UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
West Coast Region
1201 NE Lloyd Boulevard, Suite 1100
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Refer to NMFS No: WCRO-2021-00758

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October 1, 2021

Dennis C. Teitzel
District Manager, Prineville District Office
Bureau of Land Management
3050 NE 3rd Street
Prineville, Oregon 97754

Re: Endangered Species Act Section 7(a)(2) Biological Opinion and Magnuson–Stevens Fishery Conservation and Management Act Essential Fish Habitat Response for Nine Grazing Allotments in the Lower John Day River Subbasin (HUC #17070204), in Gilliam, Sherman, Wasco, and Wheeler Counties, Oregon.

Dear Mr. Teitzel:

Thank you for your letter of March 23, 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 Nine Grazing Allotments in the Lower John Day River Subbasin. This consultation was conducted in accordance with the 2019 revised regulations that implement section 7 of the ESA (50 CFR 402, 84 FR 45016).

After reviewing the current status of the species, the environmental baseline, the effects of the proposed action, and the cumulative effects, NMFS concludes that the proposed project is not likely to jeopardize the continued existence of ESA-listed Middle Columbia River (MCR) steelhead (*Oncorhynchus mykiss*). NMFS also determined the action will not destroy or adversely modify designated critical habitat for MCR steelhead. We provide rationale for our conclusions in the attached biological opinion (opinion). The enclosed opinion is based on information provided in your biological assessment, April 2017 through August 2021 emails and phone conversations between NMFS (Randy Tweten and Colleen Fagan) and the Bureau of Land Management (BLM) (Jeff Moss, Prineville District), and other sources of information cited in the opinion.

As required by section 7 of the ESA, NMFS provided an incidental take statement (ITS) with the opinion. The ITS includes reasonable and prudent measures (RPMs) that NMFS considers necessary or appropriate to minimize incidental take associated with the proposed action. The take statement sets forth terms and conditions, including reporting requirements that the BLM and any person who performs the action must comply with to carry out the RPMs. Incidental take from the proposed action that meets these terms and conditions will be exempt from the ESA take prohibition.

Please contact Colleen Fagan, Interior Columbia Basin Office, La Grande, Oregon, (541) 962-8512 or colleen.fagan@noaa.gov, if you have any questions concerning this consultation, or if you require additional information.

Sincerely,

Michael P. Tehan
Assistant Regional Administrator
Interior Columbia Basin Office
NOAA Fisheries, West Coast Region

Enclosure

cc: [File]
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Endangered Species Act (ESA) Section 7(a)(2) Biological Opinion

Nine Grazing Allotments in the
Lower John Day River Subbasin

NMFS Consultation Number: WCRO-2021-00758

Action Agency: Bureau of Land Management

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?**
Middle Columbia River steelhead (*Oncorhynchus mykiss*)	Threatened	Yes	No	Yes	No

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

Issued By: ______________________________
Michael P. Tehan
Assistant Regional Administrator
Interior Columbia Basin Office
NOAA Fisheries, West Coast Region

Date: October 1, 2021

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ACRONYM GLOSSARY

A&P	Abundance and Productivity
AIM	Assessment, Inventory, Monitoring
AUM	Animal Unit Months
BA	Biological Assessment
BLM	Bureau of Land Management
CHART	Critical Habitat Analytical Review Team
DMA	Designated Monitoring Area
DPS	Distinct Population Segment
DQA	Data Quality Act
EPA	Environmental Protection Agency
ESA	Endangered Species Act
ESU	Evolutionarily Significant Unit
FR	Federal Register
HUC5	Fifth-Field Hydrologic Unit Code
ICRD	Interior Columbia Recovery Domain
ICTRT	Interior Columbia Basin Technical Recovery Team
IPCC	Intergovernmental Panel on Climate Change
ISAB	Independent Scientific Advisory Board
ITS	Incidental Take Statement
MaSA	Major Spawning Area
MCR	Middle Columbia River
MIM	Multiple Indicator Monitoring
MiSA	Minor Spawning Area
MPG	Major Population Group
NMFS	National Marine Fisheries Service
NPCC	Northwest Power and Conservation Council
NWFSC	Northwest Fisheries Science Center
ODA	Oregon Department of Agriculture
ODEQ	Oregon Department of Environmental Quality
ODFW	Oregon Department of Fish and Wildlife
Opinion	Biological Opinion
PBF	Physical or Biological Features
PCE	Primary Constituent Element
PIBO	Pacfish/Infish Biological Opinion
RPM	Reasonable and Prudent Measure
SS/D	Spatial Structure and Diversity
USGCRP	U.S. Global Change Research Program
VSP	Viable Salmonid Population

1. INTRODUCTION

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

1.1. Background

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

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' La Grande, Oregon office.

1.2. Consultation History

Bureau of Land Management (BLM) submitted a draft Biological Assessment (BA) to NMFS in October 2017. NMFS provided comments on the draft BA on December 04, 2017. Site visits and pre-consultation coordination occurred in 2018. NMFS met with BLM on August 12, 2019 to discuss how to move this, and two other grazing consultations (Lower Deschutes and Upper John Day), forward. Meeting participants agreed to proceed with the Lower John Day River consultation first.

Jeff Moss (BLM) conducted a field tour of the Lower John Day River allotments for Colleen Fagan (NMFS) October 22-24, 2019. BLM submitted a draft BA on August 26, 2020. Several phone calls and emails were exchanged from August 26, 2020 through March 2021 regarding the proposed action, NMFS comments on the draft BA, and additional information needed by NMFS. NMFS received BLM's request for formal consultation on March 31, 2021. Several phone calls and emails occurred between BLM and NMFS from April 2021 through August 2021 regarding additional information needed by NMFS, and BLM needing to include the John Day River in the proposed action for three allotments. As a result of these conversations, BLM provided an amendment to the BA on May 11, 2021, and modified its proposed action to include the John Day River in the Belshe, Lafoon and Carlson, and Side Seale allotments. NMFS initiated ESA consultation on May 17, 2021.

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). The Prineville District BLM proposes to authorize cattle grazing on nine allotments within the Lower John Day River subbasin for calendar years 2020–2030 (Figure 1). All BLM managed lands in these allotments fall under the jurisdiction of the John Day Resource Management Plan (BLM 2015). BLM's resource objectives are contained in the John Day Basin Resource Management Plan's Aquatic Conservation Strategy.

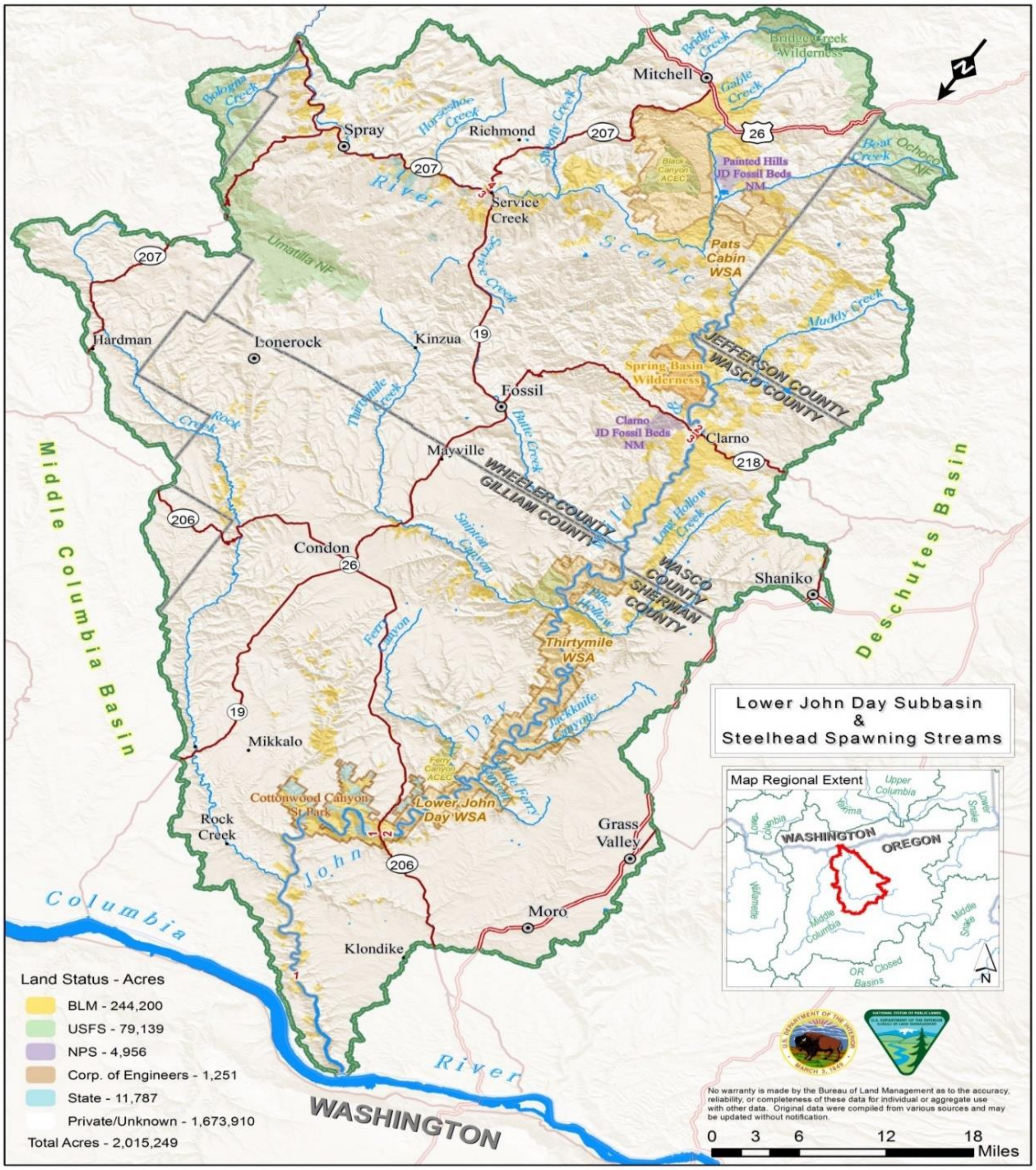

Figure 1. Lower John Day River Subbasin, Oregon.

The Prineville District BLM authorizes livestock grazing on 155 allotments within the Lower John Day River subbasin (HUC 17070204). The BLM determined that actions authorized in nine of the allotment livestock grazing leases were Likely to Adversely Affect MCR steelhead and their critical habitat. These nine livestock grazing allotments comprise 106,390 acres of which 55,095 acres, 2.7 percent of the Lower John Day River Subbasin (2,015,249 acres), are BLM managed land.

For each of these nine allotments, proposed grazing dates, pastures, location and miles of critical habitat, current habitat rating, and usage quantified as animal unit months (AUM) is included in Table 1. All nine allotments contain streams that provide critical habitat for ESA-listed Middle Columbia River (MCR) steelhead (*Oncorhynchus mykiss*). Additional allotment specific information is included in Section 11.0 of the BA.

Table 1. Allotment name, proposed dates of cattle grazing, pasture names, streams containing Middle Columbia River summer steelhead critical habitat, and animal unit months of grazing for nine allotments proposed for permitting by the Bureau of Land Management in the Lower John Day River subbasin for 2021–2030.

Allotment	Acreage	Proposed Grazing Use	Pasture Name	Steelhead Critical Habitat	Steelhead Critical Habitat (Miles)	Current Habitat Rating (Good, Fair, or Poor)	Animal Unit Months
Belshe #2509	BLM = 1,596 Total = 2,688	30 days between March 1 and May 1. Non-use since 2008.	Dan's Little Ferry Canyon	Little Ferry Canyon Creek John Day River	1.11 • 0.38 Intermittent • 0.73 Perennial 1.5	Poor Poor	66
Gable Creek #2516	BLM = 4,979 Total = 4,979	30 days of April in odd years	None	Gable Creek Nelson Creek	2.65 Perennial Currently Blocked	Fair	210
Pine Creek #2518	BLM = 5,437 Total = 16,518	April or May Currently not actively grazing riparian areas, keeping cattle in the uplands	Zig Zag Porter Canyon Cramer Canyon Cramer Canyon Bath Canyon Bath Canyon	Pine Hollow Long Hollow Creek	2.3 • 1.7 Intermittent 0.5 0.3 0.75 0.15 • 0.7 Perennial 0.1 0.6	Poor Poor Poor Poor Poor Poor	346
Circle Bar #2531	BLM = 18,224 Total = 18,501	30 days of April		Bridge Creek	2.6 Perennial	Good = .25 miles Fair = 2.35 miles	637

Allotment	Acreage	Proposed Grazing Use	Pasture Name	Steelhead Critical Habitat	Steelhead Critical Habitat (Miles)	Current Habitat Rating (Good, Fair, or Poor)	Animal Unit Months
Eakin #2541	BLM = 1,758 Total = 6,248	30 days between March 1 and May 1. Non-use since 2008.	Jackknife	Jackknife Canyon Creek	1.5 • 0.5 Intermittent • 1.0 Perennial	Fair	12
Lafoon & Carlson #2572	BLM = 2,823 Total = 6,712	30 days between March 1 and May 1. Non-use since 2008.		Jackknife Canyon Creek John Day River	1.15 • 1.05 Intermittent • 0.1 Perennial 8.4	Poor	74
Verne Mobley #2593	BLM = 1,316 Total = 6,415	30 days between March 1 and May 1. Non-use for 20 years.	McGilvery Pine Hollow	Pine Hollow Creek	2.5 • 1.6 Intermittent • 0.9 Perennial	Poor Poor	133
Crown Rock #2609	BLM = 4,257 Total = 4,277	30 days of April in even years. Grazed once in 17 years.	Bear Creek	Bear Creek	2.0 Perennial	Poor to Good Poor during drought years	108
Sid Seale #2619	BLM = 14,705 Total = 40,052	30 days of April. Gap fencing reduces riparian grazing.	Ferry Canyon	Ferry Canyon Creek	2.05 • 1.6 Intermittent • 0.45 Perennial	Poor Poor	733
Total	**BLM = 55,095** **Total = 106,390**				**27.86**		**2,319**

1.3.1. Information Common to All Nine Allotments

The nine allotments considered in this consultation have numerous assumptions, resource issues, resource effects, protocols, and practices common to each other. The proposed actions consists of the following components: (1) livestock numbers and season of use; (2) grazing standards, forage use criteria, and regulatory requirements; and (3) monitoring and adaptive management procedures to adjust grazing practices if necessary to protect natural resources, including ESA-listed fish and their habitat.

All proposed grazing would occur in the spring, for no more than 30 days between March 01 and May 01. BLM would conduct implementation monitoring and effectiveness monitoring at each of the nine allotments to evaluate the short and long-term effects of grazing (Table 2). Actual use monitoring, compliance monitoring, and spawning ground surveys would occur annually. Partial Multiple Indicator Monitoring (MIM) would occur in years 4, 5, 9, and 10, and Assessment, Inventory, Monitoring (AIM) or Pacfish/Infish Biological Opinion (PIBO) Effectiveness Monitoring would occur in years 5 and 10. Given the sheer size of the Prineville District, the number of acres covered, and the number of stream miles present on public land within the Prineville District, subsampling approaches may be used. Monitoring work would be subject to BLM's budget and personnel.

Table 2. Proposed implementation and effectiveness monitoring, and location of monitoring, for nine grazing allotments permitted by the Bureau of Land Management in the Lower John Day River Subbasin. Proposed Monitoring would only occur if allotments are grazed. Partial Multiple Indicator Monitoring (MIM) would include mean stubble height, percent bank alteration, and percent woody browse utilization. The entire protocol for Assessment, Inventory, Monitoring (AIM) or Pacfish/Infish Biological Opinion (PIBO) Effectiveness Monitoring would be completed. Monitoring would occur at the end of the growing season, June–September.

Allotment	Proposed Monitoring		Designated Monitoring Area Location
	Monitoring	Frequency	
Belshe #2509	• Actual use • Compliance • Redd Counts • Partial MIM • PIBO	• Annually • Annually • Annually • Year 4, 5, 9, 10 • Year 5, 10	Little Ferry Canyon Creek
Gable Creek #2516	• Actual use • Compliance • Redd Counts • Partial MIM • PIBO	• Annually • Annually • Annually • Year 4, 5, 9, 10 • Year 5, 10	Gable Creek
Pine Creek #2518	• Actual use • Compliance • Redd Counts • Partial MIM • PIBO	• Annually • Annually • Annually • Year 4, 5, 9, 10 • Year 5, 10	Long Hollow Creek

Allotment	Proposed Monitoring		Designated Monitoring Area Location
	Monitoring	**Frequency**	
Circle Bar #2531	• Actual use • Compliance • Redd Counts • Partial MIM • PIBO	• Annually • Annually • Annually • Year 4, 5, 9, 10 • Year 5, 10	Bridge Creek
Eakin #2541	• Actual use • Compliance • Redd Counts • Partial MIM • AIM	• Annually • Annually • Annually • Year 4, 5, 9, 10 • Year 5, 10	Jackknife Canyon Creek
Lafoon & Carlson #2572	• Actual use • Compliance • Redd Counts • Partial MIM • PIBO/AIM	• Annually • Annually • Annually • Year 4, 5, 9, 10 • Year 5, 10	To be established
Verne Mobley #2593	• Actual use • Compliance • Redd Counts • Partial MIM • PIBO	• Annually • Annually • Annually • Year 4, 5, 9, 10 • Year 5, 10	Pine Hollow Creek
Crown Rock #2609	• Actual use • Compliance • Redd Counts • Partial MIM • PIBO	• Annually • Annually • Annually • Year 4, 5, 9, 10 • Year 5, 10	Bear Creek
Sid Seale #2619	• Actual use • Compliance • Redd Counts • Partial MIM • PIBO	• Annually • Annually • Annually • Year 4, 5, 9, 10 • Year 5, 10	Ferry Canyon Creek

1.3.2. District Monitoring

BLM would conduct monitoring at designated monitoring areas (DMA) on a 5-year rotation. One DMA is established in each of eight allotments in the reach most vulnerable to grazing impacts. A ninth DMA would be established on Jackknife Canyon Creek in the Lafoon and Carlson allotment.

Implementation Monitoring

Implementation monitoring would occur to evaluate short-term effects of cattle grazing and to determine whether or not grazing was conducted as permitted. BLM would conduct a partial MIM protocol in years 4, 5, 9, and 10 to measure three attributes: (1) mean stubble height, (2) percent bank alteration, and (3) percent woody browse utilization. End of season objectives for each attribute are:

1. A minimum 6 inch mean stubble height
2. Bank alteration of 20 percent or less
3. Woody use of 50 percent or less

The partial MIM assessment would occur at the end of the growing season, in August and September, to determine habitat conditions going into the winter and to determine trend of the three indicators the BLM considers best demonstrate the short-term effects of livestock grazing.

Annual implementation monitoring would also occur to: (1) document the quantity of livestock and the location and length of time grazing occurred on an allotment, pasture, or portion of an allotment; and (2) verify authorized number of livestock present; and (3) verify grazing is in the agreed upon area defined in the John Day Resource Management Plan.

If objectives are not met, BLM would analyze why they were not met, whether this is detrimental to the function of the riparian area, and modify the current management strategy as necessary.

Effectiveness Monitoring

Effectiveness monitoring would occur every 5 years (years 5 and 10) to evaluate the long-term effects of grazing and whether or not grazing resulted in the desired outcome. There would be eight PIBO effectiveness-monitoring sites and one AIM effectiveness-monitoring site. Seasonal employees employed by the PIBO Monitoring Program would conduct PIBO monitoring. Seasonal employees employed by the BLM would conduct AIM monitoring. Monitoring would occur June through August and would meet all requirements for each protocol.

No objectives have been set for the variables to be monitored. Instead, BLM would use collected data to determine long-term trends over time of three variables to determine whether grazing use levels are appropriate for each allotment or pasture. These three variables are: (1) residual pool depth, (2) percent stable banks, and (3) percent undercut banks. BLM believes these three indicators best describe effects from cattle grazing over time, based on analysis of collected PIBO data. If the trend of any of these three indicators is downward, BLM would analyze why the trend was negative, whether this is detrimental to the function of the riparian area, and modify the current management strategy as necessary.

Spawning Ground Surveys and Redd Trampling

Spawning ground surveys would occur at least once in each allotment where livestock are present and have access to streams. If redds are identified, the BLM would select index reaches and monitor these for redd trampling every two weeks until cattle are removed from the area. The BLM would select index reaches and submit these to the Level 1 Team for approval prior to commencement of monitoring.

