UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
West Coast Region
1201 NE Lloyd Boulevard, Suite 1100
Portland, Oregon 97232-1274

Refer to NMFS No: WCRO-2019-03481

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March 26, 2020

Craig Trulock
Forest Supervisor
Malheur National Forest
P.O. Box 909
John Day, OR 97845

Re: Endangered Species Act Section 7(a)(2) Biological Opinion for the Malheur National Forest Camp Lick Vegetation Project, Lower Camp Creek, Lick Creek and Upper Camp Creek sub-watersheds, in the Camp Creek–Middle Fork John Day River watershed (HUC 1707020302), in the John Day Basin, Grant County, Oregon.

Dear Mr. Trulock:

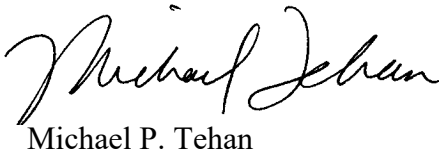
Thank you for your letter dated November 7, 2019, requesting initiation of consultation with NOAA's National Marine Fisheries Service (NMFS) pursuant to section 7 of the Endangered Species Act of 1973 (ESA) (16 U.S.C. 1531 et seq.) for the Malheur National Forest's implementation of the Camp Lick Vegetation Project (Project) in Grant County, Oregon. This consultation was conducted in accordance with the 2019 revised regulations that implement section 7 of the ESA (50 CFR 402, 84 FR 45016).

NMFS concludes in this opinion that the operation of the Project is not likely to jeopardize the continued existence of Middle Columbia River steelhead.

NMFS also concludes that the proposed action is not likely to destroy or adversely modify designated critical habitat. As required by section 7 of the ESA, NMFS included reasonable and prudent measures with nondiscretionary terms and conditions that NMFS believes are necessary to avoid or minimize the effect of incidental take caused by this action.

Please contact Rebecca Viray, of the Columbia Basin Area Office at (541) 962-8524, or email Rebecca.Viray@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]
Liana Aker, Malheur National Forest (Liana.Aker@usda.gov)
Amy Unthank, Malheur National Forest (amy.unthank@usda.gov)
Mark Penninger, U.S. Fish and Wildlife Service (Mark_Penninger@fws.gov)

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

Camp Lick Vegetation Project

NMFS Consultation Number: WCRO-2019-03481

Action Agency: U.S. Forest Service, Malheur National Forest

Affected Species and NMFS' Determinations:

ESA-Listed Species	Status	Is Action Likely to Adversely Affect Species?	Is Action Likely To Jeopardize the Species?	Is Action Likely to Adversely Affect Critical Habitat?	Is Action Likely To Destroy or Adversely Modify Critical Habitat?
Middle Columbia River steelhead (*Oncorhynchus mykiss*)	Threatened	Yes	No	Yes	No

Consultatio ıe Fisheries Service, West Coast Region

Issued By:

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

Date: March 26, 2020

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ACRONYM GLOSSARY

A&P	Abundance and Productivity
ARBO	Aquatic Restoration Biological Opinion
BA	Biological Assessment
BMP	Best Management Practice
CFR	Code of Federal Regulations
CHART	Critical Habitat Analytical Review Team
DBH	Diameter at Breast Height
DCH	Designated Critical Habitat
DPS	Distinct Population Segment
DQA	Data Quality Act
EPA	Environmental Protection Agency
ERT	Ecological Riparian Treatments
ESA	Endangered Species Act
ESU	Evolutionarily Significant Unit
FR	Federal Register
FWCA	Fish and Wildlife Coordination Act
HUC	Hydrologic Unit Code
ICTRT	Interior Columbia Basin Technical Recovery Team
ITS	Incidental Take Statement
IWWW	In-Water Work Window
LAA	Likely to Adversely Affect
MCR	Middle Columbia River
MFIMW	Middle Fork John Day River Intensively Monitored Watershed
MFJDR	Middle Fork John Day River
MNF	Malheur National Forest
MPG	Major Population Group
MPI	Matrix of Pathways and Indicators
NMFS	National Marine Fisheries Service
NOAA	National Oceanic Atmospheric Administration
ODFW	Oregon Department of Fish and Wildlife
Opinion	Biological Opinion
PAG	Plant Association Group
PBF	Physical and Biological Feature
PCE	Primary Constituent Element
PDC	Project Design Criteria
Project	Camp Lick Vegetation Project
RHCA	Riparian Habitat Conservation Area
RMO	Riparian Management Objective
RPM	Reasonable and Prudent Measure
SS&D	Spatial Structure and Diversity
TPA	Trees per Acre
U.S.C.	United States Code
USFS	U.S. Forest Service
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

The National Marine Fisheries Service (NMFS) prepared the biological opinion (opinion) and incidental take statement (ITS) portions of this document in accordance with section 7(b) of the Endangered Species Act (ESA) of 1973 (16 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 2 weeks at the NOAA Library Institutional Repository [https://repository.library.noaa.gov/welcome]. A complete record of this consultation is on file at Ellensburg, Oregon.

1.2 Consultation History

This opinion is based on information provided in the U.S. Forest Service Malheur National Forest's (MNF) Camp Lick Vegetation Project (Project) Final Biological Assessment (BA) dated November 7, 2019, and various email, telephone conversations, site visits and MNF Level 1 meetings. The following chronology documents key points of the pre-consultation process that culminated in this opinion.

July 2018: Site visit occurred with MNF Level 1 team and MNF specialists to tour action area. The MNF staff provided a preliminary introduction overview of the Project and a draft BA to NMFS.

September 20, 2018: NMFS participated on a site visit to the action area with MNF fisheries and hydrology staff to discuss the Project.

September 2018–December 2018: NMFS and MNF staff engaged in extensive back and forth discussion though emails, conference calls and meetings concerning the initial draft BA and Project details. The MNF provided NMFS draft BAs on September 25, 2018, and October 25, 2018. NMFS provided extensive comments and reiterated concerns to MNF staff about the proposed action and described information needed to initiate consultation.

December 2018–March 2019: During winter 2018 to spring 2019, the MNF Level 1 Team encountered several factors contributing to delays in finalizing the proposed action. These included a month-long furlough, multiple staff vacancies at the MNF, and MNF consultation staff on detail assignments.

February 2019: NMFS and MNF staff agreed that the action was Likely to Adversely Affect Middle Columbia River (MCR) steelhead and its designated critical habitat (DCH). The MNF

had, to that point, determined that the action was Not Likely to Adversely Affect ESA-listed species or critical habitat.

February 21, 2019: The MNF provided NMFS an updated draft BA dated February 21, 2019. NMFS shortly thereafter identified issues with the BA that prevented the initiation of consultation.

March 2019: The MNF Level 1 and Level 2 Teams (MNF, U.S. Fish and Wildlife Service, and NMFS) held a joint meeting at the MNF John Day Supervisor Office. The MNF expressed the Project was a priority for the USFS. NMFS expressed concern that the riparian tree thinning and harvest proposed across much of the action area would encourage subsequent use of those areas by cattle. Thus, the purported purpose of these treatments—encouraging reestablishment of hardwood tree species—was likely to fail. NMFS encouraged MNF to include measures to limit livestock use of treated riparian areas and MNF agreed to develop such plans.

Summer 2019: The MNF Level 1 team toured additional Camp Lick riparian treatment sites.

August 12, 2019: The MNF provided NMFS a revised draft BA (dated July 29, 2019).

August 13, 2019: NMFS provided comments and questions on the revised draft BA.

August 15, 2019: A conference call occurred between MNF Level 1 and NMFS to discuss the remaining information still needed on the fencing and protection proposal.

September 18, 2019: The MNF Level 1 staff provided NMFS a revised draft BA (dated September 12, 2019). This revised BA included proposed fencing and other measures to protect the riparian treatment areas.

September 23, 2019: The MNF Level 1 ESA, fish biologist staff, and NMFS had a conference call to discuss the review and status of the draft BA. The MNF emailed NMFS specifics related to the fencing proposal not provided with the draft BA.

September 24, 2019 and October 2, 2019: NMFS completed review of the updated September 12, 2019, draft BA. On September 24, 2019, NMFS provided an email explaining ways in which the BA did not address NMFS' August 13, 2019 comments. On October 1, 2019, MNF requested confirmation of the information needed. NMFS then resent the September 24, 2019, email memo to MNF staff.

October 8, 2019: The MNF emailed information to NMFS on the updated Appendix G Fencing Proposal.

October 10, 2019: The MNF emailed to NMFS proposed revisions to the BA.

October 18, 2019: The MNF provided a BA dated October 18, 2019, to NMFS for review. NMFS reviewed the draft BA and did not have additional questions or comments.

November 13, 2019: The MNF submitted a consultation request letter and Final BA dated November 7, 2019, requesting formal consultation to NMFS. NMFS initiated formal ESA consultation at that time.

1.3 Proposed Federal Action

"Action" means all activities or programs of any kind authorized, funded, or carried out, in whole or in part, by federal agencies (50 CFR 402.02). For purposes of this consultation, the proposed action will include the MNF authorization and implementation of the Project. The Project lies within the Lower Camp Creek, Lick Creek and Upper Camp Creek sub-watersheds (Table 1) within the Middle Fork John Day River (MFJDR) watershed [a 4th-field hydrologic unit code (HUC4)]. It includes vegetation and silviculture treatments, prescribed burning and fuel treatments, road maintenance and use, riparian thinning, and riparian fencing. The objectives for the Project are to: (1) improve forest structure, composition, and density, and promote forest resiliency; (2) reduce fuel loading to reduce uncharacteristic wildfire effects; (3) improve biodiversity and habitat for fish and wildlife including MCR steelhead, and big game forage habitat; (4) provide abundant clean water (both for fish and downstream uses); (5) contribute to the social and economic health of nearby communities and forest users; and (6) protect historical properties.

Table 1. Camp Lick Vegetation Project Hydrologic Unit Codes (HUCs).

4th-field HUC: name	4th-field HUC number	5th-field HUC	5th-field HUC number	6th-field HUC	6th-field HUC name
Middle Fork John Day	17070203	Camp Creek–Middle Fork John Day River	1707020302	Lower Camp Creek	170702030207
Middle Fork John Day	17070203	Camp Creek–Middle Fork John Day River	1707020302	Lick Creek	170702030206
Middle Fork John Day	17070203	Camp Creek–Middle Fork John Day River	1707020302	Upper Camp Creek	170702030205

The Project includes the following activities within the 38,838-acre action area:

(1) Vegetation silviculture treatments on 12,430 acres [includes upland silviculture prescriptions, which will result in whole tree removal, biomass utilization, yarding, danger tree felling, aspen restoration, headwaters treatments, meadow restoration, and ecological riparian treatments (ERTs) on 2,300 Riparian Habitat Conservation Area (RHCA) acres]; (2) Fuel treatments (includes prescribed burning and piling/burning); (3) Road treatments, maintenance, and use (includes haul, openings and closing roads temporarily, new roads, road relocation, and landings); and (4) Riparian fencing to protect riparian areas from livestock and ungulate impacts. Figure 1 displays the Camp Lick planning area and stream reaches. Project activities are described in detail in Sections 1.3.1 to 1.3.8, below, and are based on the information provided in the BA (USFS MNF 2019). Implementation of the proposed action is anticipated to occur over a 25+ year timeframe. Most of the activities will occur within approximately the next 10 years. Fuels treatment work will occur following vegetation treatments and is anticipated to take place from approximately year 10 to year 25.

We considered whether or not the proposed action would cause any other activities and determined that the proposed action would not cause any such activities. In the future, the USFS intends, depending on funding, to also install designed log structures in "inner" RHCA units. This activity was not considered part of this action because, although it would not occur but for the action, it is not reasonably certain to occur. Additionally, installation of these features is expected to follow protocols as analyzed and authorized in the programmatic Aquatic Restoration Biological Opinion (ARBO–NMFS # NWR-2013-9664). Thus, the installation of designed large wood structures is not part of this action. Incidental take from the installation of large wood structures would be authorized under the ARBO.

