United States Department of Agriculture

Bitterroot Front Project

Draft Environmental Assessment

Forest Service Bitterroot National Forest, Stevensville and Darby-Sula Ranger Districts, August 2023

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How to comment: Comments on this project, the alternatives, and the analysis are requested for a period of 30 days to help improve the analysis, finalize alternatives, develop a final environmental assessment, and Decision Notice should a finding of no significant impact be made.

The project has received an Emergency Action Determination (EAD) under section 40807 of the Infrastructure Investment and Jobs Act (PL 117-58). The intent of the EAD is to expedite actions in 250 high risk western firesheds in need of critical hazardous fuels reduction to address growing wildfire risk. The EAD requires the opportunity for public comment during the preparation of the environmental assessment for authorized emergency actions. Actions under this section are not subject to the objection process and a court shall not enjoin an authorized emergency action under this section in some circumstances. With this EAD approval, the 30-day EA comment period would be the last official public comment period opportunity for this project. It is the responsibility of persons providing comments to submit them by the close of established comment period.

Names and contact information submitted with comments will become part of the public record and may be released under the Freedom of Information Act. Comments submitted anonymously will be accepted and considered; however, Forest Service staff will not be able to send further project information to anonymous commenters.

The 30-day comment period for this draft environmental assessment began on the date that the legal notice of availability published in the Ravalli Republic. This draft environmental assessment, appendices, and supporting documents are available on the project website at https://www.fs.usda.gov/project/?project=57341.

Please submit comments via one of the following methods:

The preferred method for submitting comments is via the online public participation portal. The public participation portal can be reached via the project website homepage by navigating to the “Comment/Object on Project” link in the “Get Connected” menu section: https://www.fs.usda.gov/project/bitterroot/?project=57341

Comments can also be mailed or hand delivered to: Bitterroot Forest Plan Amendment Comments, Bitterroot National Forest Supervisor’s Office, 1801 N 1st St, Hamilton, MT 59840.

Photo: Bitterroot Front during the 2016 Roaring Lion Fire. Credit: Mike Daniels

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Acronyms/Abbreviations

BE	beneficial effect
BI	beneficial impact
BRF	Bitterroot National Forest
CCF	cubic feet
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CPZ	community protection zone
CWD	coarse woody debris
DBH	diameter at breast height
DSD	detrimental soil disturbance
EA	environmental assessment
ECA	equivalent clearcut area
EIS	environmental impact statement
EPA	Environmental Protection Agency
ESA	Endangered Species Act
FC	Federal candidate
FIA	Forest Inventory and Analysis
forest plan	1987 Bitterroot National Forest Land and Resource Management Plan
FPT	federally proposed threatened
FRCC	fire regime condition class
FSM	Forest Service Manual
FSS	Forest Service sensitive species
FT	federally threatened
GIS	geospatial information system
HIP	heritage implementation plan
HMs	head months
HUC	hydrologic unit code
ID	Idaho
IDT	interdisciplinary team
IRA	inventoried roadless area
KOP	key observation point
LAA	likely to adversely affect
MA	Management Area
MDEQ	Montana Department of Environmental Quality
MFAP	Montana Forest Action Plan
MIIH	may impact individuals or habitat
MIS	management indicator species
ML	maintenance level
MMCF	million cubic feet
MNHP	Montana Natural Heritage Program
MT	Montana
NEPA	National Environmental Policy Act
NFSR	National Forest System road
NFST	National Forest System trail
NHPA	National Historic Preservation Act of 1966
NLAA	not likely to adversely affect

NLJ	not likely to jeopardize
NRHP	National Register of Historic Places
NRM	natural resource manager
NWSRS	National Wild and Scenic River System
OHV	off-highway vehicle
ORV	outstandingly remarkable value
R1	Region 1
RHCA	riparian habitat conservation area
RNA	research natural area
SNOTEL	snow telemetry
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
Vdep	vegetation departure
WEPP	Water Erosion Prediction Process
WSR	wild and scenic river

Glossary

303(d) list	A state's list of impaired and threatened waters (such as stream or river segments and lakes). States are required to submit their list for EPA approval every 2 years. For each water on the list, the state identifies the pollutant causing the impairment, when known.
Archaeological site	A location that contains material remains of past human activities, generally defined as over 50 years old.
Artifact	A human-modified object, often appearing on an archaeological site, that typically dates to over 50 years in age.
Basal area	The average amount of an area occupied by tree stems.
Bulk density	The mass of dry soil per unit volume of soil. Bulk density increases, and soil porosity decreases, when soils are compacted.
Canopy base height	Describes the average height from the ground to a forest stand's canopy bottom. It is the lowest height in a stand at which there is a sufficient amount of forest canopy to propagate fire vertically into the canopy.
Canopy bulk density	Describes the density of available canopy fuel in a stand. It is measured by the mass of available canopy fuel per canopy volume unit.
Canopy closure	Describes the percent cover or cover class of the tree canopy in a stand. It is the vertical projection of the tree canopy onto an imaginary horizontal surface representing the ground surface.
Coarse woody debris	Dead woody material greater than 3 inches in diameter.
Cultural resources	The present expressions of human culture and the physical remains of past activities, such as historic buildings, structures, objects, districts, landscapes, and archaeological sites. These resources can be significant in the context of national, regional, or local history, architecture, archaeology, engineering, or culture. They may also include sacred sites and natural features of landscapes that are significant to living communities.
Diameter at breast height (DBH)	The diameter of a tree 4½ feet above the ground, on a per acre basis.
Elk habitat effectiveness	An index of the capability of an area to provide security for elk. It is based on hiding and thermal cover present and roads open to public motorized use.
Equivalent clearcut area	The area that has been clearcut, with a reduction factor to account for the hydrological recovery due to forest regeneration and subsequent growth.

Historic property	Cultural resources, such as historic buildings, structures, objects, districts, or archaeological sites, that are listed on, or eligible for listing on, the National Register of Historic Places.
Hummock	A small mound above ground usually above a marsh or ice field.
Modification visual quality objective	A visual quality objective where the activities of vegetative and landform alteration must borrow from the naturally established form, line, color, or texture so completely and at such a scale that the landscape's visual characteristics are those of natural occurrences within the surrounding area with similar character type.
National Register of Historic Places (NRHP)	A listing of resources that are considered significant at the national, state, or local level and that have been found to meet specific criteria of historic significance, integrity, and age.
Partial retention visual quality objective	A visual quality objective under which management activities remain visually subordinate to the characteristic landscape. Activities may repeat the form, line, color, or texture common to the characteristic landscape, but changes in their qualities of size, amount, intensity, direction, pattern, etc. remain visually subordinate to the characteristic landscape.
Preservation visual quality objective	A visual quality objective that allows ecological changes only. Except for very low visual-impact recreational facilities, management activities are prohibited. This objective applies to wilderness areas, primitive areas, other special classified areas, areas awaiting classification, and some unique management units that do not justify special classification.
Quadratic mean diameter	The diameter of a tree with the average basal area within a stand, measured on a per acre basis.
Resiliency	The ability of an ecosystem and its component parts to absorb, or recover from, the effects of disturbances through preservation, restoration, or improvement of its essential structures and functions and redundancy of ecological patterns across the landscape.
Retention visual quality objective	A visual quality objective that provides for management activities that are not visually evident. Activities may only repeat the form, line, color, and texture that are frequently in the characteristic landscape.
Sediment delivery	The total amount of sediment delivered to a waterbody.
Seral species	A species that begins growing in natural succession soon after a disturbance.
Soil texture	The components of clay, silt, and sand particles in a soil.
Special status species	Collectively, any ESA federally threatened, endangered, proposed, or candidate species and regional forester's sensitive species.
Species composition	The percentage of a stand made up of different species.

Stand	A continuous group of trees sufficiently uniform in age class distribution, composition, and structure, and growing on a site of sufficiently uniform quality to be a distinguishable unit.
Stand density	Defined by trees per acre or basal area, or both.
Talus sites	A slope made up of loose rocks.
Thermal cover	Cover used by animals to ameliorate chilling effects of weather; for elk, a stand of coniferous trees 40 feet or taller with an average crown closure of 70 percent or more.
Turbidity	The measure of relative clarity of a liquid.
Vernal pond	A seasonal/temporary pool of water.
Water yield	An estimate of freshwater input (for example, rain, snow, and snowmelt) flowing into streams and rivers.
Watershed Erosion Prediction Project (WEPP) model	A model that integrates hydrology, plant science, hydraulics, and erosion mechanics to predict erosion at the hillslope and watershed scale.
Witches' broom	The swelling or deformity caused by dwarf mistletoe on a tree branch.

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Chapter 1

Introduction

The United States Forest Service Bitterroot National Forest Stevensville and Darby-Sula Ranger Districts propose conducting **forest management activities** in the Bitterroot Front project area to **address the wildfire risk** to the nearby communities and **promote forest restoration**. The forest management activities include a variety of actions that mostly fall within the categories of vegetation management, fuels reduction, and transportation system management. The project's primary purpose is to reduce the risk of a stand-replacing wildfire and return the forest to a healthy and resilient ecosystem, which includes high-frequency and low-intensity fire. Additional benefits of the project would include improving vegetation, watershed, wildlife and fish habitat, and transportation resources.

By preparing this environmental assessment (EA), the Forest Service is fulfilling agency policy and direction to comply with the National Environmental Policy Act (NEPA) requirements and to determine whether the effects of the proposed action may be significant enough to require the preparation of an environmental impact statement (EIS). Preparing an EA also fulfills other relevant Federal and State laws and regulations. For more details of the proposed action, see the "Proposed Action and Alternatives" section of this document.

40807 Emergency Authorization

In January 2023, the Secretary of Agriculture, Tom Vilsack, invoked the emergency authority under the Infrastructure Investment and Jobs Act (Section 40807) of Public Law 117-58, passed on November 15, 2021. The action was taken across 250 high-risk fire sheds in the western United States. The law authorizes the Forest Service to take emergency actions to mitigate and protect public health and safety, critical infrastructure, and natural resources on National Forest System and adjacent lands from the effects of destructive wildfires (PF-PROPOSED ACTION-001).

The Bitterroot National Forest (BRF) contains five of the 250 highest-risk fire sheds in the nation; four of these are in the Bitterroot Front project area. The Montana State Forest Action Plan has identified the area as having high wildfire risk to communities and infrastructure and significant forest health concerns. Also identified in the MFAP, Ravalli County currently has the greatest risk from wildfires in Montana, with six communities in the top 10 of all Montana communities with structures at risk from wildfire (Montana Forest Action Advisory Council 2020). The BRF staff announced on July 20, 2023, that it has received "Emergency Actions" approval from the Forest Service Chief to expedite implementation of the Bitterroot Front project.

Direction from the Secretary of Agriculture on the use of this emergency authority states that the Chief of the Forest Service will approve actions on a case-by-case basis. As a result of the Emergency Action Determination, the Forest Service will analyze and incorporate comments to the draft EA, but the Bitterroot Front project will not be subject to the pre-decisional objection review process. Using the right tools in the right places, the emergency authorization would provide the BRF staff the opportunity to accelerate the implementation of these critical fuels and forest health treatments. Proposed project treatments include prescribed fire, noncommercial thinning, and commercial harvesting.

Proposed Project Location

The project area is along the eastern face of the Bitterroot Range from the Bitterroot National Forest boundary at the northern end of the Stevensville Ranger District near McClain Creek to the southern end of the Darby-Sula Ranger District near Trapper Creek (figure 1-1). The Bitterroot Front project area runs north to south, bounded on the east by private lands and communities situated along U.S. Highway 93 and the Selway-Bitterroot Wilderness to the west. The elevation within the project area ranges from about 3,400 to over 9,100 feet. Notable landforms include Lolo Peak on the project area's northern end and Trapper Peak on the south. Blodgett Canyon, Mill Creek, Lake Como, and Bass Creek Recreation Areas, as well as various motorized and nonmotorized recreational trails, fall within the project boundary.

The project area is 143,340 acres; most of the project area (97 percent) falls within Ravalli County, Montana, with the remaining 3 percent in Missoula County, Montana. No management activities under private or other ownerships are considered with this proposal; this is because the Forest Service does not have jurisdiction to make decisions on lands of other ownership.

The fuels management project area is spread across the Stevensville and Darby-Sula Ranger Districts in the Bitterroot National Forest and is divided into priority areas (appendix C, figure 1-2). Proposed project activities are near the following communities: Florence, Stevensville, Victor, Corvalis, Pinesdale, Hamilton, Grantsdale, Ward, Charlos Heights, Como, Darby, University Heights, and Conner.

The project area is primarily allocated to timber management and partial retention visual quality objectives; it includes Management Areas 1, 2, 3a, 3c, 5, 6, and 10 (appendix C, figure 1-3).

Background

Existing Forest Vegetation and Conditions

Influences of Management Activities and Wildfire

Since the early 20th century, fire suppression efforts have resulted in a departure from historical fire regimes within the project area. While the proposed fuel reduction treatments (in cooperation of both the Forest Service and the Natural Resource Conservation Service) would not cover the entire project area, they would address fuel loading and fire risk, and take another critical step to returning fire to its historical role on the landscape. The project would also increase the success of future wildfire suppression operations to protect critical infrastructure that occurs in or adjacent to the treated landscapes.

A large portion of the project area falls within the community protection zone (CPZ). The CPZ identifies where hazardous fuel conditions currently put communities, community assets, and private land at very high risk of damage from wildfires. Wildfires that start in this zone contribute more to the potential loss of community assets than any other strategic fire management zone. Fuel reduction treatments and fire protection are generally needed in this zone to prevent direct threats to life or property. Wildfire in this zone is suppressed under most conditions due to the significant risk, potential economic loss, and public safety concerns. Additional details are available in the Fire and Fuels Specialist Report (PF-FIRE AND FUELS-001).