We considered, under the ESA, whether or not the proposed action would cause any other activities and determined that it would not. Entities holding grazing leases under the proposed actions may also graze livestock on adjacent private lands. However, grazing on private land adjacent to BLM allotments would continue to occur regardless of whether or not the permittees are able to the use the BLM allotments. Since effects of grazing on adjacent private lands would occur regardless of the BLM grazing leases, the effects of future grazing activities on adjacent private lands are not effects caused by the proposed actions. Therefore, these effects are not considered in this opinion.

1.3.3. Action Agency's Effects Determination

BLM determined that the proposed action for nine grazing allotments may affect, and is likely to adversely affect, MCR steelhead and their critical habitat. BLM based their effects determination on distribution of steelhead spawning and rearing in each allotment and the timing of livestock grazing.

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

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

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

2.2. Rangewide Status of the Species and Critical Habitat

In this opinion, we examine the status of each species that would be adversely affected by the proposed action. The status is determined by the level of extinction risk that the listed species face, based on parameters considered in documents such as recovery plans, status reviews, and listing decisions. This informs the description of the species' likelihood of both survival and recovery. The species status section also helps to inform the description of the species' "reproduction, numbers, or distribution" as described in 50 CFR 402.02. 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. Status of the Species

For Pacific salmon and steelhead, we commonly use the four "viable salmonid population" (VSP) criteria (McElhany et al. 2000) to assess the viability of the populations that, together, constitute the species. These four criteria (spatial structure, diversity, abundance, and productivity) encompass the species' "reproduction, numbers, or distribution" as described in 50 CFR 402.02. When these parameters are collectively at appropriate levels, they maintain a population's capacity to adapt to various environmental conditions and allow it to sustain itself in the natural environment.

“Spatial structure” refers both to the spatial distributions of individuals in the population and the processes that generate that distribution. A population’s spatial structure depends on habitat quality and spatial configuration, and the dynamics and dispersal characteristics of individuals in the population.

“Diversity” refers to the distribution of traits within and among populations. These range in scale from DNA sequence variation in single genes to complex life history traits (McElhany et al. 2000).

“Abundance” generally refers to the number of naturally-produced adults (i.e., the progeny of naturally-spawning parents) in the natural environment (e.g., on spawning grounds).

“Productivity”, as applied to viability factors, refers to the entire life cycle (i.e., the number of naturally-spawning adults produced per parent). When progeny replace or exceed the number of parents, a population is stable or increasing. When progeny fail to replace the number of parents, the population is declining. McElhany et al. (2000) use the terms “population growth rate” and “productivity” interchangeably when referring to production over the entire life cycle. They also refer to “trend in abundance”, which is the manifestation of long-term population growth rate.

For species with multiple populations, once the biological status of a species’ populations has been determined, we assess the status of the entire species using criteria for groups of populations, as described in recovery plans and guidance documents from technical recovery teams. Considerations for species viability include having multiple populations that are viable, ensuring that populations with unique life histories and phenotypes are viable, and that some viable populations are both widespread to avoid concurrent extinctions from mass catastrophes and spatially close to allow functioning as metapopulations (McElhany et al. 2000).

The summary that follows describes the status of MCR steelhead and its designated critical habitat. MCR steelhead is the one ESA-listed species that occurs within the geographic area of this proposed action and is considered in this opinion. More detailed information on the status and trends of this listed resource, and its biology and ecology, are in the listing regulations and critical habitat designations published in the Federal Register (Table 3), as well as applicable recovery plans and 5-year status reports. These additional documents are incorporated by reference (NMFS 2009; NMFS 2016). These documents are available on the NMFS West Coast Region website (https://www.westcoast.fisheries.noaa.gov/). The next 5-year status reviews will be completed in 2021.

Table 3. Listing status, status of critical habitat designation and protective regulations, and relevant Federal Register (FR) decision notices for Endangered Species Act-listed Middle Columbia River steelhead considered in this opinion.

Species	Listing Status	Critical Habitat	Protective Regulations
Middle Columbia River Steelhead (*Oncorhynchus mykiss*)	Threatened 3/25/1999; 64 FR 14517 Reaffirmed 5/26/2016; 81 FR 33468	9/02/2005; 70 FR 52630	6/28/2005; 70 FR 37160

Middle Columbia River Steelhead Distinct Population Segment

NMFS listed the MCR steelhead Distinct Population Segment (DPS) as threatened on March 25, 1999 (64 FR 14517) and reaffirmed its threatened status on May 26, 2016 (81 FR 33468). NMFS designated critical habitat on September 2, 2005 (70 FR 52630) and established protective regulations on June 28, 2005 (70 FR 37160). The recovery plan for this species (NMFS 2009) details much of the existing status information for MCR steelhead. The most recent 5-year status review was completed in 2015 (NMFS 2016), and a technical memo prepared by the Northwest Fisheries Science Center (NWFSC) for the status review contains detailed information on the biological status of MCR steelhead (NWFSC 2015).

Life history. The MCR steelhead DPS includes 16 summer-run populations and 4 winter-run populations. MCR summer steelhead enter freshwater (the Columbia River) between May and October and require several months to mature before spawning in late winter through spring. Winter steelhead enter freshwater between November and April and spawn shortly thereafter. Summer steelhead usually spawn further upstream than winter steelhead. Steelhead in the John Day Basin are summer-run. Fry emergence typically occurs between May and August dependent on water temperature. Some juveniles move downstream to rear in larger tributaries and mainstem rivers. Most steelhead smolt at 2 years and adults return to the Columbia River after spending 1 to 2 years at sea (NMFS 2009).

Steelhead are iteroparous, meaning they can spawn more than once. Repeat spawning for Columbia River Basin steelhead ranges from reported rates of 2 to 4 percent above McNary Dam (Busby et al. 1996) to 17 percent in the unimpounded tributaries below Bonneville Dam (Leider et al. 1986).

Spatial structure and diversity. This species includes all naturally-spawned steelhead populations originating below natural and manmade impassable barriers from the Columbia River and its tributaries upstream and exclusive of the Wind River in Washington and the Hood River in Oregon, to and including the Yakima River in Washington, excluding steelhead originating from the Snake River Basin. The Interior Columbia Basin Technical Recovery Team (ICTRT) identified 17 extant populations in this DPS (ICTRT 2003; McClure et al. 2005). The populations fall into four Major Population Groups (MPGs): Cascade eastern slope tributaries (five extant and two extirpated populations), the John Day River (five extant populations), the Walla Walla and Umatilla rivers (three extant and one extirpated populations), and the Yakima

River (four extant populations) (ICTRT 2003; McClure et al. 2005). Steelhead in the Lower John Day River subbasin are part of the John Day River MPG.

This DPS includes steelhead from seven artificial propagation programs (USDOC 2014). The DPS does not currently include steelhead that are designated as part of an experimental population above the Pelton Round Butte Hydroelectric Project in the Deschutes River Basin, Oregon (USDOC 2013). NMFS has defined the steelhead DPSs to include only the anadromous members of this species (70 FR 67130). As of the last status review (NWFSC 2015; NMFS 2016), viability ratings for the populations in the MCR steelhead DPS range from extirpated to highly viable (Table 4).

Table 4. Major population groups, populations, and scores for the key elements of abundance and productivity (A&P), diversity, and spatial structure and diversity (SS/D), used to determine current overall viability risk for Middle Columbia River steelhead during the most recent status review (NWFSC 2015). Risk ratings include very low (VL), low (L), moderate (M), high (H), and extirpated (E). Maintained (MT) population status indicates that the population does not meet the criteria for a viable population but does support ecological functions and preserves options for recovery of the Distinct Population Segment.

Major Population Group	Population (Watershed)	A&P	Natural Processes Risk	Diversity	Integrated SS/D	Overall Viability Risk
Cascade Eastern Slope Tributaries	Fifteenmile Creek	M	VL	L	L	MT
	Klickitat River	M	L	M	M	MT
	Deschutes Eastside	L	L	M	M	Viable
	Deschutes Westside	H	L	M	M	H
	Rock Creek	*	M	M	M	H
	White Salmon	N/A	N/A	N/A	N/A	E
	Crooked River	N/A	N/A	N/A	N/A	E
John Day River	Upper John Day	M	VL	M	M	MT
	North Fork John Day	VL	VL	L	L	Highly Viable
	Middle Fork John Day	L	L	M	M	Viable
	South Fork John Day	L	VL	M	M	Viable
	Lower Mainstem John Day	M	VL	M	M	MT
Walla Walla and Umatilla rivers	Umatilla River	M	M	M	M	MT
	Touchet River	H	L	M	M	H
	Walla Walla River	M	M	M	M	MT
Yakima River	Satus Creek	L	L	M	M	Viable
	Toppenish Creek	L	L	M	M	Viable
	Naches River	M	L	M	M	M
	Upper Yakima	M	M	H	H	H

* Reintroduction efforts underway (NMFS 2009).

Abundance and productivity. The most recent status review (NWFSC 2015; NMFS 2016), NMFS determined that for almost all populations in this DPS, the most recent 5-year geomean for natural-origin abundance had increased relative to the previous 5-year review.[1] Similarly, 15-year trends were positive for most populations in the DPS.[2] Based on the most recent status review, NMFS concluded that the MCR steelhead DPS was at moderate risk and remained threatened. While there had been improvements in the extinction risk for some populations, and while several populations were considered viable, the MCR steelhead DPS as a whole was not meeting delisting criteria and most risk ratings remained unchanged from the previous review. The increases in abundance and productivity needed to achieve recovery goals for MCR steelhead were generally smaller than those needed for the other Interior Columbia River basin-listed DPSs (NWFSC 2015).

However, there has been a downward trend in the abundance of natural-origin spawners at the DPS level from 2014 to 2019 (NMFS 2019). Estimates of natural-origin and total (natural- plus hatchery-origin) spawners through 2018 or 2019 at the population level have also decreased recently, with substantial downward trends in abundance for most of the MPGs and populations, including the Lower Mainstem John Day River population, when compared to the number of spawners from 2009 to 2013. In many cases, including the Lower Mainstem John Day River population, the most recent 5-year geometric mean in natural-origin abundance is considerably below the minimum abundance thresholds established by the ICTRT. However, the Klickitat, Middle Fork John Day, and Umatilla River populations are well above these thresholds.

Stray levels into the John Day River populations have decreased in recent years. However, out of basin hatchery stray proportions, although reduced, remain high in spawning reaches within the Deschutes River Basin populations. The 2019 natural-origin abundance level for the South Fork John Day River population was higher than the geometric mean for 2013 to 2018, but the abundance levels for the Lower Mainstem John Day River, Middle Fork John Day River, Walla Walla River, and Touchet River were lower than their respective recent geometric means.

This recent downturn in adult abundance is thought to be driven primarily by marine environmental conditions and a decline in ocean productivity because hydropower operations, the overall availability and quality of tributary and estuary habitat, and hatchery practices have been relatively constant or improving over the past 10 years.[3] Increased abundance of sea lions in the lower Columbia River could also be a contributing factor.

NMFS will evaluate the implications for viability risk of these more recent returns in the upcoming 5-year status review, expected in 2021. The status review will also include new information on productivity, diversity, and spatial structure.

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[1] For all five populations in the John Day MPG, all four populations in the Yakima River MPG, all three populations in the Umatilla/Walla Walla MPG; and for two of the three populations for which data were available in the East Cascade MPG.

[2] For four of five populations in the John Day MPG, all four populations in the Yakima River MPG, one population in the Umatilla/Walla Walla River MPG (a second population had a slightly negative trend and data were insufficient for the third); and for one of three populations with available data in the East Cascade MPG.

[3] Many factors (e.g., higher summer temperatures, lower late summer flows, low spring flows, etc.) affect the ability of tributary habitat to produce juvenile migrants (capacity) each year. Recent drought and temperature patterns may have had a negative effect on tributary habitat productivity, and as a result, lower than average juvenile production may have contributed in some years to downturns in adult abundance.

Limiting factors. Limiting factors for this species include (NMFS 2009; NWFSC 2015):

- Degradation of floodplain connectivity and function, channel structure and complexity, riparian areas, fish passage, stream substrate, stream flow, and water quality.
- Mainstem Columbia River hydropower-related impacts.
- Degraded estuarine and nearshore marine habitat.
- Hatchery-related effects.
- Harvest-related effects
- Effects of predation, competition, and disease.

2.2.2. Status of Critical Habitat

In this section, we examine the status of designated critical habitat by examining the condition and trends of the essential PBFs of that habitat throughout the designated areas (Table 5). These features are essential to the conservation of the ESA-listed species because they support one or more of the species' life stages (e.g., sites with conditions that support spawning, rearing, migration, and foraging). Rangewide, all habitat types are impaired to some degree, even though many of the watersheds comprising the fully designated area are ranked as providing high conservation value. The proposed action, however, affects only freshwater spawning, freshwater rearing, and freshwater migration habitats.

Table 5. Physical and biological features of critical habitat designated for Middle Columbia River steelhead, and corresponding species life history events.

Physical or Biological Features		**Species Life History Event**
Site Type	**Site Attribute**	
Freshwater Spawning	Substrate Water quality Water quantity	Adult spawning Embryo incubation Alevin growth and development
Freshwater Rearing	Floodplain connectivity Forage Natural Cover Water quality Water quantity	Fry/parr/smolt growth and development
Freshwater Migration	Free of artificial obstruction Natural cover Water quality Water quantity	Adult upstream migration and holding Kelt (steelhead) seaward migration Fry/parr/smolt growth, development, and seaward migration
Estuarine Areas	Forage Free of artificial obstruction Natural cover Salinity Water quality Water quantity	Adult sexual maturation and "reverse smoltification" Adult upstream migration and holding Kelt (steelhead) seaward migration Fry/parr/smolt growth, development, and seaward migration

For salmon and steelhead, NMFS' critical habitat analytical review teams (CHARTs) ranked watersheds within designated critical habitat at the scale of the fifth-field hydrologic unit code (HUC5) in terms of the conservation value they provide to each ESA-listed species that they support (NMFS 2005). The conservation rankings are high, medium, or low. To determine the conservation value of each watershed to species viability, the CHARTs evaluated the quantity and quality of habitat features (e.g., spawning gravels, wood and water condition, side channels), the relationship of the area compared to other areas within the species' range, and the significance of the population occupying that area to the species' viability criteria. Thus, even if a location had poor habitat quality, it could be ranked with a high conservation value if it were essential due to factors such as limited availability (e.g., one of a very few spawning areas), a unique contribution of the population it served (e.g., a population at the extreme end of geographic distribution), or the fact that it serves another important role (e.g., obligate area for migration to upstream spawning areas).

Interior Columbia Recovery Domain

Critical habitat has been designated in the Interior Columbia recovery domain (ICRD), which includes the John Day River. Habitat quality in tributary streams in the ICRD varies from excellent in wilderness and roadless areas to poor in areas subject to heavy agricultural and urban development (Wissmar et al. 1994; NMFS 2009). Intense agriculture, alteration of stream morphology (i.e., channel modifications and diking), riparian vegetation disturbance, wetland draining and conversion, livestock grazing, dredging, road construction and maintenance, logging, mining, and urbanization (EPA 2020; Lee et al. 1997; McIver and Starr 2001; NMFS 2009) have degraded critical habitat throughout much of the ICRD. Reduced summer stream flows, impaired water quality, and reduced habitat complexity are common problems for critical habitat in developed areas.

Migratory habitat quality in this area has been affected by the development and operation of the Columbia River System dams and reservoirs in the mainstem Columbia River, Reclamation tributary projects, and privately owned dams in the Snake and Upper Columbia River basins. For example, construction of Hells Canyon Dam eliminated access to several likely production areas in Oregon and Idaho, including the Burnt, Powder, Weiser, Payette, Malheur, Owyhee, and Boise river basins (Good et al. 2005), and Grand Coulee and Chief Joseph dams completely block anadromous fish passage on the upper mainstem Columbia River.

Hydroelectric development modified natural flow regimes, resulting in higher water temperatures, changes in fish community structure leading to increased rates of piscivorous and avian predation on juvenile salmon and steelhead, and delayed migration for both adult and juveniles. Physical features of dams such as turbines also kill migrating fish. In-river survival of emigrating juveniles is inversely related to the number of hydropower projects encountered. Similarly, development and operation of extensive irrigation systems and dams for water withdrawal and storage in tributaries have altered hydrological cycles.

A series of large regulating dams on the middle and upper Deschutes River affect flow and block access to upstream habitat, and have extirpated one or more populations from the Cascades Eastern Slope major population. Also, operation and maintenance of large water reclamation systems such as the Umatilla Basin and Yakima projects have significantly modified flow regimes and degraded water quality and physical habitat in this domain.

Many stream reaches designated as critical habitat in the ICRD are over-allocated, with more allocated water rights than existing streamflow. Withdrawal of water, particularly during low-flow periods that commonly overlap with agricultural withdrawals, often increases summer stream temperatures, blocks fish migration, strands fish, and alters sediment transport (Spence et al. 1996). NMFS has identified reduced tributary streamflow as a major limiting factor for MCR steelhead in this area (NMFS 2007; NMFS 2011).

Many stream reaches designated as critical habitat are listed on Oregon's and Washington's Section 303(d) lists for water temperature. Many areas that were historically suitable rearing and spawning habitat are now unsuitable due to high summer stream temperatures. Removal of riparian vegetation, alteration of natural stream morphology, and withdrawal of water for agricultural or municipal use all contribute to elevated stream temperatures. Contaminants such as insecticides and herbicides from agricultural runoff and heavy metals from mine waste are common in some areas of critical habitat.

The ICRD is a very large and diverse area. The CHART determined that few watersheds with PBFs for Chinook salmon or steelhead are in good to excellent condition with no potential for improvement. Overall, most ICRD watersheds are in fair-to-poor or fair-to-good condition. However, most of these watersheds have some or high potential for improvement.

Despite these degraded habitat conditions, the hydrologic unit codes that have been identified as critical habitat for this species are largely ranked as having high conservation value. Conservation value reflects several factors, including: (1) how important the area is for various life history stages, (2) how necessary the area is to access other vital areas of habitat, and (3) the relative importance of the populations the area supports relative to the overall viability of the Evolutionarily Significant Unit (ESU) or DPS.

A summary of the status of critical habitats considered in this opinion is provided in Table 6.

Table 6. Critical habitat, designation date, Federal Register (FR) citation, and status summary for critical habitat considered in this opinion.

Species	Designation Date and Federal Register Citation	Critical Habitat Status Summary
Middle Columbia River steelhead	9/02/05; 70 FR 52630	Critical habitat encompasses 15 subbasins in Oregon and Washington containing 111 occupied watersheds, as well as the Columbia River rearing/migration corridor. Most fifth-field hydrologic code watersheds with physical or biological features for salmon are in fair-to-poor or fair-to-good condition (NMFS 2005). However, most of these watersheds have some or a high potential for improvement. The conservation value of occupied fifth-field hydrologic code watersheds is rated as high for 80 watersheds, medium for 24 watersheds, and low for 9 watersheds.

2.2.3. Climate Change

One factor affecting the status of ESA-listed species considered in this opinion, and aquatic habitat at large, is climate change. Climate change is likely to play an increasingly important role in determining the abundance and distribution of ESA-listed species, and the conservation value of its designated critical habitats, in the Pacific Northwest. These changes will not be spatially homogeneous across the Pacific Northwest. The largest hydrologic responses are expected to occur in basins with significant snow accumulation, where warming decreases snow pack, increases winter flows, and advances the timing of spring melt (Mote et al. 2014, 2016). Rain-dominated watersheds and those with significant contributions from groundwater may be less sensitive to predicted changes in climate (Tague et al. 2013; Mote et al. 2014).

During the last century, average regional air temperatures in the Pacific Northwest increased by 1 to 1.4°F as an annual average, and up to 2°F in some seasons, based on average linear increase per decade (Abatzoglou et al. 2014; Kunkel et al. 2013). Warming is likely to continue during the next century as average temperatures are projected to increase another 3 to 10°F, with the largest increases predicted to occur in the summer (Mote et al. 2014; USGCRP 2018). The 5 warmest years in the 1880 to 2019 record have all occurred since 2015, while 9 of the 10 warmest years have occurred since 2005 (Lindsey and Dahlman 2020).

Decreases in summer precipitation of as much as 30 percent by the end of the century are consistently predicted across climate models (Mote et al. 2014). Precipitation is more likely to occur during October through March, less during summer months, and more winter precipitation will be rain than snow (ISAB 2007; Mote et al. 2014). Earlier snowmelt will cause lower stream flows in late spring, summer, and fall, and water temperatures will be warmer (ISAB 2007; Mote et al. 2014). Models consistently predict increases in the frequency of severe winter precipitation events (i.e., 20-year and 50-year events), in the western United States (Dominguez et al. 2012). The largest increases in winter flood frequency and magnitude are predicted in mixed rain-snow watersheds (Mote et al. 2014).