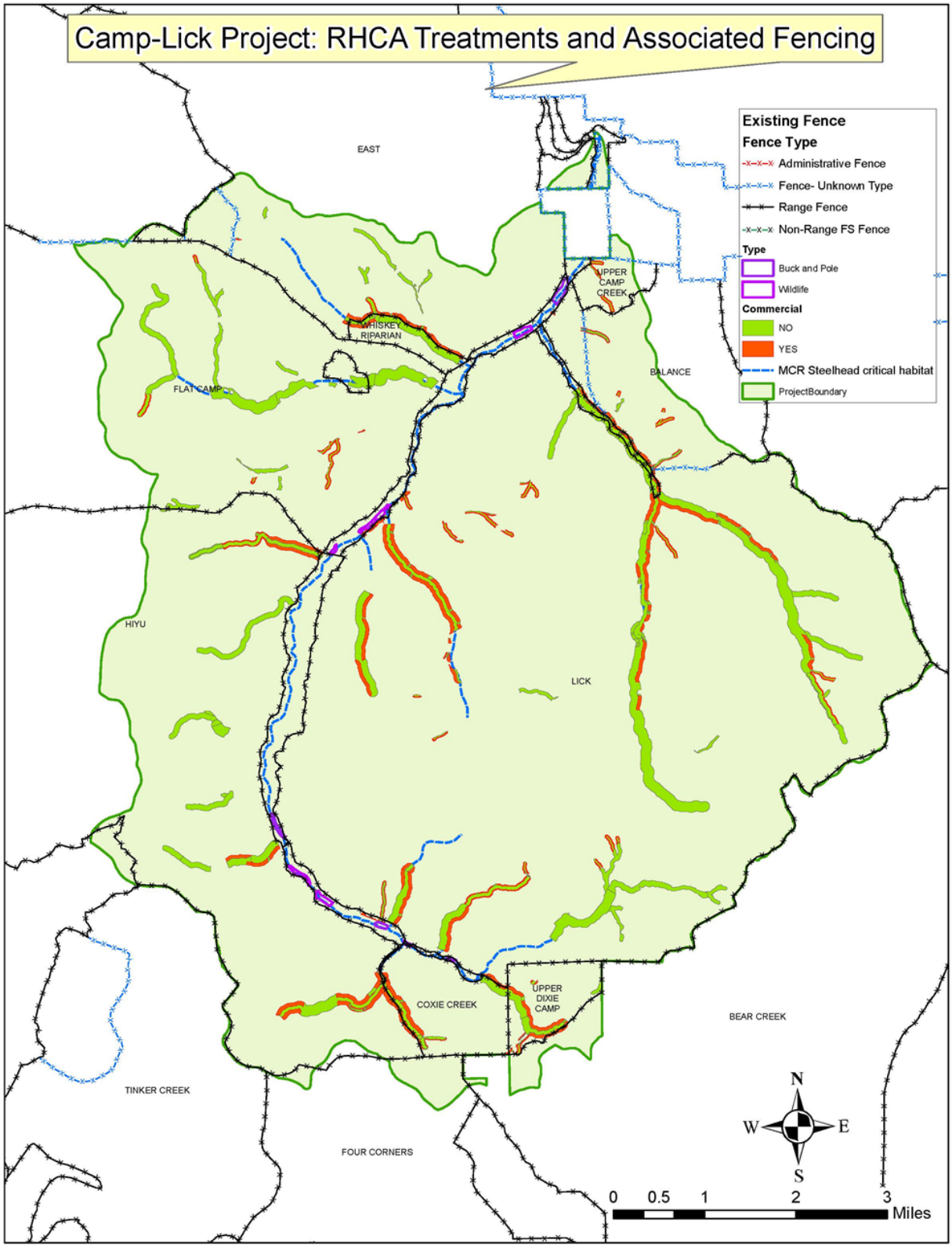

Figure 1. Camp Lick Area. Figure identifies Middle Columbia River steelhead designated critical habitat, stream reaches with proposed commercial harvest, existing fences and reaches with proposed new fences.

1.3.1 Vegetation Treatments

The MNF proposes silviculture treatments on 12,430 acres to include the following (some activities are spatially complementary):

- 9,300 acres of commercial harvest
- 600 acres of lodgepole post and pole treatments
- 2,200 acres of stand-improvement biomass thinning
- 730 acres of juniper treatments
- 150 acres of white pine restoration
- 34 acres of aspen restoration
- 115 acres of meadow restoration
- 170 acres of headwater restoration

To implement the prescribed treatments, various methods will include yarding (ground-based and skyline), skidding, danger tree felling, slashbusters, and feller-bunchers. Forwarders and hand-equipment may be used during harvest, thinning, biomass treatment, and treatment of slash material.

Silviculture treatments include a combination of ground-based and skyline yarding. The total commercial harvest will include 8,700 acres in upland units (non-RHCAs) and 600 acres in RHCAs for ERTs. The commercial harvest in riparian treatments are further described in Section 1.3.2.

Landing sites will be at pre-selected locations and will occupy not more than 2 acres. No new landings will be in RHCAs. Some existing landings currently located in RHCAs will be used.

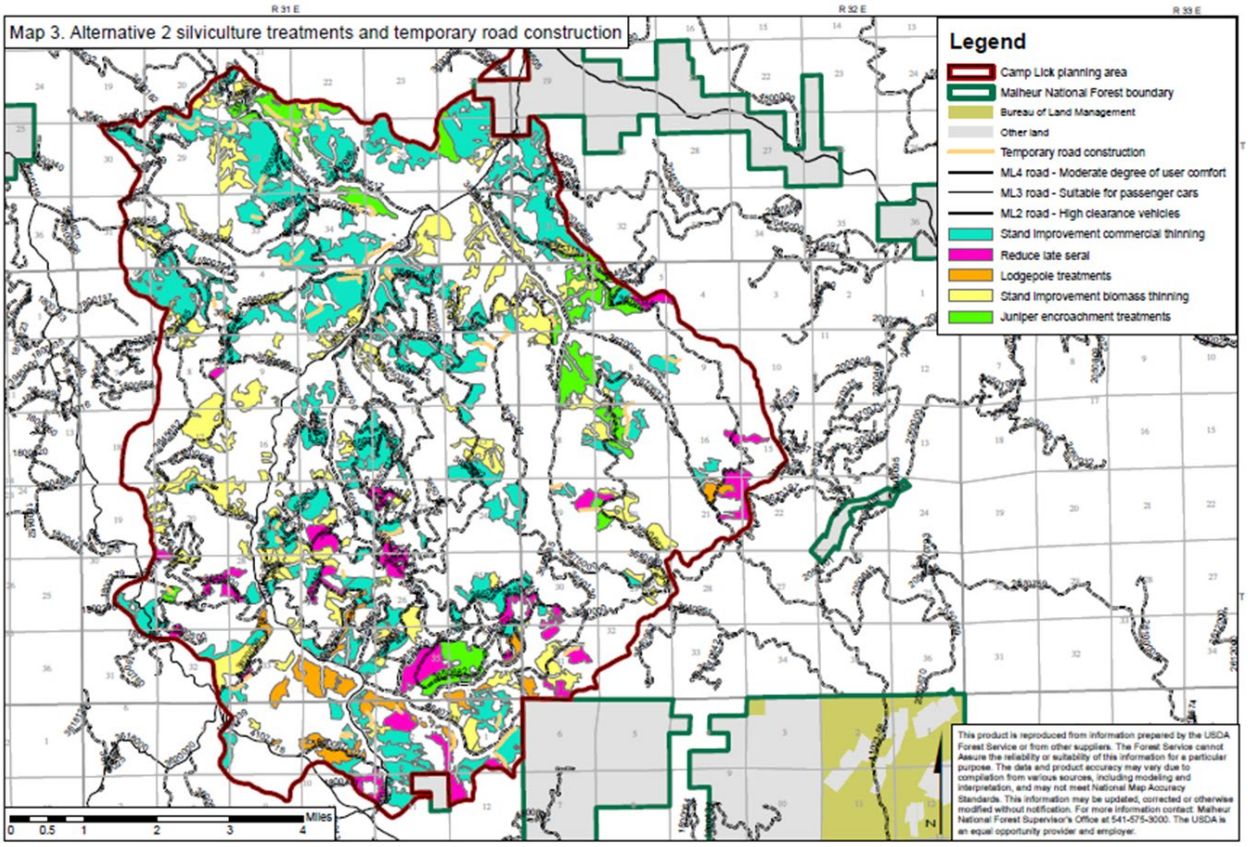

Figure 2. Camp Lick Project Vegetation Units and Road Use Map.

Commercial Harvest
Commercial harvest (non-RHCAs) is prescribed on 8,700 acres to reduce stand density, primarily to improve vigor and enhance stand health in upland stand units. Stand-improvement commercial harvest will not occur in RHCAs. Commercial harvest and treatments in 600 acres of RHCAs are described and discussed in Section 1.3.2.

Prescription priority will generally be to first leave healthy western larch, ponderosa pine, Douglas-fir, lodgepole pine, and, lastly, grand fir. Old trees are defined using guidelines defined by Van Pelt (2008) and Franklin and Johnson (2012). Treatments would not remove old trees as defined by Franklin and Johnson (2012). There would be no removal of trees greater than or equal to 21 inches diameter at breast height (DBH).

The prescription will include retaining variable density and irregular stand structure with an average of 40–60 square feet of basal area per acre. In stands with mollic/mollisol soils, basal area will remain higher in clumps of large ponderosa pine and on north facing slopes. Treatments are proposed in the units of warm dry plant association groups (PAGs) and cool moist and cold dry PAGs. The MNF proposes retaining approximately 35–65 trees per acre (TPA) in the warm dry PAGs (40–80 basal area), and 60–150 TPA in the cool moist and cold dry PAGs (80–180 basal area).

Most grand fir containing Indian paint fungus will be left on site to provide future snags and increased forest complexity. Gaps up to 2 acres each will be created by removing all trees less than 21 inches DBH to simulate disturbance. Grand fir and Douglas-fir greater than or equal to 21 inches DBH but less than 150 years old could also be removed. Patches (skips) of high density un-thinned trees will be left untreated for the benefit of wildlife. The skips may be up to 2 acres each. One patch and one gap will occur, on average, every 25 acres. Skips and gaps will not be placed in units less than 40 acres in size. Biomass materials will be removed for commercial use, lopped and scattered, or piled and burned in areas of light fuel loads.

Lodgepole Post and Pole Treatments
Treatment in lodgepole stands will occur on approximately 600 acres where pine-beetle infestation has occurred. Trees suitable for post and poles would be removed for commercial or personal use. All lodgepole pine under 21 inches DBH will be removed. Those trees over 150 years of age or greater than or equal to 21 inches will remain. Other tree species will be thinned throughout the diameter range (up to 21 inches DBH). Stocking levels will be designed for meeting desired basal area implementation based on Powell (1999) for PAGs. Post-treatment stands would be 59–87 ponderosa pine and 132–199 western larch TPA.

Stand Improvement Biomass Treatments
Stand-improvement biomass thinning is prescribed on approximately 2,250 acres of ponderosa pine and mixed conifer sapling stands to improve stand growth, composition, health, or structure. Residual stand tree density will range from 100–125 TPA. In descending order, the priority tree species for retention are healthy western larch, ponderosa pine, Douglas-fir, lodgepole pine, and grand fir. Engelmann spruce and western white pine are not priorities for removal. Trees up to 11 inches DBH are targeted for thinning. Techniques may include chainsaws or heavy equipment (e.g., a masticator). Stand improvement biomass thinning will not occur within RHCAs.

Biomass Utilization
Biomass can be defined as woody material that is not of commercial saw log size. Biomass removal from any unit will follow the guidelines of the designated prescription. This material may be removed during logging operations, by hand, or with small equipment such as all-terrain/utility-terrain vehicles, or small excavators or forwarders. Existing woody material unsuitable for harvest would be left on site to naturally decompose, or it will be piled and burned where accumulations are excessive.

Juniper Treatments
On approximately 730 acres, juniper that do not exhibit old growth characteristics will be removed. Biomass materials will be removed for commercial purposes, lopped and scattered, or piled and burned.

White Pine Restoration
To encourage the growth and regeneration of western white pine, on 150 acres, other conifers around western white pine will be thinned. All other conifers less than 21 inches DBH and less than 150 years old that are within 50 feet of a western white pine on the subject 150 acres will be removed. This proposed activity will be accomplished by hand or chainsaw only.

Western white pine is not a fire-tolerant conifer, therefore fuels activity (scattering slash and piles) will not be planned near western white pine.

Aspen Restoration
Thinning of conifers is proposed on 34 acres to promote expansion of an aspen stands. Conifers within 150 feet of an existing aspen stand may be removed or girdled. Aspen stands proposed for treatment are outside of RHCAs. Conifer trees greater than or equal to 21 inches DBH, but less than 150 years old, may be felled. Implementation methods will follow project design criteria (PDC) and methods as described in the BA (USFS MNF 2019).

Meadow Restoration
Small- and medium-diameter conifers are proposed for removal at ten meadows encompassing 115 acres. This prescription intends to restore large tree structure around the edges of meadows, increase intact hydric plant communities, and promote meadow functions of water storage. This treatment would remove conifers less than 21 inches DBH and younger than 150 years old. None of the meadows are located within RHCAs.