In 2019, a comprehensive wildfire risk assessment was completed for the Bitterroot National Forest, using modeling and fire simulations (Scott 2019). One of the outputs from that simulation modeling was the creation of an ignition density layer that allows for areas to be classified based on the probability that fire ignitions originating in those areas will reach identified values (such as communities, infrastructure, and habitat). The CPZ ignition density layer spatially displays percentile classes across the Bitterroot National Forest that, if a fire were to start in those areas, have a certain probability of reaching structures on private land within Ravalli County's valley communities or forest inholdings. The data are broken into 10 classes based on probability percentiles. For example, 61 to 70 percent of the fire starts within the 61–70 percentile class area would reach a private structure if suppression actions are not successful. In short, if a wildfire occurs within a CPZ , the designated percentile represents the probability that a wildfire will impact private property including structures and critical infrastructure. The main area of concern for this project included the 50-100 percentiles.

Insect and Disease Hazard

Forest insects and diseases can dramatically alter forest structure, composition, and age class distribution. The Region I Forest Insect Hazard Rating System developed hazard ratings to aid in identifying stands that are at risk for significant insect activity. Western pine beetle (*Dendroctonus brevicomis*), mountain pine beetle (*Dendroctonus ponderosae*), Douglas-fir beetle (*Dendroctonus pseudotsugae*), and western spruce budworm (*Choristoneura freemani*) are all actively present in the project area. These insects can negatively affect stands dominated by ponderosa pine (*Pinus ponderosa*); Douglas-fir (*Pseudotsuga menziesii*); mixed, shade-tolerant conifers; spruce (*Picea* spp.); and subalpine fir (*Abies lasiocarpa*). The listed insect species above occur across much of the project area. Tree stands dominated by mixed, shade-tolerant conifers; Douglas-fir; and ponderosa pine have moderate to high insect hazard ratings.

Dwarf mistletoe (*Arceuthobium* spp.) also impacts Douglas-fir in the project area. Dwarf mistletoe is a parasitic plant that depends on a living host for water and nutrients. Infected trees form witches' brooms in the tree canopies that divert nutrients to the mistletoe plant and reduce the amount of available nutrients to the rest of the tree. Eventually, this lack of nutrients leads to a slow death starting from the top down. Severe infestations cause tree growth loss and make the tree more vulnerable to attack by other insects or diseases. Additionally, witches' brooms are highly flammable and increase the fire risk and intensity within a stand.

White pine blister rust is a nonnative fungal disease that infects five-needle pines (whitebark pine [*Pinus albicaulis*] in the Bitterroot Front project area). White pine blister rust requires living host tissue, and it requires two hosts, five-needled pines, and shrub or herbaceous alternate hosts, to complete its complex life cycle. Infections occur through needles by spores that come from alternate hosts in late fall during periods of high humidity. The rust fungus grows through branches toward the bole about 2 inches per year, killing tissue as it advances. Once the fungus reaches the bole, it creates stem cankers that eventually girdle the stem and kill or top kill the tree. All sizes of trees are attacked, and small regeneration can be killed rapidly.

Annosus root disease (P type and S type) is common in the Bitterroot National Forest. P type annosus primarily affects ponderosa pine, whereas S type annosus can affect Douglas-fir, grand fir (*Albies grandis*), and subalpine fir. Root disease causes decay in the roots of the infected trees, preventing the uptake of water and nutrients, which increases the susceptibility to bark beetle attack and eventually leads to mortality. The spores infect freshly cut stump surfaces and basal wounds. Once infected, the fungus grows through the root system and can infect neighboring pine through root-to-root contact.

Existing Transportation System

The Bitterroot Front interdisciplinary team (IDT) has conducted a travel analysis and has identified opportunities to modify existing roads based on the following condition:

- Implement road improvements and best management practices to reduce sedimentation effects on watersheds.

Purpose and Need

Over the past decade, the project area has experienced extreme fire behavior with numerous large fires; the most recent fires were the Roaring Lion (2016) and Lolo Peak (2017). The Forest Service conducted a geospatial analysis to predict stand-replacing fire behavior across the project area. Modeling results of the current conditions within the project area show that the forest is at extreme risk of a catastrophic fire. The modeled outputs from the present fuel arrangement conditions do not mimic the natural fire spread type for sustainable ecosystem management in the Bitterroot National Forest. Graphics of the modeling results are in appendix C, figures 1-4 to 1-7. They include:

- Fire regime groups (figure 1-4)
- Vegetation condition class (figure 1-5)
- Existing flame length conditions (figure 1-6)
- Crown fire activity (figure 1-7)

Additional details on these models are available in the Fire and Fuels Specialist Report (PF-FIRE AND FUELS-001).

Climate change affects human health and well-being through more extreme weather events, increased wildfire activity, decreased air quality, and increased disease transmission. Prolonged periods of high temperatures associated with droughts contribute to conditions that lead to larger wildfires and longer fire seasons (United States Global Change Research Program 2023). Increased wildfire activity can lead to the loss of recreational opportunities, homes, and livestock, and cause community-wide evacuations.

The Forest Service recognizes unfavorable fire behavior conditions exist across the project area, as well as the potential impacts on the neighboring communities and first responders. The Forest Service recognizes these conditions exist by, but are not limited to, the following reasons:

- The shift in historical plant community composition and condition class toward fire-intolerant plant species
- Overstocked and overcrowded forest stand conditions
- An increase in insect and pathogen outbreaks
- Climatic warming trends and unseasonably longer summers and dryer winters

The purpose of the Bitterroot Front project is to address the wildfire risk to the nearby communities and promote forest restoration using a wide range of tools, including tree thinning, harvesting, and prescribed burning. Specifically, the Bitterroot Front project aims to:

1. Reduce fire behavior and intensity by reducing the fuel quantity, modifying the arrangement of the fuels, and reducing the current and future wildfire risk to people, private lands, and resource values.
2. Improve forest landscape health and resilience by reducing the risk or extent of, or increasing resilience to, insect and disease infestation.
3. Reduce the risk to first responders and raise the probability of success during direct and indirect engagement on wildfires by treating fuels to modify fire behavior and increasing operational opportunities to protect values.

Public Involvement and Tribal Consultation

Public scoping for the project was completed during project initiation. During the scoping process, the Forest Service consulted with individuals and Federal, State, Tribal, and local agencies. A complete list of these entities can be found in chapter 4 of this EA.

Issues

The following issues were identified based on a review of the public comments received during the scoping process, internal review, and the preparation of the EA.

Fire and Fuels Management

- How would the project better align expected fire behavior after treatment with the historical range of fire behavior for the project area?
- How would the project affect air quality?

Heritage and Cultural Resources

- How would the fuels reduction treatment activities of the proposed action impact heritage and cultural resources, including archaeological and architectural resources?
- How would increasing resiliency to insect and disease infestations and fire affect cultural resources?

Rangeland and Weeds

- How would the alternatives affect rangeland grazing within the current rangeland allotments?
- How would the alternatives influence the present and future distribution of invasive plant and noxious weed populations?

Socioeconomics

- How would the alternatives impact jobs and income?
- How would the alternatives impact ecosystem services?
- Would the alternatives result in disproportionate adverse impacts on environmental justice communities?

Recreation and Designated Areas

- How would the proposed action affect access to recreational sites and change the recreation opportunity spectrum, as outlined by the 1987 Bitterroot National Forest Land and Resource Management Plan (forest plan)?
- How would the proposed action affect wild and scenic river (WSR) eligibility in the project area?
- How would the proposed action affect the wilderness character and inventoried roadless areas (IRAs) in the project area?

Scenery

- How would the proposed action affect visual quality in the project area?

Soils

- How would the proposed action affect soil quality?
- How would the proposed action affect soil organic matter?

Rare Plants

- How would the proposed action affect the abundance and viability of rare plant species in the project area?

Transportation

- How would new roads affect the Bitterroot National Forest?
- How would the Forest Service maintain roads built in the BRF through this project?

Vegetation

- How would altering forest vegetation through treatment affect the resilience of vegetation to disturbances such as insects, disease, wildfires, and climate change?
- How would the proposed action affect the old-growth character and abundance, and the resilience of old-growth stands?

Watershed and Aquatics

- How would the project's activities, including use and management of roads, affect the water quality and quantity?
- How would the project's activities affect aquatic species and aquatic habitat conditions?

Wildlife

- What measures would the Forest Service take to protect wildlife habitat?
- How would the Forest Service mitigate effects on critical species and habitat?

Table 1 summarizes issues and resources not carried forward for analysis during the development of the project.

Table 1. Resources and issues not carried forward for analysis

Resource/Issue	Rationale
Recreation	Recreation improvements were not carried forward from scoping because the project focus narrowed to fuels reduction. The addition of recreation improvements to the project would divert time and resources away from the immediate need of fuels treatments designed to reduce the chance of a stand-replacing wildfire.
NEPA Process	During the scoping process, concerns over the use of an EA versus an EIS were voiced. This project will follow the steps of the NEPA process. It did not qualify for a categorical exclusion, so the Forest Service is now preparing an EA. At the end of that analysis, if an EIS is required, the Forest Service will prepare an EIS consistent with 40 CFR section 1501.9(e)(1).

Additional Resource Concerns

The following issue related to the forest vegetation were expressed during scoping. The Forest Service addressed these issues through the in-depth analysis in the Fire and Fuels and Vegetation specialist reports (PF-FIRE and FUELS-001 and PF-VEGETATION-001).

- Old-growth treatment—Vegetation management treatments would occur within old-growth areas to protect the integrity of the old growth. Old growth is not defined by a single tree, but rather by an entire stand condition. Treatments and activities performed in stands meeting old-growth stature would enhance stand resiliency to insects, disease, and fire events. The stands would not change the overall status of the old-growth area.

What Will Be Decided

This EA discloses the environmental consequences of implementing the no-action alternative and the proposed action. The Forest Supervisor for the Bitterroot National Forest is the deciding official who will review the anticipated consequences to determine whether a significant effect on the quality of the human environment is likely to occur, in accordance with Forest Service Handbook 1909.15, chapter 40, section 43.1. If the Forest Supervisor determines that the selected alternative would have a significant effect on the human environment, an EIS would need to be prepared. If no significant effect is determined, then the proposed action will be implemented based on the following criteria:

- The extent that the proposed action addresses the project's purpose and need
- Consistency with the goals and standards of the forest plan and other relevant legal mandates
- How well the proposed action addresses environmental issues identified through internal and external scoping and whether the project design, design features, and implementation process would minimize those environmental issues

Whether the forest plan should be amended for elk habitat objectives, snags, old growth, and coarse woody debris standards to accomplish the project objectives

Chapter 2

This chapter provides a detailed description of the activities proposed for this EA, including the no-action alternative and the proposed action. The project description is an overview of the categories of actions proposed, along with the environmental conditions they are designed to respond to. It includes the key components required by the NEPA: what is being proposed, where it would be implemented, how much is proposed, and how would it be implemented. Rather than presenting specific treatment units, the Forest Service will identify and describe the environmental conditions in the project area that warrant an action and describe the categories of actions that would be taken ("what"), the process that would be used to identify treatment locations ("where"), the upper limit of acres (or miles) that could be treated ("how much"), and the implementation strategy (along with design features and mitigations) that would be used ("how").

No-Action Alternative

Under the no-action alternative, current management plans would continue to guide activities within the project area. The current unsustainable forest ecosystem conditions would continue. Fires like the Blodgett, Kootenai, Gash, Lolo Peak, Ward, Roaring Lion, Observation, and Blodgett Lake Complex Fires would continue to impact communities, infrastructure, private property, and air quality. No management actions would be taken to influence the direction (or rate) of change for moving existing conditions away from the risk of a stand-replacing wildfire and toward the return of fire as a natural manageable cycle within the forest. A natural fire cycle should be high frequency, low-severity fires that are a result of proper fuel arrangement. This does not currently exist in the Bitterroot Front project area. As such, the risk of intense crown fire behavior and the potential for significant loss to National Forest System lands, the surrounding private lands, and communities would remain high.

Existing timber and stewardship contracts in the project area would continue to be carried out (PF-PROPOSED ACTION-002). Other current programmatic projects taking place in the Bitterroot Front project area would continue under the no-action alternative. Routine maintenance of National Forest System roads (NFSRs) and trails would continue in accordance with the designated maintenance level for each designated route. No new road or trail system routes would be added.

Proposed Action

Proposed Action Overview

The proposed action consists of fuel arrangement activities to address undesirable flame lengths and prescribed fire behavior. The fuel arrangement and conditioning objectives of the proposed action include:

- Reducing fuel loading and arrangement of fuels to protect private property immediately adjacent to the forest boundary and forest ecosystems that are at risk to stand-replacing fire behavior
- Restoring and maintaining ecosystem health by continuing to move the fire regime condition class toward the desired future condition through continued treatments that create disturbance
- Restoring stands devastated by insects, disease, and overstocked conditions to young, vigorous stands of fire-adapted species historically found within the project area
- Improving stand health and individual tree vigor for increased resistance to insects and disease using a variety of treatments, such as thinning, mechanical fuel reduction, and prescribed fire
- Restoring and maintaining fire-adapted species across the landscape

- Utilizing prescribed fire for maintaining these stands into the future, which would result in the reduction of future hazards to the public, critical values, and first responders

In accordance with the condition-based approach, the proposed action describes the existing vegetative conditions in the project area and the range of treatments that would be used to accomplish the project needs based on the fuel conditions at the time of implementation. The exact location of a treatment is not defined.

Geospatial Analysis

The Forest Service completed a geospatial analysis of the Bitterroot Front project area to prioritize communities at risk from large wildland fire growth. The Forest Service completed a geospatial manipulation of stand structure to identify areas for potential treatments that would need to be completed to reduce the risk to these communities. Reducing crown fire behavior could be accomplished by reducing flame lengths, increasing tree spacing among the forest overstory tree species, and decreasing the amount of midstory ladder fuels across the project site.

The Forest Service chose activities by analyzing the on-site tree species, slope percentage, tree diameter, aspect, elevation, previous treatment entries, previous wildland fire scars, and the proximity to NFSRs. The acres proposed for treatments are the estimated acreage totals of treatment needed in the project area based on a geospatial analysis of current conditions. These proposed acres provide the upper limit of treatment in the project area and represent the maximum potential effects analysis area of the proposed action’s environmental impacts described in chapter 3 of this EA.

The Forest Service also identified activities across the project area by conducting a thorough analysis of fire behavior and the fire spread method based on current forest conditions. Many different combinations of activities could be used to achieve desired conditions; these combinations will be based on the application of the implementation plan (appendix B).

