmonid habitat are significantly degraded, the remaining habitat for spawning and egg incubation, migratory corridors, and rearing is considered to have high intrinsic value for the conservation of the species.

The impact of the proposed action on critical habitat is described in Section 2.5. The proposed action will have temporary or minimal effects on water quality, riparian vegetation, and streambanks. The vast majority of grazing effects will be confined to CUAs in high elevation meadows, which comprise 0.5 percent of lands within the allotments or 229 acres. USFS monitoring has indicated that range condition is satisfactory in eight of nine long-range plots located within CUAs, all of which are located at least 2.3 miles upstream of SONCC coho critical habitat (Thomas 2021). Given the low gradient topography of CUAs and distance from coho salmon habitat, any adverse effects to habitat from grazing is expected to remain near the source and not extend downstream to coho salmon habitat. Apart from Lower Cow Creek, Lower Grouse Creek, and Beaver Creek, the proposed action would result in a minor amount of potential trampling or disturbance to other perennial channels, with only limited segments of perennial streams likely to be exposed to detectable impacts from grazing.

Only in the aforementioned streams with cattle crossings is there potential for localized effects to streambanks and water quality. As mentioned earlier, the Klamath River along the southern border of the East Beaver and Ash Creek Allotment is inaccessible to cattle. Because these areas will be monitored annually, cattle will only occupy them for a few days at a time, and at least a 3- to 4-inch stubble height will be retained, there is low probability that grazing will physically affect stream channels in any meaningful way. The livestock exclosure on Lower Cow Creek will reduce livestock impacts and allow the area to recover. Given the low pumping rate and limited time frame of water usage, there is minimal likelihood that water drafting will have any measurable effect on stream habitat.

The low level of grazing exposure to streambanks, minor percentage of watersheds potentially affected by concentrated grazing, project design features, limited number of livestock, and the long period of rest between grazing seasons (at least 7.5 months) will minimize the probability of negative effects to habitat and will ensure that utilization and resource standards in the allotments are met.

Coho salmon are likely to experience adverse effects during brief periods of cattle access to Lower Cow Creek, Grouse Creek and Beaver Creek from redd trampling. However, the number of coho salmon redds exposed to these adverse effects will be limited by the proposed requirements of herding cattle back to the nearest USFS road within two days during migration to summer range and holding cattle at Hungry Creek corral for no more than three days during

the fall gather. We expect that behavioral modifications of individual fish disturbed by livestock will be minor because habitat conditions in the action area should provide suitable escape cover.

Because injury or mortalities are limited spatially and temporally, the effects of the proposed action are unlikely to appreciably reduce the survival and recovery of SONCC coho salmon at the population, diversity stratum or ESU/DPS scale. Some coho salmon egg mortality is expected, but this impact will not appreciably alter the abundance of the Upper Klamath River coho salmon population in future years or appreciably affect long term population trends. Effects to critical habitat are relatively minor and temporary with ample time allowed for recovery. The proposed action will not reduce the likelihood of the survival and recovery of SONCC coho salmon.

2.8. Conclusion

After reviewing and analyzing the current status of the listed species, the environmental baseline within the action area, the effects of the proposed action, the effects of other activities caused by the proposed action, and cumulative effects, it is NMFS' biological opinion that the proposed action is not likely to jeopardize the continued existence of SONCC coho salmon, or destroy or adversely modify it's critical habitat.

2.9. Incidental Take Statement

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

2.9.1. Amount or Extent of Take

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

NMFS also expects that an unknown number of SONCC salmon eggs may be crushed by livestock trampling up to 6 redds while crossing the following stream channels in Beaver Creek watershed: Lower Cow Creek, Lower Grouse Creek and Beaver Creek, and the approximately

1.75-mile reach of Beaver Creek between the Hungry Creek corral and the Cow and Grouse Creek confluence, and in stream channels in the vicinity of Hungry Creek Corral (Lower Cow Creek downstream of the FS Road 40S16 bridge, Lower Grouse Creek downstream of the Monte Creek confluence, and sections of Beaver Creek downstream of the Cow Creek/Grouse Creek confluence) between October through November.