Headwaters Restoration Treatments
This prescription applies to seven headwater stands and features vegetation treatment and prescribed fire disturbance of 170 upland acres. This treatment would leave all ponderosa pine and larch over 15 inches DBH and all lodgepole pine, Douglas-fir, and grand fir over 21 inches DBH. The treatment will create an irregular, open pine stand. Felled material would be available for restoration or commercial byproduct purposes. Prescribed fire and fuels treatment would be used to reduce small-diameter tree abundance and reduce ground cover following treatment of the stands. Fuels and fire treatment methods will follow prescribed fire PDC to avoid greater-than-moderate-severity fires.

Skidding in RHCAs
Skidding through RHCAs is proposed to access eleven upland commercial silviculture units (not located in RHCAs) and units with less than 35 percent slope. There will be no new landings in RHCAs. Slash will be left on ground for equipment pathways, no skidding will be allowed within 100 feet of category 1 and category 2 streams or within 50 feet of category 4 streams, and heavy equipment will not travel on highly erodible soils. The BA contains details for each unit adjacent to an RHCA, including unit size, description of road segments, and the proximity to the nearest DCH or nearest MCR steelhead presence.

1.3.2 Riparian Treatments

Various treatments are proposed on 2,300 acres of the 6,200 acres of RHCAs within the Project planning area. The MNF refers to these planned actions as ERTs, which are intended to promote resiliency, restore biophysical and ecological functions, and meet MNF Forest Plan large wood riparian management objectives (RMOs). The prescriptions include riparian variable-density thinning, openings, and leave areas. Thinning would be utilized to reduce conifer density (thereby reducing canopy cover) to encourage regeneration of riparian hardwoods and increase forage for wildlife. Thinning prescriptions are written so that the residual stand will be approximately 50–75 percent of a fully stocked stand, by volume.

Riparian Treatments
Riparian treatments would be implemented in multiple phases. The Project entails treatment of 37 percent of the "inner" RHCAs and 9.7 percent of the "outer" RHCA acres in the planning area. The MNF defines this zone as 100 feet on either side of PACFISH[1] category 1 or 2 streams and 50 feet on either side of category 4 streams. Treatments will be limited to no more than 25 percent of total RHCA acreages per sub-watershed per year. Leave areas with no treatments in RHCAs will be in both "inner" (within 100 feet or within 50 feet of a stream's edge, depending on the stream's classification) and "outer" (from 100 to 200 feet, or from 100 to 300 feet from a stream's edge, depending on the stream's classification) units, based on the forest type. No new or temporary roads would be constructed to facilitate riparian treatments. Nine riparian treatments are adjacent to upland units that require skidding through the RHCAs to existing roads as described in the previous section.

Riparian treatment locations were identified using a combination of NetMap (Benda et al. 2007), in-stream wood loading (stream survey data), stand information (collected by USFS district silviculture personnel during stand exams), slope (from GIS, using light detection and ranging), research, and scientific literature. For the NetMap analysis, steelhead intrinsic potential, shade impacts, and erosion were used as the three surrogates for ecologically important reaches. Slope, location within the RHCA buffer, presence of roads, and whether upland treatment units adjacent to the RHCA were also factors used in identifying areas for treatment.

The MNF will implement the following riparian treatment PDC:

- Retain 15–20 tons of coarse woody debris per acre in Cool Moist PAGs and 10–20 tons per acre in Warm Dry PAGs.
- Maintain slash on mechanical equipment paths during implementation in the riparian treatment units and in areas where skidding through an RHCA.
- Allow no ruts deeper than 4 inches, soil compaction, or structural penetration deeper than 9 inches for a distance greater than 50 feet in RHCAs.
- Implement riparian treatments in coordination with and approval of USFS district Hydrologist, Wildlife Biologist, and Fisheries Biologist.
- Locate new landings outside of RHCAs. Existing landings located at least 100 feet from category 1 streams may be used. Small roadside decks would be used to implement riparian treatment and connected upland units where existing or historical landings are not present.

Inner RHCA Treatments
Thinning of trees in "inner" RHCA units is intended to move stands toward desired vegetation characteristics. Trees up to 21 inches DBH could be felled and tipped to remain in "inner" RHCAs. The MNF will tip and place individual pieces of large wood in multiple stream reaches within the action area as part of this action. All trees felled within RHCAs in these "inner" stands will be used for restoration purposes—either as instream or downed wood. "Inner" RHCA

[1] U.S. Department of Agriculture (USDA), and U.S. Department of Interior (USDI). 1994. Environmental Assessment for the Implementation of Interim Strategies for Managing Anadromous Fish-producing Watersheds in Eastern Oregon and Washington, Idaho, and Portions of California (PACFISH). U.S. Department of Agriculture and U.S. Department of Interior. March.

thinning would occur in the inner portions of the RHCA. The MNF will not fell or tip any trees within the primary shade zone[2] following criteria from the Aquatic Restoration Environmental Assessment (USFS MNF 2014). "Inner" RHCA thinning criteria would be applied to outer areas of the RHCA where slopes are greater than 35 percent and where areas of the RHCA overlap old growth or roadless areas. Commercial removal of wood will not occur in "inner" RHCA zones. Protective fencing will be applied strategically to areas with high solar input, and elsewhere where high cattle use would otherwise undermine the intended restoration objectives.

Outer RHCA Treatments
The "outer" RHCAs begin at the outside edge of the inner RHCA and extend out to 300 feet for category 1 streams, to 150 feet for category 2 streams, and to 100 feet for category 4 streams. This prescription allows for commercial harvest (total 600 RHCA acres). All areas proposed for commercial treatment will meet RMOs for in-stream large wood. This treatment will occur adjacent to approximately 17 miles of category 1 streams, with potential commercial removal occurring within 467 acres of outer category 1 RHCA, of which approximately 257 acres border 10.6 stream miles of DCH. There are 3.4 miles next to category 2 streams (31 acres), and 8 miles border category 4 streams (71 acres).

RHCA Openings for Hardwood Recruitment
Openings of up to 0.5 acres, consistent with the RHCA provisions above, will be created in RHCAs to mimic natural disturbance regimes. Openings would consist of 10–20 percent of the RHCAs. They will be monitored to determine if grazing is retarding attainment of the Project objectives and will be fenced as warranted.

1.3.3 Fuel Treatments (Includes Prescribed Burning and Piling/Burning)

Prescribed burning is proposed in both mechanically-treated and untreated areas to restore and maintain stands that are resilient to wildfire. Treatments include burning piled material (not in RHCAs) and underburning.

Fuel treatments will occur over the next 25+ years. Prescribed burns will be allowed to back into RHCAs. Single-pass active ignition may occur in the RHCA no closer than 25 feet from a stream. Prescribed burns are designed to reduce fuel loads and decrease the probability of catastrophic wildfire. Treatments aim to reduce surface fuels, duff/litter depth, ladder fuels, and crown bulk density. Burn prescriptions include PDC to maintain burns at a low intensity. Low intensity burns will minimize damage to soils and riparian vegetation in RHCAs. These techniques would result in a mosaic of burned and unburned areas in RHCAs. Using these techniques, fire intensities would not be high enough to consume downed wood that plays a role in trapping fine sediment. Some ground cover would be consumed but would be replaced as litter accumulates and herbaceous plants recover following burning.

Prescribed low severity burning would occur within RHCAs to help restore plant species composition and structure similar to conditions under natural fire regimes. Moderate-severity burns are permitted to invigorate decadent aspen stands, willows, and other native deciduous

[2] Phone conversation and email on 1/30/2020 between R. Viray (NMFS Fish Biologist) and D. Armichardy (MNF Fish Biologist) concerning thinning of shade trees and tree size from within the "Inner" RHCA zone.

species, and may be targeted in no more than 20 percent of the area within RHCAs or riparian reserves/6th-field HUC/per year. Fire line use, construction, and rehabilitation will follow techniques as described in the submitted BA (USFS MNF 2019) and would not occur within RHCAs. No biomass removal activities associated with prescribed burning would occur in RHCAs.

Fuel treatment would occur as follows:

- Whole tree yarding and/or cut to length, grapple piling and/or hand piling, and pile burning (12,190 acres, 295 units).
- Grapple piling and/or hand piling with pile burning (11,650 acres, 278 units).
- Hand piling with pile burning only (600 acres, 19 units).

Underburning (the use of low-intensity ground fire) would occur on approximately 32,080 acres. The underburning is intended to reduce potential resource damage from future wildfires.

Most of the underburning will be scheduled after the planned mechanical treatments. Descriptions of underburning methods are provided in the BA (USFS MNF 2019). Once desired fuel conditions are met, maintenance underburning would be done every 10–15 years to keep fuels within desired levels and to reduce the amount of new understory establishment.

1.3.4 Road Management, Construction and Use

The proposed action will require multiple road maintenance activities (haul, water drafting, opening closed and new temporary roads, culvert repair and removals, road relocation, road closure, rock crossings, and road improvements) for implementing the prescribed treatments. Proposed road activities are as follows:

- Maintain 312 miles of haul road (79.11 miles are within RHCAs). These include 24 crossings of MCR steelhead DCH, as detailed in the submitted BA (USFS MNF 2019).
- Temporarily open 23.4 miles of closed road within RHCAs. Of these, 11.7 miles are within a category 1 RHCA, 2.48 miles are within a category 2 RHCA, and 9.24 miles are within a category 4 RHCA.
- Relocate approximately 0.2 miles (Fire Service Road 3650699) of road 100 feet uphill to replace a road segment within an RHCA.
- Permanently opening 3.8 miles of road (0.55 miles within RHCAs), located outside of RHCAs bordering MCR steelhead DCH.
- Close 26.3 miles of open roads. Closed roads are closed for long-term storage till the next time they are needed for vegetation treatments. The proposed action does not include details to restore or decommission these closed roads in this opinion.
- Confirm closure of approximately 13 miles of road. These road segments are generally overgrown with natural vegetation and are impassible. The process is administrative only.
- Build approximately 7.8 miles of new temporary roads (7.8 miles total, includes 0.14 miles within RHCAs). No temporary road construction is proposed within 100 feet of

MCR DCH and no temporary roads cross streams. There are 0.04 miles of temporary road within the outer edge of a category 1 RHCA.

- Extend Fire Service Road 3600209 0.4 miles to enable closure of a segment a road that parallels MCR steelhead critical habitat.
- Remove 27 culverts, repair one culvert, and rock nine stream crossings.

Where warranted, in-water construction will be completed during the Oregon Department of Fish and Wildlife (ODFW) recommended in-water work window, July 15–August 15 (ODFW 2008). In-water construction on ESA-listed streams will be required to follow Best Management Practices (BMPs) for in-water isolation and fish salvage methods to reduce effects to ESA-listed species. The BA (Appendices C and F) details the PDC related to haul, rock crossings, and road maintenance to minimize erosion and sediment delivery (USFS MNF 2019).

Closed roads reopened for timber haul will be closed and treated after use. Methods used will be determined on a site-specific basis and may include earth berms, storm proofing, removal of ditch relief culverts, waterbars, sediment barriers, cleaning side ditches, removal and repair of culverts, catch basins, reshaping or rocking of drain dips, grade sags, and cross ditches as necessary.

Temporary roads would be removed after use. Removal would eliminate future use of the road with the objective of restoring hydrological functions. After use of temporary roads, the disturbed ground will be restored with a combination of the following:

- Storm proofing.
- Waterbarring as needed to restore natural drainage patterns.
- Recontouring slopes and pulling back berms from the road edge.
- Subsoiling compacted soil.
- Planting or seeding native species to disturbed areas to achieve a minimum of 35 percent ground cover.
- Placing slash, boulders, and logs on the roadbed (where available).
- Disguising the visible entrance with pieces of cull logs, tops of cut trees, and/or rocks, and similar, to prevent vehicle use.

1.3.5 Riparian Protection and Fencing

Riparian exclosure fencing is proposed at strategic locations along stream reaches within the action area. There will be approximately 24 miles of fencing installed to protect and restore riparian areas and vegetation on 12 miles of stream where cattle grazing would otherwise undermine the efficacy of restoration actions. Riparian fencing will be implemented primarily in the years 2020–2022, with some occurring up to 2 years later, concurrent with riparian thinning and opening creation. The MNF proposes to maintain the fencing for 10 years following treatment for restoration and recovery.

Fencing is proposed to protect hardwoods from browse, to promote stream shade and improve stream temperatures. Areas selected for fencing contain previous restoration projects [(USFS

MNF 2019) BA, Table 12] and/or experience heavy grazing. Three different fence treatments are proposed (buck and pole, wildlife exclusion, and barbed wire) to address the specific type of browse (livestock or wildlife ungulates) believed to be limiting hardwood establishment.