This analysis is a common practice by the Federal Emergency Management Agency response teams and incident management teams to large wildland fire incidents. It is done by analyzing current fuel models, canopy closure, canopy base height, canopy bulk density, tree height, and the weather parameters. This analysis has been proven to reliably predict flame length, fire spread potential, fire spread method, and fire intensity. By manipulating the forest stand structure, the Forest Service can successfully manipulate fire behavior over the project area. This allows the managers to identify activities and treatments needed to achieve desired conditions to meet the purpose and need.

Fuels and Vegetation Management

The fuels management proposed action includes modifying the forest structure, vegetation composition, and fuels to improve the landscape’s resilience to disturbance and to reduce the potential for extreme fire behavior in the community protection zones and low-severity fire regimes.

The vegetation management actions propose to lower the forest stocking levels, shift the species composition, and reduce the number of continuous canopies within the project area. A variety of commercial timber harvesting and noncommercial stand improvement vegetation treatments would be used to address management needs specific to the forest type and current conditions within the stand. Listed below are the various silvicultural treatment options and specific vegetation and fuels management activities to move the stand toward the desired conditions outlined in the project’s purpose and need.

The criteria for selecting where treatment activities would occur are described below. The Forest Service excluded certain lands for treatments due to special designation status. These include the Lower Lost

Horse Research Natural Area (RNA), the Upper Lost Horse Canyon RNA, and the Bitterroot Mountain Snow Avalanche RNA.

The proposed action describes the upper limits for each vegetation treatment type. The acres proposed for treatment are the estimated maximum amount of treatment needed in the project area based on the analysis of current conditions. Vegetation treatment types and maximum acres of treatment are shown in table 2 and appendix C, figure 2-1.

Table 2. Summary of proposed action – vegetation treatments

Treatment Type	Proposed Treated Acres
Commercial intermediate harvest and prescribed burning	27,477
Noncommercial stand improvement and prescribed burning	3,163
Noncommercial whitebark pine restoration and prescribed burning	35,575
Prescribed burning only	54,046
Slashing and prescribed burning	18,019
Other treatments: tree planting, meadow restoration, aspen restoration, native vegetation revegetation, biological weed control, mastication, herbicide weed control, hazard tree removal, and chipping	No maximum set
Total treatment area	**138,280**

Treatment types would not be exclusive in any area; they would overlap. For example, to achieve desired stand conditions, one location that is commercially harvested may also be subject to noncommercial and prescribed fire activities at a later date during the project implementation period. The implementation process (appendix B) provides for field verification of the geospatial analysis. Final treatment types for commercial harvest would be determined after stand diagnosis and field review to select the best treatment for site-specific conditions at the time of implementation.

Commercial and Prescribed Fire

Commercial timber harvesting is one management tool to help move the project area toward the desired conditions and to meet the project's purpose and need. Commercial intermediate harvesting would come first followed by a prescribed fire treatment. Depending on the habitat type and stand condition, the Forest Service would look at commercial products on-site and the commercial harvesting methods to open the canopy and reduce the risk of a crown-running wildfire, especially in areas where structures on private lands would likely be impacted. Visual and scenic assessments would also guide what design features are implemented to meet or exceed the visual quality objectives stipulated in the forest plan. Commercial harvesting also improves forest health by removing trees affected by insects or disease and promoting tree species more resilient to these impacts, such as ponderosa pine and western larch (*Larix occidentals*). Intermediate harvests leave enough trees within the stand to qualify as a stocked stand. The following assumptions would guide the commercial harvesting plans.

- As outlined in the forest plan, commercial timber harvesting is an appropriate tool to move the project area toward desired conditions within Management Areas (MAs) 1, 2, 3a, 3c, and 5. Commercial timber harvesting is not appropriate for MAs 6 and 9; therefore, no harvesting would take place in these areas. The Forest Service will also considered accessibility from existing NFSRs and the feasibility of developing new access based on the hillslope and terrain.

- To further refine where commercial harvesting would take place, the Forest Service excluded recent harvest units that meet the desired species composition and stand density and are already at a lower risk from severe wildfire and insect and disease impacts. These include areas treated as a part of the Horselick Timber Sale (Como Forest Health Protection Project EIS), Little Jumper Timber Sale (Westside Project), Larry-Bass Stewardship, Roaring Lion Salvage, and Westside Timber Sale. The Forest Service also excluded all regeneration harvests completed since 1980. During the review of past harvesting, these areas included 54 previously harvested stands. Based on the best available information, noncommercial vegetation management (such as thinning) would be more appropriate in these stands.
- Areas that experienced severe wildfire were also removed from commercial timber harvesting, because they are not viable to harvest commercially.

Noncommercial Stand Improvement and Prescribed Fire

Noncommercial stand improvement in the form of tree thinning is a type of fuels management that is used to reduce the density of trees, improve growth and vigor, reduce insect and disease risk, and maintain desired species composition. After identifying where commercial vegetation management may be an appropriate tool to meet project objectives, the Forest Service would consider where noncommercial vegetation and forest fuels treatments are appropriate to move the project area toward desired conditions. These areas include those that recently experienced wildfire events, MAs or designated areas where commercial harvesting is not allowed, areas of regeneration harvest since 1980, and other inaccessible parts of the project area.

Where forest regeneration exceeds desirable stocking levels or consists of less-than-optimal species composition, thinning of vegetation and forest fuels treatments would reduce wildfire severity by:

- Preventing surface fire behavior transitioning into the canopy
- Reducing accumulated downed woody material that could increase fire intensity
- Promoting tree species that are more resilient to wildfire, insects, and disease impacts

Stand improvement activities could include hand felling of individual trees through stand improvement, mechanical treatments to decrease stand density through mastication or chipping, and prescribed fire activities to reduce fuel loadings. Where stocking levels are below desired levels or not of optimal species composition for the location following recent wildfire activity, site preparation and tree planting would occur to ensure the forested stand meets desired conditions appropriate for that location.

In areas where the canopy cover is greater than 20 percent and trees have less than a 10-inch diameter breast height (DBH), prescribed burning and thinning would be utilized as treatment options. Thinning and slashing reduces the understory vegetation arrangement, effectively reducing ladder fuels and lowering the risk of fire reaching the crowns of the overstory. All thinning treatments would be followed by prescribed fire.

Prescribed Fire Only

Prescribed fire would be the only treatment in recommended wilderness and the primary treatment in areas where the topography limits access, such as steep slopes or canyon walls; areas where no tree life-forms are present; or in the Northern Region Existing Vegetation Database (VMAP) transitional forests. In the remaining areas, prescribed fire would be the primary treatment option if the canopy cover is less than 20 percent. Specifically, any prescribed fire would use existing trails and natural features for control lines. The prescribed fire activities covered under the proposed action include site preparation, low-intensity burns maintenance burns, mixed-severity burns, and pile burning (see appendix A).

Maintenance Fire Regime

As activities and treatments are being conducted across the project area, the intent is to use prescribed fire to maintain desired conditions. Having a maintenance regime to sustain desired conditions would assist future management of the project area. Maintaining canopy gaps in the overstory and appropriate fuel loading levels has proven to create a more fire-resilient landscape; it has also ensured the safety and success of first responders while responding to new wildfires. Utilizing prescribed fire and natural fire regimes to maintain the landscape would promote a resilient and diverse landscape across the project area consistent with historic fire processes. More information regarding the maintenance cycle can be found in the Silviculture (PF-VEGETATION-001) and Fire and Fuels Specialist (PF-FIRE AND FUELS-001) Reports.

Inventoried Roadless Areas (IRAs)

Exceptions for treatment activities within IRAs are defined under the 2001 Roadless Rule and other relevant Federal regulations (USFS 2001). Commercial treatment would be authorized in areas within one-fourth mile of a road or within one-fourth mile of private lands (appendix C, figure 2-2). There would be no new construction of roads or temporary roads constructed within the IRAs. Outside the above perimeters within the IRA, the only other proposed activity is noncommercial treatments with prescribed fire and/or prescribed fire only. Additional details of exceptions for allowable treatments are described in the Recreation Specialist Report in the project file (PF-RECREATION-001).

Recommended Wilderness Areas

Prescribed fire would be the only vegetation treatment activity within the recommended wilderness areas. Prescribed fires would be designed to follow minimum impact strategic tactics. These include utilizing current trail systems and natural features for control lines.

Special Situations and Approaches Common to All Vegetation Treatments across the Project Area

Old Growth

Old-growth stands would be as defined by Green et al. (1992, errata 2011). Green et al. (1992, errata 2011) is the regional direction for assessing and determining old growth. Definitions of old growth are based on habitat types, which are then grouped and used to the stratify site potential. Tree age, DBH, and basal area are all criteria used to determine whether a stand meets the definition of old growth. While individual trees may be old, old growth is not measured on an individual tree basis; rather, it is measured on the qualities of the stand as a whole.

Each area proposed for treatment would have a stand diagnosis completed as part of the implementation process. As part of this stand diagnosis, the criteria for old growth (habitat type, tree ages, DBH, and basal of the large trees) would be collected. The objective for treatments would be to carry these old-growth stands into the future as old growth.

No treatments would remove any stand from old-growth status. However, commercial and noncommercial treatments would be proposed within old-growth stands to increase the stands' resiliency to insects, disease, fire, and drought. Treatments would remove the smaller, intermediate competing crown classes and ladder fuels created by the ingrowth of other species. Once treatments create conditions to safely allow fire, low-intensity prescribed fire would be used to maintain the open crown conditions that historically aided in the development of these old-growth stands.

White Bark Pine

On December 15, 2022, the U.S. Fish and Wildlife Service (USFWS) listed whitebark pine (Pinus albicaulis) as threatened under the Endangered Species Act (ESA; USFWS 2022). This listing rule went into effect on January 17, 2023. The USFWS identified four threats in the listing decision: white pine blister rust, mountain pine beetle, altered fire regimes, and climate change. White pine blister rust was identified as the main driver of the species' current and future conditions. Mountain pine beetle, altered fire regimes, and the accelerating effect of climate change represent a compounding negative effect for the species. The USFWS determined it is not prudent to designate critical habitat for whitebark pine because neither habitat loss nor range restriction is a threat to this species' continued survival.

The listing includes a final "4(d) Rule" authorized under section 4 of the ESA, which allows the USFWS to tailor the protections and invoke prohibitions pertinent to the specific conservation needs of a threatened species. Note that these prohibitions apply equally to live or dead plants, their progeny, and parts or products derived from them. Under the 4(d) Rule, the following prohibitions are enacted for whitebark pine:

- Removing, cutting, digging up, damaging, or destroying whitebark pine are prohibited on Federal lands. This includes malicious damage or destruction of the species on any area under Federal jurisdiction.
- Import, export, transport, or sale and activities related to interstate or foreign commerce are prohibited.

However, the final 4(d) Rule included exceptions that are intended to allow Federal land management agencies to continue some management of the forest ecosystems where whitebark pine occurs and to continue conducting restoration and research activities that benefit the species. The exception covers silviculture practices and forest management activities that reduce high-severity wildfires, insect, and disease impacts; manage vegetation in existing utility rights-of-way; manage wildlife habitat; and improve overall forest health. These actions include, but are not limited to, cone collections, planting seedlings, sowing seeds, mechanical cuttings as a restoration tool in stands experiencing advancing succession, full or partial suppression of wildfire in whitebark pine communities, allowing wildfires to burn, and surveying and monitoring of tree health status.

Implementation Process

To mitigate natural resource impacts, the IDT has identified design features to follow for project implementation. A key part of the implementation process is design features that define a limited and focused array of activities without regard to specific locations. These activities are designed to help meet the project's purpose and need and ensure all aspects of the project are implemented within the scope of the effects analyzed in this EA. The activity cards contain information about what each activity accomplishes, how it is implemented, what constraints and resource-specific guidelines apply, and when it would be implemented. The IDT produced activity cards that correlate to fuels, vegetation, and transportation management that define each activity that will be allowed to take place (appendix A).

The activity cards define all operational implementation options the Forest Service may use throughout the project to best meet the purpose and need. Having identified operational activities would allow for market flexibility for faster implementation, the ability to adapt to changing conditions, and the ability to meet the needs of the communities within the Bitterroot Valley. The Bitterroot Front project design features process is discussed in detail in the “Design Features” section of this EA and is accessible in appendix A.

The treatments shown in table 2 would be implemented in phases for each priority area (appendix C, figure 1-3). The location in which treatments occur would be determined based on conditions at the time of implementation. Total treatments would not exceed the proposed upper acreage limit for each treatment type (table 2).

The implementation process identified in appendix B is an essential component of this project for accountability, tracking, decision-making, and documentation purposes. Under the condition-based approach, specific locations and types of treatments would be identified or refined during implementation based on local conditions. The implementation process and associated checklists in appendix B describe how the Forest Service would determine detailed treatment prescriptions prior to implementation of the proposed action by field reviewing existing conditions and identifying any resource concerns.

Implementation of the proposed action would occur over four phases (table 3 to 6). Use of the process and checklists in appendix B for vegetation management and road construction would occur during each phase for every opportunity area within each phase of the larger project area. For proposed road storage and decommissioning, the implementation process could be completed once for the entire project area rather than by implementation area.

In each phase, all acres identified in table 3 to 6 would be treated with prescribed fire to meet the project’s purpose and need. The timeline for implementation of each phase may be determined by staffing levels, contractor availability, and budgets. Additionally, as each priority area is field verified, operations can commence if no mechanical activity has been identified within the priority area. Priority areas meeting this condition would be available for prescribed fire operations beginning as early as 2024.

Information about proposed activities, including maps, treatment unit tables, and the activities’ relationship to the Bitterroot Front project’s overall treatment thresholds, would be available on the Bitterroot National Forest website. The responsible official would finalize proposed activities only after field review of existing conditions. The responsible official would retain the authority to make final decisions about the location, extent, and types of activities planned and completed under the Bitterroot Front project.