It is not possible to observe the number of eggs subjected to redd trampling from cattle because locating crushed eggs is extremely difficult as they are buried in stream substrate by spawning adults and obscured from view. When NMFS cannot quantify the amount or extent of incidental take in terms of the numbers of individuals, NMFS uses surrogates to estimate the amount or extent of incidental take. Trampling is most likely to occur when cattle concentrate in riparian areas and cross or enter streams to water. This is more likely to occur if permittees fail to remove cattle from riparian areas by proposed off grazing dates or allow cattle to loiter at stream crossings and Hungry Creek Corral area. The number of redds trampled by cattle will be observable by hoof prints disturbing the substrate at redd sites in conjunction with other indicators of cattle presence (e.g. chiseling, hoof prints, cropped vegetation, and droppings). Trampled redds provide an indication of the number of eggs destroyed. Therefore, NMFS will use no more than six trampled redds as the extent of take for SONCC coho salmon in the form of crushed eggs pursuant to 50 CFR 402.14(i)(1)(i). This standard will be applied at the previously mentioned stream channels as measured pre and post grazing season. Reinitiation would be required if more than six redds are trampled each year at the crossings previously delineated in the East Beaver allotment.

2.9.2. Effect of the Take

In the biological opinion, NMFS determined that the amount or extent of anticipated take, coupled with other effects of the proposed action, is not likely to result in jeopardy to the species or destruction or adverse modification of critical habitat.

2.9.3. Reasonable and Prudent Measures

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

1. Minimize incidental take from livestock grazing on the East Beaver allotment by adjusting grazing use as needed, based on monitoring results.

2. Monitor impacts of grazing on streams used by SONCC coho salmon to ensure that the extent of take (redd trampling) is not exceeded, and report the monitoring results to NMFS.

2.9.4. Terms and Conditions

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

1. The following terms and conditions implement reasonable and prudent measure 1:

   A. The KNF shall conduct annual pre and post grazing monitoring each year in the East Beaver allotment to ensure that the extent of redd trampling from cattle and incidental take is not exceeded.

   B. The KNF shall notify NMFS within 1 week of discovering that cattle-influenced streambank alteration has reached at least eight percent of the bank condition at the beginning of the proposed action at Lower Cow Creek, Lower Grouse Creek and Beaver Creek, and the approximately 1.75-mile reach of Beaver Creek between the Hungry Creek corral and the Cow and Grouse Creek confluence to discuss adaptive management process to ensure cattle-induced streambank alteration does not exceed 10 percent. Adaptive management may include changes to the annual operating instructions to ensure that no more than 10 percent of the streambank will be altered by cattle.

   C. The KNF shall ensure data collected during permittee patrolling within the proposed allotment area will be used to inform administrative actions including, but limited to, immediate changes to annual operating instructions.

   D. The KNF shall ensure that the allotment permittee or their employees receive training to appropriately implement the adaptive management options identified in the BA (Thomas 2021).

   E. The KNF and their permittees shall ensure that all exclosures, fences, and water developments that reduce cattle use adjacent to streams containing SONCC coho salmon are properly maintained and functioning as intended.

2. The following terms and conditions implement reasonable and prudent measure 2:

   A. The KNF shall ensure that the permittee(s) remove all cattle from proposed allotments by October 31 of each year. The KNF shall require permittees to conduct a pre and post grazing season head count, and if necessary, search for and gather cattle in late October or early November to decrease the likelihood of stray cattle left behind on allotments. If any cattle are found, the permittee must remove cattle from the allotment within 2 days of discovery.

B. The KNF shall survey stream channels in the vicinity of Hungry Creek (Lower Cow Creek downstream of the FS Road 40S16 bridge, Lower Grouse Creek downstream of the Monte Creek confluence, and sections of Beaver Creek downstream of the Cow Creek/Grouse Creek confluence) each year in early November, and count the number of coho salmon redds, note the condition of the redds (e.g., whether there are evidence of cattle trampling in and around the redds), and photograph the redds. The KNF shall notify NMFS, as soon as possible, but no later than 48 hours, after any incidental take is exceeded for their project or if such an event is likely, and describe why the incidental take level was exceed or is likely to be exceeded.