Proposed fence locations will be field verified and adjusted prior to fence installation. A contractor will supply fencing material, except that buck and pole fencing will be harvested locally.

Photo Monitoring
Photo monitoring will occur along fenced areas. The monitoring will follow guidance from a photo monitoring handbook (Hall 2002) and updated methods to track plant growth and progress. Photopoints will be established the same year fences are installed. Temperature data will continue to be collected to assess water temperature changes.

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

2.1 Analytical Approach

This 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(s) of critical habitat for (species) use(s) 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

opinion, we use the term PBF to mean PCE or essential feature, as appropriate for the specific critical habitat.

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

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

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

2.2 Rangewide Status of the Species and Critical Habitat

This opinion examines the 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 essential PBFs that help to form that conservation value.

One factor affecting the status of MCR steelhead, 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 MCR steelhead, and the conservation value of its DCH. These changes will not be spatially homogeneous across the range of MCR steelhead. 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; Mote et

al. 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).

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).

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 (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; 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. 2008a; 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 steelhead from rivers to estuaries before they are physically mature, increasing stress and reducing smolt survival (McMahon and Hartman 1989; Lawson et al. 2004).

Climate change is predicted to increase the intensity of storms, reduce winter snow pack at low and middle elevations, and increase snowpack at high elevations in northern areas. Middle and lower-elevation streams will have larger fall/winter flood events and lower late-summer flows, while higher elevations may have higher minimum flows. How these changes will affect freshwater ecosystems largely depends on their specific characteristics and location, which vary at fine spatial scales (Crozier et al. 2008b; Martins et al. 2012). For example, within a relatively

small geographic area (the Salmon River basin in Idaho), survival of some Chinook salmon populations was shown to be determined largely by temperature, while in others it was determined by flow (Crozier and Zabel 2006).

Certain salmon populations inhabiting regions that are already near or exceeding thermal maxima will be most affected by further increases in temperature and, perhaps, the rate of the increases. The effects of altered flow are less clear and likely to be basin-specific (Crozier et al. 2008b; Beechie et al. 2013). However, river flow is already becoming more variable in many rivers and is believed to negatively affect anadromous fish survival more than other environmental parameters. It is likely this increasingly variable flow is detrimental to multiple salmon and steelhead populations (Ward et al. 2015), and likely multiple other freshwater fish species in the Columbia River basin as well.

Stream ecosystems will likely change in response to climate change in ways that are difficult to predict (Lynch et al. 2016). Changes in stream temperature and flow regimes will likely lead to shifts in the distributions of native species and provide "invasion opportunities" for exotic species. This will result in novel species interactions, including predator-prey dynamics, where juvenile native species may be either predators or prey (Lynch et al. 2016; Rehage and Blanchard 2016). How juvenile native species will fare as part of "hybrid food webs," which are constructed from natives, native invaders, and exotic species, is difficult to predict (Naiman et al. 2012).

During the 25+ year span of the Project, climate change-related effects are expected to become more evident in this and other watersheds within the range of the MCR steelhead distinct population segment (DPS). Climate change may increase the risk of large rain-on-snow runoff events (Crozier 2013), which could increase erosion on roads. However, the MNF's proposed road upgrades and plans to decommission roads will reduce future potential for sediment delivery and reduce the overall amount of sediment delivered to streams.

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).

Moreover, as atmospheric carbon emissions increase, increasing levels of carbon are absorbed by the oceans, changing the pH of the water. Acidification also impacts 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). 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). 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).

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.

In 2007, the Interior Columbia Basin Technical Recovery Team (ICTRT) further defined population-level viability criteria to address, abundance, productivity, and SS/D (ICTRT 2007). These viability attributes are influenced by survival, behavior, and experiences throughout the entire life cycle, characteristics that are influenced in turn by habitat and other environmental conditions. The present risk faced by the Evolutionarily Significant Unit (ESU)/DPS informs NMFS' determination of whether additional risk will appreciably reduce the likelihood that the ESU/DPS will survive or recover in the wild. The greater the present risk, the more likely any additional risk resulting from the proposed action's effects on the abundance (population size), productivity, distribution, or genetic diversity of the ESU/DPS will be an appreciable reduction (McElhany et al. 2000).

Middle Columbia River Steelhead

The MCR steelhead DPS was listed as threatened on March 25, 1999 (64 FR 14517), and its threatened status was reaffirmed on May 26, 2016 (81 FR 33468). The DPS is comprised of 17 independent populations within four Major Population Groups (MPGs) in Washington and Oregon. This DPS includes all naturally-spawned populations of steelhead (and their progeny) in streams from above the Wind River, Washington, and the Hood River, Oregon (exclusive), upstream to, and including, the Yakima River, Washington, excluding steelhead from the Snake River Basin (Table 2). Seven artificial propagation programs are considered part of the DPS: the Touchet River Endemic, Yakima River Kelt Reconditioning Program (in Satus Creek, Toppenish Creek, Naches River, and Upper Yakima River), Umatilla River, and the Deschutes River steelhead hatchery programs.

The life history characteristics for MCR steelhead are similar to those of other inland steelhead DPSs. Most fish smolt at 2 years and spend 1 to 2 years in salt water before re-entering freshwater, where they may remain up to a year before spawning (Howell et al. 1985). All steelhead upstream of The Dalles Dam are summer-run (Reisenbichler et al. 1992) fish that enter the Columbia River from June to August. Adult steelhead ascend mainstem rivers and their tributaries throughout the winter, spawning in the late winter and early spring. Fry emergence typically occurs between May and the end of June.

Table 2. Major Population Groups, populations, and scores for the key elements [abundance and productivity (A&P), and spatial structure and diversity (SS&D)] used to determine current overall viability risk for Middle Columbia River steelhead (NMFS 2009). Risk ratings included very low (VL), low (L), moderate (M), high (H), very high (VH), 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 preserve 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 John Day Tribs	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

* Re-introduction efforts underway (NMFS 2009).

Updated Biological Risk Summary. The following is a summary from the status review update. More detailed information on the status and trends of these listed resources, and their biology and ecology are in the status update (NWFSC 2015). On May 26, 2016, in the agency's most recent 5-year review for Pacific salmon and steelhead, NMFS concluded that the species should remain listed as threatened (81 FR 33468).

There have been improvements in the viability ratings for some of the component populations, but the MCR steelhead DPS is not currently meeting the viability criteria described in the Middle Columbia Steelhead Recovery Plan (NMFS 2009). In addition, several of the factors cited by (ICTRT 2007) remain as concerns or key uncertainties. Natural origin returns to the majority of populations in two of the four MPGs in this DPS increased modestly relative to the levels reported in the previous 5-year review. Abundance estimates for two of three populations with sufficient data in the remaining two MPGs (Eastside Cascades and Umatilla–Walla Walla) were marginally lower. Natural-origin spawning estimates are highly variable relative to minimum abundance thresholds across the populations in the DPS. Three of the four MPGs in this DPS include at least one population rated at low risk for A&P (NWFSC 2015). The survival gaps for the remaining populations are generally smaller than those for the other Interior Columbia Basin

listed DPSs (NWFSC 2015). Updated information indicates that stray levels into the John Day River populations have decreased in recent years. Out-of-basin hatchery stray proportions, although reduced, remain high in spawning reaches within the Deschutes River basin populations. In general, the majority of population-level viability ratings remained unchanged from prior reviews for each MPG within the DPS.

Limiting Factors. Limiting factors for this species include:

- 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.

Status of MCR steelhead in the Middle Fork John Day River Subbasin. Hatchery steelhead are not released in the John Day Basin. However, hatchery fish originating from other Columbia Basin hatchery populations have been found to stray into the John Day Basin. The MFJDR is used by MCR steelhead for migration, spawning, and rearing. Steelhead spawning and rearing occurs in all major MFJD river tributaries. Spawning and juvenile rearing occur in the action area in Camp, Cougar, Cottonwood, Coxie, Eagle, East Fork Camp, Little Trail, Lock, Shoberg, West Fork Lick, Whiskey, and Trail Creeks.

Middle Columbia River steelhead occupy 410 miles of habitat on the MNF-managed lands. The ODFW estimates there are 281 miles of available MCR steelhead spawning habitat (ODFW 2016a). The Middle Fork John Day River Intensively Monitored Watershed (MFIMW) effort estimated adult escapement at 1,676 for 2016. The ODFW estimated 1,261 steelhead redds along the segment of the MFIMW in this most recent spring (MFIMW 2017).

The MFJDR steelhead population comprises about a quarter (22 percent) of the total steelhead return to the John Day Basin. The Oregon Department of Fish and Wildlife has conducted redd counts since 1964 (ODFW 2016a). Redd density in the MFJD has exceeded the ODFW goal of 5.8 per mile for the most recent 7 years but was short of that goal in 9 of the past 16 years. Redd surveys in 2016 observed 4.4 redds per mile in Camp Creek and 16.7 per mile in Lick Creek (ODFW 2016b).

2.2.2 Status of Critical Habitat

This section describes the status of DCH affected by the proposed action by examining the condition and trends of the essential PBFs of that habitat throughout the designated areas (Table 3). 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).

Table 3. Physical and biological features of critical habitat designated for ESA-listed species considered in this opinion and corresponding species life history events.

Physical and Biological Features		
Site Type	**Site Attribute**	**Species Life History Event**
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 emergence from gravel Fry/parr/smolt growth and development
Freshwater migration	Free of artificial obstruction Natural cover Water quality Water quantity	Adult sexual maturation Adult upstream migration and holding Kelt (steelhead) seaward migration Fry/parr/smolt growth, development, and seaward migration

For most salmon and steelhead, NMFS' critical habitat analytical review teams (CHARTs) ranked watersheds within DCH at the scale of the 5th-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 were 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, the relationship of the area compared to other areas within the species' range, and the significance to the species of the population occupying that area. 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, a unique contribution of the population it served, or if it is serving another important role.

Critical habitat for MCR steelhead was re-designated on September 2, 2005. A summary of the status of critical habitats considered in this opinion is provided in Table 4, below.

Table 4. Critical habitat, designation date, Federal Register 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 HUC5 watersheds with physical and 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. We rated conservation value of occupied HUC5 watersheds as high for 80 watersheds, medium for 24 watersheds, and low for 9 watersheds.

Migratory habitat quality for DCH has been impacted by the development and operation of the Federal Columbia River Power System dams in the mainstem Columbia River and privately-owned dams in the Snake and Upper Columbia River basins. Hydroelectric development has

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 salmonids, and delayed migration time for both adult and juvenile salmonids. Physical features of dams such as turbines also kill migrating fish. Construction of Hells Canyon Dam eliminated access to several historic production areas in Oregon and Idaho including the Burnt, Powder, Weiser, Payette, Malheur, Owyhee, and Boise River basins (Ford 2011).

Status of Critical Habitat in the Middle Fork John Day River Subbasin
The action area contains 32.1 miles of streams and reaches of DCH for MCR steelhead freshwater spawning, rearing and migration within the MFJDR subbasin. Table 5 identifies stream name with miles of DCH located within the action area.

Table 5. Middle Columbia River (MCR) steelhead Designated Critical Habitat (DCH) streams and miles located in the Camp Lick Project.

Stream Name	**Miles of MCR DCH**
Camp Creek	12.5
Cougar Creek	2.6
Cottonwood Creek	3.8
Coxie Creek	0.5
Eagle Creek	1.5
East Fork Camp Creek	0.7
Lick Creek	5.0
Trail Creek	0.4
West Fork Lick Creek	2.4
Whiskey Creek	2.7
Total	**32.1**

2.3 Action Area

"Action area" means all areas to be affected directly or indirectly by the federal action and not merely the immediate area involved in the action (50 CFR 402.02). The action area includes the Lower Camp Creek, Lick Creek, and Upper Camp Creek subwatersheds in their entirety. These watersheds will be affected by upland vegetation treatments, prescribed fire, road use, and road maintenance.

The action area is used by all freshwater life stages of MCR steelhead. Streams within the action area are DCH for MCR steelhead. Middle Columbia River critical habitat is designated within the action area as published in the Federal Register (70 FR 52630).

2.4 Environmental Baseline

The "environmental baseline" refers to the condition of the listed species or its DCH in the action area, without the consequences to the listed species or DCH 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 that are contemporaneous with the consultation in process. The consequences to listed species or DCH from ongoing agency

activities or existing agency facilities that are not within the agency's discretion to modify are part of the environmental baseline (50 CFR 402.02).