The implementation process includes a project-level monitoring protocol, which complements the forestwide monitoring program (USFS 2016). The monitoring protocol details resource-specific monitoring items that would occur after implementation activities to ensure design features and mitigations are achieving the intended results. This would help complement the design of subsequent treatments in the project area and help inform the design of future projects in the Bitterroot National Forest. The monitoring protocol would be a required component of the implementation process. During implementation, summarized monitoring results would be stored in the project record.

Table 3. Phase 1 2024 proposed implementation – maximum acres of treatment by priority area

Priority Area	Commercial Intermediate Harvest and Prescribed Burning (Acres)	Noncommercial Stand Improvement and Prescribed Burning (Acres)	Noncommercial Whitebark Pine Restoration and Prescribed Burning (Acres)	Prescribed Burning Only (Acres)	Slashing and Prescribed Burning (Acres)	Total Treatment Acres*
Bear Creek	610	50	3	139	150	952
Brooks	614	—	—	1	1,700	2,315
Canyon Creek	—	—	—	3	100	103
Como East	2,199	640	—	4,055	1,940	8,834
Fred Burr	72	—	—	8	—	80
Gash	830	70	395	611	1,050	2,956
Lost Horse	877	40	—	234	160	1,311
McCalla Sharrott	2,849	200	595	967	230	4,841
Smith	923	90	771	778	580	3,142
Tamarack	249	—	—	—	70	319
Trapper Bunkhouse Spoon McCoy	9,594	190	149	1,714	3,360	15,007
Phase 1 Total Treatment Acres	18,817	1,280	1,913	8,512	9,340	39,862

* The total does not include the additional treatments shown in table 2, including tree planting, meadow restoration, aspen restoration, native vegetation revegetation, biological weed control, mastication, herbicide weed control, hazard tree removal, and chipping.

Table 4. Phase 2 2025 proposed implementation – maximum acres of treatment by priority area

Priority Area	Commercial Intermediate Harvest and Prescribed Burning (Acres)	Noncommercial Stand Improvement and Prescribed Burning (Acres)	Noncommercial Whitebark Pine Restoration and Prescribed Burning (Acres)	Prescribed Burning Only (Acres)	Slashing and Prescribed Burning (Acres)	Total Treatment Acres*
Big Creek	1	—	10	685	283	**979**
Como	35	—	659	1,183	183	**2,060**
Cow Creek	219	911	395	103	180	**1,809**
Roaring Lion-Camas-Hayes	4,190	281	—	—	1,441	**5,912**
Sweeney	3,622	694	3	104	2,304	**6,727**
Phase 2 Total Treatment Acres	**8,067**	**1,887**	**1,067**	**2,075**	**4,391**	**17,487**

* The total does not include the additional treatments shown in table 2, including tree planting, meadow restoration, aspen restoration, native vegetation revegetation, biological weed control, mastication, herbicide weed control, hazard tree removal, and chipping.

Table 5. Phase 3 2026 proposed implementation – maximum acres of treatment by priority area

Priority Area	Commercial Intermediate Harvest and Prescribed Burning (Acres)	Noncommercial Stand Improvement and Prescribed Burning (Acres)	Noncommercial Whitebark Pine Restoration and Prescribed Burning (Acres)	Prescribed Burning Only (Acres)	Slashing and Prescribed Burning (Acres)	Total Treatment Acres*
Blodgett Creek	30	—	—	—	—	**30**
Lolo-Carlton	90	—	—	—	710	**800**
Phase 3 Total Treatment Acres	**120**	**0**	**0**	**0**	**710**	**830**

* The total does not include additional treatments shown in table 2, including tree planting, meadow restoration, aspen restoration, native vegetation revegetation, biological weed control, mastication, herbicide weed control, hazard tree removal, and chipping.

Table 6. Phase 4 2027 proposed implementation – maximum acres of treatment by priority area

Priority Area	Commercial Intermediate Harvest and Prescribed Burning (Acres)	Noncommercial Stand Improvement and Prescribed Burning (Acres)	Noncommercial Whitebark Pine Restoration and Prescribed Burning (Acres)	Prescribed Burning Only (Acres)	Slashing and Prescribed Burning (Acres)	Total Treatment Acres*
Bass Creek	18	—	23	1,531	1	1,573
Bear Creek	—	—	2	1,719	25	1,746
Big Creek	—	—	—	—	1,911	1,911
Blodgett Creek	—	—	—	9,490	—	9,490
Canyon Creek	—	—	1,440	1,703	404	3,548
Carlton	—	—	574	4	—	578
Como	—	—	677	1,942	—	2,620
Fred Burr	232	2	558	4,453	480	5,725
Kootenai	—	—	19	2,186	1	2,206
Lolo-Carlton	193	—	2,196	970	47	3,406
Lost Horse	—	—	8,002	6,262	99	14,362
McCalla Sharrott	—	—	1,802	222	—	2,024
Mill Creek	—	—	—	1,316	—	1,316
North Lost Horse Creek	—	—	6,898	1,681	—	8,579
Roaring Lion-Camas-Hayes	2	—	5,204	1,724	511	7,441
Sawtooth Creek	—	—	280	1,201	43	**1,524**
Smith	1	—	423	493	8	**925**
South Lost Horse Creek	—	—	487	1,091	1	**1,580**
Sweeney	2	—	1,283	827	—	**2,112**
Tamarack	—	—	—	1,187	—	**1,187**
Tin Cup Creek	6	—	105	663	38	**812**
Trapper Bunkhouse Spoon McCoy	22	—	932	776	1	**1,731**
Trapper Chaffin	—	—	1,688	2,016	—	**3,704**
Phase 4 Total Treatment Acres	**476**	**2**	**32,595**	**43,457**	**3,571**	**80,101**

* The total does not include the additional treatments shown in table 2, including tree planting, meadow restoration, aspen restoration, native vegetation revegetation, biological weed control, mastication, herbicide weed control, hazard tree removal, and chipping.

Transportation Management

Roads

The Forest Service proposes to implement a suitable transportation system for long-term land management that is responsive to public interests and reduces adverse environmental effects. This portion of the proposed action is informed by a risk/benefit assessment conducted by the project IDT, which analyzed the risk and benefit across a range of resource areas for all road segments within the project area's existing and proposed road and trail network (PF-ROAD-002).

Implementation of the proposed action would require road construction. Transportation management, including road construction, under the proposed action would use the following guidelines:

- There would be no net gain of system roads (table 7); any new road would be as nonintrusive as possible (that is, limited to lower elevations) and mainly for the purpose of rerouting to improve riparian conditions.
- Use of temporary roads would be limited to only where it is absolutely necessary.
- A preference would be on longer forwarding/skidding distances as opposed to the creation of new roads.
- Effects on wildlife, especially grizzly bears (*Ursus arctos horribilis*), would be considered for all transportation management actions.

Table 7. Proposed action transportation changes

Transportation Changes	Miles
New roads	
New construction NFSRs	+1.98
New temporary roads (maximum)	+27.00
Total	**28.98**
Administrative changes (no changes in public access)	
Undetermined roads added as NFSRs	+8.54
Decommission NFSRs	-10.08
Total	**-1.54**
Roads maintained as National Forest System trails	
Decommission NFSRs; maintain as National Forest System trail	-0.62
Undetermined road; maintain as National Forest System trail	-0.70
Total	**-1.32**
Road prisms removed from landscape (no changes in public access)	
Undetermined road; obliterate after use	-2.28
Undetermined road; obliterate	-49.32
Total	**-51.60**
Sum of proposed action transportation changes	
Net change	**-25.48**

The Forest Service determined the potential road construction (specified and temporary) needs by evaluating the existing transportation network, topography, and timber stand data. Proposed transportation system changes are shown in table 7 and table 8, and major system changes are shown in appendix C, figure 2-3. Distances were determined by spatial data in a geographic information system (GIS); detailed information on the proposed transportation management changes is in appendix E.

Table 8. Maintain status

Transportation Changes	Miles
Private road; maintain status	12.93
Maintain current status as NFSRs	341.84
Store NFSRs	7.21
Store NFSRs after use	11.55
Total	373.53

Road Construction

Specified Road Construction

Specified road construction is used when future access to a stand is needed, whereas temporary roads only offer access in the near term and are decommissioned following project completion. A total of 1.98 miles of specified roads would be needed to implement proposed timber harvest activities.

New road construction in Chaffin Creek (appendix C, figure 2-4) and McCoy Creek (appendix C, figure 2-5) would benefit water resources by eliminating timber haul on adjacent streamside sections of road. In addition, the new construction of a NFSR in Chaffin Creek also would provide access to timber stands currently accessed from NFSRs 13226, 74972, 74973, and 74982. The planned work in the stands accessed by NFSR 13226 was not accomplished in the Trapper Bunkhouse area because of an insufficient corner at the intersection with NFSR 374. The new construction would extend road 74982 for approximately 0.67 miles and intersect NFSR 62886, allowing timber haul to go down NFSR 374 in Little Trapper Creek. New construction in McCoy Creek would provide alternative access to areas currently accessed by NFSR 62892. This new route would eliminate timber haul on roads adjacent to McCoy Creek and one of McCoy Creek's tributaries. With this new road construction, more fuels reduction acres would be addressed, and timber haul would not go down NFSR 374 in the South Fork of Chaffin Creek.

Newly constructed roads and undetermined roads added to the National Forest System of roads would be stored after use as a maintenance level (ML) 1 road and not be available for public motorized travel. See the Wildlife and Fisheries sections in chapter 3 for further discussion regarding the impacts of new road construction.

Temporary Road Construction

Temporary roads would be used to facilitate log removal from stands treated through commercial harvest. A maximum of 27 miles of temporary roads would be needed to implement proposed timber harvest activities. This maximum was determined based on GIS data, current road system locations, and field reconnaissance. Some temporary roads miles would be located on an existing prism (existing routes not managed as part of the National Forest transportation system).

If changing conditions preclude timber harvest on some acres within the project area, then the temporary roads associated with accessing those acres would not be constructed. Construction also would not occur when resource concerns are identified with the road location and mitigations, or when route adjustments cannot alleviate those concerns. While specific locations of temporary roads could be adjusted based on further ground-truthing, the miles of temporary roads constructed for the project would not exceed the maximum identified. These miles of temporary roads would not be constructed at the same time and would be in use during different times based on the timber sales implementation phases, as discussed in the vegetation management section of the proposed action.

Temporary roads for one harvest area could be in use for up to 5 years. The duration of temporary roads on the landscape would depend on the duration of the timber sale contract of which the roads are a part.

Historically, temporary roads in the Bitterroot National Forest are typically present on the landscape for less than 2 years. Motorized public use is prohibited on temporary roads; only administrative motorized use occurs as needed to implement management activities. These roads would be obliterated and/or decommissioned and revegetated upon completion of management activities in a timber sale area.

Areas Where Road Construction (Specified or Temporary) Would Not Occur

Based on resource concerns, road construction would not take place in the following portions of the project area:

- No new stream crossings (as part of specified or temporary roads) on fish-bearing streams would be constructed.
- No specified roads would be constructed within riparian habitat conservation areas.
- No temporary roads would be constructed within riparian habitat conservation areas.
- Existing road prisms (undetermined road) could be used as temporary roads in riparian habitat.
- No new roads would be constructed in recommended wilderness or IRAs.

Existing Road Network Management

Undetermined Roads

Undetermined roads are existing road prisms on the landscape that have not been inventoried, or they were erroneously coded as decommissioned due to a change in databases. The condition of these roads varies depending on their location on the landscape and the last management entry. Some are completely grown in, while others can be accessible with minimal work. Additional details on the undetermined roads are available in the Transportation project file (PF-TRANSPORTATION-002).

Road Storage

Road storage is planned on 18.76 miles of NFSRs; 11.55 miles would be needed for project implementation and would be stored after use. Storge treatments would mitigate the impacts of roads on affected resources. These roads would be available for future use and remain on the National Forest System of roads in a ML 1 status; they would receive basic custodial care and be closed year-round to motorized use. These roads currently are closed year-round to motor vehicles.

Maintain Status

The implementation of the proposed action would categorize approximately 355 miles of roads as "maintain status." This designation means that no system changes would occur, and access would remain the same as under the no-action alternative.

Road Decommissioning

The proposed action would include decommissioning 10.08 miles of roads from the National Forest System. Decommissioning of roads (see appendix A, TRM-04) is the administrative removal of roads from the National Forest System. Roads are decommissioned when they are not needed for current or future management needs and their location or condition is resulting in resource impacts. The road surface and prism may be physically blocked, de-compacted, and/or recontoured depending on the current road condition. Oftentimes, roads proposed for decommissioning have not been used in years and have already revegetated to a condition where they are not producing sediment runoff and are functionally closed to motorized use. In these cases, no physical treatment may be needed. Of the 10.08 miles of road, 0.62 would remain as National Forest System trails with no change in the current travel status.

Obliteration

The proposed action would include obliteration of 51.60 miles of roads that are not open to the public. Obliteration is a treatment method that completely eliminates the roadbed by restoring natural contours and slopes.

Design Features

The design features are a critical component of the implementation process for the Bitterroot Front project. The Forest Service would apply the design features identified in appendix A to all implemented activities to ensure any subsequent effects are within the magnitude and intensity analyzed in this EA. The design features describe all activities potentially considered within the project area. Information about each activity includes what the activity usually accomplishes, how it is typically implemented, what constraints and resource-specific guidelines apply, and when it would be implemented. Resource concerns are often mitigated by design features, as well as adherence to forest plan direction, best management practices, and all other applicable laws and regulations.

The design features are part of the proposed action. Each set of design features is specific to an activity type that was included in this EA. The activity types are the tools that could be used to manage the project area over the next 20 years based on what is known from existing data or conditions. This broad list of activity types includes those that have been suggested in public comments and additional ones necessary to meet forest plan objectives or that are otherwise desirable. They are meant to be integrated with one another and to coordinate management opportunities across the landscape.

The design features would be used throughout the implementation process to ensure all aspects of the project are implemented within the scope of effects analyzed in this EA. As described in the implementation process in appendix B, resource specialists would review or survey field locations prior to implementation to ensure any planned activity would be implemented in accordance with the design features.