The combined effects of increasing air temperatures and decreasing spring through fall flows are expected to cause increasing stream temperatures. Overall, about one-third of the current cold-water salmonid habitat in the Pacific Northwest is likely to exceed key water temperature thresholds by the end of this century (Mantua et al. 2009). Higher temperatures will reduce the quality of available salmonid habitat for most freshwater life stages (ISAB 2007). Reduced flows will make it more difficult for migrating fish to pass physical and thermal obstructions, limiting their access to available habitat (Isaak et al. 2012; Mantua et al. 2010). Temperature increases shift timing of key life cycle events for salmonids and species forming the base of their aquatic foodwebs (Crozier et al. 2011; Tillmann and Siemann 2011; Winder and Schindler 2004). Higher stream temperatures will also cause decreases in dissolved oxygen and may also cause earlier onset of stratification and reduced mixing between layers in lakes and reservoirs, which can also result in reduced oxygen (Meyer et al. 1999; Raymondi et al. 2013; Winder and Schindler 2004). Higher temperatures are likely to cause several species to become more susceptible to parasites, disease, and higher predation rates (Crozier et al. 2008; Raymondi et al. 2013; Wainwright and Weitkamp 2013).

As more basins become rain-dominated and prone to more severe winter storms, higher winter stream flows may increase the risk that winter or spring floods in sensitive watersheds will damage spawning redds and wash away incubating eggs (Goode et al. 2013). Earlier peak stream flows will also alter migration timing for salmon smolts and may flush some young salmon and steelhead from rivers to estuaries before they are physically mature, increasing stress and reducing smolt survival (McMahon and Hartman 1989; Lawson et al. 2004).

In addition to changes in freshwater conditions, predicted changes for coastal waters in the Pacific Northwest as a result of climate change include increasing surface water temperature, increasing but highly variable acidity, and increasing storm frequency and magnitude (Mote et al. 2014). Elevated ocean temperatures already documented for the Pacific Northwest are highly likely to continue during the next century, with sea surface temperature projected to increase by 33.8 to 38.7°F by the end of the century (IPCC 2014). Habitat loss, shifts in species' ranges and abundances, and altered marine food webs could have substantial consequences to anadromous, coastal, and marine species in the Pacific Northwest (Tillmann and Siemann 2011).

Moreover, as atmospheric carbon emissions increase, increasing levels of carbon are absorbed by the oceans, changing the pH of the water. A 38 to 109 percent increase in acidity is projected by the end of this century in all but the most stringent CO_2 mitigation scenarios, and is essentially irreversible over a time scale of centuries (IPCC 2014). Regional factors appear to be amplifying acidification in Northwest ocean waters, which is occurring earlier and more acutely than in other regions and is already impacting important local marine species (Barton et al. 2012; Feely et al. 2012). Acidification also affects sensitive estuary habitats, where organic matter and nutrient inputs further reduce pH and produce conditions more corrosive than those in offshore waters (Feely et al. 2012; Sunda and Cai 2012).

Global sea levels are expected to continue rising throughout this century, reaching likely predicted increases of 10 to 32 inches by 2081–2100 (IPCC 2014). These changes will likely result in increased erosion and more frequent and severe coastal flooding and shifts in the composition of nearshore habitats (Tillmann and Siemann 2011). Estuarine-dependent salmonids such as chum and Chinook salmon are predicted to be impacted by significant reductions in rearing habitat in some Pacific Northwest coastal areas (Glick et al. 2007). Historically, warm periods in the coastal Pacific Ocean have coincided with relatively low abundances of salmon and steelhead, while cooler ocean periods have coincided with relatively high abundances, and therefore these species are predicted to fare poorly in warming ocean conditions (Scheuerell and Williams 2005; Zabel et al. 2006). This is supported by the recent observation that anomalously warm sea surface temperatures off the coast of Washington from 2013 to 2016 resulted in poor coho and Chinook salmon body condition for juveniles caught in those waters (NWFSC 2015). Changes to estuarine and coastal conditions, as well as the timing of seasonal shifts in these habitats, have the potential to impact a wide range of listed aquatic species (Tillmann and Siemann 2011; Reeder et al. 2013).

The adaptive ability of these threatened and endangered species is depressed due to reductions in population size, habitat quantity and diversity, and loss of behavioral and genetic variation. Without these natural sources of resilience, systematic changes in local and regional climatic conditions due to anthropogenic global climate change will likely reduce long-term viability and sustainability of populations in many of these ESUs and DPSs (NWFSC 2015). New stressors generated by climate change, or existing stressors with effects that have been amplified by climate change, may also have synergistic impacts on species and ecosystems (Doney et al.

2012). These conditions will possibly intensify the climate change stressors inhibiting recovery of ESA-listed species in the future.

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 consists of streams and riparian areas within the allotment boundaries, which are located in the Lower John Day River subbasin of eastern Oregon. There are 10 streams within the nine allotments that support steelhead and are designated critical habitat. All freshwater life history stages of MCR steelhead use the action area. For this consultation, the action area includes:

1. Belshe Allotment, with Little Ferry Canyon Creek and the John Day River in the 170702040802 watershed, containing 2.61 miles of MCR steelhead designated critical habitat, of which 2.23 miles are perennial and 0.38 miles intermittent (Figure 2).
2. Gable Creek Allotment, with Gable Creek and Nelson Creek in the 170702043007 watershed, containing 2.65 miles of MCR steelhead designated critical habitat, of which all 2.65 miles is perennial (Figure 3).
3. Pine Creek Allotment, with Pine Hollow and Long Hollow Creeks in the 170702043401 watershed, containing 2.3 miles of MCR steelhead designated critical habitat, of which 0.7 miles are perennial and 1.6 miles are intermittent (Figure 4).
4. Circle Bar Allotment, with Bridge Creek in the 170702043003 watershed, containing 2.6 miles of MCR steelhead designated critical habitat, of which all 2.6 miles are perennial (Figure 5).
5. Eakin Allotment, with Jackknife Canyon Creek in the 170702043601 watershed, containing 1.5 miles of MCR steelhead designated critical habitat, of which 1.0 miles are perennial and 0.5 miles are intermittent (Figure 6).
6. Laffoon and Carlson Allotment, with Jackknife Canyon Creek and the John Day River in the 170702043601 watershed, containing 9.95 miles of MCR steelhead designated critical habitat, of which 8.5 miles is perennial and 1.05 miles are intermittent (Figure 7).
7. Verne Mobley Allotment, with Pine Hollow Creek in the 170702043403 watershed, containing 2.5 miles of MCR steelhead designated critical habitat, of which 0.9 miles is perennial and 1.6 miles are intermittent (Figure 8).
8. Crown Rock Allotment, with Bear Creek in the 170702043101 watershed, containing 2.0 miles of MCR steelhead designated critical habitat, of which all 2.0 miles are perennial (Figure 9).
9. Sid Seale Allotment, with Ferry Canyon Creek in the 170702043101 watershed, containing 2.05 miles of MCR steelhead designated critical habitat, of which 0.45 miles are perennial and 1.6 miles are intermittent (Figure 10).

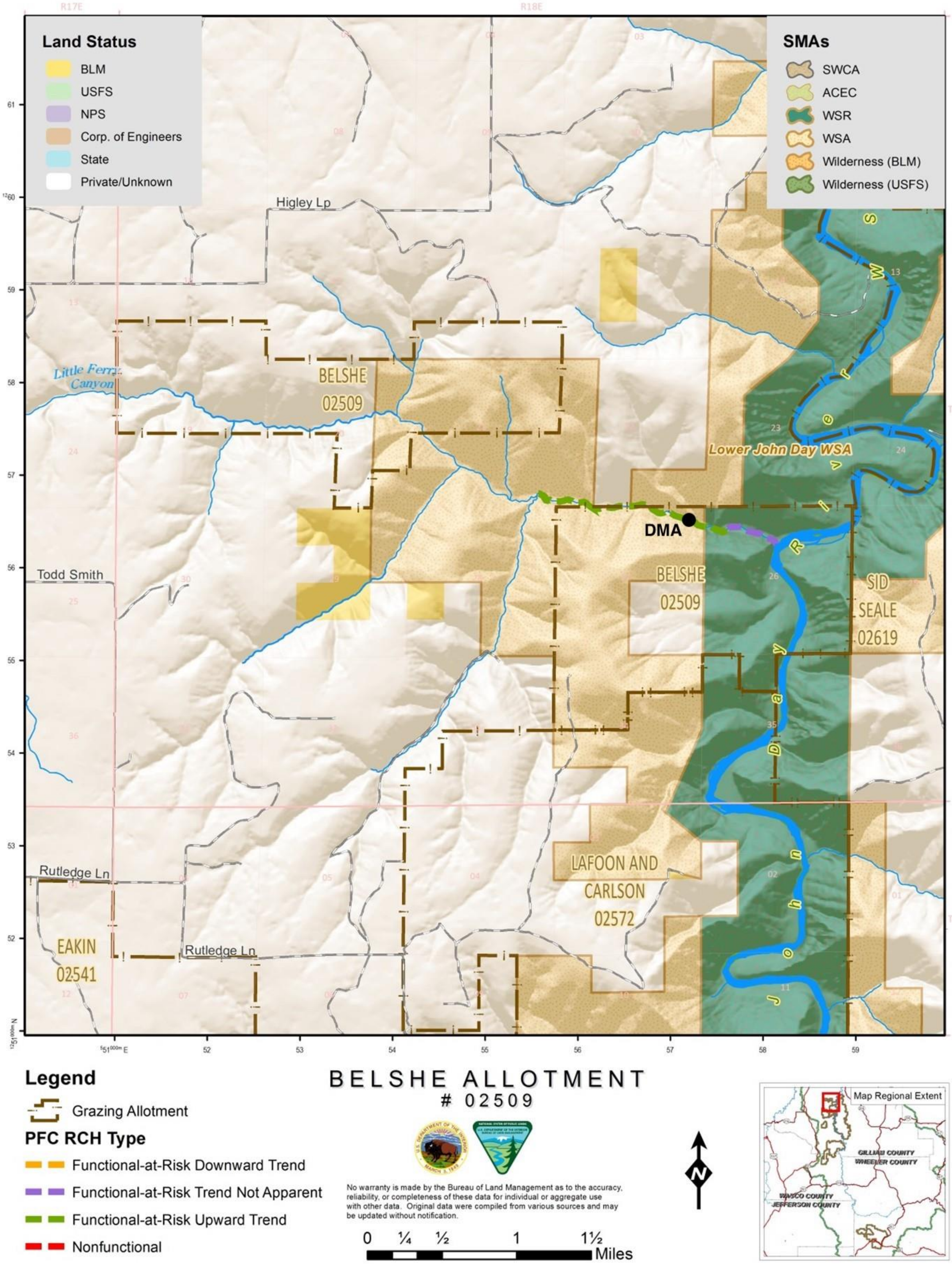

Figure 2. Location of the Belshe Allotment in the Lower John Day River subbasin.

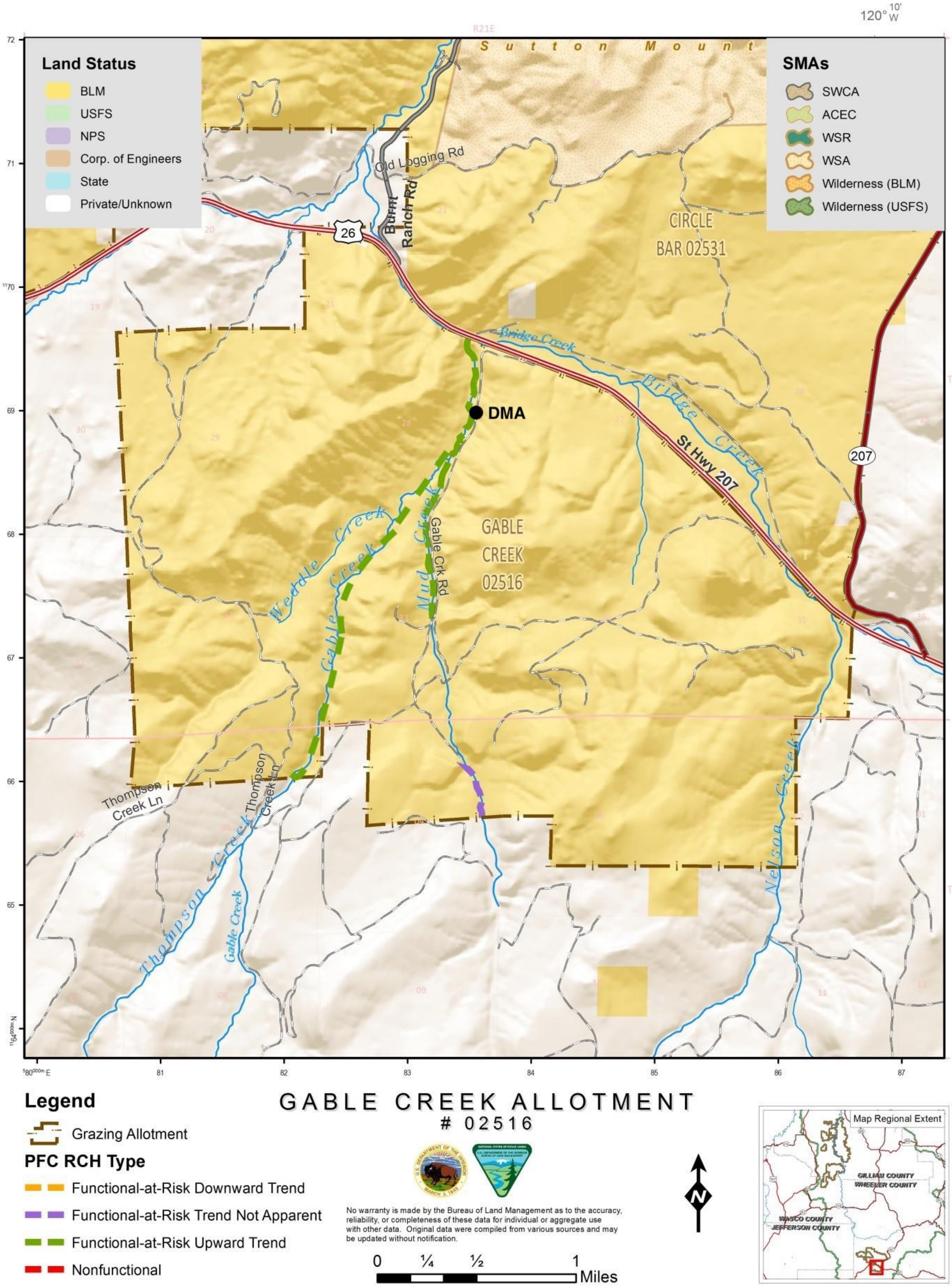

Figure 3. Location of the Gable Creek Allotment in the Lower John Day River subbasin.

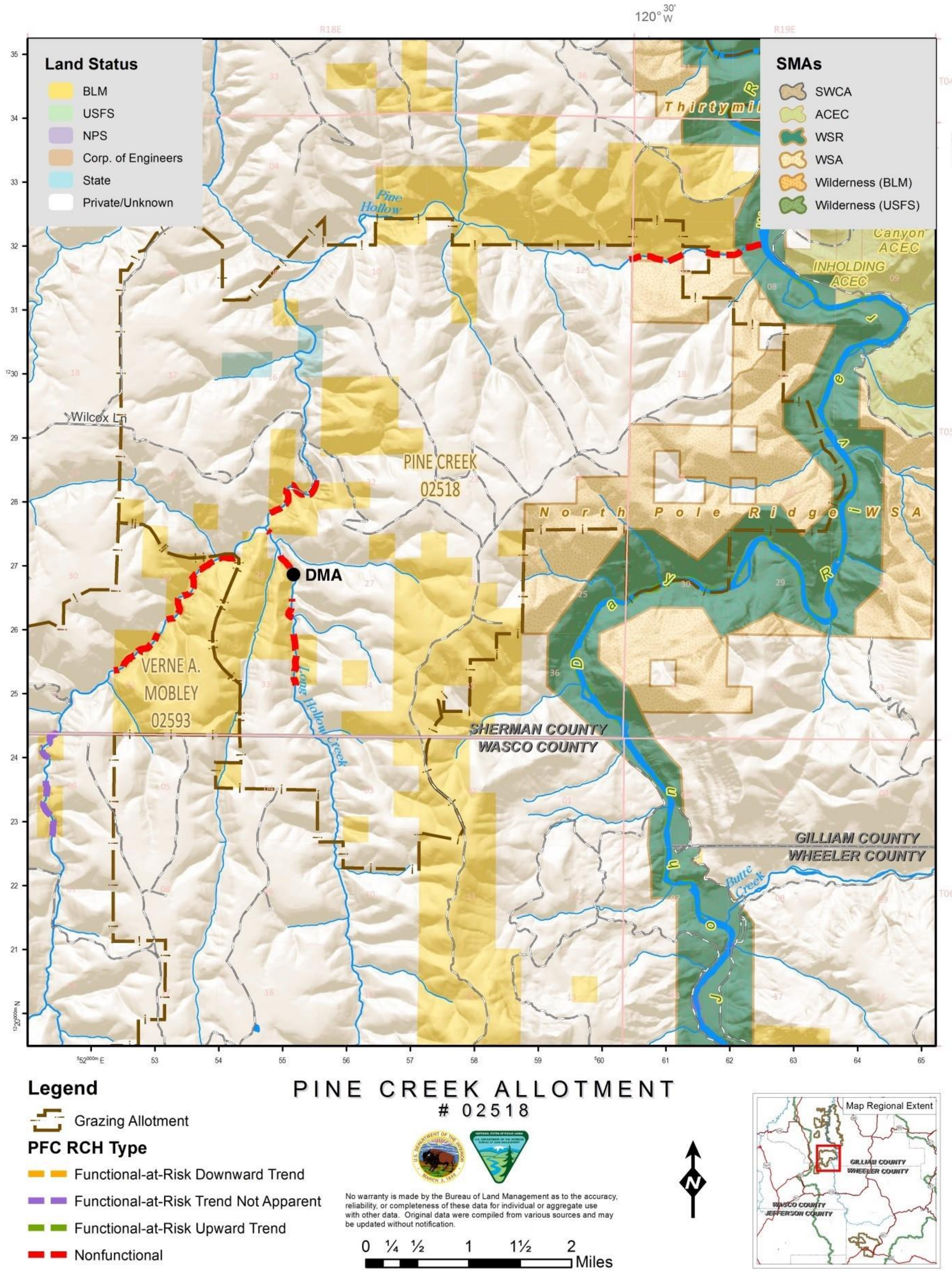

Figure 4. Location of the Pine Creek Allotment in the Lower John Day River subbasin.