The action area encompasses public lands managed by the Blue Mountain Ranger District MNF, located within the Lower Camp Creek, Lick Creek, and Upper Camp Creek sub-watersheds within the MFJDR subbasin. Adult and juvenile MCR steelhead occupy streams and DCH within the action area. NMFS describes the environmental baseline in terms of the biological requirements for habitat features and processes necessary to support all life stages of MCR steelhead in the action area.

Lands within the action area have been subjected to a variety of past and current land-use activities on both public and private land (USFS MNF 2008). These include silvicultural treatments, fire suppression, prescribed and wildfire, early railroads, road construction, livestock grazing, and multi-recreational activities (e.g., camping, hunting, harvest/gather, firewood cutting). These activities have contributed to reduced aquatic species, habitat quality, and the complexity of streams within the action area.

The effects of recreation occur throughout the landscape and include the persistence of many miles of forest road that would be closed, but for demands from the recreation community. The road network also contributes to development of dispersed recreation and campsites in riparian areas, degrading aquatic habitat.

Legacy effects from past timber harvest, grazing, road and levee construction, have caused channel widening and straightening, and reduced stream shading. These practices have negatively affected water temperature, habitat complexity, pool formation, and in-stream habitat availability. The old railroad berms in the action area adjacent to Camp Creek confine the channel and disconnect Camp Creek from its floodplain.

The action area contains many roads in RHCAs. These are native surface roads that contribute fine sediment to streams, adversely affecting aquatic habitats. In some areas, roads located in riparian areas preclude the recruitment of large wood to streams. There are approximately 400 miles of open and closed roads in the action area—a road density of approximately 6.43 miles per square mile.

There are approximately 66 miles of roads in close proximity (within 100 feet) to streams in the action area. These conditions reduce availability of subsurface cool water storage and have caused streams to become disconnected from floodplains. Road-stream crossings have impacted local stream channels and water quality. Some crossings were poorly designed with improperly sized culverts. Fine sediment is also a concern for roads that are hydrologically connected to disturbed areas.

The "Malheur National Forest Roads Analysis Report" (USFS MNF 2004) describes an analysis of its road system and the existing road network's threat to watershed health. The Road Analysis Report rated the risk for each indicator for the existing road network for the sub-watershed in the area. The risk indicators were rated as either "low", "moderate", "high", or "extreme" for the following: road density, proximity within 200 feet of a stream, stream crossings, geological

sensitivity and soil erosion, and Overall Watershed Risk. A majority of the indicators received an "extreme" risk rating for three 6th-field HUCs in the action area—Upper Camp Creek, Lick Creek and Lower Camp Creek, with all three receiving an "extreme" risk rating for Overall Watershed Risk.

Past grazing management practices impacted existing aquatic habitat and water quality due to reductions in shade and bank-stabilizing wetland vegetation, streambank alteration, increased width-to-depth ratios and fine sediment levels. These impacts were exacerbated within areas disturbed by past railroad prisms, and logging. Improved management practices, on both private land and National Forest System land, have resulted in improved aquatic conditions. Restoration activities such as fence building, to protect riparian areas from grazing, and adding large wood to streams have improved conditions at project scales. The addition of in-stream wood has, in some cases, limited cattle access, increasing bank stability. The following six livestock grazing allotments are located either completely or partially within the action area: Long Creek, Slide Creek, South Middle Fork, Camp Creek, Dixie, and Round Top Allotments. Effects of the MNF Grazing Program were analyzed in the NMFS 2018 Grazing opinion (NMFS 2018).

Water temperature influences the metabolism, behavior, and health of fish and other aquatic organisms. Mean maximum water temperatures are above the suitable range for salmonid species present during summer months in the action area in all of the stream reaches that we have data for (USFS MNF 2019) except for Camp Creek reach 10, Camp Creek reach 11, Cougar Creek reach 2, Lick Creek reach 1, Trail Creek reach 1, and West Fork Lick Creek reach 1. These stretches have maximum water temperatures within the suitable range for salmonid species during the summer months.

The Malheur Forest Plan standard for water temperature is for no measurable increase in maximum water temperature and the PACFISH RMO is for maximum water temperatures below 64°F within migration and rearing habitat and below 60°F within spawning habitats. The average 7-day maximum stream temperature across the action area, where data are available, ranges from 55.17 to 77.1°F (USFS MNF 2019).

The MNF provided a detailed description in the BA (USFS MNF 2019) with an evaluation of environmental baseline conditions for the Camp Creek– MFJDR watershed within the action area. The MNF used NMFS' Matrix of Pathways and Indicators (MPI) (NMFS 1996) to summarize the current status of each indicator in the BA (See USFS MNF 2019, Table 27). The MPI analyzes the conditions for the following pathways: (1) water quality, (2) habitat access, (3) habitat elements, (4) channel condition and dynamics, (5) flow and hydrology, and (6) watershed condition. The BA describes the condition as either "Properly Functioning", "At Risk" (AR), or "Not Properly Functioning" (NPF). The Camp Creek– MFJDR watershed was rated AR, and NPF for all indicators as summarized in the following Table 6. These were informed by Level III stream surveys and inventories of fish-bearing streams collected in 2014 and 2016. Additional specific details for each pathway and stream survey data are described in the BA.

Table 6. Environmental Baseline, Matrix of Pathways and Indicators (MPI) for Camp Creek–Middle Fork John Day River watershed identified in (USFS MNF 2019, Table 27).

Pathway: **Water Quality**	**Indicator**	**MPI Rating[1]**
	Temperature	NPF
	Sediment	NPF
	Chemical contaminants or nutrients	AR
Habitat Access	Physical Barrier	AR
Habitat Elements	Substrate	NPF
	Large Woody Debris	NPF
	Pool Frequency	NPF
	Pool Quality	NPF
	Off-Channel habitat	AR
	Refugia	AR
Channel Condition/Dynamics		
	Width-to-Depth ratio	NPF
	Streambank condition	AR
	Floodplain connectivity	NPF
Flow Hydrology		
	Change in peak/base flows	NPF
	Increase in drainage network	NPF
Watershed Condition		
	Road Density and location	NPF
	Disturbance History	AR
	Riparian Management Areas	AR

[1] Definitions of MPI Ratings: "At Risk" (AR); "Not Properly Functioning" (NPF).

Middle Columbia River Steelhead in the Middle Fork John Day River Subbasin
The John Day River represents the largest naturally-spawning collection of MCR steelhead. The MCR steelhead DPS does not include co-occurring resident forms of *Oncorhynchus mykiss* (rainbow trout).

The MCR steelhead ESA Recovery Plan (NMFS 2009) identified population-limiting factors. Tributary-limiting factors for the MFJDR population include degraded channel structure and complexity (habitat quantity and diversity), altered hydrology and water temperature, and altered sediment routing. For the MFJDR population, the primary tributary limiting factors are degraded floodplain and channel structure (habitat quantity and diversity), altered sediment routing, altered hydrology, and water temperature. Major spawning areas have enough habitat to support 500 spawning adults. Habitat limiting factors identified in (NMFS 2009) for the MFJDR are displayed in Table 7.

Table 7. Habitat-limiting factors identified in (NMFS 2009) for the Middle Fork John Day River and streams within the ESA action area.

Limiting factor	Upper Middle Fork John Day[1]	Camp Creek[1]	Long Creek[1]	Slide Creek[1]
Degraded floodplain connectivity and function	No	No	No	Yes
Degraded channel structure and complexity	Yes	Yes	Yes	Yes
Altered hydrology	Yes	Yes	Yes	No
Altered sediment routing	Yes	Yes	Yes	Yes
Water Quality temperature	Yes	Yes	Yes	No
Fish Passage	No	No	Yes	No
Degraded Riparian Areas	No	No	No	Yes

[1] From Table 8-33 of the Recovery Plan (NMFS 2009).

Elevated stream temperatures have been identified as the most significant limiting factor for salmonid populations by limiting summer parr distribution and causing increased mortality of adult and juvenile fish in the MFJDR and Camp Creek (MFIMW 2017). Multiple fish mortality events have occurred on the mainstem MFJDR when stream water temperatures experienced rapid summer thermal increases during low stream flow conditions (MFIMW 2017). The Middle Fork John Day River Intensively Monitored Watershed (MFIMW) working group found restoration efforts implemented in the area are showing slow progress. Intensive grazing by cattle, deer and elk suppresses the growth and recruitment of hardwoods to an extent that stream shade is severely compromised throughout the watershed. Recent restoration projects completed by the USFS through the ARBO II programmatic include fish passage (removal of log weirs, blocked culverts), and instream large wood improvements. In addition, multiple restoration projects were recently completed and in progress to remove legacy structures (obsolete railroad berms and levees), restore and improve natural floodplain functions, and improve stream water temperatures in the MFJDR watershed.

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).

The proposed action includes the following project elements: timber harvest and thinning, road maintenance and use, skid trails and landings, prescribed fire, and riparian fencing and protection. The Project includes various vegetation treatments over a 10-year period. Following mechanical vegetation treatments, prescribed, controlled burns will occur over the next 15 or more years.

2.5.1 Fish Exposure

The MNF's BA provides a detailed analysis of the effects of the proposed action on MCR steelhead and its critical habitat in the action area. The analysis considers habitat conditions in the context of NMFS' MPI. Adult steelhead are expected to occupy streams in the action area from late February to June, and rearing juveniles will be present year around. Thus, both adults and juveniles will be exposed to effects of the action. Critical habitat for MCR steelhead will also experience temporary adverse effects. The Project will temporarily reduce water quality, spawning substrate condition, and riparian functions. These effects are described in subsequent sections.

2.5.2 Effects to Species

The proposed action may cause indirect and direct effects to MCR steelhead from fish salvage and work site isolation, loss of instream cover, increases in stream temperature, sediment delivery, turbidity, natural cover and peak flows.

Fish Salvage and In-water Work Isolation

In-water construction for removal, repair, and maintenance is planned for 6 culverts and 6 stream crossings on streams occupied by MCR steelhead. Implementation is likely to require in-water isolation, fish salvage, and relocation of juvenile MCR steelhead. Based on requirements to follow fish handling guidelines and past fish salvage operations[3] completed by MNF, NMFS anticipates no more than 30 juvenile MCR steelhead to be captured, handled, and relocated during fish salvage at each of the subject sites. Therefore, NMFS anticipates up to a total of 360 juvenile MCR steelhead and no adult steelhead will be handled in the course of replacing the six culverts and hardening the other six crossings. We expect the actual number to be far fewer because habitat quality is poor at the ford locations.

Handling fish may cause short-term stress and is likely to cause harm or death to some individuals, particularly those exposed to electrofishing (McMichael et al. 1998; Nielson 1998). Electrofishing can cause spinal injury or death to individual fish (Dalbey et al. 1996). Employing the NMFS (2000) electrofishing guidelines will minimize stress and mortality. NMFS does not expect that electrofishing will injure or kill more than 5 percent of the fish exposed. Thus, NMFS expects that not more than 18 juvenile steelhead will be killed or injured by fish salvage. This loss of individuals will be spread across at least two work seasons and thus at least three steelhead broods. The loss of fewer than six or so (likely fewer) parr from any brood year is unlikely to reduce the number of adult returns. In addition, the actions that invoke the need for salvage are intended to improve conditions for rearing steelhead by reducing turbidity and enabling passage. Worksite isolation will also prevent fish passage during construction. Because the isolation will last for not more than a couple of weeks at any site and the isolation will occur during the summer when juvenile steelhead migrate very little and adults are not present in the action area, the effects to migration of individual steelhead will be negligible.

[3] Email correspondence received on January 6, 2020, and January 9, 2020, between L. Aker (MNF, ESA Consultation Biologist), D. Armichardy (MNF Fish Biologist) and R. Viray (NMFS Fish Biologist) regarding past culvert fish salvage data.

Vegetation Treatments

Tree removal through commercial and non-commercial thinning can increase sedimentation, remove cover, reduce large wood recruitment, increase water temperatures and reduce other riparian functions. The Project includes timber harvest and thinning on 12,430 acres. Thinning, both commercial (600 acres) and non-commercial (1,700 acres), will occur within RHCAs, amounting to approximately 10 percent and 27 percent, respectively, of total RCHA acreage. Tree harvest outside of the RHCAs as proposed is generally aimed at redirecting stand conditions toward a more natural state with respect to hydrologic function. Thus, we expect the effects of upland activities to improve late season base flows and reduce the severity of wildfire.