Condition-based Planning Approach

This proposed action is designed to improve the landscape’s resilience to disturbances such as insects, disease, fire, and drought through a combination of vegetation and fuel reduction treatments. Because the project area has been subject to a century of fire suppression and decades of past management actions, in many cases it is not possible to achieve site-specific desired conditions in a location with just one entry into the stand. Additionally, during the time in which the series of management activities necessary to achieve the project’s purpose and need would occur, the conditions in the project area could change because of disturbances such as insects, disease, and wildfire. As a result, this project would use a condition-based implementation approach that is responsive to changing conditions and allows the necessary management flexibility to achieve desired conditions. The condition-based approach considers the landscape as a whole, both spatially and temporally, to address management needs more holistically and in a timelier manner than a series of individual projects would allow.

Condition-based management is a system of management practices that relies on specific design features to create desired outcomes on the ground. The proposed action describes a suite of activities available to manage the project area over a period of approximately 20 years. The types of treatments described in the proposed action are linked to a set of conditions on the landscape via the design features. The Forest Service designed the proposed action based on coarse-scale data sets and prior fieldwork that showed the range of likely conditions on the ground. The timing and location of treatments would depend on identification of specific conditions using fieldwork during implementation of the project. In this way, the condition-based approach would facilitate a resilient landscape via successive treatments that are responsive to changes in conditions as disturbances and stressors occur.

Forest Plan Amendments

The Bitterroot Front project would require a project-specific amendment to the 1987 forest plan. Project-specific amendments arise from a need to take specific action to meet a forest plan goal or desired condition in such a way that would be inconsistent with plan standards. The plan is amended simultaneously with the approval of the project or activity so that the project or activity is consistent with the plan, as amended, and the amendment only applies to that project or activity (36 CFR section 219.15(c)).

The Forest Service is required to identify which substantive requirements of the 2012 Planning Rule[1] are likely to be directly related to the amendment. Scoping notifications acknowledged that a project-specific amendment is needed for the following standards:

- Winter range thermal cover
- Elk habitat effectiveness
- Old growth
- Snags
- Coarse woody debris

Further details and a discussion of the proposed forest plan amendments are in appendix D of this EA. The amendments were designed to support the project's needs and the project area ecosystem.

Alternatives Considered but Not Analyzed in Detail

Comments received in response to the proposed action provided suggestions for alternative methods for achieving this plan amendment's purpose and need. In general, these were management suggestions that could be considered as elements of a full alternative. Suggestions were either integrated into the proposed action, would be analyzed as part of the no-action alternative, or are listed below with the reasons for not pursuing a detailed analysis.

[1] 36 CFR Part 219 National Forest System Land Management Planning - 2012 Planning Rule

Vegetation Management

Treating Fuels Only within One-fourth Mile of the Private Land/Forest Service Boundary

Treating fuels only within one-fourth mile of the private land/Forest Service boundary was dismissed because this approach would not provide a sufficient amount of fuels reduction to support the project's purpose and need.

Completing Treatments Only in Upper Elevations

Treatments focused only in upper elevations versus mid- to lower elevations was dismissed because treatments in mid- to lower elevations have been historically more productive than upper-elevation treatments, based on historical modeling.

Transportation Management

No New Road Construction

Several commenters expressed concerns related to various resources stemming from the construction of new roads. There was a request for the Forest Service to consider an alternative that would not construct any new roads (permanent or temporary) for the project.

The use of the existing road network alone would not provide enough access for commercial harvest operations to be able to meet this project's purpose and need. Some construction of specified and temporary roads would be needed to access stands that need treating. Roads are necessary for commercial harvest because alternative logging systems, such as helicopter yarding, would make the timber sales economically infeasible and inconsistent with the forest plan. Forestwide standard 1(g)(1) requires that "all timber sales will be designed, as well as possible, to be affordable to purchasers under average market conditions at the time of sale" (USFS 1987, p. II-21). Because commercial treatments are a necessary tool to address forest health and fuels conditions within the project area, an alternative that precluded all road construction would not meet this project's purpose and need. For those reasons, the IDT did not analyze a no-new-road-construction alternative in further detail.

The IDT does, however, recognize that new and existing roads have effects on resources. The team used the transportation analysis process to recommend road decommissioning where resource impacts outweigh the management benefits. Where roads would not be needed in the near term but may be needed for long-term resource management, the team proposed road storage or decommissioning. Specialists identified areas where best management practices and road surface upgrades would be needed to address resource concerns (for example, sediment runoff). Additional project design features were developed to address the potential spread of invasive plants along haul routes.

Chapter 3 – Environmental Impacts of the No-Action Alternative and Proposed Action

This chapter presents information about the effects of implementing the no-action alternative and proposed action described in chapter 2 of this EA. More in-depth information on the analysis methodology, existing conditions of the project area, and legal framework is provided in the specialist reports that are found in the project file. The information presented below for individual resource areas is meant to provide a summary of the effects of the no-action alternative and the proposed action. *The information provided in this chapter is not meant to represent the full assessment of resource areas in relation to the no-action alternative and proposed action without consideration of supporting documentation presented in the appendixes of this EA and the supporting documents provided in the project file.*

In the context of the proposed action's condition-based approach, the effects analyses assumed that all treatments would be implemented to the thresholds described for the proposed action. The implementation period would be 5 to 20 years. The effects disclosed have considered the effectiveness of the design features (appendix A) and the steps of the implementation process (appendix B). Each resource area discloses the direct, indirect, and cumulative effects for that resource area. Direct effects are caused by the action and occur at the same time and place (that is, immediately). Indirect effects are caused by the action but occur later in time or farther removed in distance, but they are still reasonably foreseeable. Cumulative effects are those that result from the incremental impacts of the action when added to other past, present, and reasonably foreseeable actions.

Past, Present, and Reasonably Foreseeable Future Actions

The IDT identified past, present, and reasonably foreseeable future actions that could have cumulative impacts with the proposed action. Each resource area considered different combinations of these actions, depending on the cumulative effects boundary for the resource area and the resource affected.

Only those past, present, and reasonably foreseeable actions that overlap the geographic analysis area boundary for each particular resource area are considered; those other actions are considered only if they are expected to have overlapping effects in time and space with potential effects from the Bitterroot Front project. Some past actions may still be having effects on one resource, but not another.

The cumulative effects analysis does not attempt to quantify the effects of past human actions by adding up all prior activities and influences on an action-by-action basis. Current conditions have been impacted by innumerable actions over the last century (and beyond), and trying to isolate the individual actions that continue to have residual impacts would be nearly impossible. Rather, the interdisciplinary team has focused on the current aggregate or remaining residual effects of past actions and has incorporated the effects of these actions in descriptions of existing conditions for each resource. Each resource specialist described the existing conditions for their resource and identified specific present and future foreseeable actions relevant to their resource. By looking at current conditions, the analysis is sure to capture all the residual effects of past human actions and natural events, regardless of which particular action or event contributed those effects. This approach complies with the Council on Environmental Quality (CEQ) 2005 memorandum stating, "Agencies can conduct an adequate cumulative effects analysis by focusing on the current aggregate effects of past actions without delving into the historical details of individual past actions."

Fire and Fuels

Introduction

The Bitterroot Front project is designed to better align expected fire behavior after treatment with the historical range of fire behavior for the project area. Current forest fuel conditions contribute to uncharacteristic fire behavior. Within the project area, fuel loading in all layers (surface, ladder, and crown fuels) contributes to sustained crown fire behavior. Existing fuel loading and fuel arrangement conditions do not mimic historical fire behavior.

The criteria used to evaluate and describe existing conditions in the context of historical fire frequency and fire severity and to summarize how departed the existing conditions are from historical conditions include:

- Fire regimes
- Fire regime condition class
- Vegetation departure index (Vdep)

These products are sourced from the LANDFIRE[2] program. Additional metrics used to characterize current conditions include fire history and fire behavior. The fire history within the project area provides an overview of acres burned and structures lost. Fire behavior analyses are used to describe the predicted fire type and flame lengths and evaluate the effectiveness of proposed treatments to meet the project's purpose and need.

An additional in-depth analysis is available in the Fire and Fuels Specialist Report (PF-FIRE AND FUELS-001).

Analysis Methodology

The analysis focused on the following issues:

- Issue 1: How would the project better align expected fire behavior after treatment with the historical range of fire behavior for the project area?
- Issue 2: How would the project affect air quality?

Analysis Indicators

Fire Terminology

Fire behavior includes many elements important to describing wildland fire, including flame lengths, fire line intensity, rate of spread, fire type, and fire effects, including fire severity. Flame lengths refer to the distance between the tip of the flame and the midpoint of the flame depth at the base of the flame (generally the ground surface); flame lengths serve as an indicator of fire intensity (Rothermel 1983). Surface fire or nonlethal fire refers to a fire confined to surface fuels with minimal overstory mortality, edge, and patch size (Agee 1998; Arno et al. 2000).

Mixed-severity regimes are essentially a combination of fire intensities ranging from low-intensity surface fire, group torching, and some amount of stand-replacing fire that creates patches of intermediate size and an abundant amount of edge (Agee 1998; Arno et al. 2000). A crown fire or stand-replacing fire

[2] The LANDFIRE Program provides 25+ national geo-spatial layers (e.g., vegetation, fuel, disturbance, etc.), databases, and ecological models that are available to the public for the U.S. and insular areas.

is a moderate- to high-intensity fire with nearly complete overstory mortality creating large patch sizes with an intermediate amount of edge (Agee 1998; Arno et al. 2000). Active crown fire often requires surface fuels that burn above a critical intensity and flame length, moderate to high canopy bulk density with continuous crown fuels, and average to below average foliar moisture content (Van Wagner 1977).

Fire Regime Groups

A fire return interval is defined as the average number of years between fires based on the historical fire regime. By analyzing vegetative ecosystems, the scientific community has been able to conclude how frequently vegetation types historically burned and the expected fire severity. LANDFIRE defines a low-severity fire as less than 25 percent average top kill, mixed severity as 25 to 75 percent average top kill, and replacement as average top kill greater than 75 percent (LANDFIRE 2014).

Fire Regime Condition Class

Fire regime condition class is a qualitative measure describing the degree of departure from historical fire regimes, possibly resulting in alterations of key ecosystem components such as species composition, structural stage, stand age, canopy closure, and fuel loadings. Departure can be caused by any number of sources, such as introduced exotic species, introduced insects or disease, interruption in the fire return interval, and management activities. Depending on the forest type, the fire regime condition class can be an indicator for fuel reduction needs and can help prioritize treatments to improve the overall landscape condition class.

Vegetation Departure

The VDep indicates a simple categorical layer of current vegetation on the landscape versus what estimated historical conditions would have been if ecological disturbances stayed consistent. The VDep is based on changes to species composition, structural stage, and canopy closure and is reported at a scale ranging from 0 to 100 (LANDFIRE 2022).

Spatial and Temporal Context for the Effects Analysis

Spatial Bounds: The direct, indirect, and cumulative effects analyses are focused entirely within the project area boundary and surrounding areas.

Temporal Bounds: In response to wildfires in the West, the Forest Service has released a 10-year strategy. The Forest Service is now developing a comprehensive implementation plan for working with partners across jurisdictions to reduce the wildfire risk to people, communities, and natural resources while sustaining and restoring healthy, resilient, fire-adapted forests.

Existing Conditions

Due to fire suppression over the past 100 years, the Bitterroot Front project area in some cases has missed two to four fire intervals of low- to mixed-severity fires, which is especially prevalent in the low-elevation, warm-dry forest types. These vegetation types historically experienced frequent, low- to mixed-severity fires. Since the introduction of fire suppression over the past 100 years, the warm-dry types have missed several fire cycles. This lack of fire has increased the density of small-diameter Douglas-fir and mixed-conifer species. The conifer regeneration and tall shrubs are considered ladder fuels, capable of transitioning a surface fire into the canopy. In addition to increased stand density, there is also an increased accumulation of downed woody debris in many areas due to past fire suppression. Increased ladder fuels, increased density of trees per acre, and the accumulation of down woody debris has limited the reintroduction of planned ignition opportunities (Graham at al. 2004).

The increased global warming trend (Westerling et al. 2006), elevated fuel levels, and fire behavior characteristics have in many cases exceeded responder capabilities to respond to wildfires in recent years, often not allowing for direct attack without the support of aviation resources. The potential for large fire growth has increased since the early 2000s despite Federal Government efforts in providing better equipment and more resources. Many wildfires in the Bitterroot National Forest have had significant impacts on the public, including evacuations, reduced air quality, and fires crossing multiple ownerships. For instance, eight structures were lost in the Blodgett Trailhead Fire, 65 structures were lost during the Roaring Lion Fire, and 10 structures were lost during the Lolo Peak Fire (NRCC 2023).

Environmental Consequences of No Action

Issue 1: How would the project better align expected fire behavior after treatment with the historical range of fire behavior for the project area?

Direct and Indirect Effects

Taking no action would not actively change any of the fuel conditions that contribute to the flame length or fire type; therefore, there would be no direct effects in regard to existing fuels or fire behavior. Fire behavior within the project area would be expected to remain similar to the existing condition, assuming no further disturbances occur. With no modification of fuel loading and forest structure, fire behavior under normal summer conditions would persist as described under the existing condition; it would threaten resources within and adjacent to the project area.

Observed and predicted fire behavior, high loadings of surface fuels, and hazard trees that create unsafe working conditions would continue to limit fire management options and directly affect the probability of success in suppressing fires during initial attack. Wildfires that escape initial attack would likely become large and have the potential to damage or destroy the highly valued resources and assets in the Bitterroot National Forest and adjacent private land. Given the current conditions within the project area, some untreated areas would be expected to suffer high-intensity, stand-replacing fires that would consume a considerable portion of duff and litter due to the current density, stand structure, and stand composition (Agee and Skinner 2005; Graham et al. 2004).

Issue 2: How would the project affect air quality?

Direct and Indirect Effects

Taking no action would have no immediate effects on air quality within the airshed unless a wildfire were to occur. If a fire were to escape initial suppression operations, smoke emissions would directly impact the airshed for several weeks or months. If a fire were to occur, smoke would directly impact the project area and the surrounding areas. Under the no-action alternative, more intense and severe fires would be expected, resulting in increased volumes of smoke in the project area and surrounding areas.