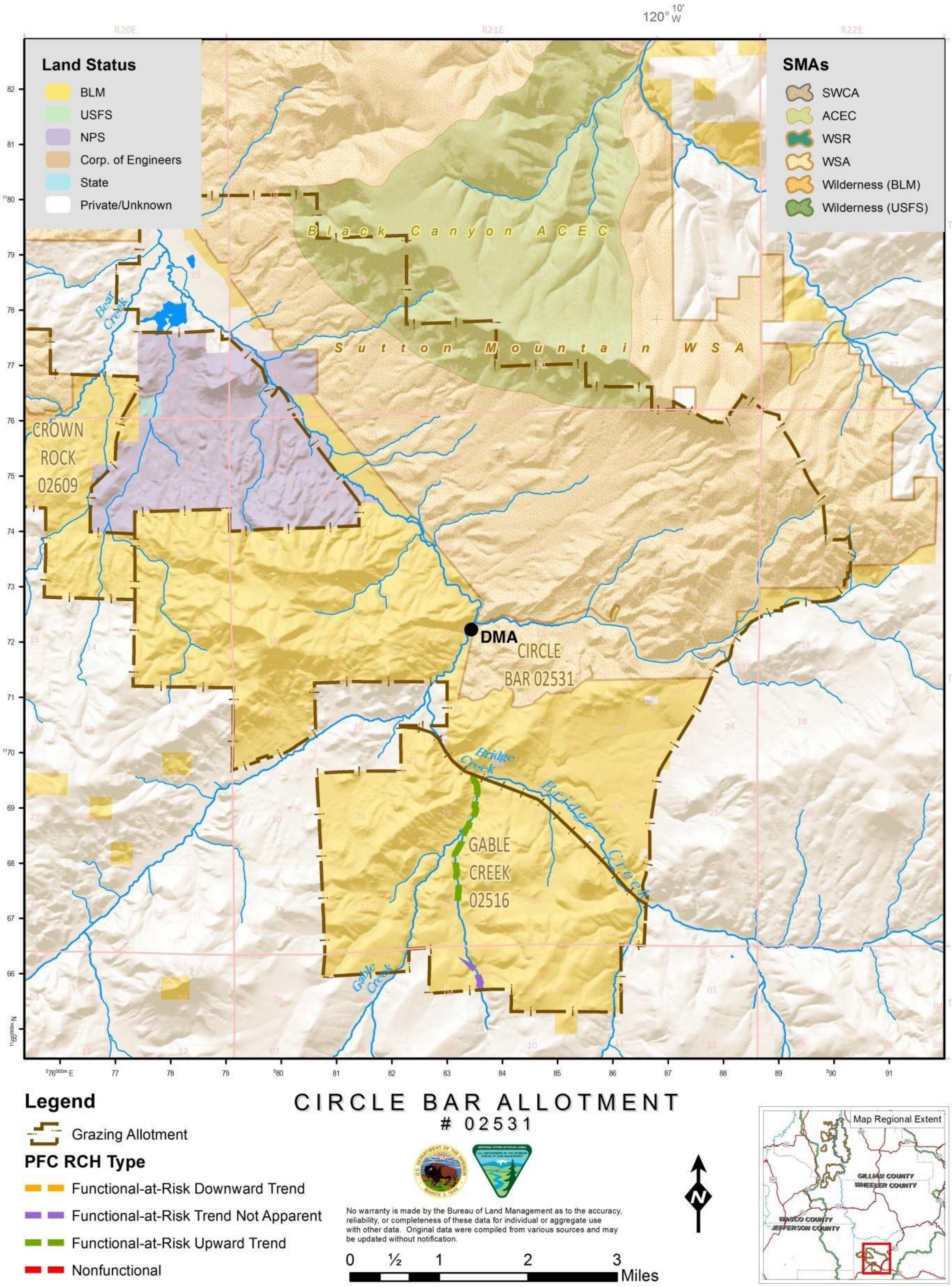

Figure 5. Location of the Circle Bar Allotment in the Lower John Day River subbasin.

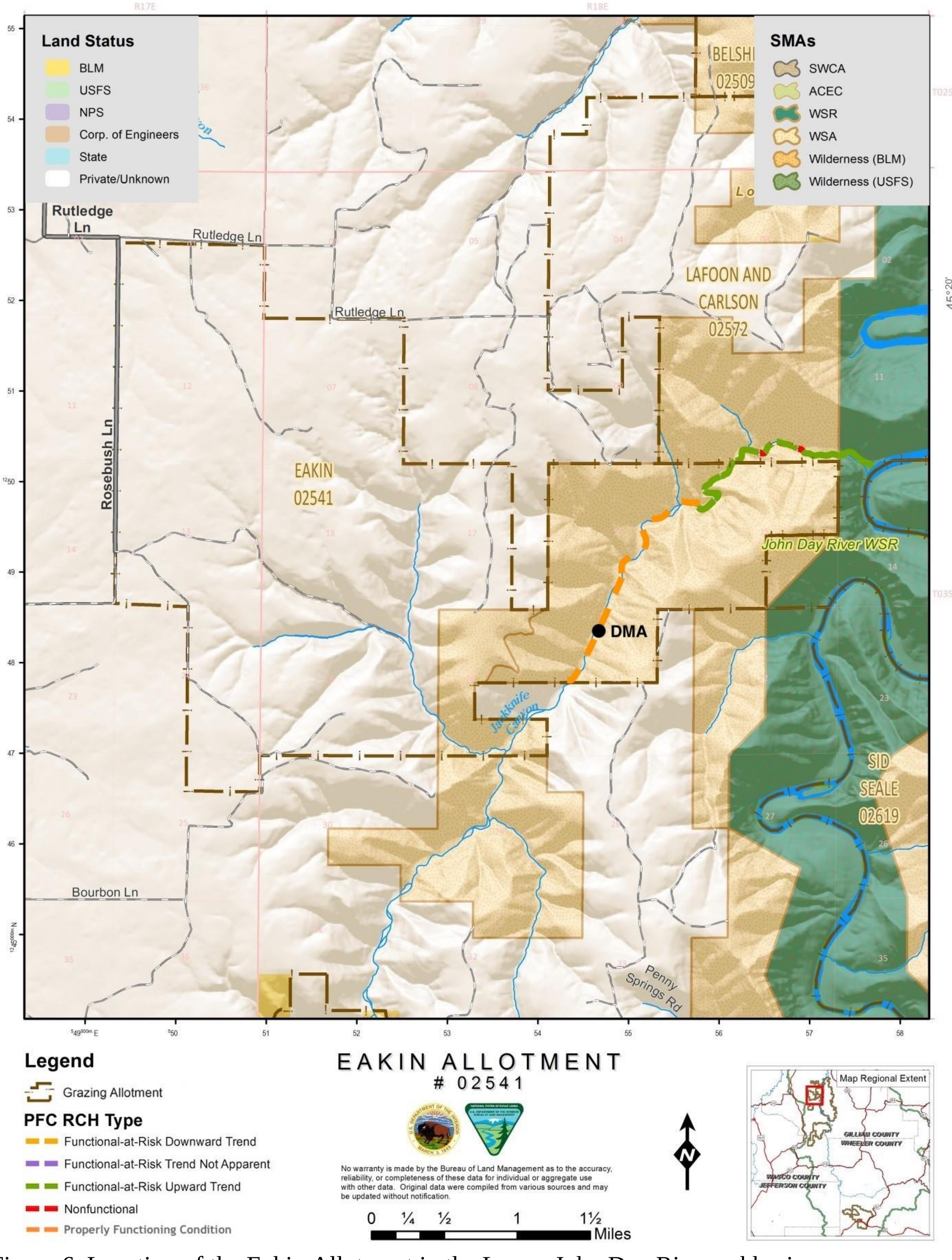

Figure 6. Location of the Eakin Allotment in the Lower John Day River subbasin.

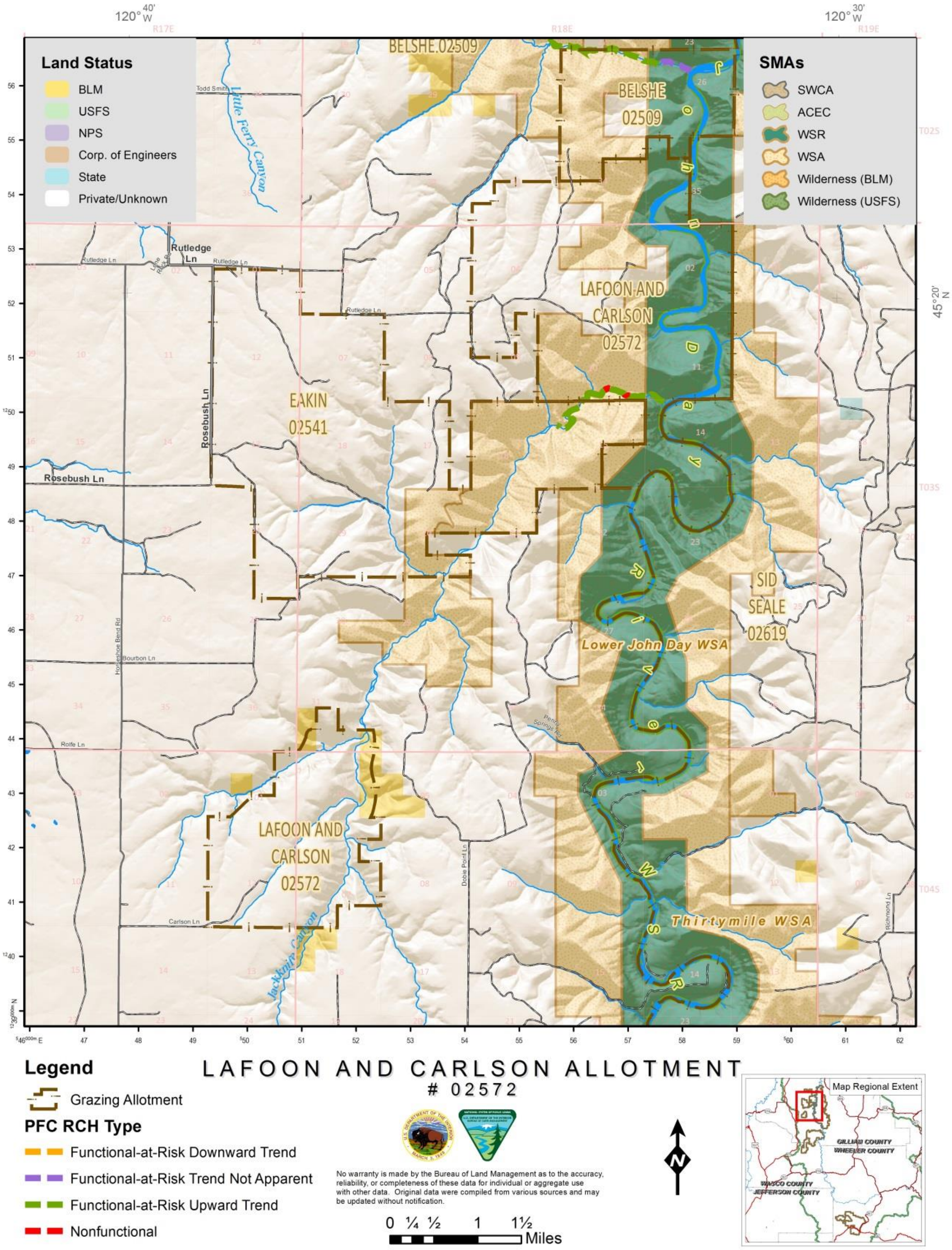

Figure 7. Location of the Lafoon and Carlson Allotment in the Lower John Day River subbasin.

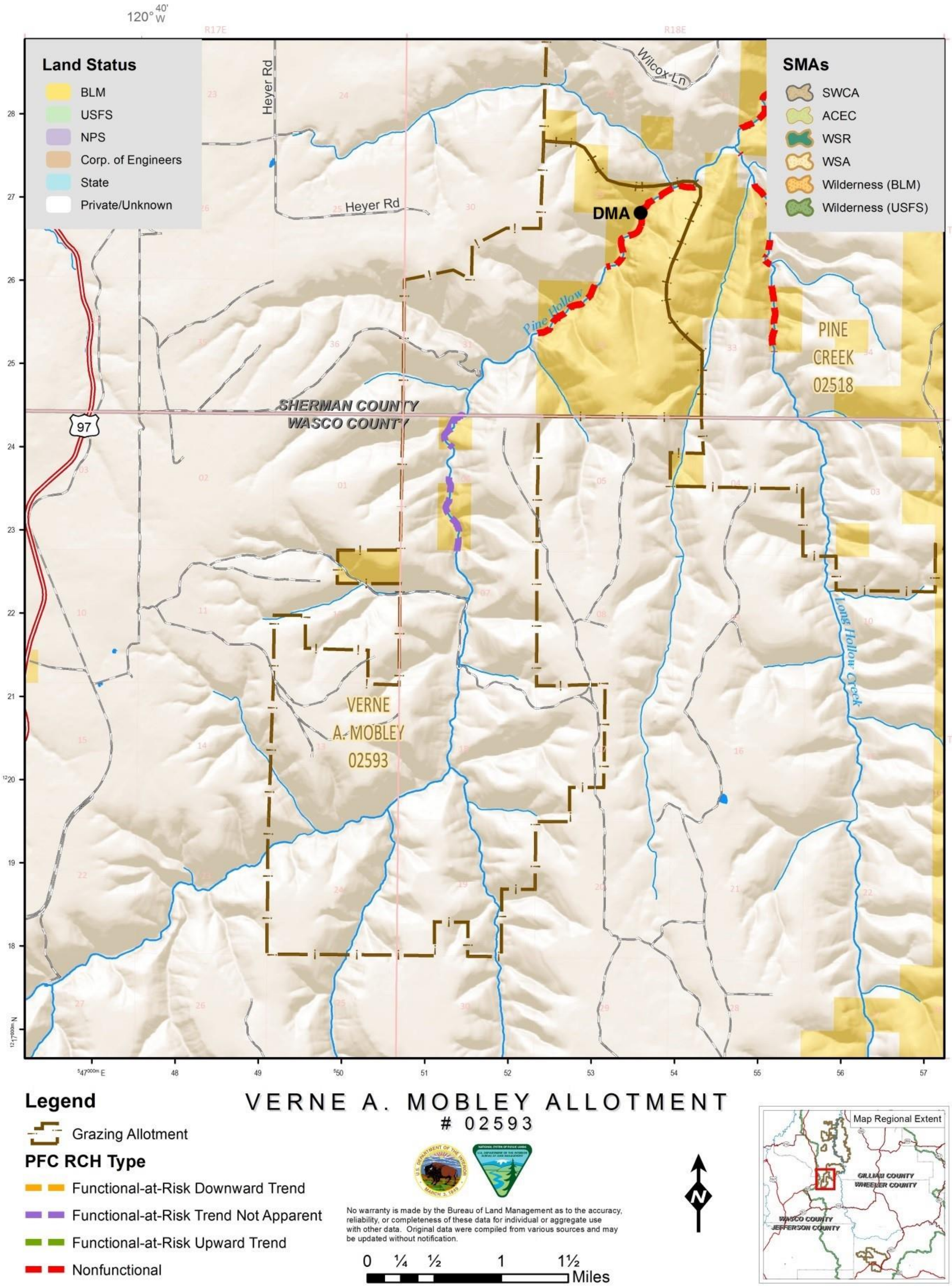

Figure 8. Location of the Verne A. Mobley Allotment in the Lower John Day River subbasin.

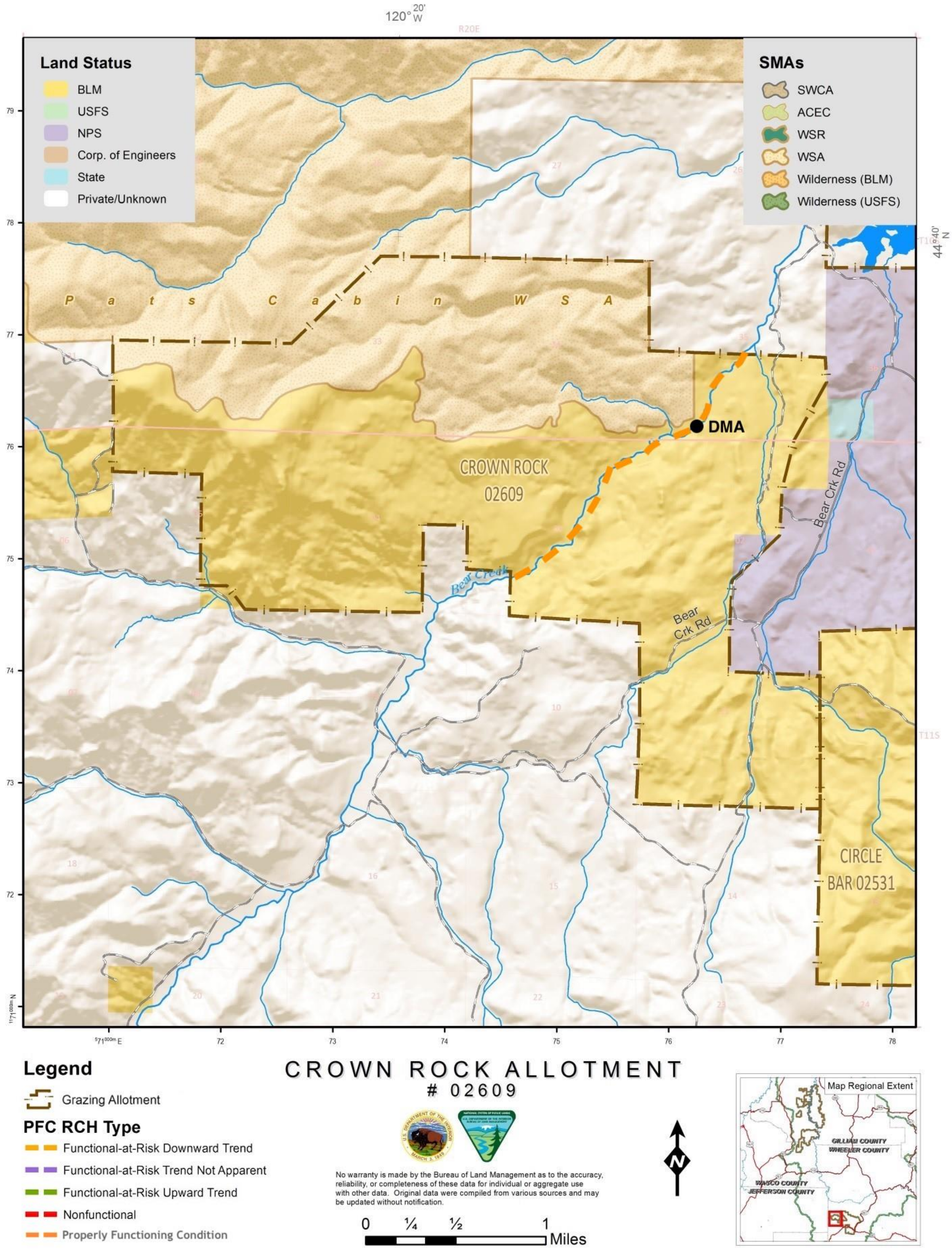

Figure 9. Location of the Crown Rock Allotment in the Lower John Day River subbasin.

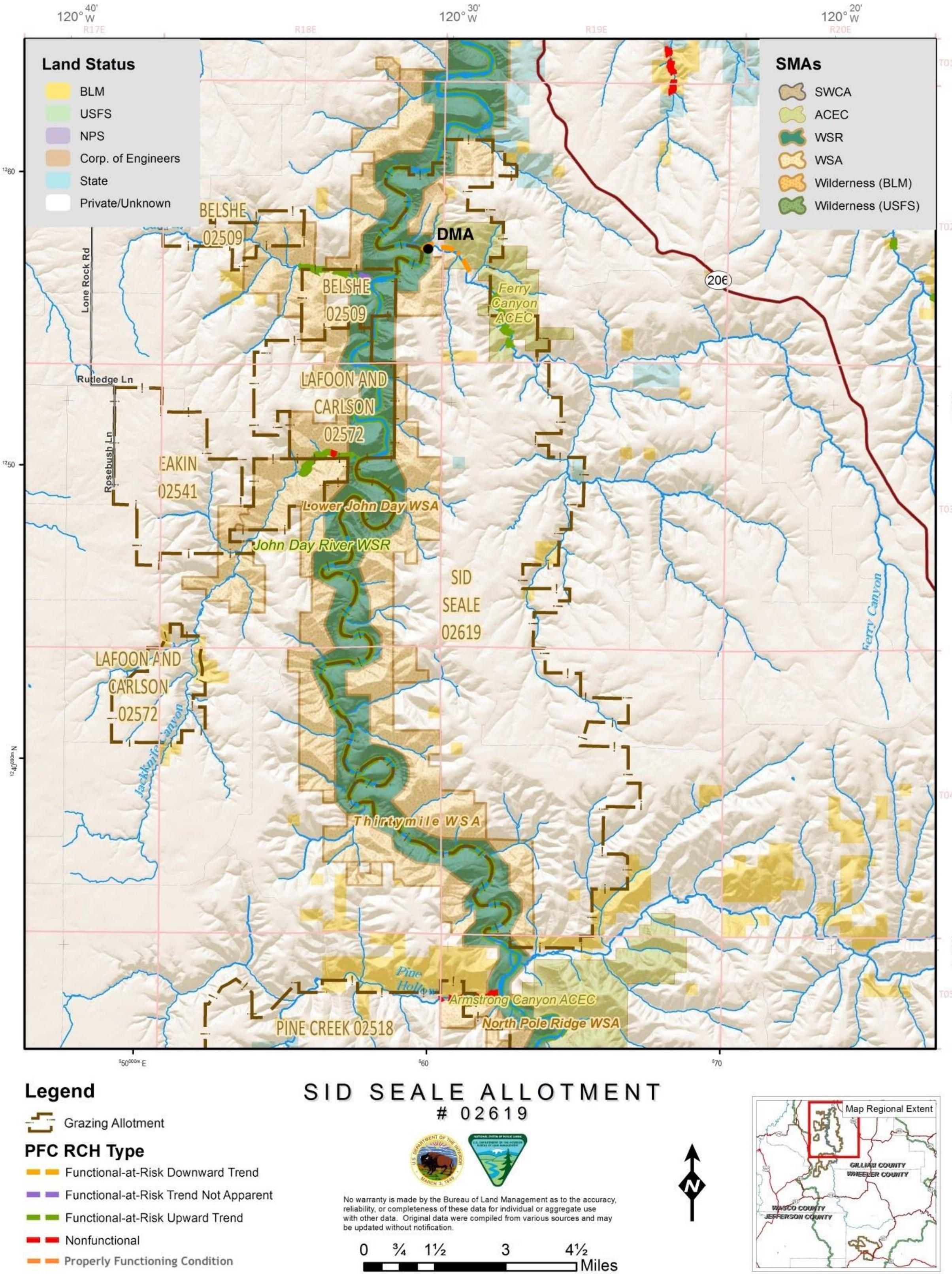

Figure 10. Location of the Sid Seale Allotment in the Lower John Day River subbasin.