As previously explained in the proposed action, the MNF will apply a 100-foot "inner" buffer (ESA-listed category 1) or 50-foot "inner" buffer (category 2 and category 4) zone along streams where only hand thinning methods will be used to fell trees. The MNF will not remove any vegetation, trees, and large wood from the "inner" buffer next to streams. Thinned and felled trees or vegetation will be left within the "inner" buffer as in-stream large wood or woody debris to meet ecological objectives. The vast majority of large wood in streams is recruited from 100 feet or nearer a stream's edge (McDade et al. 1990; Van Sickle and Gregory 1990). In thinning units, silviculture prescriptions are designed to leave stands 50–75 percent stocked post-treatment. Trees thinned and left in the adjacent riparian areas contribute to stabilizing soils and provide complexity in riparian habitat and floodplain zones. Trees felled directly into streams are anticipated to provide immediate additional in-stream wood recruitment and natural cover for salmonids (Spies et al. 2013), as well as shade.

Steelhead require cool water to successfully spawn and rear. Stream shading helps to ameliorate stream temperatures, and as shade increases, summer water temperature decreases (Murphy and Meehan 1991). Project activities that remove or alter vegetation that shades streams may increase insolation and, in turn, increase stream temperature. Timber harvest and thinning within the RHCAs are the most likely activities to potentially affect water temperature in action area streams.

Disturbance of riparian vegetation may decrease shade and increase insolation, which potentially could increase water temperatures (Moore et al. 2005). Temperature increases would be particularly critical in the action area, because streams in the MFJDR basin frequently approach the maximum thermal tolerance level for salmonids during the summer. Research completed by the MFIMW working group found water temperature and discharge to be the dominant influences on juvenile salmonid responses and growth in the MFJD basin and Camp Creek watershed (MFIMW 2017). Ruzycki et al. 2008 found warm stream temperatures contribute to high pre-spawn salmonid mortality for spring-run Chinook salmon, but steelhead spawn in the spring, before such temperatures occur. Increases in stream temperature could reduce competitive success of juveniles in relation to non-salmonid fish, increase disease virulence, and reduce disease resistance (Marine and Cech 2004; McCullough et al. 2009; Reeves et al. 1987).

The proposed action is not expected to increase water temperature appreciably because little shade will be removed and trees felled within inner zones of RHCAs will be felled into streams, providing shade. In addition, vegetation treatments will be spread out in time (over 10 years) and space. The riparian fencing that is proposed to accompany riparian thinning near critical habitat

should facilitate rapid growth of hardwood species that will provide summer shade. Thinning will also facilitate and encourage increased cattle access to these newly thinned areas, unless actions are taken to limit that access. Effective implementation of measures in the proposed action, including fencing in particular, would ensure that cattle grazing does not preclude the establishment and vigorous growth of hardwoods within RHCAs being installed and maintained as proposed.

Trees placed into streams will provide additional in-stream woody debris and structure for rearing and migrating MCR steelhead in the immediate location. The provision that large wood will not be removed from the inner RHCA ensures that the Project will not appreciably reduce the supply of large wood to streams in the action area. As noted previously, MNF intends to subsequently add large wood structures to streams within the action area under the auspices of the ARBO.

Vegetation removal can change a watershed's hydrological functions. This alters base and peak flows, which impacts stream channels and habitat quality for rearing fish. The Project is intended to help reset the hydrologic conditions within the action area and is intended in part to reduce the risk and consequences of catastrophic wildfire to hydrology. The Project is not expected to appreciably alter peak flows but may increase base flows by improving wetland and riparian function and by reducing tree stem density.

Thus, vegetation treatments are not expected to harm individual steelhead present in the action area because the action will not appreciably reduce instream cover or stream shade, increase water temperatures, or alter peak flows.

Prescribed Fire Treatments

The MNF proposes prescribed fire treatments following implementation of vegetation treatments. Prescribed fire treatments will be planned to mimic natural fire regimes to promote healthier, resilient forest stands and reduce long-term high severity wildfire risk. Fire plays a valuable role in forest ecology. Fire can accelerate nutrient (carbon and nitrogen) cycling, fertilize soils and streams, and increase large wooding to streams. The fuels treatments will be implemented after vegetation treatments, throughout the planning area over a 15+ year duration. Prescribed low-intensity burns (piles and underburning) will be employed in RHCAs. Ignitions will occur more than 25 feet away from streams. Fire will be allowed to back-burn into RHCAs. Such fires are not intended to kill large trees and thus this treatment is not likely to increase wood loading in streams within the action area. Up to 20 percent of the RHCAs within a given 6th-field HUC may be treated in any year. The implementation of BMPs will reduce the likelihood of the fuel treatments from reducing overstory shade. Thus, fire treatment is not anticipated to affect stream temperature by reducing shade and is not expected to cause direct effects to MFJD steelhead.

Road System, Maintenance and Use

Roads can significantly increase sediment delivery to streams (Belt et al. 1992; Jones et al. 2000; Wemple et al. 1996). Surface erosion from roads contributes a significant source of chronic sediment inputs (Beschta et al. 1995) and excess turbidity. Road maintenance can prevent severe erosion from drainage system failure, and cause recurring, temporary increases in sediment

contribution to streams. Road blading and ditch clearing can lead to temporary increases in road surface erosion as a result of breaking up armor layers on the road surface or the ditch and exposing fresh sediments (Black and Luce 1999; Burroughs and King 1989; Luce and Black 2001). Road system, maintenance and haul on the existing road system is reasonably certain to release small amounts of sediment inputs to streams. However, the extent of increase will be appreciable compared to baseline conditions. These activities are expected to create additional pulses of sediment associated with storm events. These increases in sediment inputs will be reduced over time as the disturbed areas become compacted and as runoff events occur.

Reopening closed roads, new temporary and permanent road construction, culvert repair, and stream crossing work are ground-disturbing activities. These activities release sediments and increase turbidity, resulting in additional short-term pulses and long-term chronic inputs of sediments to streams. The Project includes replacing six culverts and hardening six stream crossings at sites occupied by MCR steelhead or DCH. Culvert removal, replacement and stream crossing maintenance are likely to create turbidity plumes extending downstream up to 600 feet from disturbed sites (Casselli et al. 2000; Jakober 2002). The additional turbidity is anticipated to disperse farther downstream and settle into channel substrate. We expect sediment and turbidity to return to background conditions within 600 feet downstream of these disturbed sites. While these actions may increase the amount of soil available for transport to streams, the actual amount of sediment delivered to streams may be reduced because of the water management resulting from road improvements that will be implemented as part of the action.

The effects of increased suspended sediment on salmonids generally increase with exposure time, concentration, and particle size (Newcombe and Jensen 1996). These effects were reviewed by Newcombe and Jensen (1996) and range from avoidance response, to minor physiological stress and death. Failure to avoid increased suspended sediment is likely to result in gill irritation or abrasion (Servizi and Martens 1992), which can reduce respiratory efficiency or lead to infection and a reduction in juvenile feeding efficiency due to reduced visibility.

An increase in suspended sediments (turbidity) and deposition of fine sediments can affect fish and filter feeding macro-invertebrates downstream from the proposed action. Salmonids are relatively tolerant of low to moderate levels of suspended sediment and may increase feeding rates during moderate levels of suspended sediment (Gregory and Northcote 1993); at higher levels, turbidity may interfere with feeding and may injure and even kill both juvenile and adult fish (Berg and Northcote 1985; Spence et al. 1996). Berg and Northcote (1985), found juvenile salmon exposed to increased turbidity for 1 hour displayed reduced prey capture success and increased frequency of gill flaring.

Exposure duration is a critical determinant of the occurrence and magnitude of physical or behavioral effects caused by turbidity (Newcombe and Jensen 1996). Salmon and steelhead tend to avoid suspended sediments above certain concentrations (Servizi and Martens 1992; McLeay et al. 1987). Avoidance behavior can mitigate adverse effects when fish are capable of moving to an area with lower concentrations of suspended sediment. Salmonids have evolved in systems that periodically experience short-term pulses (days to weeks) of high-suspended sediment loads, often associated with flood events, and are adapted to such seasonal high pulse exposures. Bjornn and Reiser (1991) found that adult and larger juvenile salmonids appear to be little

affected by the high concentrations of suspended sediments that may be experienced during storm and snowmelt runoff episodes. However, research indicates that chronic exposure can cause physiological stress responses that can increase maintenance energy and reduce feeding and growth (Servizi and Martens 1991). In a review of 80 published reports of fish responses to suspended sediment in streams and estuaries, Newcombe and Jensen (1996) documented increasing severity of ill effects with increases in dose (concentration multiplied by exposure duration).

The life stage most sensitive to increases in fine sediment deposition is incubation. Steelhead eggs incubate from mid-March to late June. This also coincides with snowmelt runoff and higher natural turbidity. Fine sediment deposition may clog substrate interstices and thereby diminish intragravel flows. In addition, fine sediments may smother fry emergence (Redding et al. 1987). Eggs deposited in gravel with a high percentage of fine sediment have a lower survival to emergence (Spence et al. 1996).

Because of the BMPs to limit and minimize sediment delivery from existing sediment sources, we do not expect the effects from haul and maintenance on the existing road system to differ appreciably from baseline conditions in the action area. We do not expect an increase in sediment inputs and turbidity to result from new sediment sources from re-opening miles of closed roads, new temporary and permanent road construction, and the in-water construction at culverts and crossings on MCR steelhead streams. It is reasonably likely elevated short-term sediment delivery will increase at these in-stream locations. At these select construction sites, juvenile steelhead will be exposed to short pulses of turbidity at the 12 crossing replacement/repair sites in stream reaches occupied by MCR steelhead. The plumes will be short and will not be intense because stream flow will be low. We do not expect that turbidity will cause more than behavioral effects to rearing MCR steelhead.

Riparian Protection and Fencing
The MNF proposes to limit the effects of livestock grazing by making better use of existing fencing, adding new fencing, and rescheduling grazing at certain pastures. The highest priorities will be areas that are determined to be sensitive to grazing disturbance (e.g., low gradient, unconfined to moderately confined valley bottoms with deep, fine grained soils). The effects of such measures are intended to be beneficial to steelhead and, if properly monitored and maintained, they will be. Fence installation may require minor soil disturbance and vegetation removal to accommodate post installation.

2.5.3 Effects on Critical Habitat

The action area contains DCH for all MCR steelhead life stages. Critical habitat within the action area has an associated combination of physical and biological features (PBFs) essential for supporting freshwater rearing, migration, and spawning for steelhead. Modification of these PBFs may affect freshwater spawning, rearing, or migration in the action area. Proper functioning of these PBFs is necessary to support successful adult and juvenile migration, adult holding, spawning, incubation, rearing, growth and development, and survival of juvenile fish. The PBFs most likely to be affected by the proposed action include water quality (i.e., turbidity, water temperature, and chemical contamination/nutrients) for steelhead spawning, rearing, and

migration; forage for fish rearing; and fish passage for fish migration (i.e., streams free of obstructions). The following sections describe how the proposed action may affect these PBFs.

Water Quality

Stream temperature. Removing trees in riparian areas reduces the amount of shade, which leads to increases in thermal loading to the stream (Moore et al. 2005). The primary factors that influence shade are riparian vegetation (Groom et al. 2011a) and the surrounding terrain (Allen et al. 2007), but often riparian vegetation provides most of the shade (Allen 2008; Allen et al. 2007).

Leinenbach et al. (2013) present recent scientific modeling from the U.S. Environmental Protection Agency (EPA) of the effects of thinning on stream shade. The EPA identified the following factors influencing residual shade: (1) total width of the riparian buffer management zone; (2) width of the no-harvest buffer; (3) density of the vegetation within the no-harvest (expressed as canopy cover); (4) pre-harvest vegetation density within the outer "thinned" buffer; and (5) post-harvest vegetation density within the outer buffer. The microclimate impacts of upland forest removal (e.g., increased air temperature, reduced relative humidity, and increased wind speed) can extend hundreds of yards into adjacent forest, distances far greater than the width of most riparian buffers (Chen et al. 1992; Chen et al. 1995; Brosofske et al. 1997). Forest management can affect the extent and timing of water storage and discharge in a watershed. Removing upland vegetation may increase stream temperatures by increasing surface runoff, which, in turn, can decrease aquifer storage and decrease groundwater inflow (Grant and Swanson 1990; Jones and Grant 1996; Coutant 1999).

While stream shade correlates with the width of no-cut buffers, there can be variability depending on site-specific factors such as stream size, substrate type, stream discharge, topography, channel aspect, forest structure, and species composition (Caissie 2006). Inputs of cold water from ground water influences, seepage areas on the stream bank, and tributaries can help cool the stream on hot summer days if they are sufficiently large relative to the stream discharge (Wondzell 2011). The density of vegetation in riparian areas affects shade and thermal loading to a stream due to the penetration of solar radiation through gaps in the canopy and among the branches and stems (DeWalle 2010). In some instances (such as narrow streams with dense, overhanging streamside vegetation, or stands on the north sides of streams with an east-west orientation), no-cut buffers as narrow as 30 feet adjacent to clearcuts can maintain stream shade (Brazier and Brown 1973). Wider buffers, in general will provide increased protection of stream temperature (Anderson et al. 2007; Groom et al. 2011a; Groom et al. 2011b).