Cumulative Effects

Available fuels management options are currently limited in the project area. The accumulation of fine fuels (dead fuel less than 1 inch in diameter on the ground) contributes to high fire intensities. In addition, fire management options are currently limited due to the potential for extreme fire behavior characteristics (high flame lengths, fast rates of spread, long spotting distance, or crown fire.); these characteristics force firefighters to disengage. The current structure, species composition, fuel loadings, and planned fuels reduction activities are not sufficient enough to prevent the potential of a stand-replacing wildfire within the BRF and adjacent land if no action is taken. Reducing the potential of a stand-replacing wildfire directly correlates to the reduction in detrimental air quality.

Environmental Consequences of the Proposed Action

Issue 1: How would the project better align expected fire behavior after treatment with the historical range of fire behavior for the project area?

Direct and Indirect Effects

The Forest Service has not designed the proposed treatments to stop fire but to alter fire behavior in treated areas, thereby reducing the future effects of a potential wildfire (Omi and Martinson 2004; Reinhardt et al. 2008; Stratton 2004). The use of the fuels reduction treatments outlined in chapter 2 of this EA would reduce the likelihood of a catastrophic wildfire similar to incidents like the Lolo and Roaring Lion Fires. The proposed action would reduce the potential of a surface fire spreading to a crown fire. Reducing the potential for crown fire would better align with expected low to mixed severity in warm, dry forest types (Prichard et al. 2020; Stephens et al. 2012).

Issue 2: How would the project affect air quality?

Pile burning and broadcast burning treatments create smoke impacts on the neighboring communities. The Montana Department of Environmental Quality (MDEQ) is an adviser to the Idaho/Montana Airshed Group (which consists of the State and Federal resource management agencies and private companies with a history of prescribed fire use) to regulate smoke emissions through a burn-approval process and monitoring program. MDEQ retains the authority to recommend go/no-go decisions for burning throughout the year. The system in place for the Montana/Idaho airshed is designed to allow managers to seek out the best dispersion and ventilation days to conduct prescribe fire operations to reduce smoke impacts on neighboring communities and sensitive areas. Collaborating with MDEQ allows prescribed fire managers to perform fire operations under desirable conditions and therefore not have significant smoke impacts on neighboring communities. Air quality impacts from prescribed fire operations would likely be less and short lived compared with large wildfire impacts.

Cumulative Effects

The proposed action would complement other proposed Forest Service fuels reduction treatments within and adjacent to the project area. The proposed action and the already approved projects (PF-PROPOSED ACTION-002) would collectively break up fuel continuity, reduce ladder fuels, restore fire as a natural ecosystem, and reduce the potential of a stand-replacing fire in the BNF and the immediately surrounding areas.

Collectively, past and ongoing projects and historic wildfires in conjunction with the proposed action would reduce surface, ladder, and crown fuels, which would reduce the number of acres expected to burn as a surface fire. The changes in fire type and reduced flame lengths would improve firefighter and public safety, increase the probability of success during fire suppression, increase fire management options, and enhance conditions for the protection of highly valued resources and assets. The treatments would also create stand and landscape conditions representative of historical fire regimes of the area. This would reduce the potential for the loss of key ecosystem components and reduce the potential severity of future wildfires.

Heritage and Cultural Resources

Introduction

Cultural resources are locations of human activity, occupation, or use that contain materials, structures, or landscapes that were used, built, or modified by people. Cultural resources include archaeological sites, buildings, structures, objects, districts, and locations associated with cultural practices or beliefs of contemporary communities. Historic properties are those cultural resources that are listed on or are eligible for listing on the National Register of Historic Places (NRHP). Section 106 of the National Historic Preservation Act of 1966 (NHPA) requires Federal agencies to consider whether a proposed undertaking has the potential to affect historic properties.

The impacts on cultural resources are assessed by applying the criteria of adverse effect, as defined in the implementing regulations for section 106 (36 Code of Federal Regulations [CFR] 800). Actions that alter, degrade, or otherwise affect the integrity and condition of a property have a potential to adversely affect the characteristics that contribute to the property's eligibility to the NRHP. Actions that protect or avoid impacts on the integrity of the historic property would maintain the values that contribute to the property's eligibility to the NRHP.

Both natural and human actions cause direct or indirect impacts. Cultural resources are often a fragile and nonrenewable resource; once damaged or destroyed, impacts are typically irreversible. Direct impacts usually include physical degradation of the resource through the loss of historic material or ground disturbance to archaeological sites. Actions that do not cause direct impacts may still result in indirect impacts on cultural resources. Indirect effects may include the introduction of new visual, atmospheric, or audible elements in the landscape that affect the qualities of cultural resources by diminishing their use, integrity, or cultural significance.

Analysis Methodology

The analysis focused on the following issues:

- Issue 1: How would the fuels reduction treatment activities of the proposed action impact heritage and cultural resources, including archaeological and architectural resources?
- Issue 2: How would increasing resiliency to insect and disease infestations and fire affect cultural resources?

Analysis Indicators

Indicators for the cultural resources analysis include the number of historic properties and other cultural resources the proposed project's activities would affect. The degree of impacts on historic properties is measured by whether the action causes a loss or degradation of the characteristics that make the property eligible for the NRHP. These indicators are:

- Ground disturbance or other actions that would result in adverse effects on eligible archaeological resources
- Changes in the historic built environment, including modifications of significant historic structures and their environs, in a manner that would result in adverse effects on an eligible property

Actions that would adversely affect the eligibility of a traditional cultural property include:

- Direct disturbance of locations or landscapes associated with traditional beliefs, sacred sites, resource gathering areas, hunting and fishing areas, water sources, ancestral sites, human remains, and trails.
- Alterations of visual and aural aspects of a traditional cultural property's setting that would create changes to the landscape that make it no longer usable by Tribal members
- Increased public access and human presence, which could lead to increased vandalism and unauthorized collection
- Decreased Tribal member access or interference with cultural uses and practices

Assumptions used in the following analysis include:

- The recently signed National Phasing Programmatic Agreement[3] will be applied to the project to ensure the Forest Service meets its responsibilities under section 106 of the NHPA.
- Traditional cultural properties are historic properties under section 106 of the NHPA; the identification of additional tribally significant resources may require Tribal consultation.
- Cultural resources are generally considered to be nonrenewable, and adverse effects are long term. Some impacts, such as alterations to the setting, may be short term.
- Avoidance of significant resources would be preferred rather than other methods of resolving any adverse effects that may be anticipated.
- The Forest Service is continually compiling cultural resource baseline information for areas that may be under consideration for future activities. This work would result in a greater understanding of the presence and condition of known resources to identify potential conflicts.

Ongoing consultation with contemporary Tribal representatives would continue using a qualitative assessment of the potential for impacts on sites, landscapes, plant, animal, mineral, or other resources that may be important to those groups for traditional or religious uses.

Spatial and Temporal Context for the Effects Analysis

Spatial Bounds: The spatial bounds of the effects analysis for heritage and cultural resources include any historic property, traditional cultural property, or other area of Tribal interest with the potential to be affected by the actions within the Bitterroot Front project area, which covers approximately 143,340 acres in the Stevensville and Darby-Sula Ranger Districts of the Bitterroot National Forest.

Temporal Bounds: The temporal scale for the analysis includes current and reasonably foreseeable impacts on districts, sites, buildings, structures, and objects significant in American history, architecture, archaeology, engineering, and culture, and those efforts to protect cultural resources occurring now and those that are reasonably foreseeable in the future.

[3] National Programmatic Agreement Among the U.S. Department of Agricultural Forest Service, the Advisory Council on Historic Preservation, and the National Conference of State Historic Preservation Officers for Phasing Section 106 of the National Historic Preservation Act for Large-Scale Multi-Year Undertakings (signed December 5, 2021)

Existing Conditions

Since 1995, the cultural resource management studies in the Bitterroot National Forest have utilized a survey strategy, which was originally presented in "The Prehistory of the Lolo and Bitterroot National Forests: An Overview" (McLeod and Melton 1986) and subsequently updated in "Site Identification Strategy Prepared for Bitterroot, Flathead, and Lolo National Forests" (McLeod 2003). Under the site identification strategy, an area of potential effects defined for a given project is stratified into high, medium, and low probability for the presence of cultural resources based on topographic setting characteristics. High-probability areas receive 100 percent pedestrian survey coverage on 15-meter transects. Medium-probability areas receive at least 50 percent pedestrian survey coverage. Low-probability areas receive 10 to 20 percent pedestrian survey coverage.

As of February 2020, 1,691 acres of the Bitterroot Front project area had been previously surveyed, including 882 acres of high-probability areas, 717 acres of medium-probability areas, and 92 acres of low-probability areas. Modeling showed that 18,392 acres of high-probability areas, 68,608 acres of medium-probability areas, and 54,084 acres of low-probability areas are present in the project area. Under the site identification strategy (Mcleod 2003), these areas could result in up to 63,000 acres of potential new survey.

At present, a total of 110 cultural resources are recorded in the Bitterroot Front project area, including 30 in the Stevensville Ranger District and 80 in the Darby-Sula Ranger District, with a large concentration around Lake Como. Thirty-nine sites are eligible for or listed on the NRHP, including 8 in the Stevensville Ranger District and 31 in the Darby-Sula Ranger District. Forty sites have not been evaluated for the NRHP, including 15 in the Stevensville Ranger District and 25 in the Darby-Sula Ranger District. Thirty-one sites in the project area have been determined not eligible for the NRHP, including 7 in the Stevensville Ranger District and 24 in the Darby-Sula Ranger District.

Precontact site types in the Bitterroot National Forest include campsites, lithic procurement/quarry sites, rock art, and culturally modified trees. Historic-period resources include logging camps, log chutes and flumes, mining districts, and abandoned structures and buildings (McLeod 2003).

Environmental Consequences of No Action

Issue 1: How would the fuels reduction treatment activities of the proposed action impact heritage and cultural resources, including archaeological and architectural resources?

Direct and Indirect Effects

No new impacts on cultural resources would result from management activities, such as noncommercial and commercial thinning, transportation management, and recreation projects. The current management plan would continue to guide activities within the project area. The existing cultural resource conditions would be unaffected, except through natural processes.

Issue 2: How would increasing resiliency to insect and disease infestations and fire affect cultural resources?

Direct and Indirect Effects

Forest activities that would reduce the potential for severe wildfires, such as fuels reduction and vegetation removal, would not occur. These proposed actions include commercial harvest, noncommercial thinning, and prescribed fire treatments.

While there would be no adverse short-term disturbances to cultural resources associated with the no-action alternative, over the long term there would be indirect effects. This is because cultural resources and areas of Tribal importance would be exposed to greater risk of damage from uncontrolled wildfires. Wildfires impact cultural resources by burning cultural materials and features, decreasing soil stability, increasing erosion, exposing sites to artifact collecting and looting, and changing the overall setting and characteristics of cultural resources. Fire also alters the physical and chemical characteristics of the artifacts and features that flames do not consume by thermal alterations and deposition of soot and tar that can affect analytical analyses, including dating techniques such as thermoluminescences and obsidian hydration analysis (Ryan 2010). Human responses to wildfire, such as the construction of fire control lines and the application of water and foam, can also harm cultural resources. These impacts increase with uncharacteristic wildfires where the size and severity of the fire are greater.

Because the no-action alternative lacks the actions to improve the forest's resiliency to high-intensity fire, insects, and disease infestations, an indirect effect on cultural resources would be an effect on the traditional use of resources by Native American Tribes. Whitebark pine nuts are a nutritious food source utilized by Native Americans. In the past, nuts were gathered along the crest of the Bitterroot Range, contributing to a high density of sites on those landforms (Munger 1993). The inner bark tissues of both conifer and deciduous trees, including whitebark pine and lodgepole pine, were also gathered and used by Native Americans throughout the region (Kuhnlein and Turner 1991). Many culturally modified trees are now in advanced maturity, causing high rates of mortality (Merrell and Clark 2001); however, the loss of culturally modified trees to natural causes is not viewed as an adverse effect (Werle 2023a).

Studies have shown that the loss of those species, such as whitebark pine, that are traditionally important to local Tribes, including the Confederated Salish and Kootenai Tribes, Nez Percé, and others in the region, would be likely with higher susceptibility to uncontrolled high-intensity fire, disease, and insect infestations. Arno (1976) demonstrated that fires from approximately AD 1600–1900 were typically more frequent and lower intensity and covered large areas. Since approximately 1920, suppression of low- and moderate-intensity fires, coupled with insect and disease infestations, has led to the accumulation of fuels that contribute to higher-intensity fires.

A higher susceptibility to high-intensity fire, insects, and disease infestations also has the potential to adversely impact other animals and plants important to Native peoples by direct damage to various species and alterations to the forest ecosystem that supports these resources. For example, Native groups in the area have and continue to gather plants and other resources. Traditional food plants include a variety of roots and bulbs, such as bitterroot and camas; edible fruits and berries; potherbs and greens; mushrooms; and seeds. Teas and other beverages are made from saps, camas bulbs, wild mint, and other leaves. Saps and pitch from a variety of trees, including pines and cottonwood, are made into gums. Medicines are made from mosses, pine resins, dried and powdered roots, and infusions of barks, herbs, and foliage. Also, plant gathering was and still is important to spiritual beliefs and practices, such as the First Roots Ceremony (Hart 1974, 1979; Kuhnlein and Turner 1991).

Cumulative Effects

The no-action alternative would result in indirect adverse impacts on cultural resources due to a greater risk of damage from uncontrolled wildfires and the loss of natural resources important to traditional and current Native American practices, as discussed above. When combined with past activities in the project area, including timber harvest, grazing, road construction, vegetation treatments, recreation, restoration, and fires, the cumulative effect would be an even greater potential for further damage or loss of resources principally due to the increased potential for future high-intensity wildfires and insect infestation. Ongoing fuel reduction and vegetation treatment projects throughout the Bitterroot National Forest, particularly in the Darby-Sula and Stevensville Ranger Districts, should serve to lessen, but not completely remove, the potential for adverse cumulative effects on heritage and cultural resources from such wildfires and insect infestations.