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. Middle Columbia River Steelhead in the Action Area

The proposed action will take place within the John Day River MPG boundaries and will affect the Lower Mainstem John Day River summer steelhead population. The Lower Mainstem John Day River population occupies the Lower John Day River watershed below the town of Dayville at the mouth of the South Fork John Day River. The John Day River MPG does not meet viability criteria because the abundance and productivity, and spatial structure and diversity, of the Lower Mainstem John Day River population is considered at moderate risk. Overall, the Lower Mainstem John Day River and Upper John Day River populations are considered maintained, the Middle Fork John Day River and South Fork John Day River populations are considered viable, and the North Fork John Day River population is considered highly viable. Recovery criteria for the John Day River MPG requires three populations to meet viability criteria, of which one should be a very large population, and one population should be highly viable. The Lower Mainstem John Day River population represents the only population in the John Day River MPG that meets the very large size requirement (abundance threshold of 2,250 and productivity threshold of 1.19). Therefore, to achieve viable status for this MPG, the Lower Mainstem John Day River population must achieve viable status.

To achieve a viable rating, this population must improve in both Abundance/Productivity and Spatial Structure/Diversity. Spawner abundance in recent years has been highly variable. The most recent 10-year geomean number of natural-origin spawners was 1,424 (2010-2019), below the abundance threshold of 2,250 for a "very large" sized population (Table 7). A very large population must also have sufficient intrinsic productivity (greater than 1.19 recruits per spawner at the minimum abundance threshold) to achieve a 5 percent or less risk of extinction over a 100-year timeframe. The most recent 20-year (1993-2012) geomean of returns per spawner was 1.07, below the productivity threshold of 1.19. The Lower Mainstem John Day River population therefore does not meet the combined abundance and productivity criteria for recovery.

Steelhead in the Lower Mainstem John Day River population spawn in tributary streams connected by the Lower John Day River. Multiple smaller drainages also support production. The population contains 11 major spawning areas (MaSAs) and 19 minor spawning areas (MiSAs). Major spawning areas in the action area include Bridge and Pine Hollow creeks. Minor spawning areas include Jackknife Canyon and Ferry Canyon creeks. The current spawner distribution is similar to historical with all MaSAs occupied, and spawners spread over a very broad geographic area.

However, out-of-basin hatchery origin spawners remain a concern in the Lower John Day subbasin. Although the proportions of out of basin hatchery steelhead in John Day natural spawning areas have declined substantially in recent years, with the declines being negatively correlated with the proportion of Snake River outmigrants that are barge transported (Banks et al. 2013; Bare et al. 2015), the out-of-basin strays are concentrated in Lower John Day River tributaries.

Table 7. The most recent 10-year geometric mean of natural-origin steelhead spawners and the most recent 20-year geometric mean of recruits per spawner for the Lower Mainstem John Day River steelhead population. Source of data is the Oregon Department of Fish and Wildlife's salmon and steelhead recovery tracker.

10-Year Geometric Mean of Natural Origin Spawners		**20-Year Geometric Mean of Recruits Per Spawner**	
Abundance Threshold	**Spawn Years 2010–2019**	**Productivity Threshold**	**Brood Years 1993–2012**
2,250	1,424	1.19	1.07

The primary tributary habitat limiting factors identified for the Lower John Day River population are: (1) degraded channel structure and complexity (habitat quantity and diversity), (2) altered sediment routing, (3) water temperature, (4) altered hydrology, and (5) passage obstructions. The primary threats are: (1) hatchery production that results in high proportions of stray hatchery fish in natural spawning areas; (2) agricultural and grazing practices, which remove overstory trees and bank vegetation from the riparian corridor, decrease streamflow, and channelize streams; and (3) the Columbia River mainstem hydrosystem.

2.4.2. Critical Habitat in the Action Area

The Lower John Day River and tributaries, including the action area, are designated critical habitat for the Lower Mainstem John Day River population of MCR steelhead. Steelhead are widely distributed throughout most of the subbasin except in the Lower John Day River area where high temperatures and low flows are widespread, restricting the current distribution. The CHART rated habitat in the Lower John Day River Subbasin within the action area as medium to medium high with a medium to high conservation value.

Anthropogenic activities including grazing, agriculture, forest practices, irrigation impoundments and withdrawals, road building and maintenance, and introduced fish and hatchery production have degraded the habitat of the Lower John Day River and its tributaries. Land cover in the Lower John Day River watershed is predominately rangeland and cropland (ODA 2004). The collective result of habitat degradation in the subbasin is an aquatic landscape characterized by inadequate streamflows, excessive water temperatures, inadequate riparian corridors, extensively altered floodplains, simplified and reduced instream habitat, and excessive erosion and sedimentation into streams (NPCC 2005).

Much of the Lower John Day River subbasin is listed as water-quality impaired on the Oregon Department of Environmental Quality's (ODEQ) section 303(d) Clean Water Act list for water temperature. Other water quality parameters of concern are fecal coliform, pH, and dissolved oxygen. Climate change, as described in Section 2.2, may reduce the conservation value of designated critical habitat in the action area.

The primary activities affecting critical habitat in the action area are grazing and channel modifications. The PBFs that support spawning, rearing, and migration are affected by these activities. Allotment specific habitat conditions and current condition of these PBFs in the action area are described below.

2.4.3. Allotment Specific Current Habitat Conditions

The submitted BA contains historic and current information on these nine allotments. Below is a summary of the information contained in the submitted BA. Current habitat conditions in each allotment described below are based on available surveys, inventories, data, and professional knowledge. Condition information includes inventory and measured parameters obtained from: (1) Proper Functioning Condition Assessments, (2) rangeland health inventories, (3) PIBO and AIM DMAs, and (4) photo points

Belshe Allotment

The Belshe allotment is a large, unfenced tract of BLM managed land intermingled with large tracts of non-BLM managed lands. Within the allotment, summer steelhead critical habitat is present on 1.11 miles of Little Ferry Canyon Creek (0.73 miles perennial and 0.38 miles intermittent) and 1.5 miles of the John Day River. Summer steelhead spawning and rearing occurs in Little Ferry Canyon Creek and migration occurs in the John Day River.

Although spring grazing is permitted in this canyon, it has not been grazed since 2008, and likely will not be grazed in the future. The current habitat rating for the Belshe Allotment is poor. There is an alluvial fan at the mouth of Little Ferry Canyon Creek, a significant headcut approximately 0.38 miles up from the mouth, and intermittent flow at the lower end of Little Ferry Canyon Creek. There is no jump pool at the base of the headcut, making upstream adult steelhead passage unlikely.

Little Ferry Canyon Creek has a cobble and gravel streambed, lacks fine sediment, and is confined within Little Ferry Canyon. The lower end of Little Ferry Canyon Creek has intermittent flow and no perennial vegetation. The upper end has perennial flow and is lined with white alder. Some livestock trailing is evident in the riparian area at six watering and crossing sites.

The John Day River forms the eastern boundary of the allotment. Riparian vegetation along the John Day River is comprised of coyote willow, white alder, Siberian elm, reed canary grass, and various rush and sedge species. Riparian conditions are improving, and colonization by willow and expansion of the herbaceous community is occurring. This section of the John Day River was last grazed in 2008 and vegetation is in an upward trend and considered by the BLM to be very vigorous.

The DMA on Little Ferry Canyon Creek was monitored in 2005, 2010 and 2015 (Table 8). Since 2005, streambanks have ranged from 75 to 100 percent stable; the percent of undercut banks has been variable, ranging from 2.4 to 10 percent; and residual pool depth has remained less than one foot.

Table 8. Residual pool depth, percent stable banks, and percent undercut banks at the Bureau of Land Management's monitoring site on Little Ferry Canyon Creek.

Year	Residual Pool Depth (meters)	Percent Stable Banks	Percent Undercut Banks
2005	Not Collected	100	7.14
2010	0.2	75	10
2015	0.2	100	2.4

End of growing season monitoring using the MIM protocol occurred in September 2014. In the absence of grazing, mean residual stubble height was 2.86 inches, bank alteration was 0 percent, and woody utilization was 1.68 percent.

Gable Creek Allotment

Gable Creek allotment is a large, fenced tract of BLM managed land that is grazed in odd years. Although good stream channel and riparian conditions exist, the stream channel has not fully recovered from years of overuse and the BLM considers this habitat to be fair with an upward trend. The Gable Creek allotment contains 2.65 miles of perennial summer steelhead critical habitat located in Gable and Nelson creeks. Summer steelhead spawning and rearing has historically occurred in both creeks.

Gable Creek is an incised stream with fines to gravel substrate. Young and middle-aged alder, willow, cottonwood and dogwood as well as sedges and rushes are building and stabilizing streambanks, and dissipating streamflow. High turbidity and a heavy sediment load from agriculture and erosion in the upper watershed decreases available spawning habitat, and high gradient and low flow volume limit pool habitat. Western Juniper was added to the channel in 2015- 2018 for complexity and beaver are utilizing the downed slash as dam maintenance material. There are four stream crossings utilized by cattle to reach an abandoned agricultural field.

Nelson Creek is a very small creek with a head cut at the mouth currently preventing adult and juvenile steelhead migration and use of the creek. Riparian vegetation is expanding.

The DMA on Gable Creek was monitored in 2005, 2010, and 2015. Since 2005, residual pool depth has remained below 1 foot, percent stable banks has remained above 95 percent, and undercut banks have increased from approximately five to 24 percent (Table 9).

Table 9. Residual pool depth, percent stable banks, and percent undercut banks at the Bureau of Land Management's monitoring site on Gable Creek.

Year	Residual Pool Depth (meters)	Percent Stable Banks	Percent Undercut Banks
2005	Not Collected	100	4.7
2010	0.3	97.4	23.7
2015	0.2	94.7	23.7

End of growing season monitoring using the MIM protocol occurred in September 2014, approximately 17 months after grazing. Mean residual Stubble Height was 18.25 inches, bank alteration was 0 percent, and woody utilization was 7.15 percent.

Pine Creek Allotment

Pine Creek allotment contains a few small, scattered parcels of BLM land along with large tracts of private land. BLM managed lands in the allotment contain 2.3 miles of critical habitat on Pine Hollow and Long Hollow creeks (0.7 miles perennial and 1.6 miles intermittent). Steelhead spawning and rearing occur in both creeks. Habitat in both creeks is considered poor but on an upward trend.

Pine Hollow Creek and Long Hollow Creek are interrupted streams with large segments of ephemeral channels. In these ephemeral sections, vegetation along the creek is limited to white sagebrush. The stream reaches with perennial flow are recovering from years of poor grazing management, horse and cattle trespass, and feral swine. Spike rush and brook grass is beginning to expand, and an early seral stage overstory of mock orange interspersed with juniper and willow is present. Coarse substrate, predominately cobble and gravel, dominates the system. Because vegetation is beginning to express itself, sediment capture and bank formation is beginning. Very few pools exist in either creek. There are approximately eight cattle crossings on Pine Hollow Creek and four on Long Hollow Creek.

In 1964, a 36-inch natural gas pipeline was buried in the lower 6 miles of Pine Hollow Creek. The gas line is exposed following high flow events, requiring heavy machinery work in the channel to maintain the gas line.

Monitoring data was collected at the DMA on Long Hollow Creek in 2001, 2005, 2010 and 2015. Since 2001, residual pool depth has remained below 1 foot, percent stable banks has remained above 95 percent, and percent undercut banks has been variable ranging from 0 to 9.5 percent (Table 10).

Table 10. Residual pool depth, percent stable banks, and percent undercut banks at the Bureau of Land Management's monitoring site on Long Hollow Creek.

Year	Residual Pool Depth (meters)	Percent Stable Banks	Percent Undercut Banks
2001	Not Collected	100	5
2005	Not Collected	100	9.5
2010	0.28	95.2	0
2015	0.1	100	2.5

End of growing season monitoring using the MIM protocol occurred in September of 2014, approximately 5 months post grazing. Mean residual stubble height was 2.78 inches, bank alteration was 10.74 percent, and woody utilization was 28.72 percent.

Circle Bar Allotment

The Circle Bar allotment is a large fenced tract of BLM managed land. The allotment contains 2.6 miles of critical habitat on Bridge Creek, used by steelhead for spawning and rearing. The BLM considers habitat in the allotment to be fair to good, with most of Bridge Creek now in properly functioning condition.

Bridge Creek is an incised, perennial stream with a 0.25-mile reach with an active floodplain. Substrate is fines to gravel/cobble with a diverse herbaceous community and a woody overstory of cottonwood, willow, and alder.

Vegetation is providing shade, streambank stability, and sediment capture. Livestock cross Bridge Creek to reach abandoned agriculture fields and trailing is evident at four crossings. However, the encroachment of hardwoods along Bridge Creek is reducing the presence of cattle and trailing, and shading out of herbaceous vegetation is limiting foraging opportunities.

Monitoring data was collected at the Bridge Creek DMA in 2001, 2005, 2010 and 2015. Since 2001, residual pool depth has remained less than 1 foot, percent stable banks has increased to almost 100 percent, and percent undercut banks has fluctuated, ranging between 2.4 and 7.7 percent (Table 11).

Table 11. Residual pool depth, percent stable banks, and percent undercut banks at the Bureau of Land Management's monitoring site on Bridge Creek.

Year	Residual Pool Depth (meters)	Percent Stable Banks	Percent Undercut Banks
2001	Not Collected	85	7.7
2005	Not Collected	100	2.4
2010	0.5	95.2	7.7
2015	0.5	97.5	5.0

End of growing season monitoring using the MIM protocol occurred in September 2014; approximately 5 months after cattle were removed from the pasture. Mean residual stubble height was 26.35 inches, bank alteration was less than 1 percent, and woody utilization was less than 2 percent.

Eakin Allotment

The Eakin allotment is a small unfenced tract of land intermingled with larger acreages of non-BLM managed lands. The allotment contains 1.5 miles (1mile perennial and 0.5 miles intermittent) of summer steelhead critical habitat in Jackknife Canyon Creek. Summer steelhead spawn and rear in Jackknife Canyon Creek in good water years.

Although permitted, grazing has only occurred on the Eakin allotment once in the past 12 years. Steep, rough country makes it hard to get cattle distributed evenly and move cattle into and out of the canyon. The BLM expects future grazing in this allotment to be very little to none.

Jackknife Canyon Creek has had four major fires in the last 20 years: 2011, 2014, 2016, and 2018. The fires scorched and killed most of the above ground biomass, and habitat conditions have gone from good to poor. White alder, willow, water birch and other vegetation is starting to recover.

Jackknife Canyon Creek has a cobble and boulder bed and is lined with white alders where perennial flow is present. There is a limited amount of trailing in the riparian area visible at watering and crossing sites. There is little herbaceous vegetation because of the rocky substrate and shade from the white alder canopy. In intermittent reaches, the streambed is a continuous riffle with no perennial vegetation.

The BLM established an AIM DMA in 2019 (Table 12). Although cattle grazing has not occurred in the allotment since 2008, woody utilization was 10 percent.

Table 12. Residual pool depth, percent stable banks, and percent undercut banks at the Bureau of Land Management's monitoring site on Jackknife Canyon Creek.

Year	Residual Pool Depth (meters)	Percent Stable Banks	Percent Undercut Banks
2019	No pools found	75	4.8

Lafoon and Carlson Allotment

Lafoon and Carlson allotment is a large unfenced tract intermingled with larger acreages of non-BLM managed lands. Livestock grazing in the allotment has occurred once in the past 12 years due to fire and the steep, rough country. The allotment contains 1.15 miles of critical habitat on Jackknife Canyon Creek (0.1 perennial and 1.05 intermittent) and 8.4 miles on the John Day River. Steelhead use Jackknife Canyon Creek for spawning and rearing in years with high flows, and use the John Day River for migration. Jackknife Canyon Creek has experienced four large fires: 2011, 2014, 2016, and 2018. Habitat is considered poor with the loss of vegetation from wildfire, intermittent flow, and an alluvial fan present at the mouth.

Jackknife Canyon Creek is incised with a dewatered alluvial fan at the mouth, which prevents connection of Jackknife Canyon Creek to the John Day River. From the mouth upstream for 0.10 miles, flow is perennial with an alder/willow overstory. The next 1.05-mile reach has a cobble/boulder bed, lacks fine sediment, and is lined with sagebrush. Herbaceous cover is absent. There is a limited amount of trailing evident in the riparian area at watering and crossing sites.

The John Day River is the eastern boundary of the allotment. Riparian vegetation along the John Day River is comprised of coyote willow, white alder, and Siberian elm, sedges, and reed canary grass. This section of the John Day River was last grazed in 2008, and vegetation is in an upward trend and very vigorous.

Verne Mobley Allotment

The Verne Mobley allotment is a small, unfenced tract intermingled with larger acreages of non-BLM managed lands. Grazing has not occurred since 2000, and future grazing is unlikely due to the permittee's choice. However, the overall habitat condition is poor, with very little perennial vegetation and intermittent flow.

The allotment contains 2.5 miles of critical habitat in Pine Hollow Creek (0.9 miles perennial and 1.6 miles intermittent). Perennial stream reaches have slowly begun recovering from years of poor grazing management, with good stream channel and riparian conditions present. The intermittent reaches are cobble/gravel and lack perennial vegetation almost entirely. Therefore, sediment is not being captured and streambanks are not rebuilding. There is a limited amount of trailing by wild ungulates in the riparian area at old livestock crossing sites.

Pine Hollow Creek flow fluctuates greatly depending on the season. Very few pools exist, with the majority of the stream being riffle. In good water years, Pine Hollow Creek provides spawning and rearing habitat for MCR steelhead. These reaches are miles upstream from the mouth of the John Day River so MCR steelhead must navigate through many stream miles of cobble/boulder stream with intermittent and limited flows to get there.

The DMA on Pine Hollow Creek was monitored in 2005, 2010 and 2015. Pools are absent, streambanks are stable, and the percentage of undercut banks is variable (Table 13).

Table 13. Residual pool depth, percent stable banks, and percent undercut banks at the Bureau of Land Management's monitoring site on Pine Hollow Creek.

Year	Residual Pool Depth (meters)	Percent Stable Banks	Percent Undercut Banks
2005	Not Collected	100	7.3
2010	0.4	97.5	2.5
2015	0.0	100	10.5

End of growing season monitoring using the MIM protocol occurred in September 2014, 14 years after it was last grazed. Mean residual stubble height was 19.23 inches, bank alteration was 0 percent, and woody utilization was 0.29 percent.

Crown Rock Allotment

The Crown Rock allotment is a large fenced tract of BLM managed lands, with good stream channel and riparian conditions. Grazing occurs in April of even years, but the Crown Rock Allotment has only been grazed once in the last 17 years.

The allotment contains 2.0 miles of critical habitat on Bear Creek. Summer steelhead spawn and rear in Bear Creek in good water years. Recent summer drought conditions have dried the channel with only two small sections of perennial flow to support summer steelhead. When there is perennial streamflow, habitat is considered good for MCR steelhead, but during drought years, the habitat is considered poor.

Bear Creek has an alder overstory and cobble/gravel substrate. The majority of the stream is a continuous riffle. Mid-way through the reach is a 0.75 mile section composed of a coyote willow overstory. Young and middle-aged white alder, willow, and dogwood as well as sedges and rushes are beginning to capture sediment, stabilize and build banks, and dissipate streamflow. There is a limited amount of trailing in the riparian area at watering and crossing sites.

The DMA on Bear Creek was monitored in 2003, 2008, 2013, and 2018. Streambanks are stable, but there are no undercut banks and pools are less than one foot deep (Table 14).

Table 14. Residual pool depth, percent stable banks, and percent undercut banks at the Bureau of Land Management's monitoring site on Bear Creek.

Year	Residual Pool Depth (meters)	Percent Stable Banks	Percent Undercut Banks
2003	Not Collected	100	0
2008	0.2	100	0
2013	0.3	100	0
2018	0.13	100	0

End of growing season monitoring using the MIM protocol occurred in September 2018. Mean residual stubble height was 11.67 inches, bank alteration was 1.38 percent, and woody utilization was 0.19 percent.