C. By December 1 of each year, the KNF will provide NMFS with a summary of that year's allotment livestock final gather and removal activities, including dates of encounter and numbers of animals; where the allotment livestock was encountered; when they were herded to and arrived at the Hungry Creek corral; when they were transported from the corral off of KNF-managed land; number of redds observed near the Hungry Creek corral and the condition of the redds; streambank alteration; and results of the monitoring discussed in the *Proposed Action* section, and identify any modifications to move-triggers or annual indicators that result from implementing the adaptive management strategy. The reports shall be annually submitted to NMFS at:

NMFS – California Coastal Office
Attn: North Coast Branch Supervisor
1655 Heindon Road
Arcata, California 95521.

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). We recommend the KNF annually monitor permittee herding or drift of cattle into and out of the proposed East Beaver allotment area to ensure their timely passage through Lower Cow Creek, Lower Grouse Creek and Beaver Creek.

2.11. Reinitiation of Consultation

This concludes formal consultation for the Oak Knoll Range Project.

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

manner that causes an effect to the listed species or critical habitat that was not considered in the biological opinion or written concurrence; or (4) If a new species is listed or critical habitat designated that may be affected by the identified action."

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

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

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

3.1. Essential Fish Habitat Affected by the Project

The proposed action area contains EFH for Chinook and coho salmon in the lower 7.5 miles of Beaver Creek from the confluence with Soda Creek to the mouth, and the lower 2.5 miles of the West Fork of Beaver Creek from the Trapper Creek confluence to the mouth. In this area, Habitat Areas of Particular Concern (HAPC) that could be adversely affected include: complex channel and floodplain habitat, spawning habitat, thermal refugia, and submerged aquatic vegetation (see descriptions of salmon HAPCs in the Pacific Coast Salmon Fishery Management Plan (PFMC 2014).

3.2. Adverse Effects on Essential Fish Habitat

Potential effects to EFH in the action area are identified in the Opinion. Where habitat indicators are not properly functioning, continued grazing has the potential to retard the rate of habitat recovery compared to no grazing. Continued grazing under the proposed action could slow the recovery of the riparian vegetation somewhat from what might occur absent grazing. This could produce small adverse effects on stream temperature (thermal refugia HAPC), benthic vegetation and substrate (spawning habitat and submerged aquatic vegetation HAPC), and streambank

conditions (complex channel and floodplain HAPC). These effects to stream temperature and streambank condition would be small because we expect grazing with a maximum of 10 percent streambank alteration would allow for an improving trend in habitat conditions but at a slower rate than without grazing. Any sediment mobilized in low gradient CUAs is also expected to remain near the source and not detrimentally affect EFH.

Overall, the possibility of the Project causing damage to riparian vegetation, sediment mobilization, or streambank destabilization, will be minimized by following Project minimization measures.

3.3. Essential Fish Habitat Conservation Recommendations

NMFS believes that the implementation of the terms and conditions provided in the ESA consultation above are adequate to ensure conservation of EFH within the action area. Therefore, NMFS has no EFH recommendations at this time.

3.4. Supplemental Consultation

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

4. DATA QUALITY ACT DOCUMENTATION AND PRE-DISSEMINATION REVIEW

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

4.1. Utility

Utility principally refers to ensuring that the information contained in this consultation is helpful, serviceable, and beneficial to the intended users. The intended user of this opinion is the KNF. Other interested users could include grazing permittees and watershed groups. Individual copies of this opinion were provided to the KNF. The document will be available within two weeks at the NOAA Library Institutional Repository [https://repository.library.noaa.gov/welcome]. The format and naming adheres to conventional standards for style.

4.2. Integrity

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

4.3. Objectivity

Information Product Category: Natural Resource Plan

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

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

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

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

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