Environmental Consequences of the Proposed Action

Issue 1: How would the fuels reduction treatment activities of the proposed action impact heritage and cultural resources, including archaeological and architectural resources?

Direct and Indirect Effects

At present, a maximum of 86,375 acres in the project area are estimated for proposed vegetation treatments, including 49,046 in the Darby-Sula Ranger District and 37,329 in the Stevensville Ranger District. Treatment areas include those subject to commercial harvests, noncommercial stand improvement, vegetation treatments, and prescribed fire, as well as the specific treatments noted in table 1 of chapter 2. Given the higher number of sites and acres of potential treatment activities in the Darby-Sula Ranger District, a higher potential for impacts on cultural resources in that district could result from the proposed action.

The direct impacts from mechanical vegetation treatments include potential ground disturbance associated with the use of heavy equipment, road construction, and vegetation removal. However, the Forest Service would complete project-specific section 106 compliance and Tribal consultation in advance of these undertakings under the standards established in a heritage implementation plan (HIP) (PF-CULTURAL-002). Therefore, any direct impacts on cultural resources should be avoided, minimized, or mitigated.

Prescribed fire can result in similar impacts on cultural resources. However, prescribed fires generally burn at lower temperatures; therefore, the impacts would be less than they would be in the event of a wildfire. Additionally, during prescribed fires, the Forest Service would take measures to avoid cultural resources and to remove vegetation around and on sites prior to burning (to reduce the fire intensity). Also, prescribed fires would only be allowed within cultural resources that are not susceptible to adverse effects from burning, such as lithic scatters. These measures would further reduce the likelihood for damage to cultural resources during treatments.

Issue 2: How would increasing resiliency to insect and disease infestations and fire affect cultural resources?

Direct and Indirect Effects

The proposed action’s purpose of increasing resiliency to insect and disease infestations and fire would cause a direct beneficial effect on cultural resources by restoring the historical fire regimes and reducing the risk of uncharacteristic high-intensity wildfire. This would benefit cultural resources by providing them increased protection from high-severity fire and the subsequent erosion that can directly damage sites.

A direct beneficial effect on cultural resources from increased resiliency to insect and disease infestations and fire due to the proposed action would be the protection of resources such as whitebark pine and other plants that are important to traditional and current Native American practices. Both Arno (1976) and Keane (2000) argue that prescribed fire is an effective treatment for the restoration of forest stands, including whitebark pine, as whitebark pine is more capable of surviving and regenerating after low- and moderate-intensity fires due to its thicker bark, thinner crowns, and deeper roots. Native people, particularly the Confederated Salish and Kootenai Tribes, have expressed interest in restoring controlled fire regimes to the landscape (Werle 2023b). Arno (1976) notes that anthropologists have also recognized the long tradition of Native peoples in the Rocky Mountains setting fires to improve forage conditions.

Cumulative Effects

Past activities in the project area include timber harvest, grazing, road construction, vegetation treatments, recreation, restoration, and fires. There are continuing nonmotorized recreation, timber harvest and noncommercial thinning, and prescribed fire projects, as well as reasonably foreseeable trail and campground improvement activities, in the potential treatment areas under the proposed action that could affect cultural resources. However, the Forest Service would complete project-specific section 106 compliance and Tribal consultation in advance of the proposed action undertakings under the standards established in the HIP. Therefore, any impacts that could cumulatively add to past, present, and reasonably foreseeable future actions that would affect cultural resources would be avoided, minimized, or mitigated.

Range and Weeds

Introduction

Range resources focus on the management of rangelands and livestock grazing operations. Under the grazing permit system, the Forest Service administers domestic livestock grazing as compatible with other multiple-use objectives. Livestock grazing on rangelands offers several benefits to the local communities. Not only have rangelands provided an economic opportunity to sustain ranching operations for several generations, but they have also provided the basis for the local culture and lifestyle.

Rangelands are divided into grazing units known as allotments, which are subdivided into pastures. Under most permits, grazing does not occur on National Forest System lands year-round. Grazing operators may rotate cattle between pastures throughout the year, both on and off Federal lands. The borders of allotments and pastures typically follow geographic and topographic features, such as canyons and riverine habitat, and they may also be completely fenced.

Invasive plants and noxious weeds disrupt or have the potential to disrupt or alter the natural ecosystem function, composition, or diversity of infested areas. These species complicate natural resource use and may interfere with management objectives. The spread of these species is often influenced by the extent of disturbed soil and the proximity to established infestation. Noxious weeds are designated under Federal and state noxious weed acts.

The range and weeds analysis evaluates the effects on these resources by the no-action alternative and the proposed action. Existing conditions are detailed in the Range and Weeds Specialist Report (PF-RANGE-001).

Analysis Methodology

The methodology consists of reviewing the allotment areas for grazing that overlap potential treatment areas using the most current allotment management plans and range data, and evaluating the short-term and long-term impacts on current rangeland allotments from implementation of the alternatives.

The methodology used to evaluate the effects of the alternatives on invasive plants and noxious weeds includes reviewing the most current data on invasive plant and noxious weed occurrence and abundance, evaluating the risk of establishment and the potential for spread of invasive plants and noxious weeds as a result of the alternatives, and reviewing how best management practices and project design features that address invasive plants and noxious weeds would reduce the potential spread and establishment.

The analysis focused on the following issues:

- Issue 1: How would the alternatives affect rangeland grazing within the current rangeland allotments?
- Issue 2: How would the alternatives influence the present and future distribution of invasive plant and noxious weed populations?

Analysis Indicators

The indicators for rangeland management include:

- Changes in access to grazing allotments
- Changes in the quality of grazing allotments
- Potential displacement of livestock

The indicators for invasive plants and noxious weeds include:

- Changes in the abundance, occurrence, and spread of invasive plants and noxious weeds

Spatial and Temporal Context for the Effects Analysis

Spatial Bounds: The spatial bounds for the effects analysis for range management are the areas of the project area within the three grazing allotments (see table 9). The spatial bounds for invasive plants and noxious weeds are anywhere in the 143,340-acre project area that includes a significant population of invasive plants and noxious weeds.

Temporal Bounds: The temporal bound for the effects analysis for both range management and invasive plants and noxious weeds is the life of this EA.

Existing Conditions

Three allotments overlap the project area: Bass Creek Term, Sweathouse-Gash on/off, and Trapper Peak Term. A total of 436 head months (HMs) are permitted across all three allotments (see table 9). One HM is defined as 1 month's use and occupancy of the range by one weaned or adult cow with or without a calf, a bull, a steer, a heifer, a horse, a burro, a mule, or five sheep or goats. The HMs in table 9 represent the permitted number, not the actual use number; therefore, the HMs on the allotments are potentially lower than those listed in the table.

Table 9. Grazing allotments in the Bitterroot Front project area

Grazing Allotment	Total Acres	Head Months	Cattle Pair (Cow/Calf)	Usage Dates
Bass Creek Term	1,328	100	50	June 1–July 31
Sweathouse-Gash on/off	477	16	4	July 1–October 31
Trapper Peak Term	21,598	320	50	June 1–September 30

Sources: USFS GIS 2023; Bessler-Hackett 2023

All noxious weeds are invasive, but not all invasive plants are noxious weeds (USFS 2023a). Between 2002 and 2020, inventories for invasive plants and noxious weeds were conducted in some locations within the project area; these inventories documented the presence of species on the Montana Noxious

Weed List that fall into priorities 1B, 2A, 2B, and 3. No priority 1A new invaders are currently inventoried in the project area; however, they may exist on nearby private land. Table 10 below, displays the current species, densities, and general locations in the project area.

Table 10. Invasive plants and noxious weeds in the project area

Invasive Plants and Noxious Species	Montana Noxious List Category*	Location(s)	Density
Rush skeletonweed (*Chondrilla juncea*)	Priority 1B	On private property south of Darby, but none currently found in the forest in the project area	Patchy clumps
Blueweed (*Echium vulgare*)	Priority 1B	McCoy Creek	Light density
Tall buttercup (*Ranunculus acris*)	Priority 2A	Bass Creek, Blodgett Creek, Coyote Coulee Trail, Lost Horse Creek, Lick Creek, Tin Cup Creek, and Trapper Peak Term	Scattered
Orange hawkweed (*Hieracium aurantiacum*)	Priority 2A	Kootenai Creek Trail – in the wilderness	Small clump
Leafy spurge (*Euphorbia esula*)	Priority 2B	Isolated patch present in the forest in Sweeney Creek, Bass Creek, and the Lake Como Recreation Area and on private lands in Sweeney Creek	Patchy
Dalmatian toadflax (*Linaria dalmatica*)	Priority 2B	Sweeney Creek and Larry Creek	Limited presence
Houndstongue (*Cynoglossum officinale*)	Priority 2B	Coyote Coulee Trail, Chaffin Creek, and Bear Creek	Lightly scattered along existing roadsides
St. John’s wort (*Hypericum perfoliatum*)	Priority 2B	Various locations – heaviest in Lost Horse Creek and Camus Creek drainages	Scattered in large populations
Ox-eye daisy (*Leucanthemum vulgare*)	Priority 2B	Scattered throughout the project area	Small amount
Sulphur cinquefoil (*Potentilla recta*)	Priority 2B	Bass Creek, Sharrott Creek, Smith Creek, Gash Creek, Ward Mountain Trailhead, Coyote Coulee Trail, and Trapper Peak Term	Isolated patches
Spotted knapweed (*Centaurea stoebe*)	Priority 2B	Scattered throughout the project area in most places	Found commonly throughout those areas
Canada thistle (*Cirsium arvense*)	Priority 2B	Bear Creek, Bunkhouse Trailhead, Tin Cup Creek, and Trapper Peak Term	Found throughout the project area
Common tansy (*Tanacetum vulgare*)	Priority 2B	Most drainages of the project area	Small, scattered patches
Cheatgrass (*Bromus tectorum*)	Priority 3	Scattered throughout the project area in many places	Found throughout the project area

Source: USFS 2023a
***Priority Status Codes**: 1B = limited presence; 2A = common in isolated areas; 2B = abundant and widespread; 3 = has the potential to have significant negative impacts (Mangold 2019)

The project area presents a mosaic of invasive weed-infested and un-infested vegetation cover types. Spotted knapweed is the most common and widespread noxious species. Cheatgrass, a priority 3 invader, follows closely behind in extent throughout the project area. Invasive plant and noxious weed populations in the project area have received intermittent chemical and biological control treatments over the past 20 years since the implementation of weed management plans (USFS 2003).

Environmental Consequences of No Action

Issue 1: How would the alternatives affect rangeland grazing within the current rangeland allotments?

Direct and Indirect Effects

The no-action alternative would not implement the proposed vegetation or fire treatments. It also would not modify or create roads for treatment access. There would be no changes to rangeland allotment access, no short-term displacement of livestock in treatment areas, and no modification of current rangelands in the project area. Without vegetation and fire treatments, the forage for livestock would continue to be influenced by existing dense, forested conditions and excessive undergrowth and fuel loading; these decrease forage quality or quantity, or both.

In addition, grazing could also be affected by the increased potential for high-severity fire. These fires have the potential to affect foraging opportunities, cause livestock loss, and pose economic losses for the lessees. High-severity fire could also result in a shift in plant species composition to nonnative species that are able to outcompete native plants; these nonnative species have little to no nutritional value for livestock.

Cumulative Effects

The analysis area for cumulative effects on grazing management is the allotments within the Bitterroot Front project area. Past and present actions such as vegetation management, weed treatments, and construction have impacted grazing and forage potential in the allotments in the project area. Vegetation management on lands adjacent to the project area would aid fuel management along the Bitterroot Front by decreasing the possibility of a severe wildfire starting on the neighboring lands and crossing onto National Forest System lands, thus decreasing the potential for a fire to reduce livestock forage quality and quantity.

A lack of weed treatments on National Forest System lands and adjacent lands can impact the spread of invasive species and noxious weeds within the project area and allotments and increase the number of weeds in the grazing allotments, thus lowering the forage quality for the livestock. Construction can also spread invasive plants and noxious weeds by increasing site-specific disturbance; this decreases forage quality and causes sedimentation in streams, thus lowering the water quality.

The no-action alternative would increase the potential for the effects described above. By not treating National Forest System lands, the fuel load would continue to grow. This would increase the chances of a severe wildfire in the Bitterroot Front project area and also a fire spreading to National Forest System lands from other ownerships and vice versa, thus increasing the potential for degradation of allotments and grazing lands.

Issue 2: How would the alternatives influence the present and future distribution of invasive plant and noxious weed populations?

Direct and Indirect Effects

The current management and control of invasive plants and noxious weeds would continue under the no-action alternative. There would be no potential risk of spread or establishment from equipment or personnel from implementing the proposed treatments. Roads (temporary or permanent) would not be created for access to treatment areas; therefore, there would not be an increased risk of spread from road creation and log-hauling truck use.

Methods of weed spread would remain constant under the no-action alternative. Wildlife, livestock, humans, vehicles, wind, and overland surface water flow would continue transporting invasive weed seeds into open areas (Zouhar 2001) and throughout the project boundaries. Although invasive plants and noxious weeds could continue to spread by existing vectors within the project area, the potential for the introduction and spread from surface-disturbing activities would not occur.

Without vegetation and fire treatments to move conditions toward desired conditions, the project area would have a greater likelihood of high-severity fires. High-severity fires are known to increase the abundance and spread of invasive plants and noxious weeds, whereas low- (that is, prescribed fires) to moderate-severity fires carry a lower risk of invasive plant increases and a higher probability of native species stability (Sutherland 2004). High-severity wildfires under the no-action alternative could also expose mineral soil and sometimes sterilize topsoil. This typically leads to the disruption of native plant communities and increases the density of invasive plants and noxious weeds over the long term.

Cumulative Effects

The analysis area for cumulative effects on invasive plants and noxious weeds is the Bitterroot Front project area. Past, present, and reasonably foreseeable future actions were evaluated for the cumulative effects on invasive plants and noxious weeds. Past and ongoing treatments have attempted to reduce noxious weed populations, but eradication may be difficult to accomplish due to detected infestations that surround the Bitterroot Front project area. Past revegetation and rehabilitation efforts on soil-disturbed areas of the forest have shown success in the sustained establishment of native plant species with appropriate herbicide treatments.