Sid Seale Allotment

The Sid Seale allotment is a large, partially fenced tract intermingled with larger acreages of non-BLM managed lands. There is 2.5 miles of critical habitat in Ferry Canyon Creek (0.45 miles perennial and 1.6 miles intermittent). The allotment is adjacent to the John Day River, which is fenced and not grazed. Currently, habitat is rated poor in Ferry Canyon Creek, though some good stream channel and riparian conditions exist.

Historically, Ferry Canyon Creek provided spawning and rearing habitat for MCR steelhead. Beginning in 2016, the stream began to dewater, and as of 2020, it is completely dewatered from the mouth upstream 1.6 miles, preventing steelhead access. After 1.6 miles, the stream appears above ground and is perennial to the end of the BLM managed reach. There are beaver in this system where water remains, creating complex habitat for fish. Perennial reaches have a cobble/gravel bed and are lined with alders and willows as well as a sedges and rushes. In the dewatered reach, both herbaceous and woody vegetation is dying out. There is a limited amount of trailing in the riparian area at watering and crossing sites.

The DMA on Ferry Canyon Creek was monitored in 2005, 2010 and 2015. There are no pools, streambanks are about 100 percent stable, and undercut banks have decreased from 7 to 2.8 percent (Table 15).

Table 15. Residual pool depth, percent stable banks, and percent undercut banks at the Bureau of Land Management's monitoring site on Ferry Canyon Creek.

Year	Residual Pool Depth (meters)	Percent Stable Banks	Percent Undercut Banks
2005	Not Collected	97.62	7.14
2010	No flow, dry	No flow, dry	No flow, dry
2015	0.0	100	2.8

End of growing season monitoring using the MIM protocol occurred in September 2014. Ferry Canyon Creek was not grazed in the spring of 2014, and mean residual stubble height was 27.65 inches, bank alteration was 0.24 percent, and woody utilization was 8.57 percent.

Summary

Recovery criteria for the John Day River MPG requires that the Lower Mainstem John Day River population meet viability criteria. To achieve a viable rating, this population must improve in both Abundance/Productivity and Spatial Structure/Diversity. Habitat within the action area is currently degraded with inadequate streamflows, excessive water temperatures, inadequate riparian corridors, extensively altered floodplains, simplified and reduced instream habitat, and excessive erosion and sedimentation into streams. The primary activities affecting critical habitat in the action area are grazing and channel modifications.

2.5. Effects of the Action

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

2.5.1. Presence of MCR Steelhead

Summer steelhead use the Lower John Day River in the action area for migration. Adult migration in the John Day River generally occurs October through April, with juvenile migration occurring April through July. Summer steelhead use, or have historically used nine tributaries in the action area for spawning and rearing: Little Ferry Canyon Creek, Gable Creek, Nelson Creek, Pine Hollow Creek, Long Hollow Creek, Bridge Creek, Jackknife Canyon Creek, Bear Creek, and Ferry Canyon Creek (Figure 1). Spawning occurs March through June and rearing occurs year round.

2.5.2. Effects on Middle Columbia River Steelhead

Cattle grazing has the potential to affect ESA-listed fish by disturbing rearing, holding, or spawning salmonids by trampling incubating redds as cows wade through or cross instream habitats and through impacts to habitat (described below in Section 2.5.3). Some of these effects can result in injury and death. All freshwater life stages of summer steelhead will likely be present on the nine Lower John Day River Allotments considered in this consultation during the grazing season.

Fish Disturbance and Redd Trampling

The BLM proposes spring grazing for all allotments, with all cattle grazing occurring for no more than 31 days between March 1 and May 1. Middle Columbia steelhead migration, spawning, incubation, and rearing will be occurring in each allotment during grazing.

Within the action area, there are 10 fish-bearing streams where cattle have access to stream segments accessible to, or potentially accessible to, listed steelhead. These include: the John Day River; and Little Ferry Canyon, Gable, Nelson, Pine Hollow, Long Hollow, Bridge, Jackknife Canyon, Bear, and Ferry Canyon creeks. As cattle approach streams to drink or cross they could interrupt spawning behavior by forcing adult steelhead to retreat to nearby cover. Most of the spawning by adult MCR steelhead occurs from March through May, peaking in April. Adult steelhead either die or swim downstream after constructing redds. Because spawning will be occurring when cattle enter allotments, adults may be disturbed by grazing livestock. These disruptions will only occur occasionally and in dispersed areas. We consider the probability of cattle interrupting spawning or other adult behavior to be low given that cattle will be spending the majority of their time in the uplands, most riparian areas will be under water, the limited number of access points, presence of steep canyons, and the limited amount of documented spawning in areas where livestock have access. However, since cattle have access to all streams, some minor disturbance of spawning adults is still reasonably certain to occur.

Although cattle will be spending the majority of their time in the uplands, rearing juvenile MCR steelhead are also likely to be present in many areas and disturbed by cattle approaching and entering streams. Disturbance of juvenile steelhead can lead to behavioral changes detrimental to steelhead growth or survival through alteration of feeding success, increased exposure to predators, or displacement into less suitable habitat. We expect most juveniles affected by cattle approaching and entering streams to move to adjacent suitable cover to avoid injury or death. However, given the length of streams in the allotments with rearing MCR steelhead and poor habitat conditions in some allotments, disturbance of a small number of juvenile MCR steelhead is still reasonably certain to occur. NMFS expects this disturbance to result in behavioral changes to essential juvenile behaviors of feeding and sheltering, with a small number of juveniles entering open water.

Of more concern, is that livestock standing in or crossing streams may trample redds. The likelihood of redd trampling is determined by the joint occurrence of cattle using a stream and steelhead redds being present at the same place and time. Steelhead incubation within the action area typically occurs from March through June. During this time, redds are susceptible to trampling by livestock. The proposed grazing season overlaps the incubation period in six streams currently accessible to steelhead and cattle. If redd trampling occurs, it may kill or injure all, or a portion of, fish developing in the redd. Salmonid embryos are vulnerable to mechanical disturbance, and their sensitivity varies with developmental stage (Peterson et al. 2010). For instance, Roberts and White (1992) reported that a single wading incident on a simulated rainbow trout redd killed 43 percent of pre-hatching embryos and twice-daily wading throughout embryo development killed at least 83 percent of eggs and pre-emergent fry.

The BLM will conduct one spawning ground survey on each steelhead-bearing stream with livestock present. If a redd or redds are identified, the BLM will monitor index reaches every 2 weeks to determine the number of redds trampled. The BLM does not propose measures to protect redds from trampling. Therefore, NMFS concludes that it is reasonably certain that a small number of MCR steelhead redds will be trampled over the 10-year term of this opinion. Trampling will result in the death or injury of MCR steelhead eggs, alevins, and/or juveniles. Although redd trampling is possible, the total number of redds trampled is expected to be low because of the spring grazing strategy and the historically low number of redds documented in these nine allotments.

The likelihood of adverse effects from disturbance and redd trampling in each allotment are as follows:

Belshe Allotment

Cattle will have access to 1.11 miles of spawning and rearing areas in Little Ferry Canyon Creek during critical spawning and incubation times and to 1.5 miles of migratory habitat in the John Day River. However, the permittee has not grazed the Belshe Allotment since 2008 and likely will not in the future. In addition, a 3-foot headcut approximately 0.38 miles up from the mouth of Little Ferry Canyon Creek and an alluvial fan at the mouth make adult steelhead upstream passage unlikely. Steelhead redds in Little Ferry Canyon Creek were last observed in 2006 near the mouth (Table 16), and adult steelhead have not been documented in the creek during spawning ground surveys although turbidity was light. Cattle will also have access to less than less than 0.5 miles along the John Day River migratory corridor. The accessible area is at the mouth of Little Ferry Canyon Creek.

Because adult steelhead access to spawning and rearing habitat in Little Ferry Canyon Creek is currently blocked, flow in the John Day River limits habitat available for grazing and prevents livestock use and crossing of the river, and because grazing will likely not occur in the future, NMFS concludes there will likely be no disturbance to adult or juvenile salmon and no trampling of redds by cattle in the Belshe Allotment. If passage improves and grazing occurs, a very small number of juvenile and adult steelhead man be disturbed and a very small number of redds may be trampled.

Table 16. Number of redds identified in steelhead bearing streams in nine allotments in the Lower John Day River subbasin, 2004–2019.

2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Little Ferry Canyon Creek – Belshe Allotment															
0	0	2	0	0	0	0	0	-	-	0	-	0	0	-	0
Gable and Nelson Creeks – Gable Creek Allotment															
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pine Hollow and Long Hollow Creeks – Pine Creek Allotment															
-	0	-	10	4	0	0	3	0	1	1	3	5	0	0	1
Bridge Creek – Circle Bar Allotment															
0	0	0	7	0	0	2	0	0	0	0	0	0	0	0	0

2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Jackknife Canyon Creek – Eakin Allotment															
0	0	0	0	0	0	0	0	-	-	0	-	0	0	-	0
Jackknife Canyon Creek – Lafoon and Carlson Allotment															
0	0	3	0	0	0	0	0	-	-	0	-	0	0	-	0
Pine Hollow Canyon Creek – Verne Mobley Allotment															
-	0	-	0	0	0	0	0	0	0	0	0	0	0	0	0
Bear Creek – Crown Rock Allotment															
0	1	2	0	1	3	4	7	1	0	0	6	4	5	3	4
Ferry Canyon Creek – Sid Seale Allotment															
0	0	0	0	0	0	0	0	-	0	0	0	0	0	-	0

Gable Creek Allotment

Cattle will have access to 2.65 miles of spawning and rearing areas in Gable and Nelson creeks during critical spawning and incubation times. However, a head cut at the mouth of Nelson Creek currently prevents adult and juvenile steelhead migration and use of the creek, therefore NMFS expects there will be no disturbance to adult or juvenile steelhead and no trampling of redds in Nelson Creek. If passage improves, a very small number of juvenile and adult steelhead man be disturbed and a very small number of redds may be trampled.

In Gable Creek, spawning behavior may be interrupted forcing adults to retreat to nearby cover and redds will be at risk of being trampled. The BLM documented two adult steelhead in Gable Creek in 2019 and one in 2018 during spawning ground surveys. Redds were not documented during spawning ground surveys conducted from 2004-2019, but turbidity was moderate or high during surveys in all but one year (2012). Therefore, NMFS concludes that a very small number of adult steelhead and redds could be affected by grazing in the Gable Creek Allotment.

It is likely that a very small number of juvenile MCR steelhead will be disturbed as cattle approach Gable Creek to drink or cross. The BLM documented only one parr/smolt *O. mykiss* during spawning ground surveys, with turbidity light in 1 year, moderate in 10 years, and high in 5 years. Although Gable Creek is small, BLM added woody material to increase habitat diversity, and very few rearing juvenile steelhead have been documented during spawning ground surveys; it is likely that a very small number of juveniles will be disturbed and forced into open water at some point during the grazing season given the 2.65 miles of perennial stream in the allotment and the four stream crossings utilized by cattle to reach an abandoned agricultural field.

Therefore, NMFS concludes that disturbance of a very small number of adult steelhead and trampling of a very small number of redds may occur, and disturbance of a very small number juvenile steelhead is likely to occur in the Gable Creek Allotment.

Pine Creek Allotment

Cattle will have access to 2.3 miles of spawning and rearing areas in Pine Hollow and Long Hollow creeks during critical spawning and incubation times. Steelhead redds have been documented in these creeks in 8 of the 14 years surveyed since 2005, with a high of 10 redds documented in 2007. Most recently, five redds were documented in 2016 and one redd was documented in 2019. Adult steelhead were documented during spawning ground surveys in 5 years, most recently two each year from 2013-2016. Although the current operator keeps the cattle in the uplands and does not actively graze riparian areas, a few cattle will access Pine Hollow and Long Hollow creeks for water. Therefore, a small number of adults may be disturbed or have their spawning behavior interrupted, and a small number of redds will be at risk of being trampled.

It is likely that disturbance of juvenile MCR steelhead will occur. Cattle will access Pine Hollow and Long Hollow creek to drink, utilizing approximately eight crossings on Pine Hollow Creek and four on Long Hollow Creek. Since 2007, the BLM documented 13-100 rearing *O. mykiss*, an average of 35 per year, during spawning ground surveys. Given the length of stream in the allotment, and the lack of pools and undercut banks, it is likely that a small number of juveniles will be disturbed at some point during the grazing season.

Therefore, NMFS concludes that a small number of adult and juvenile steelhead will be disturbed in Pine Hollow and Long Hollow creeks, and a small number of redds may be trampled.

Circle Bar Allotment

Cattle will have access to 2.6 miles of spawning and rearing areas in Bridge Creek during critical spawning and incubation times. Livestock cross Bridge Creek to reach abandoned agriculture fields, and trailing is evident at four crossing locations. The BLM conducted spawning ground surveys in 2004-2019. Redds have not been documented since 2010, but adult steelhead have been documented in eight of the last 13 years of surveys, including two in 2019. High turbidity conditions existed in 11 of the years in which surveys occurred, and moderate turbidity occurred in 3 years. Redds were documented in both years when turbidity was considered light. Therefore, NMFS concludes a small number of adults will be disturbed or have their spawning behavior interrupted, and a very small number of redds will be at risk of being trampled.

It is also likely that disturbance of juvenile MCR steelhead will occur when cattle access Bridge Creek to drink and cross. Although the BLM did not document juvenile *O. mykiss* during any spawning ground surveys conducted since 2004, visibility was affected by high to moderate turbidity conditions. Given the length of stream in the allotment and the lack of pools and undercut banks, it is likely that a small number of juveniles will be disturbed at some point during the grazing season.

Therefore, NMFS concludes that a small number of adult and juvenile steelhead will be disturbed in Pine Hollow and Long Hollow creeks, and a very small number of redds may be trampled.

Eakin Allotment

Cattle will have access to 1.5 miles of spawning and rearing areas in Jackknife Canyon Creek during critical spawning and incubation times. However, the permittee has only grazed the Eakin Allotment once in the past 12 years, there are very few AUMs, steep hillslopes make it difficult to move cattle into and out of the canyon, and the BLM expects there will be little to no future grazing in this allotment. Spawning ground surveys were conducted in 12 of the last 17 years, and there were no redds or adult steelhead documented although visibility was good. Therefore, NMFS concludes that there is a reasonable chance that zero adult steelhead will be disturbed and zero redds will be trampled. However, a very small number of adults and redds may be disturbed if grazing occurs since cattle will have access to the creek.

If grazed, some minor disturbance of juvenile MCR steelhead could occur by cattle accessing Jackknife Canyon Creek to drink. The BLM has not documented juvenile *O. mykiss* during spawning ground surveys, even though visibility was good. However, given the length of stream in the allotment, and the lack of pools and undercut banks, a very small number of juveniles may be disturbed at some point during the grazing season.

Therefore, NMFS concludes that there will likely be no adult or juvenile steelhead disturbed, or redds trampled in the Eakin Allotment. However, if grazing does occur, cattle will occasionally access Pine Hollow and Long Hollow creeks, and a very small number of adult and juvenile steelhead may be disturbed, and a very small number of redds may be trampled.

Lafoon and Carlson Allotment

Cattle will have access to 1.15 miles of spawning and rearing areas in Jackknife Canyon Creek during critical spawning and incubation times, and access to 8.4 miles of migratory habitat in the John Day River. Steelhead redds (three) and adult steelhead (four) were last documented during spawning ground surveys in Jackknife Canyon Creek in 2006. The BLM has not documented juvenile *O. mykiss* in any of the 12 years that spawning ground surveys have occurred, although visibility was good.

The Lafoon and Carlson Allotment has been in non-use since 2008 due to fire and the current permittees choice not to graze. The BLM expects very little to no future grazing in this allotment. The steep hillslopes make it difficult to get cattle distributed evenly and move cattle into and out of the canyon. In addition, the BLM observed on a recent spawning ground survey that there is a small, dewatered section at the mouth of the creek due to an alluvial fan, which is preventing connection of Jackknife Canyon Creek to the John Day River. However, the BLM also notes in the BA that a reach from the mouth upstream for 0.10 miles can provide potential spawning and rearing habitat for MCR steelhead in good water years. Therefore, NMFS concludes that no adult or juvenile steelhead will be disturbed and no redds will be trampled. However, if grazed, a very small number of adult and juvenile steelhead may be disturbed, and a very small number of redds may be trampled in the Lafoon and Carlson Allotment.

Verne Mobley Allotment

Cattle will have access to 2.5 miles of spawning and rearing areas in Pine Hollow Creek during critical spawning and incubation times. Although this allotment has been in non-use for 20 years, and will likely not be grazed in the future, Pine Hollow Creek provides spawning and rearing habitat for MCR steelhead in good water years. However, these reaches are miles upstream from the mouth of the John Day River and MCR steelhead must navigate through many stream miles with intermittent flow to get there. The BLM conducted spawning ground surveys from 2007-2019 and did not document adult steelhead or redds, and visibility was considered good during each survey. Therefore, NMFS concludes that no adult or juvenile steelhead will be disturbed, and no trampling of redds will occur.

Crown Rock Allotment

Cattle will have access to spawning and rearing areas in 2.0 miles of Bear Creek during critical spawning and incubation times. The BLM conducted spawning ground surveys from 2004-2019. Redds and adult steelhead were documented in 14 of the 16 years surveyed. High turbidity was present in two of the years when neither redds nor adults were documented. Therefore, NMFS concludes that a small number of adults will be disturbed, and a small number of redds may be trampled.

It is also likely that disturbance of juvenile MCR steelhead will occur. The BLM has documented juvenile *O. mykiss* during spawning ground surveys in 7 of the 16 years surveyed, including 7 in 2019 and 13 in 2017. Given the length of stream in the allotment, and the lack of pools and undercut banks, it is likely that a small number of juveniles will be disturbed.

Therefore, NMFS concludes that a small number of adult and juvenile steelhead will be disturbed, and a small number of redds may be trampled in the Crown Rock Allotment.

Sid Seale Allotment

Cattle will have access to 2.05 miles of historic spawning and rearing areas in Ferry Canyon Creek during critical spawning and incubation times. Historically, Ferry Canyon Creek provided spawning and rearing habitat for MCR steelhead. Beginning in 2016, the stream began to dewater, and as of 2020, it is completely dewatered from the mouth upstream 1.6 miles. After 1.6 miles, the stream appears above ground and is perennial to the end of the BLM managed reach. The permittee constructed a gap fence in 2014 and created several small riparian pastures for low intensity, short duration use. Livestock are rotated through these pastures to reduce stress on riparian areas. The permittee grazes this area on average once every two years. Steelhead redds were not documented during spawning surveys conducted from 2004-2019, and visibility was good. The BLM documented one adult steelhead (2009) during surveys. The BLM has not documented juvenile *O. mykiss* during spawning ground surveys since 2014.

Therefore, NMFS concludes that no adult or juvenile steelhead will be disturbed and no redds will be trampled. However, if flow is restored to the lower 1.6 miles of Ferry Canyon Creek, a very small number of adults and juveniles may be disturbed, and a very small number of redds may be trampled in the Sid Seale Allotment.

Expected Number of Redds Trampled

The BLM would permit nine allotments for grazing in the Lower John Day River subbasin with the potential to adversely affect MCR steelhead. NMFS does not expect grazing to occur in five of these allotments: Belshe, Eakin, Lafoon and Carlson, Verne Mobley, and Crown Rock. Redds were not documented in the Eakin or Verne Mobley allotments during surveys conducted from 2004-2019. Within the Belshe and Lafoon and Carlson allotments, redds have not been documented since 2006, and adult passage into Little Ferry Canyon Creek (Belshe Allotment) and Jackknife Canyon Creek (Lafoon and Carlson Allotment) is blocked. Within the Crown Rock allotment, three to six redds have been documented in each of the last 5 years surveyed (2015-2019), averaging 4.4 per year. Grazing would only occur in the Crown Rock Allotment in even years. Therefore, if grazing were to occur in these five allotments, NMFS expects five redds could be present in even years.

NMFS expects that only four of the nine allotments would be grazed during the 10-year permit term: Gable Creek, Pine Creek, Circle Bar, and Sid Seale, with the Gable Creek Allotment only grazed in odd years. Within the Gable Creek and Sid Seale allotments, redds were not identified during spawning ground surveys conducted from 2004-2019. However, adult steelhead have recently been documented in Gable Creek and turbidity limits visibility during spawning ground surveys. Within Bridge Creek (Circle Bar Allotment), redds were enumerated in both years with light turbidity, 2007 (seven redds) and 2010 (two redds), and adult steelhead were documented in eight of the last 13 years surveyed, including two in 2019. Redds have been enumerated in Pine Hollow and Long Hollow creeks in the Pine Creek Allotment in 8 of the last 13 years surveyed, averaging 2 per year. Therefore, NMFS expects two redds could be present each year.