Multiple studies examining buffer width and the effects of tree removal have demonstrated that vegetation that is less than 150 feet away from streams can contribute shade to streams in some situations (Brosofske et al. 1997; Groom et al. 2011b; Kiffney et al. 2003). In general, buffers greater than 150 feet protect stream shade and will likely prevent thinning activities from increasing stream temperatures (Anderson et al. 2007; Groom et al. 2011a; Groom et al. 2011b; Leinenbach et al. 2013; Moore et al. 2005). However, in units where thinning occurs closer than 150 feet and where those trees provide direct stream shade, we expect increased insolation and changes to microclimatic conditions that increase stream temperature.

The proposed action includes thinning trees and vegetation removal in selected units within riparian buffers. This will increase insolation to some streams and stream reaches. However, the intent of all of the riparian treatments is to encourage the establishment of natural riparian plant assemblages and conditions. We expect this plant succession will occur if measures to control grazing are successful. The MNF has committed to monitoring and taking corrective action (i.e., installing additional fencing or modifying lease provisions) if grazing is preventing attainment of desired riparian outcomes. The thinning will be of low intensity and will be spread over 10 years across the action area. In addition, cattle will be excluded from treated areas adjacent to streams occupied by MCR steelhead. Riparian conditions, including shade, are expected to improve significantly within a few years after treatment. We expected these treatments to improve riparian conditions, increase resiliency of riparian corridors and upland forest to potential wildfires. In sum, summer water temperatures are a significant problem at present. The proposed action incudes removing small amounts of shade in an effort to encourage the growth of larger trees and hardwood species that will, in the relatively near future provide more shade and improve other riparian functions.

Suspended sediment and substrate embeddedness. Timber harvest and road building can increase sediment supply to streams via surface erosion (Beschta 1978; Furniss et al. 1991; Gomi et al. 2005; Reid et al. 2010; Spence et al. 1996) or increased mass wasting (primarily landslides) (Furniss et al. 1991; Spence et al. 1996). Mass wasting is not expected to result from any portion of the Project. Harvest intensity, the type and extent of buffers, soil properties, geology, unit slope, and precipitation pattern all factor into the magnitude of sediment delivery. Ground-based yarding will be limited to relatively flat ground, and skid trails will not terminate near streams. Skyline or multi-spanning yarding systems, which dramatically reduce soil disturbance, will be employed at steeper sites. Thus, yarding systems are not expected to deliver appreciable amount of sediments to streams in the action area.

Road construction, road re-opening, road maintenance, and stream crossing repair can all increase sediment supply to streams. As sediment deposition occurs, larger particles settle out first and smaller particles settle out farther downstream of activities (Foltz et al. 2008). Finer-grained sediments settle into streambed interstices, reducing the quality of spawning, incubating, and rearing habitat (Anderson 1996; Suttle et al. 2004).

Several studies document that buffer strips can reduce erosion and sediment delivery. Vegetated riparian buffer areas ranging in width from 40 to 100 feet appear to prevent sediment from reaching streams (Burroughs and King 1989; Gomi et al. 2005; Sweeney and Newbold 2014). Lakel (2010) concluded that streamside management zones (buffers) between 25 and 100 feet were effective in trapping sediment before it could enter streams. Sweeney (2014) also concluded that stream buffers up to 30 feet wide were shown to trap about 65 percent of sediments delivered by overland flow, while 90-foot buffers where expected to trap about 85 percent of sediments and a larger fraction of finer silts and clays.

The proposed action includes robust buffers and road drainage relief features to reduce the extent of road-derived sediment delivery to streams. NMFS expects these measures to be effective to an extent that sediment delivery is likely to be comparable to the amount sediment delivered if the action (including water routing improvements associated with road maintenance) were not

implemented. There will be small turbidity events associated with actions at twelve stream crossings but neither those, nor the delivery of sediments at the Project scale will appreciably reduce the function of PBFs for rearing, spawning, or incubation.

Chemical contamination. Heavy machinery use adjacent to streams raises concern for the potential of an accidental spill of fuel, lubricants, hydraulic fluid or similar contaminant into the riparian zone, or directly into the water. In the event of contaminants entering streams, these chemicals could adversely affect habitat, injure or kill aquatic food organisms, or directly impact ESA-listed species. Petroleum-based contaminants such as fuel, oil, and some hydraulic fluids, contain polycyclic aromatic hydrocarbons, which can cause chronic sublethal effects to aquatic organisms (Neff 1985). Ethylene glycol (the primary ingredient in antifreeze) has been shown to result in sublethal effects to rainbow trout at concentrations of 20,400 milligrams per liter (Staples 2001). Brake fluid is also a mixture of glycols and glycol ethers, and has about the same toxicity as antifreeze.

The Project entails a great deal of activity over a relatively long period of time. Thus, some form of chemical spill is likely. Whether a spill is consequential to DCH depends on the size and location of the spill and the nature of the spilled substance. Equipment will rarely work near streams and will be serviced and fueled at least 150 feet from streams. To further prevent toxic materials from entering streams, the MNF will not allow fuel storage in RHCA's and will require that all heavy equipment is inspected for hydraulic or other leaks, and is cleaned in designated areas outside RHCAs. The MNF will require contractors to submit for approval hazardous substance and prevention of oil spill plans prior to implementation of activities. It is not likely that PBFs for any element of freshwater habitat will be appreciably diminished by chemical contamination.

Change in peak flows and increase in drainage network. The removal of vegetation can alter hydrological functions of a watershed. Of particular concern are reductions in base flows, which reduce habitat quality and area for rearing fish, and increases in peak flows, which can destabilize and enlarge channels, further exacerbating effects of reduced base flows. An increase in the extent, timing, or frequency of peak flows capable of mobilizing streambed particles may reduce the suitability of spawning habitats.

Many studies have shown that timber harvest and forest roads increase peak flows in small basins (Wemple et al. 1996; Wemple and Jones 2003). While tree harvest may contribute to increases in small peak flows, there is less evidence that harvest alone significantly increases peak flows. The effect of tree harvest on peak flows is due to a reduction in interception of soil moisture and increases in subsurface water routing to adjacent streams (Jones 2000; Wemple et al. 1996). Timber removal can increase the fraction of winter snow and spring rain that reaches the ground while the amount of soil moisture removed by evapotranspiration decreases, resulting in higher peak flows. High peak flows move bedload and scour salmon and steelhead redds. Increasing the magnitude and frequency of high peak flows could result in flows that move bedload and scour redds each year until the channel substrate particle size distribution equilibrates to the new flow regime.

Road system networks have been identified as having the most significant effect on water routing and peak flows (Grant et al. 2008). Where roads occur in and near harvest units, the road network may facilitate this routing (Grant et al. 2008). As noted previously, the Project contains measures to route water and sediment off of road surfaces and onto vegetated buffers.

The Project is intended to help reset the hydrologic conditions within the action area and is intended in part to reduce the risk and consequences of catastrophic wildfire to hydrology. The Project is not expected to appreciably alter peak flows but may increase base flows by improving riparian function and by reducing tree stem density in uplands. NMFS does not expect that any PBFs for any aspect of freshwater habitat will be appreciably reduced.

Forage. NMFS anticipates forage decreases for juvenile steelhead will likely be short-term due to habitat heterogeneity, the high probability aquatic invertebrates will rapidly recolonize from adjacent habitat, and the staggering of treatment activities throughout the action area. The forage attribute will be diminished slightly within small areas (stream crossing sites scheduled for repair, as noted in project description) and for a short time period, but not to an extent that that will appreciably reduce PBFs of freshwater rearing habitat.

Natural cover and channel complexity. The complexity of habitats created by wood in streams is a key source of cover and shelter to salmonids. Components of the proposed action include tree thinning (located in the "inner" riparian areas) near streams. These trees will be left on site or added to streams. Trees felled into the streams will improve in-stream habitat characteristics and functions after thinning occurs. The placed trees will provide habitat for decades. The action is expected to increase wood loading over the next decade and should restore wood loading rates to near natural conditions within a few decades thereafter. The PBFs for rearing habitat as affected by cover will be enhanced in the short term and for the coming few decades.

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.

NMFS reviewed the proposed action and non-federal activities in the action area. The action area is primarily located on national forest lands. Most activities likely to occur in the reasonable future will be federal actions that are required to undergo separate ESA consultation. Recreational use (e.g., camping, hunting, fishing, firewood cutting) is likely to continue within the action area and on adjacent state, private, and federal lands. Repeated dispersed camping and recreational activities adjacent to streams and in riparian areas contributes to a cumulative reduction in riparian vegetation and can reduce hardwood recruitment and establishment within riparian corridors and next to streams. Livestock grazing in the MFJDR subbasin occurs on adjacent private lands. However, there are effects from unauthorized grazing within the action area.

Non-federal activities may exacerbate climate effects within the action area. However, it is difficult if not impossible to distinguish between the action area's future environmental conditions caused by global climate change that are properly part of the environmental baseline vs. cumulative effects. Therefore, all relevant future climate-related environmental conditions in the action area are described in the environmental baseline (Section 2.4). At this time, no specific non-federal projects are identified on state and private lands in the action area. Therefore, NMFS assumes future state and private actions and land uses will continue within the action at their current rate.

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 opinion as to whether the proposed action is likely to: (1) appreciably reduce 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.

The environmental baseline is characterized by degraded floodplain and channel structure (habitat quantity and diversity), altered sediment routing, altered hydrology, and elevated water temperature. Elevated stream temperatures have been identified as the most significant limiting factor for salmonid populations in the MFJD and Camp Creek (MFIMW 2017). The cumulative effects of state and private actions within the action area are anticipated to continue at approximately the same level that they are now occurring.

Species
The action area is used by individuals of the MFJDR population of MCR steelhead. Individual steelhead are likely to experience effects of behavior modification, degraded water quality (temperature, sedimentation), temporary reductions in forage, altered natural cover, passage, and fish salvage from implementation of the described Project activities. The MFJD population is rated at low risk for A&P, and natural process risk. Spatial structure/diversity is rated at medium risk. Overall, the MFJD steelhead are considered a viable population.

Considering the effects of the action in conjunction with the existing condition of the environmental baseline and the small level of potential cumulative effects, NMFS has determined that the loss of a very small number of juvenile steelhead that may be caused by the proposed action should not appreciably reduce the likelihood of the MFJDR population maintaining its status as a viable population. Because the effects will not be substantial enough to negatively influence VSP criteria at the population scale, the viability of the MPG and DPS are also not expected to be reduced. The effects of the proposed action are not likely to reduce survival of MCR steelhead at the species level. Nor is the action likely to reduce the likelihood of recovery of the species.

Critical Habitat

The proposed action has the potential to affect numerous PBFs within the action area. Those PBFs include water quality (i.e., sediment and turbidity, water temperature, and chemical contamination), water quantity, spawning substrate, natural cover/shelter, fish passage, and forage. Many of these PBFs have the potential to be negatively affected in localized areas. The treatments and improved control of cattle grazing are expected to make the action area more resilient to climate change and the associated wildfire risk. Over the 25+ year timeframe of the proposed activities, increases in summer water temperature are expected to be very small and persist only for a few years until shade from trees within thinned RHCAs returns to and surpasses baseline conditions. Erosion on road systems may increase with more precipitation falling as rain or from more frequent rain on snow events. However, road drainage and water routing will be improved as part of the action and thus changes in sediment delivery are not expected.

As described in Section 2.2, climate change is predicted to cause a variety of impacts to Pacific salmon and their ecosystems. The complex life cycles of anadromous fishes, including salmon, rely on productive freshwater, estuarine, and marine habitats for growth and survival, making them particularly vulnerable to environmental variation. Ultimately, the effects of climate change on salmon and steelhead across the Pacific Northwest will be determined by the specific nature, level, and rate of change and the synergy between interconnected terrestrial/freshwater, estuarine, nearshore, and ocean environments. Within the action area, climate change is likely to alter timing of snowmelt and peak flow events. Winter precipitation is likely to occur less as snowfall; and in larger rain and flood events. Peak flows from snowmelt will occur earlier in the spring and will result in reduced late spring/early summer cold water flows, and water temperatures will increase. Reduced stream flows will likely make fish passage more difficult when returning fish encounter migration barriers. Elevated water temperatures during summer low flows will likely exceed salmonid temperature thresholds.