NMFS expects two to seven redds will be present in the action area each year. Because they will be dispersed over many miles in two to three allotments, grazing will be limited to 31 days, and cattle will spend the majority of their time in the uplands, NMFS expects two or fewer redds will be trampled annually.

Habitat-related Effects

The BLM proposes to use spring grazing to reduce the time livestock spend in riparian areas and thereby reduce the impacts of livestock grazing on stream habitat. The BLM also proposes streambank alteration and utilization criteria (browse and woody vegetation). The scientific literature suggests that the combination of BLM’s stubble height, streambank alteration, and shrub browse endpoint objectives (minimum 6-inch stubble height, maximum 20 percent streambank alteration, and maximum 50 percent shrub browse) will protect many streams from livestock damage, but will not eliminate livestock damage.

Livestock grazing could adversely affect steelhead through impacts to spawning, rearing, and migration habitat. As described below in Section 2.5.3, NMFS concludes that the habitat-related effects of the proposed action are relatively minor effects that have limited potential to harm or kill steelhead. These habitat effects are localized impacts affecting a small portion of action area streams. Some of the habitat effects, such as floodplain connectivity, will likely be too small to affect conditions for fish. Localized changes to habitat that may affect listed fish consist of changes in forage, increased deposition of fine sediment, and reduced cover from alteration of streambanks and riparian vegetation. These habitat effects are not severe enough to alter habitat-forming processes in a manner that would change the utility of the affected streams for spawning and rearing, but they may adversely affect individual fish in small sections of stream through increased exposure of juveniles to predators from reduced overhead cover or changes in feeding and territorial behavior from increased suspended sediment load (Berg and Northcote 1985).

Summary of Effects to Middle Columbia River Steelhead

- After reviewing the available information and considering the BLM has not proposed measures to protect redds, NMFS concludes that it is reasonably certain that two or fewer MCR steelhead redds per year will be trampled over the 10-year term of this opinion. Trampling will result in the death or injury of MCR steelhead eggs, alevins, and/or juveniles.

- Because spawning will be occurring when cattle enter allotments, a very small number adult steelhead will likely be disturbed by grazing livestock. These disruptions will only occur occasionally and in dispersed areas.

- A small number of rearing juvenile MCR steelhead will likely to be disturbed by cattle approaching and entering streams. Although it is not possible to estimate how many, we expect disruptions to essential juvenile behaviors of feeding and sheltering and entering open water will occur occasionally for a small number of juvenile steelhead, and will likely be limited to stream reaches where cattle can easily approach or enter the water.

- The habitat-related effects of the proposed action are all minor, localized impacts affecting a small portion of action area streams. Localized changes to habitat that may affect listed fish consist of changes in forage, increased deposition of fine sediment, and reduced cover from alteration of streambanks and riparian vegetation. Although it is not possible to estimate how many, we expect that a very small number of juvenile steelhead will be affected by increased exposure of juveniles to predators from reduced overhead cover or changes in feeding and territorial behavior from increased suspended sediment load.

2.5.3. Effects on Critical Habitat

The BLM authorizes grazing on 155 allotments within the Lower John Day River subbasin of which the BLM has determined nine are likely to adversely affect MCR steelhead. Together, these nine allotments contain an estimated 27.86 miles of MCR steelhead critical habitat.

Numerous publications have documented the detrimental effects of livestock grazing on stream and riparian habitats (Johnson et al. 1985; Menke 1977; Meehan and Platts 1978; Cope 1979; American Fisheries Society 1980; Platts 1981; Peek and Dalke 1982; Ohmart and Anderson 1982; Kauffman and Krueger 1984; Clary and Webster 1989; Gresswell et al. 1989; Kinch 1989; Chaney et al. 1990; Belsky et al. 1997). These publications describe a series of synergistic effects that can occur when cattle over-graze or impact riparian areas, including: (1) reduction or elimination of woody and hydric herbaceous vegetation along a stream; (2) streambank collapse, stream widening, and channel incision due to livestock trampling; (3) streambank erosion without vegetation to slow water velocities and hold the soil; (4) a lower water table elevation; and (5) loss of hydric, deeply rooted herbaceous vegetation that may be replaced by upland species with shallower roots and less ability to bind the soil. These effects have the potential to adversely affect steelhead critical habitat in the action area where cattle have access to streams and they concentrate their grazing and loafing in streamside areas.

Effects of cattle grazing in the action area are constrained primarily by the number of AUMs, season of use, grazing use objectives, and the location of the allotments with respect to streams and critical habitat. BLM will permit spring grazing in all nine allotments to reduce the impacts of cattle grazing on steelhead critical habitat. Spring use normally results in better livestock distribution between riparian and upland areas due to flooding, generally cooler temperatures of riparian areas, and highly palatable upland forage (Clary and Booth 1993; Leonard et al. 1997; Parsons et al. 2003). The hill slope-growing season begins earlier than the riparian growing season due to warmer temperatures on slopes. Riparian vegetation is often inundated during spring grazing making it unavailable for forage, soils in riparian areas are wet enough to discourage livestock use, and riparian temperatures are generally cooler making the hill slopes more desirable for cattle and limiting the time cattle spend in riparian areas to drink or cross the stream (Clary and Webster 1989; Kinch 1989). Spring use also provides more opportunity for regrowth and plant recovery than summer or fall use and results in more residual cover (Leonard et al. 1997; Wyman et al. 2006).

BLM would use monitoring and adaptive management to ensure that grazing is meeting objectives for streams and riparian areas. BLM would use stubble height, streambank alteration, and shrub browse information collected at DMAs in years 4 and 5 of a 5-year cycle to monitor the short-term impacts of cattle on riparian areas. These endpoint indicators would be used to assess resource impacts of current-year grazing to help determine if the annual timing, frequency, and duration of livestock use is appropriate to meet objectives. If objectives are not met, BLM would analyze why they were not met, whether this is detrimental to the function of the riparian area, and what changes to management should be made.

Goss and Roper (2018) found that stubble height or streambank stability were suitable indicators of grazing impacts on stream habitat attributes important to salmon and trout. In an analysis of 153 stream reaches subjected to grazing within the Interior Columbia Basin, they found that width-to-depth ratio, streambank angle, percent undercut banks, streambank stability, residual pool depth, percent pools, percent pool-tail fine sediments less than 2 millimeters, and wood frequency all trended toward lower-quality salmonid habitat as streambank alteration increased or as stubble height decreased.

Stubble Height. Stubble height has a direct relationship to the health of herbaceous riparian plants and the ability of the vegetation to provide streambank protection; to filter out and trap sediment from overbank flows; and in small streams to provide overhead cover (University of Idaho Stubble Height Review Team 2004; Roper 2016; Saunders and Fausch 2007). On monitoring sites across 17 National Forest and four BLM units in the Interior Columbia River basin, Goss (2013) found a linear relationship between increasing stubble height and multiple components of high quality salmonid habitat, including: increasing residual pool depth; increasing streambank stability; increasing percent undercut banks; and decreasing streambank angle. This suggests that across stream and riparian conditions evaluated within the Interior

Columbia River basin, the higher the stubble height the greater the likelihood that stream conditions favored by salmonids will be present (Goss 2013).

Multiple studies have evaluated minimum stubble heights necessary to protect stream habitat from the impacts of livestock grazing. Using monitoring data from federal lands in the Columbia basin, Goss and Roper (2018) found that stubble height was related to streambank disturbance, and streambank disturbance began to increase when stubble heights fell below 10 inches. Bengeyfield (2006) found that a 4-inch stubble height did not initiate an upward trend in stream channel morphology at sites on the Beaverhead–Deerlodge National Forest in Montana, based on 7 to 9 years of monitoring. Clary (1999) found that while a 5-inch stubble height at the end of the growing season resulted in improvements in most measured aquatic and riparian conditions in an Idaho meadow after 10 years, a 6.5-inch stubble height was needed to improve all measured habitat metrics. These studies reinforce the observation that higher stubble heights are positively correlated with improving stream conditions for fish habitat.

After reviewing the available scientific literature, including all of the studies mentioned above, Roper (2016) strongly recommended 6 inches as a starting point for a stubble height objective, measured at the end of the growing season, for small to medium sized cold-water streams inhabited by salmon and trout. This is consistent with Clary and Webster (1989), who suggested a 6-inch starting point for stubble height objectives in the presence of ESA-listed or sensitive fish.

In the proposed action, the stubble height criteria is 6 inches, which might allow significant streambank alteration to occur if it were the only criterion used to manage grazing, or if streams were dominated by herbaceous vegetation. However, riparian areas in most of the streams in these allotments are dominated by shrubs and not grass. Woody browse is a more appropriate indicator of livestock use than grass stubble height for these streams. BLM will use streambank alteration in conjunction with stubble height and shrub utilization to limit physical changes to streams that might otherwise occur with a 6-inch stubble height criterion alone.

Streambank Alteration. Streambank alteration measures the amount of annual bank disturbance caused by livestock grazing in riparian areas, the levels of which can then be related to streambank stability and riparian vegetation conditions (Cowley and Burton 2005). Streambank alteration tends to increase with the number of cows present and the time spent by those cows in riparian areas. Excessive bank trampling can cause streams to widen with subsequent decreases in water depth and velocity. In low gradient channels, stream widening can cause mid-channel sediment deposition, which can further erode streambanks and reduce water storage. These impacts reduce the quality of fish habitat by reducing the physical heterogeneity of the stream channel. Of indicators evaluated by Bengeyfield (2006), bank alteration level was the most sensitive.

Cowley (2002) suggested that the maximum allowable streambank alteration necessary to maintain streambank stability is 30 percent, and that applying a 20 percent streambank alteration standard should allow streambanks damaged by grazing to recover. Cowley (2002) also cited studies to support a recommendation that “10 percent or less alteration would seem to allow for near optimal recovery and should not retard or prevent attainment of resource management objectives." BLM proposes a maximum 20 percent streambank alteration standard. Based on existing conditions and Cowley (2002) we expect this standard to: (1) prevent negative impacts to streambanks from grazing; (2) maintain properly functioning conditions where they currently occur on the allotments; and (3) allow for stream habitat recovery and an upward trend where habitat indicators are not currently properly functioning. However, where habitat indicators are not properly functioning, continued grazing has the potential to retard the rate of habitat recovery compared to no grazing. A more protracted recovery period could result in greater sediment delivery, wider stream channels, reduced vegetative vigor, and higher water temperatures in the action area for a longer period of time than would occur absent grazing.

Shrub Browse. Shrub utilization is the third type of criterion used to manage grazing effects. Burton et al. (2011) consider 40 percent shrub utilization to be light use. Research has shown that heavy to extreme use by grazing animals every year is detrimental to plant health, while light to moderate use maintains overall plant health (Thorne et al. 2005). In general, there is a reduction in seed production when livestock shrub browse is above 55 percent (Winward 2000). There can be a reduction in the overall health of plants, including size and root strength, when heavy and severe utilization levels are sustained over time. Although the BLM is requiring 50 percent maximum shrub use for riparian areas on these allotments, this use criterion is expected to keep riparian shrub use below levels detrimental to plant growth or survival because cattle will spend most of their time in the uplands where forage is more palatable; the opportunity for regrowth and plant recovery; and monitoring in 2014 and 2019 documented a maximum shrub use of less than 10 percent in all but one allotment, which had 28.7 percent utilization.

The BLM would also use PIBO or AIM assessments conducted every 5 years to determine the condition and long-term trend of key biological and physical components of aquatic and riparian communities. The BLM would use collected data to determine long-term trends over time of three variables to determine whether grazing use levels are appropriate for each allotment or pasture. These three variables are: (1) residual pool depth, (2) percent stable banks, and (3) percent undercut banks. If the trend of any of these three indicators were negative, BLM would analyze why the trend was negative, whether this is detrimental to the function of the riparian area, and modify the current management strategy.

Effects to Critical Habitat Physical and Biological Features

The action area includes PBFs for freshwater spawning, rearing, and migration. The essential features of these PBFs that would be affected by the proposed action include floodplain connectivity, water quality (sediment and turbidity), substrate, forage, riparian vegetation, and natural cover. The effects of the proposed action on these essential features are summarized below.

Obstruction. The proposed action will not create any obstructions or block fish passage in any way.

Floodplain Connectivity. Riparian grazing and associated removal of riparian vegetation and bank instability can lead to stream down cutting and a drop in the water table. This could lead to a reduction in floodplain connectivity. Because of the BLM's spring grazing strategy and streambank alteration and utilization criteria (stubble height and/or shrub utilization), we expect only minor impacts to riparian vegetation and bank stability from the proposed action. Therefore, NMFS expects any effects to the floodplain connectivity PBF will be minor.

Over time, streams that are currently disconnected from their floodplains will be able to reestablish connectivity as riparian conditions improve. However, this can take decades for streams that are significantly incised. The riparian utilization criteria incorporated into the proposed action should help promote an upward trend of improving riparian habitats that in turn aid the long-term development of streambanks, and ultimately, floodplain connectivity.

Water Quantity. Riparian grazing and associated removal of riparian vegetation and bank instability can decrease the ability of riparian areas to retain water. When this occurs, high flows in the spring tend to increase in volume, leading to bank damage and erosion. Summer and fall base flows are decreased, often resulting in flows that are insufficient to provide suitable rearing habitat for juvenile salmonids. Some streams that typically flowed perennially may experience periods of no flow in the summer or fall. Li et al. (1994) found that streamflow in a heavily grazed eastern Oregon stream became intermittent during the summer, while a nearby, well-vegetated reference stream in a similar-sized watershed had permanent flows.

Effects of historic season-long and summer livestock grazing in the action area (including trailing and watering), on channel and bank features such as bank stability, undercut banks and width to depth ratio, as well as impacts to riparian plant recruitment, have likely affected peak and base flows on some streams. The proposed spring grazing for no more than 31 days March 01 through May 01 will reduce the amount of time cattle remain in riparian areas, reduce the amount of herbaceous and woody vegetation consumed, and reduce the amount of streambank trampling and compaction. Because of the BLM's spring grazing strategy and streambank alteration and utilization criteria (stubble height and/or shrub utilization), we expect only minor impacts to riparian vegetation and bank stability from the proposed action, and do next expect these minor impacts to affect water quantity. Therefore, we do not anticipate any effect to the water quantity PBF.

Water Quality. Livestock grazing will cause some minor sediment delivery and short-term increases in turbidity levels, and deposition of cattle waste in riparian areas and streams. There will be a minor, temporary decrease in water quality associated with increased turbidity during high-flow periods downstream from cattle stream crossing and watering access points and intermittent areas where cattle have grazed along the John Day River and each creek. A small amount of sediment and a short-term increase in turbidity may also occur when cattle cross or water.

Water Temperature. The Lower John Day River and its tributaries are identified as water quality limited for temperature on the State of Oregon's 303(d) list. Because of higher spring flows, stream temperatures are generally suitable for MCR steelhead adult migration, spawning, and egg incubation. Concerns about elevated stream temperature are primarily associated with the summer juvenile rearing life stage, which takes place between June and September. Juvenile MCR steelhead exposed to higher than optimal stream temperatures suffer reduced growth or die due to thermal stress. Continued grazing could impact temperature if grazing reduces shade provided by riparian vegetation, or if stream widening increases the width to depth ratio or increases exposure to sunlight (Barton et al. 1985; Platts and Nelson 1989; Li et al. 1994; Maloney et al. 1999; Bottom et al. 1984; Platts 1991; Beschta 1997; Brown 1972).

The BLM's spring grazing strategy and use of streambank alteration and utilization criteria (stubble height and/or shrub utilization) is designed to promote increased vigor and distribution of riparian vegetation and natural rates of recovery. Riparian vegetation is beginning to recover in areas of perennial flow, and five allotments are currently in non-use. In two allotments, Circle Bar and Sid Seale, herbaceous cover is an important component of the riparian community. These allotments were grazed in March or April 2014. In September 2014, mean residual stubble height in both allotments was over 26 inches, woody utilization was less than 9 percent, and bank alteration was less than 1 percent. Streambank alteration and utilization criteria were met in all allotments that were monitored in 2014 or 2019. Therefore, the proposed action is unlikely to decrease available shade or widen streams. As riparian vegetation recovers, shade should increase and other factors that influence stream temperatures, such as stream morphology, exposed bare ground, and soil compaction along streams, should improve over time. Therefore, NMFS concludes that grazing practices under the proposed actions are unlikely to increase water temperature.

Nutrients. Nutrients consumed by cattle elsewhere on the range are often deposited in riparian zones (Heady and Child 1994). The deposition of nutrients in riparian areas increases the likelihood that elements such as nitrogen and phosphorous will enter the stream. ODEQ has not identified excess nutrients as a problem affecting the Lower John Day River or its tributaries in the action area. Spring grazing will help limit or reduce the amount of time livestock spend in riparian areas, and recovering riparian vegetation will function to trap and utilize nutrients deposited in riparian areas. In addition, higher spring flows will dilute nutrients. This should limit the amount of waste livestock deposit in streams and riparian areas and result in negligible effects on MCR steelhead and critical habitat.

Sediment and Turbidity. Livestock grazing can trample or result in hoof shear of streambanks, expose bare soil, or generate fine sediments, which may enter streams (McIver and McInnis 2007). Fine sediment entering streams can create turbidity. Increased fine sediment and turbidity can be detrimental to juvenile salmon and steelhead in several ways including avoidance of the area, abandonment of cover, stress, and reduced growth rates (Newcombe and Jensen 1996). At moderate levels, turbidity has the potential to reduce primary and secondary productivity. At higher levels, turbidity may disrupt steelhead feeding and territorial behavior, displace fish from preferred feeding and resting areas, and may injure and kill both juvenile and adult salmonids (Berg and Northcote 1985; Newcombe and Jensen 1996); Spence et al. 1996). Chronic exposure can cause physiological stress responses that can increase maintenance energy and reduce feeding and growth (Servizi and Martens 1991). However, low to moderate levels of turbidity can provide cover from predation (Gregory and Levings 1998).

The BLM's spring grazing strategy and use of streambank alteration and riparian utilization criteria limits the amount of vegetation that can be removed from riparian areas and reduces the amount of time livestock spend in riparian areas, thus limiting the amount of fine sediment introduced into streams. In each allotment, riparian vegetation is beginning to recover in areas of perennial flow, but mostly absent in intermittent reaches. The BLM has set a 20 percent streambank alteration objective, and monitoring streambank alteration will help determine if sediment and turbidity are negatively affecting critical habitat. The BLM conducted end of growing season monitoring in eight allotments once between September 2014 and 2019. Five of the allotments were not grazed prior to monitoring. Three allotments were grazed with cattle removed 4 to 5 months prior to monitoring. Streambank alteration in the three allotments that were grazed ranged from 0.24 percent to 10.74 percent. Bank alteration in the allotments that were not grazed ranged from 0 to 1.38 percent. In addition, as of 2015, streambank stability is 94.7 percent or greater in seven of the allotments. In the Eakin Allotment, streambank stability is lowest at 75 percent, and this allotment has not been grazed since 2008.

Because some streambank alteration will occur, the proposed action will result in a small amount of fine sediment entering streams. Streambank trampling and exposure of new or existing bare soil by cattle will primarily generate this fine sediment. The amount of fine sediment introduced into streams by cattle grazing at any one time will be small. Pulses of turbidity caused by this sediment are likely to be small, localized, and of short duration. When fine sediment is introduced to streams during high flows, the turbidity created may not be observable above background levels. Since spring streamflows will be relatively high, we expect no more than a minor, temporary decrease in water quality associated with increased turbidity. There will also be a long-term reduction in turbidity as riparian conditions continue to improve over time, which ongoing monitoring and associated adaptive management measures should help ensure.

Substrate. Grazing can negatively impact stream substrate by increasing substrate fine sediment and cobble-embeddedness when livestock trample streambanks or when grazing has substantially reduced soil-stabilizing riparian vegetation or exposes bare soil (McIver and McInnis 2007). Increased substrate embeddedness decreases interstitial spaces in gravel substrate important for MCR steelhead spawning, impairs food production, and blocks refugia for young salmonids (Rinne 1990). Excess fine sediment can also impact salmonid eggs in redds by suffocation in the gravels (EPA 1993).

As mentioned above, some streambank alteration will occur and the proposed action is expected to result in a small amount of fine sediment entering streams. Sediment that cannot be transported by the stream can become embedded in spawning gravels, reducing salmonid egg and alevin survival. Since spring streamflows will be relatively high, we expect fine sediment to disperse, and deposition to occur in slow water areas that are not conducive to spawning, so effects to incubating eggs and alevins are likely to be minor. We also expect only minor impacts to refugia and juveniles with high streamflows and sediment dispersal. We further expect there will be a long-term reduction in sedimentation as riparian conditions continue to improve.

Forage. Livestock grazing can reduce the amount of terrestrial and aquatic insect prey available to juvenile MCR steelhead. This reduction is caused by the removal of streamside vegetation or through the introduction of fine sediment into streams (McIver and McInnis 2007; Platts 1991). The BLM's spring grazing strategy and use of streambank alteration and riparian utilization criteria limits the amount of vegetation that can be removed from riparian areas and reduces the amount of time livestock spend in riparian areas, thus limiting the amount of fine sediment introduced into streams. Streambank alteration and utilization criteria were met in all allotments, which were monitored in 2014 or 2019. Riparian vegetation is beginning to recover in areas of perennial flow, high streamflow should disperse sediment, and five allotments are currently in non-use. Therefore, any effects to the forage PBF will be minor within the affected stream reaches. NMFS also expects there will be a long-term increase in available forage with a reduction in sedimentation and an increase in riparian vegetation as riparian conditions continue to improve.

Natural cover. MCR steelhead use various stream features such as undercut streambanks, large woody debris, boulders, and overhanging vegetation to provide cover. The removal of riparian vegetation can reduce overhead cover. Streambank alteration by livestock can eliminate undercut banks and improperly managed grazing can suppress the recruitment of large woody debris. The introduction of fine sediments can increase substrate embeddedness, reducing the number of hiding places between cobbles and boulders and decrease pool habitat.

Spring grazing promotes livestock use of uplands away from riparian areas. The BLM has established 6-inch stubble height, 20 percent streambank alteration, and 50 percent woody browse utilization criteria, consistent with recommendations made by Clary and Webster (1989); BLM (1996); Clary et al. (1996); Clary and Lenninger (2000); Fink et al. (2000); Cowley (2002); Goss (2013); Roper (2016); and Goss and Roper (2018). Meeting grazing use criteria and grazing when upslope vegetation is most palatable will reduce the amount of time livestock spend in riparian areas and limit the amount of vegetation trampled or removed from riparian areas. The early, short grazing seasons will allow riparian areas to recover and improve due to having most of the growing season to recover from livestock impacts. Meeting the streambank alteration criteria will reduce the amount of damage to streambanks. The implementation of these management measures will ensure that any effects to the natural cover PBF will remain minor. In the long term, the grazing strategy proposed by the BLM will allow for development of functioning riparian areas and more complex stream habitat, which in turn will increase the amount of cover available to MCR steelhead.

Summary of Impacts to Physical and Biological Features

The proposed actions are likely to cause no more than relatively minor or localized effects on PBFs for the following reasons:

- Spring grazing strategy – cows will spend the majority of their time in the uplands where forage is more palatable and temperatures are warmer.
- Short grazing season - The early, short grazing seasons will allow riparian areas to recover and improve due to having most of the growing season to recover from livestock impacts.
- Higher spring flows – Most riparian areas will be inundated, any increased nutrients will be diluted, and sediment and turbidity will be dispersed.
- Utilization criteria limits the amount of vegetation that can be removed from riparian areas and reduces the amount of time livestock spend in riparian areas, thus limiting the amount of fine sediment introduced into streams.
- Streambank alteration criteria reduces the amount of damage to streambanks.

- Monitoring - all monitoring sites are meeting grazing use criteria, stream habitat trends are stable, and streambank stability is 94.7 percent or greater for seven allotments, and 75 percent for the Eakin Allotment which has been in non-use since 2008.
- Five of the nine allotments have been in non-use for approximately 20 years, and are unlikely to be grazed in the next 10 years.

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.

The BLM did not identify any specific private or state actions that are reasonably certain to occur in the future that would affect MCR steelhead or their critical habitat within the action area. However, some continuing non-federal activities are reasonably certain to contribute to climate effects within the action area. It is difficult if not impossible to distinguish between the action area's future environmental conditions caused by global climate change that are properly part of the environmental baseline versus cumulative effects. Therefore, all relevant future climate-related environmental conditions in the action area are described in the environmental baseline (Section 2.4).

The allotments are located in remote, difficult to access areas in the Lower John Day River Subbasin. Future population growth and development are not likely to cause greater effects within the action area than those previously described, and recreation is expected to continue at similar levels. There is a history of some livestock trespassing onto BLM managed land from adjacent private land in the action area. The BLM has largely been successful addressing these issues. However, it is likely that cattle may trespass in the future at similar levels.

NMFS is not aware of any specific future non-federal activities within the action area that would cause greater effects to MCR steelhead or designated critical habitat than currently occurs. Therefore, NMFS does not expect cumulative effects in the action area to further reduce the conservation value of MCR steelhead critical habitat, or the productivity, spatial distribution, or abundance of MCR steelhead populations within the action area.

2.7. Integration and Synthesis

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

2.7.1. Middle Columbia River Steelhead

Middle Columbia River steelhead from the Lower Mainstem John Day River population inhabit the action area and depend on it to support critical life functions. The MCR steelhead DPS is not currently meeting the viability criteria described in the Mid-Columbia Steelhead Recovery Plan (NMFS 2009). The Lower Mainstem John Day River population of MCR steelhead will be affected by the proposed action. Recovery criteria for the John Day River MPG requires that three of the five historical populations meet viable criteria standards. Viable populations within the MPG must include two very large/large and one intermediate size population. The ICTRT also calls for at least one population to be highly viable. The Lower Mainstem John Day River population represents the only population that meets the very large size requirement and the North Fork John Day River population is the only one that meets the large size requirement. Therefore, to achieve viable status in the John Day River MPG, the Lower Mainstem John Day River and North Fork John Day River populations must achieve viable status. Under current conditions, the Lower Mainstem John Day River population is only considered maintained. That is, it does not meet the criteria for a viable population, but supports ecological functions and preserves options for the recovery of the DPS. To achieve a viable rating, this population must improve in both abundance and productivity and spatial structure and diversity.

Middle Columbia River steelhead use the action area for spawning, rearing, and migration. As described in Section 2.5.2, the proposed action will have effects on individual MCR steelhead. Based on the proposed action, a very small number adult steelhead will be disturbed, a small number of juvenile steelhead will be displaced, and a very small number of redds will be trampled.

Grazing will overlap with spawning and incubation and the BLM has not proposed measures to protect redds. Therefore, NMFS concludes that it is reasonably certain that cattle will trample two MCR steelhead redds per year over the 10-year term of this opinion. Trampling will result in the death or injury of MCR steelhead eggs, alevins, and juveniles. Because spawning will be occurring when cattle enter allotments and the BLM has documented adult steelhead during recent spawning ground surveys, adult steelhead will likely be disturbed by grazing cattle. These disruptions will only occur occasionally and in dispersed areas.

We conclude that a very small number of adults will have spawning or other adult behavior interrupted by cattle, and cattle will trample two redds per year, because: (1) cattle presence in and use of riparian areas will be low due to high flows, cool temperatures, and high palatability of upland vegetation, so the exposure to adults and redds will be limited to a short period a few times per day as cows cross and drink at established locations; (2) most of the riparian areas are underwater, (3) the limited number of access points; (4) the low number of adults and redds documented in each allotment during spawning ground surveys conducted from 2004-2019; and (5) some historic spawning areas are currently blocked at or near the mouth of tributaries. However, since cattle have access to all streams, some minor disturbance of spawning adults and trampling of redds is still reasonable certain to occur.

Rearing juvenile MCR steelhead are likely to be disturbed by cattle approaching and entering streams. Juvenile MCR steelhead may respond by leaving near shore cover and entering open water where they are more vulnerable to predation. This could lead to death or injury of these individuals. Cattle entering streams may also cause juvenile steelhead to abandon other critical behaviors such as feeding. The number of juvenile steelhead affected would likely be small given these disruptions will only occur occasionally and will likely be limited to stream reaches where cattle can easily approach or enter the water. However, because of the length of stream used by rearing juvenile steelhead and the poor habitat conditions in some of the allotments, some disturbance of a small number of juvenile MCR steelhead, resulting in disruption of critical behaviors and entering open water, is still reasonably certain to occur.

The habitat-related effects of the proposed action are all minor, localized impacts affecting a small portion of action area streams. Localized changes to habitat that may affect listed fish consist of reductions in floodplain connectivity, riparian vegetation, natural cover, and forage; and increased deposition of fine sediment. These habitat alterations could have minor effects on growth of a few juvenile steelhead and could result in some increased exposure to predators and incidence of predation. The number of juvenile steelhead affected would likely be very small given: (1) the population is well distributed throughout its range, and their low densities in the action area; (2) cattle presence in and use of riparian areas will be low due to high flows, cool temperatures, and high palatability of upland vegetation; (3) monitoring and associated adaptive management will ensure grazing impacts are minimized, and monitoring data show that allotments are meeting grazing criteria; (4) continued riparian improvement is expected to further limit cattle access to streams over time; and (5) only four of the nine allotments are expected to be grazed in the next 10 years.

NMFS does not expect these effects and reductions to appreciably alter the abundance, productivity, spatial structure, or diversity of the Lower Mainstem John Day River population. It is NMFS' opinion that when the effects of the action and cumulative effects are added to the environmental baseline, and in light of the status of the species, the effects of the action will not cause reductions in reproduction, numbers, or distribution that would reasonably be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of MCR steelhead.

2.7.2. Critical Habitat

Critical habitat is present in the action area for MCR steelhead. The condition of spawning, rearing, and migration habitat across the range of the species varies from excellent in wilderness and roadless areas to poor in areas subject to intensive human land uses. Within the action area, habitat condition is poor to good, with some PBFs degraded due to the impacts of land use practices including grazing. Streambanks are generally stable but summer stream temperatures are high in all streams and fine sediment levels are elevated in Bridge Creek in the Circle Bar Allotment.

As noted in Section 2.2, climate change is likely to further impact designated critical habitat. Increases in water temperature and changes to the hydrological regime will reduce suitable salmonid habitat and cause earlier migration of smolts. Warmer temperatures will likely lead to increased predation on juvenile salmonids in mainstem reservoirs (ISAB 2007). This is particularly true of non-native species such as bass and channel catfish where climate change will likely further accelerate their expansion (ISAB 2007). In addition, the warmer water temperatures will increase consumption rates by predators due to increased metabolic rates, which influence food demand. Slight changes in environmental conditions during the 10-year permit term due to climate change could amplify the proposed action's effects on water quality to some small degree.

To limit the impacts of cattle on designated critical habitat, BLM has proposed spring grazing, a maximum grazing duration of 31 days, streambank alteration criteria, and riparian utilization criteria. Based on available scientific literature, NMFS expects that these measures will reduce but not eliminate the potential for small adverse impacts to some of the essential PBFs in the action area. The potential impacts of the proposed action on MCR steelhead critical habitat are described in Section 2.5.3. The PBFs that could be affected are floodplain connectivity, water quality, substrate, forage, and natural cover. NMFS expects adverse effects to the above PBFs for ESA-listed salmonids from livestock entering rivers and creeks to drink and cross, consumption of riparian vegetation, and streambank alteration and trampling. The proposed action is likely to cause no more than relatively minor or localized effects on these PBFs. These impacts will not preclude or significantly delay development of the critical habitat features in the watersheds affected by the proposed action, because: (1) impacts to riparian areas on these allotments would be localized and dispersed; and (2) we expect the proposed adaptive management strategy for the allotments to identify trends in stream habitat conditions over the term of the permit, and for the BLM to adjust grazing practices where habitat conditions and trends are not meeting resource objectives.

Adding the effects of the action to the environmental baseline and the cumulative effects, and taking into account the status of critical habitat, the proposed action is not likely to appreciably diminish the value of designated critical habitat as a whole for the conservation of MCR steelhead.

2.8. Conclusion

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

2.9. Incidental Take Statement

Section 9 of the ESA and Federal regulations pursuant to section 4(d) of the ESA prohibit the take of endangered and threatened species, respectively, without a special exemption. "Take" is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. "Harm" is further defined by regulation to include significant habitat modification or degradation that actually kills or injures fish or wildlife by significantly impairing essential behavioral patterns, including breeding, spawning, rearing, migrating, feeding, or sheltering (50 CFR 222.102). "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 of MCR steelhead is reasonably certain to occur. NMFS expects that take may occur in the form of harm or harassment of MCR steelhead adults and juveniles when cattle cross or drink from a stream, or from habitat-related impacts on rearing juveniles. NMFS is reasonably certain that incidental take of adult and juvenile steelhead will occur because the proposed action will permit grazing in allotments adjacent to streams occupied by adult and juvenile MCR steelhead. Also, current habitat condition in most allotments is poor and lacks complexity. Therefore, it may not provide adequate escape cover to mitigate for localized disturbance. In addition, grazing will occur along streams where eggs and alevins will be in or emerging from redds, and the BLM does not propose protection of redds.

There is no practicable means to observe the number of adult or juvenile steelhead harassed, or eggs or alevins injured or killed, as a consequence of cattle walking in streams. It is, however, possible to count the number of redds trampled by cattle. Therefore, we will use the number of redds trampled as a direct measure of redd trampling and as a surrogate for harassment, injury, and death of MCR steelhead. A trampled redd is a good indicator of the amount of incidental take because: (1) Trampled redds have the most biological impact in numbers of individuals seriously injured per incident; (2) trampled redds are indicative of cattle presence in the stream; and (3) trampled redds can be measured in the field by visual observation because redds, unlike individual fish, are stationary and retain evidence of trampling, while individual fish are mobile and unless disturbance is viewed when it occurs, it is impossible to know if a fish has been disturbed by cattle.

Thus, the extent of take related to harm and harassment of adult and juvenile steelhead, and injury or death of eggs and alevins, is two redds trampled per year. NMFS will consider this extent of take exceeded if more than two trampled redds are observed per year.

In the opinion, NMFS determined that incidental take is reasonably certain to occur from habitat-related impacts on rearing juveniles. It is not possible to observe the number of fish subjected to habitat-related impacts from grazing because we cannot precisely predict where and when habitat impacts will occur across the allotments and over the course of the 10-year permit term. NMFS will therefore use the extent of streambank alteration as a surrogate for habitat-related take, pursuant to 50 CFR 402.14(i)(1)(i). Percent streambank alteration is the best extent of take indicator for the habitat pathways of incidental take. This is because: (1) The habitat effects of cattle grazing increase with the amount of time cattle spend in close proximity to streams; (2) all habitat pathways of take will vary in proportion to streambank alteration including riparian conditions and natural cover, and fine sediment and substrate; (3) measured streambank alteration is a function of within-season grazing as opposed to other indicators that might require long-term monitoring; and (4) streambank alteration is measured by a standardized and repeatable methodology. It is important to point out here that NMFS is not saying that streambank alteration is, in itself, take. Nor does streambank alteration necessarily and directly cause take of steelhead in every case. Rather, NMFS is reasonably certain that the overall habitat effects of grazing cattle on the allotments will cause take, and that measured streambank alteration is the best currently available single indicator that is proportional to all of those effects.

We do not expect any exceedance of streambank alteration to occur based on spring grazing, active grazing currently only occurring in four allotments, and all nine allotments were in compliance with grazing criteria when last monitored. NMFS anticipated no exceedances in any of the nine allotments in our analysis of effects. The extent of take will be exceeded if streambank alteration in any of the nine allotments occupied by MCR steelhead exceeds 20 percent at the end of the growing season in any year monitored during the permit term. Such an exceedance would be detected by the BLM's proposed monitoring program, and reinitiation would be triggered after one instance.

2.9.2. Effect of the Take

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

2.9.3. Reasonable and Prudent Measures

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

1. Track, monitor, and report on the proposed action to ensure the grazing program is implemented as proposed, and the amount and extent of take is not exceeded.
2. Minimize incidental take from livestock grazing on all allotments by adjusting grazing management as needed, based on monitoring results.

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 BLM 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 (monitoring and reporting):

The BLM shall ensure that the following monitoring information is collected and reported to NMFS:

A. Conduct a minimum of one spawning ground survey per year in each allotment when redds are present and visible, and look for trampling on all allotments where livestock have access to redds. If redds are identified, conduct biweekly surveys on two index reaches in areas where cattle have access to redds until cattle are removed from the area.

1. Schedule surveys to maximize the likelihood of detecting redds.
2. Coordinate with NMFS on selection of index reaches.
3. Notify NMFS as soon as practicable of any instance of redd trampling.
4. Notify NMFS' Columbia Basin Branch Chief as soon as possible when two redds have been identified as trampled.
5. Meet with NMFS within 1 week of identifying two redds as being trampled to develop appropriate protective measures to incorporate which would prevent further take.

B. If BLM monitoring indicators are not met (6 inch browse height, maximum of 20 percent streambank alteration, and maximum of 50 percent woody browse) or monitoring detects a stream channel, aquatic habitat, or riparian habitat downward trend attributed to authorized cattle grazing, BLM shall adjust livestock numbers, or implement additional minimization or avoidance measures.

C. Work with NMFS to develop implementation and effectiveness monitoring requirements for specific pastures as needed.

D. Provide an end-of-year report to NMFS by December 1 of each year. The following shall be included in the report for each allotment:
   1. Actual authorized AUMs.
   2. On-off dates.
   3. Unauthorized grazing.
   4. Results from all monitoring identified as part of the proposed action.
   5. Redd trampling monitoring results including dates, number of redds and adult steelhead observed, and location of redds.
   6. Review of management and compliance successes and failures.
   7. New habitat trend.
   8. Compliance with each pertinent term and condition contained in this opinion.
   9. Review of adequacy of monitoring program for determining habitat condition and trends.
   10. Adaptive management actions taken to date and any recommendations for future management actions to reduce impacts to ESA-listed fish and to address downward trends and situations where grazing is retarding attainment of desired conditions in aquatic and riparian areas of streams occupied by steelhead.
   11. Management recommendations for subsequent years.
   12. Any changes in relevant information regarding ESA-listed fish distribution, spawning locations, or watershed conditions that were learned since completion of this consultation.
   13. Submit the monitoring report to:

       Justin Yeager, Branch Chief
       Columbia Basin Branch
       National Marine Fisheries Service
       West Coast Region
       Attn: WCRO-2021-00758
       304 S. Water Street, Suite 201
       Ellensburg, WA 98926-3617

2. The following terms and conditions implement reasonable and prudent measure 2 (minimize incidental take):

   A. Ensure all pastures subject to grazing have an appropriately established DMA, and that all pasture DMAs are monitored in accordance with the proposed action detailed in the BA.
   B. If any proposed monitoring will not occur, contact NMFS immediately.
   C. If the budget or personnel is insufficient to conduct monitoring, meet with NMFS to prioritize monitoring and monitoring locations.
   D. Ensure that permit holders for all allotments are aware of BLM's resource objectives and riparian use criteria established for stubble height, bank alteration, and woody utilization.
   E. Notify the permittee and NMFS if an exceedance of any criteria occur.
   F. If riparian use criteria are exceeded, or habitat trends are negative, meet with NMFS to review grazing management and implement changes to grazing management as needed.
   G. Consistently implement grazing-related standards and guidelines.

2.10. Conservation Recommendations

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

The following recommendations are discretionary measures that are consistent with this obligation and therefore should be carried out by the BLM:

1. Pursue opportunities to protect MCR steelhead and critical habitat, including development of off-channel water sources and cattle exclusion devices such as riparian fencing.
2. Assess the impacts of, and incorporate into livestock grazing strategies, the changing climatic conditions that may change vegetative species distribution and availability for grazing on BLM allotments, particularly in those upper watersheds that will likely be most affected by a change in the hydrograph (more rain and less snow).

Please notify NMFS if the BLM carries out any of these recommendations that are intended to improve the conservation of listed species or their designated critical habitats.

2.11. Reinitiation of Consultation

This concludes formal consultation for Nine Grazing Allotments in the Lower John Day River Subbasin (17070204), in Gilliam, Sherman, Wasco, and Wheeler counties, Oregon.

As 50 CFR 402.16 states, 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 if: (1) The amount or extent of incidental taking specified in the ITS is exceeded, (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion, (3) the identified action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in the biological opinion, or (4) a new species is listed or critical habitat designated that may be affected by the action.

3. 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.

3.1. Utility

Utility principally refers to ensuring that the information contained in this consultation is helpful, serviceable, and beneficial to the intended users. The intended user of this opinion is the BLM. Other interested users could include grazing permittees. Individual copies of this opinion were provided to the BLM. 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.

3.2. Integrity

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

3.3. Objectivity

Information Product Category: Natural Resource Plan

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

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

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

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

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