For the reasons set out above with respect to the species, considering the potential effects of the proposed action with the baseline conditions, potential effects of climate change, and cumulative effects in the action area, NMFS concludes that the proposed action is not expected to appreciably reduce the conservation value of the critical habitat in the short-term. Improvements to forest health and wildlife resiliency may increase the long-term conservation value of critical habitat in the watershed. Because the conservation value of the critical habitat in the watershed will not be reduced, the conservation value of the DCH at the designation scale will also not be reduced.

2.8 Conclusion

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

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

The proposed action is reasonably certain to result in incidental take of ESA-listed species. NMFS is reasonably certain the incidental take described here will occur because: (1) recent, and historical surveys indicate ESA-listed species are known to occur in the action area; (2) the proposed action involves construction and maintenance activities on roads and use of roads within RHCAs that will cause sediment delivery to streams; and (3) the proposed action includes in-stream work activities that could harm juvenile steelhead (turbidity and fish salvage). In the opinion, NMFS determined that incidental take would occur as follows:

1. Harm of juvenile steelhead as a result of degraded water quality associated with reopening closed roads and constructing new roads.
2. Harm of juvenile steelhead from sedimentation of substrate below areas associated with construction activities during culvert removals/replacements and construction near stream crossings.
3. Harm of juvenile steelhead from fish handling, salvage, and relocation for in-water construction associated with culvert and stream crossings removals and maintenance.

Incidental Take from Degraded Water Quality from Reopening Closed Roads and Constructing New Roads

NMFS anticipates juvenile MCR steelhead will be present in streams and experience the effects of sediment delivery from new and reopened roads. Many juvenile steelhead are likely to be temporarily displaced due to elevated sediments and turbidity. Because it is not feasible to observe fish fleeing the area, the indicator for the extent of take from increases in sediment and turbidity is the number of miles of roads constructed or reopened, provided that all proposed road closures also occur as proposed. These indicators are causally linked to incidental take from road use and maintenance, because sediment delivery to streams generally increases as the amount of soil exposure increases, particularly from roads. Thus, the extent of take indicator that will be used as a reinitiation trigger for this pathway is: 23.42 miles of road temporarily reopened, 3.8 miles of new permanent road constructed, or 7.8 miles of new temporary road constructed, provided all temporary roads are closed after use and 26.3 miles of existing road are closed.

Although these surrogates could be considered coextensive with the proposed action, they are quantifiable and measurable. Monitoring and reporting requirements will provide opportunities to check throughout the course of the proposed action whether the surrogates are exceeded. For this reason, the surrogates function as effective reinitiation triggers.

Incidental Take from Sedimentation and Turbidity Plume from Culvert and Stream Crossing Repairs

NMFS noted that juvenile MCR steelhead could be temporarily displaced due to elevated turbidity levels resulting from in-stream work at culvert replacements and stream crossing repairs on occupied MCR steelhead streams or DCH. Because it is not feasible to observe fish fleeing the area, NMFS will use the extent and duration of the turbidity plumes as a surrogate for take resulting from degraded water quality. These indicators are casually linked to incidental take from culvert replacements and stream crossing repairs on streams containing MCR steelhead because amount of take increases as turbidity increases in extent and duration. As previously explained, NMFS will consider the extent of take exceeded if turbidity plumes at the six in-water culvert replacements or six stream crossing construction sites on MCR steelhead streams extends farther than 600 feet downstream for more than 60 consecutive minutes.

Incidental Take from Fish Salvage and Handling from Culvert and In-Water Constructions

As described in the species effects analysis, NMFS was able to quantify the take associated with the six culvert replacements and six stream crossing maintenance on ESA-listed streams that are most likely to have steelhead present. Based on the past implementation[4] by MNF on similar projects, NMFS estimates up to 30 juvenile steelhead potentially will be captured or handled during in-water construction at each of the culvert and stream crossing locations. NMFS does not anticipate any adult MCR steelhead to be present at these sites during construction. Therefore, NMFS will consider the extent of take to be exceeded if more than 30 juvenile steelhead are handled, captured, or relocated at any of these six culvert or six stream crossing locations.

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

[4] Email correspondence received on January 6, 2020, between L. Aker (MNF, ESA Consultation Biologist), D. Armichardy (MNF Fish Biologist), and R. Viray (NMFS Fish Biologist) regarding culvert fish salvage data.

The MNF shall comply with the following RPMs:

1. Minimize the potential for incidental take from degraded water quality resulting from reopening closed roads and constructing new roads.

2. Minimize the potential for incidental take from sedimentation and turbidity resulting from culvert replacement and stream crossing maintenance.

3. Minimize the potential for incidental take from fish salvage and handling at culvert and stream crossing sites during in-water construction.

4. Prepare and provide NMFS with plan(s) and report(s) describing how impacts of the incidental take on listed species in the action area would be monitored and documented. Conduct monitoring to verify that the amount and extent of take described above is not exceeded. Contact NMFS immediately if take is exceeded.

2.9.4 Terms and Conditions

The terms and conditions described below are non-discretionary, and the MNF or any applicant must comply with them in order to implement the RPMs (50 CFR 402.14). The MNF 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 RPM 1:
   a) The proposed action, including all described conservation measures and BMPs, will be implemented as described in the BA and Proposed Federal Action section of this opinion.

   b) The MNF or timber purchaser will install, maintain, and routinely inspect erosion and stormwater controls for active operations as necessary to ensure proper and effective function during any potential wet or storm season to control off-site discharge of sediment. This includes sediment movement from road surfaces, drainage ditches, skid trails, and fuels treatment areas.

   c) Sediment sources on reconstructed roads and haul routes will be addressed and eliminated or minimized prior to log haul activities for each planned timber or vegetation treatment.

   d) Avoid channelizing flow through harvest activities (i.e., skid trails, yarding activities, landing construction and implementation).

   e) During intense or prolonged rainfall, the MNF will monitor haul road surface conditions. Anytime the road surface begins to deteriorate, as evidenced by the increasing presence of surface mud, rutting, ponding, or under any other conditions when haul roads show visible signs of eroding sediment or turbid stormwater discharge, the MNF will not allow timber or rock haul until surface conditions improve and sediment is no longer transported from the road surfaces.

f) Contractors shall maintain all equipment operating in the action area in good repair and free of abnormal leakage of lubricants, fuel, coolants, and hydraulic fluid.

g) All motorized equipment and vehicles used in or near the stream or riparian areas are cleaned of external oil, grease, dirt, and mud; and leaks repaired prior to arriving at the Project site.

h) Onsite contractors will have spill prevention and containment materials on site during in-water work to minimize the risk of an accidental spill of petroleum products resulting in adverse effects to water courses and aquatic biota in the event of a spill.

2) The following terms and conditions implement RPM 2:

a) Turbidity monitoring shall be conducted during the culvert replacements and stream crossings proposed for replacement, removal or in-stream construction. Turbidity readings shall be collected at the following locations: (1) greater than 50 feet upstream of the action area; and (2) 600 feet or less downstream of the in-water locations. Turbidity at the downstream sample location shall be recorded every 30 minutes until the plume is no longer visible at 600 feet or less downstream. Monitoring of nephelometric turbidity units, time and distance of measurements, and maximum extent of turbidity will be reported in the Project annual report.

3) The following terms and conditions implement RPM 3:

a) Before beginning in-stream construction activities, fish shall be isolated from the in-water work area through a combination of seins, dip-netting, and electrofishing.

b) Block nets shall be used to isolate listed fish from all in-water work areas. Block nets shall be constructed of nylon materials, with mesh of appropriate size (e.g., 0.28 inches) to not entrap juvenile listed fish species.

i) Qualified fisheries biologist(s) conducting work area isolation shall have demonstrated experience conducting work area isolation, backpack electrofishing, and fish handling. Fish handled and salvaged will be placed into large aerated coolers or buckets until they are relocated in a safe location. Water temperatures will be monitored frequently to avoid thermal stress.

ii) All fish will be transported a minimum of 500 feet to upstream locations, outside the Project work area and in areas with good habitat features. Multiple release sites will be designated prior to beginning electroshocking to avoid concentrating fish at any one location.

iii) Electroshocking and fish relocation activities should be conducted as early as possible in the morning to avoid warmer temperatures.

4) The following terms and conditions implement RPM 4:

a) Monitor electrofishing efforts and project-generated turbidity to ensure that fish salvage and turbidity levels are met during project implementation. If incidental take thresholds

are close to being reached, MNF will ensure that project activities are halted until levels recede. If it is not possible to conduct work within the turbidity guideline, work shall be halted until NMFS has been notified.

b) Prepare and submit an annual project status completion report to NMFS within 3 months following each year the vegetation treatment or prescribed fire treatment is implemented. Since the whole Project will occur over a 2 decade period, an annual report shall include a statement on the vegetation and fire treatments conducted and whether all the terms and conditions of this opinion were successfully implemented. The report shall also include: (1) description of the total acres of vegetation removed and or fire treatments in RHCAs units; (2) description and status of riparian protection (number of total miles fences installed, or stream miles protected), photo point and any other monitoring of riparian units; (3) a summary of any in-stream repairs (culverts/stream crossing) completed; (4) pollution and erosion control inspection results, including a description of any erosion control failures, contaminant releases, and efforts that were taken to correct such incidences; (5) documentation of turbidity monitoring results; and (6) documentation of the number and species of fish salvaged, and the final disposition of the fish salvaged.

c) Monitor and submit an annual project report to NMFS within 3 months following each year the status of reopening closed roads, and road construction implemented in accordance to the extent of take described in Section 2.9.1. The report shall include: (1) a statement on the miles of reopened temporary roads; (2) new temporary and permanent roads constructed; (3) additional temporary roads closed; and (4) all permanent existing roads closed within the action area.

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 MNF should coordinate and partner with other tribal, federal, state, and non-governmental stakeholders in the John Day Basin to restore proper riparian area vegetation and natural ecosystem functions, in order to secure long-term protection of restoration and recovery of riparian areas and streams. NMFS recommends partnership to secure funding and maintenance of long-term fencing, exclosures of stream to prevent access and over use by ungulates and livestock. NMFS recommends long-term exclusion of livestock grazing along streams and exclusion from riparian pastures.

- NMFS recommends continuing coordination and negotiations with other partners and entities in the John Day Basin to secure additional in-stream water for tributaries during summer low stream flow conditions to assist to lower in-stream water temperatures.

Please notify NMFS if the MNF, or other entities, carries out these recommendations so that we will be kept informed of actions that minimize or avoid adverse effects and those that benefit listed species or their DCHs.

2.11 Reinitiation of Consultation

This concludes formal consultation for the Camp Lick Vegetation Project. As 50 CFR 402.16 states, reinitiation of consultation is required and shall be requested by the federal agency or by NMFS where discretionary federal agency involvement or control over the action has been retained or is authorized by law and if: (1) the amount or extent of incidental taking specified in the ITS is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the 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. FISH AND WILDLIFE COORDINATION ACT

The purpose of the Fish and Wildlife Coordination Act (FWCA) is to ensure that wildlife conservation receives equal consideration, and is coordinated with other aspects of water resources development (16 U.S.C. 661). The FWCA establishes a consultation requirement for federal agencies that undertake any action to modify any stream or other body of water for any purpose, including navigation and drainage (16 U.S.C. 662(a)), regarding the impacts of their actions on fish and wildlife, and measures to mitigate those impacts. Consistent with this consultation requirement, NMFS provides recommendations and comments to federal action agencies for the purpose of conserving fish and wildlife resources, and providing equal consideration for these resources. NMFS' recommendations are provided to conserve wildlife resources by preventing loss of and damage to such resources. The FWCA allows the opportunity to provide recommendations for the conservation of all species and habitats within NMFS' authority, not just those currently managed under the ESA and MSA.

NMFS does not have additional recommendations at this time beyond those detailed in Section 2.10 Conservation Recommendations, above.

This concludes the FWCA portion of this consultation.

4. DATA QUALITY ACT DOCUMENTATION AND PRE-DISSEMINATION REVIEW

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

4.1 Utility

Utility principally refers to ensuring that the information contained in this consultation is helpful, serviceable, and beneficial to the intended users. The intended user of this opinion is the MNF. Other interested users could include permit applicants or contractors granted authorized use by MNF, citizens or recreational users in the vicinity of affected areas, or others interested in the conservation of the affected ESUs/DPS. Individual copies of this opinion were provided to the MNF. The document will be available within 2 weeks at the NOAA Library Institutional Repository [https://repository.library.noaa.gov/welcome]. The format and naming adheres to conventional standards for style.

4.2 Integrity

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

4.3 Objectivity

Information Product Category: Natural Resource Plan

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