Other past management actions (for instance, road construction and timber harvest) have increased invasive plants and noxious weed dispersal within the project area. In addition, past, ongoing, and future activities within the cumulative effects analysis area, such as recreational foot and horse traffic, grazing, soil and vegetation disturbances on National Forest System lands or adjacent private land, trail expansion and construction, and wildfires, have also contributed and will continue to contribute to the spread of invasive plants and noxious weeds within the analysis area.

Other fuels reduction, revegetation, and noxious weed treatment projects, including the Bitterroot National Forest Burn Area Recovery Project, the Canyon Creek Fuels Reduction Project, the Sweeney Fuel Reduction Project, and the Western Collaborative Vegetation Management Project, have contributed to current conditions within the analysis area. These projects have assisted in the removal of invasive plants and noxious weeds within the treated sites by using fuel load–reducing procedures and herbicide treatments to mitigate for future plant establishments.

Without the vegetation and weed treatments under the proposed action, the no-action alternative would allow for invasive plants and noxious weeds to spread at a faster rate and build up fuel loads; this would increase the likelihood of a severe wildfire, as described under the Issue 1 cumulative effects section above.

Environmental Consequences of the Proposed Action

Issue 1: How would the alternatives affect rangeland grazing within the current rangeland allotments?

Direct and Indirect Effects

The proposed action includes vegetation treatments, fire treatments, and modification or creation of roads to access treatment areas. Changes to the road system would not change access to current rangeland allotments. Implementation of vegetation and fire treatments would open the forest canopy, control invasive species, promote native plant stability through low- and mixed-severity prescribed burning, and reduce excessive understory fuels. These would increase the quality of grazing forage in allotments where treatments overlap. Implementation of treatments could temporarily displace livestock from current allotments if vegetation treatments and prescribed burning are needed during the allotment usage dates. The Forest Service would work with allotment permittees to avoid displacement of livestock, to the extent feasible.

Cumulative Effects

The cumulative effects under the proposed action would be similar to those described under the Issue 1 cumulative effects above; however, the proposed action would decrease the potential of severe wildfires crossing the project area. Treating fuel loads across the landscape rather than by ownership would create consistency and reduce potential wildfire spread.

Issue 2: How would the alternatives influence the present and future distribution of invasive plant and noxious weed populations?

Direct and Indirect Effects

The project area has known populations of invasive plant and noxious weed species. Invasive plant species and noxious weeds thrive in disturbed areas, such as burned and surface-disturbed areas, and where insects and diseases have caused tree mortality; in these areas, invasive and noxious weed species can become established and outcompete native vegetation.

The proposed project’s purpose is to reduce fuels to decrease future wildfire risk and to improve forest resilience. Compared with the no-action alternative, implementing treatments to reduce the risk of high-severity wildfire would decrease the potential spread or potential increase in abundance of invasive and noxious weeds that have been associated with high-severity wildfire (Sutherland 2004). Over the long term, improving forest resilience to disturbances would improve conditions for native vegetation to persist and decrease the opportunities for invasive species and noxious weeds to spread and increase in abundance.

Surface-disturbing activities, including changes to the road systems and implementation of vegetation and fire treatments, would increase the potential spread and abundance of weeds and invasive plants in the project area during project implementation activities. However, following best management practices and project design features to control invasive species and noxious weeds (see appendix A for a full list) would avoid or minimize the potential spread and increases in abundance of invasive species and noxious weeds from proposed actions.

With implementation of design features, the proposed project would cause a greater decrease in invasive plant and noxious weed presence over time and allow for native plant populations to reestablish, compared with the no-action alternative. Vegetation and fire treatments, combined with posttreatment herbicide application, would move vegetation toward desired conditions and promote native plant establishment.

In addition, the activity card Native Plant Revegetation for the planting or seeding of native plant species in areas of disturbance would reduce the potential for invasive species and noxious weeds' establishment. The primary objective of Native Plant Revegetation is to use native shrubs, forbs, and grasses to reestablish vegetation on bare ground resulting from disturbance activities in order to reduce the spread of weeds and increase species diversity.

Cumulative Effects

The cumulative effects would be the same as the Issue 2 cumulative effects above; however, vegetation treatments and design features under the proposed action and other ongoing and reasonably foreseeable future actions would help to mitigate risk and work toward reducing the establishment and spread of invasive plants and noxious species within the cumulative effects analysis area.

Ongoing and reasonably foreseeable future projects, including noxious weed treatments in the West Fork, Darby, and Stevensville Ranger Districts and vegetation and fuels treatments in the Darby and Stevensville Ranger Districts, would work in collaboration with the Bitterroot Front project to move invasive plants and noxious weeds toward desired conditions and to reduce fuel loading within the analysis area. These projects would have similar and complementary vegetation and fuel treatments to move invasive plants and noxious weeds toward desired conditions over the long term and to provide better foraging and grazing opportunities for livestock and wildlife, while also improving habitat for surrounding communities.

Socioeconomics

The following sections provide a brief overview of the current economic conditions in and around the Bitterroot National Forest that are most relevant to the proposed action and a discussion of the impacts associated with each issue statement described below. An additional analysis is available in the Economics Specialist Report located in the project file (PF-ECONOMICS-001).

Analysis Methodology

The analysis focused on the following issues:

- Issue 1: How would the alternatives impact jobs and income?
- Issue 2: How would the alternatives impact ecosystem services?
- Issue 3: Would the alternatives result in disproportionate adverse impacts on environmental justice communities?

Analysis Indicators

The impacts on economic contributions, such as jobs and income, from the no-action alternative and the proposed action will be discussed as they relate to the potential change in commercial and noncommercial wood product availability for harvesting and from vegetation treatments. Changes in economic contributions from recreation due to vegetation treatments will be discussed as well as changes in economic contributions due to reductions in the risk and severity of potential wildfire.

Ecosystem services are values that the local communities receive from the surrounding ecosystem, and they could include services such as sustenance and shelter, flood regulation, and cultural resources. Impacts on ecosystem services from the no-action alternative and the proposed action will be analyzed qualitatively by describing the potential changes in ecosystem services that are discussed in the existing conditions subsection, including those associated with the reduction in the risk and severity from potential wildfire. Quantitative data will be provided as available to provide context to the discussion.

Environmental justice communities are identified by examining low-income, minority, and Tribal populations in comparison with populations in the reference area, which is the respective county, consistent with guidance from the CEQ (CEQ 1997). The potential for disproportionate adverse impacts on these populations is examined qualitatively based on identified impacts in other resource sections.

Spatial and Temporal Context for the Effects Analysis

Spatial Bounds: The socioeconomic and environmental justice analysis areas were selected as Ravalli and Missoula Counties, which are the counties that overlap the project area. Any economic or social impacts from the Forest Service's management decisions would largely occur in these two counties. The environmental justice discussion highlights data on minority and low-income populations at the census tract level in Ravalli and Missoula Counties; this is because counties often include multiple communities with different needs and interests. The reference areas for determining the census tracts that identify as environmental justice populations are the respective counties in which each census tract is located.

Temporal Bounds: The temporal bound for the effects analysis of economics and social justice is the life of this EA.

Existing Conditions

The following subsections discuss the current demographic data for the socioeconomic and environmental justice analysis area. The discussion on current conditions focuses on information that is most relevant to the scope of the proposed activities.

Population

Missoula County and Ravalli County are among the ten counties with the highest populations in Montana. Table 11 compares the population in Missoula County, Ravalli County, and the state of Montana from 2000 to 2021. In 2021, the population in Missoula County was about 117,000 people, and the population in Ravalli County was almost 44,000 people. From 2000 to 2021, Missoula County and Ravalli County both had a higher percentage increase in population (23 percent and 21 percent, respectively) than the state of Montana (20 percent increase).

Table 11. Population in the analysis area and Montana, 2000–2021

Geographic Area	2000	2021	Percent Change (2000–2021)
Missoula County	95,802	117,379	23
Ravalli County	36,070	43,790	21
Montana	902,195	1,077,978	20

Sources: Census Bureau 2000, 2021a

The population in the analysis area can be an important consideration with regard to the impacts of the proposed decision. This is because as the population increases, the number of individuals who live around National Forest System lands tends to increase. This includes those areas that have a higher propensity for risks of wildfires. These individuals who live close to lands with a higher risk for wildfires could reap the most benefit from the Forest Service's decisions regarding fuels management.

Jobs by Sector

Table 12 shows the number of jobs (in 2021) in selected industries in Missoula County, Ravalli County, and Montana. Missoula County had a total of 89,008 jobs, with over 1,000 jobs in the forestry, fishing, and related activities industry. Ravalli County had a total of 23,599 jobs, with almost 400 jobs in the forestry, fishing, and related activities industry (BEA 2021).

Table 12. Number of jobs in key industries, 2021

Key Industry*	Missoula County	Ravalli County	Montana
Total employment	**89,008**	**23,599**	**709,342**
Selected non-service related			
Farm employment	636	1,392	28,955
Forestry, fishing, and related activities	1,045	397	8,193
Construction	5,855	2,608	55,366
Manufacturing	3,011	1,148	25,703
Total non-services related*	**10,783**	**5,595**	**127,798**
Selected services related			
Transportation and warehousing	3,310	720**	24,342
Accommodation and food services	7,176	1,395	60,521
Total services related*	**66,520**	**16,043****	**485,730**
Total government	**11,705**	**2,110**	**95,814**

Source: BEA 2021
*Only key industry sectors are shown in the table. Total services- and non-services-related employment were calculated using data from all nongovernment sectors, including those not depicted in the table.
**These are estimated employment numbers because data are not available and to avoid disclosure of confidential information.

The Forest Service provides economic contributions through its operations, uses, and resources by providing jobs, labor income, and economic output. In 2019, the Bitterroot National Forest contributed 510 jobs, $19 million in labor income, and $26 million in gross domestic product (USFS 2019a).

Ecosystem Services

In addition to economic contributions that the Forest Service provides through its goods and services, the Forest Service provides values to the surrounding communities that are not accounted for through market mechanisms. These values often include what are called ecosystem services. Ecosystem services are benefits that people receive from a healthy ecosystem through the interacting relationships of wildlife, plant life, and microorganism communities.

Ecosystem services are commonly subdivided into four categories, according to the type of benefit provided (Millennium Ecosystem Assessment 2005): provisioning services, regulating services, cultural or information services, and supporting services. Provisioning services are products directly obtained from ecosystem services for basic human needs, such as food, water, minerals, shelter, and fuel. Regulating services maintain water and air quality; these services include flood regulation and carbon sequestration. Cultural and information services relate to aesthetic values, recreational opportunities, and spiritual uses. Supporting services maintain habitats for wildlife and include nutrient cycling and biodiversity.

The Bitterroot National Forest provides benefits from ecosystem services, including clean water, timber products, forage for livestock grazing, wildlife biodiversity, recreational opportunities, and cultural resources. The Bitterroot National Forest also provides values by supporting and sustaining a healthy forest ecosystem through the Forest Service's management of wildfire fuels and land and resource protection and conservation for future generations. Active and passive forms of fuels management in the Bitterroot National Forest, which move forests toward historical fire regimes, can assist with minimizing the risk of uncharacteristic fires for local communities. Recent examples of vegetation management projects in the Bitterroot National Forest include small-scale forest thinning, small- and large-scale timber harvesting and sales, post-fire restoration, and large-scale fuels reduction projects (USFS 2023b).

Environmental Justice

Executive Order 12898 requires each Federal agency to "make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations" (59 *Federal Register* 7629, February 16, 1994).

An evaluation of environmental justice impacts requires identification of minority and low-income populations (including Tribal nations) within the affected area and evaluation of the potential for the alternatives to have disproportionately high and adverse impacts on such populations.

Subsequent to the publication of Executive Order 12898, the CEQ, part of the Executive Office of the President, issued guidance for considering environmental justice within the NEPA process (CEQ 1997). This guidance defines minorities as individuals who are members of the following population groups: American Indian or Alaskan Native; Asian or Pacific Islander; Black, not of Hispanic origin; or Hispanic. The guidance further defines a minority population as follows: "Minority populations should be identified where either: (a) the minority population of the affected area exceeds 50 percent or (b) the minority population percentage of the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis" (CEQ 1997). The guidance also makes clear that Tribal nations in the affected area should also be considered in the environmental justice screening analysis.

The CEQ guidance does not define what constitutes meaningfully greater. The Forest Service recommends using a threshold for "meaningfully greater" as 5 percentage points greater than the minority population in the reference area (Grinspoon et al. 2014). The CEQ guidance also does not specify how to identify a low-income population or Tribal population. The Forest Service defines a low-income population as being present if the percentage of people with income below the poverty line is at least 5 percentage points greater than the percentage of people in the reference area living below the poverty line (Grinspoon et al. 2014). For the purposes of this analysis, the thresholds stated above, from the CEQ and the Forest Service, are used to identify any low-income and minority communities in the environmental justice analysis area. Tribal populations are identified using the same methodology as minority populations (with a threshold of 5 percentage points).

Table 13 shows the percentage of the population that identifies as minority, low-income, or part of the Tribal population, by census tract. Twelve census tracts in Missoula County and four census tracts in Ravalli County were identified as being an environmental justice community. In Missoula County, seven census tracts had minority populations that exceeded the threshold for an environmental justice community, seven census tracts had low-income populations that exceeded the threshold, and five census tracts had Tribal populations that exceeded the threshold. In Ravalli County, two census tracts had minority populations that exceeded the threshold for an environmental justice community, and two census tracts had low-income populations that exceeded the threshold. No census tracts exceeded the threshold for Tribal environmental justice populations.

Table 13. Demographic information for determining environmental justice communities by census tract*

Geographic Area	Percentage of Minority Population	Percentage of Low-Income Population	Percentage of Tribal Population	Environmental Justice Community**
Missoula County	12.2	12.6	4.2	—
Ravalli County	9.2	10.8	2.9	—
Census Tracts in Missoula County				
Census tract 1	**18.8**	14.5	1.7	**Yes**
Census tract 2.03	10.5	16.4	2.5	No
Census tract 2.04	**22.8**	**27.1**	**10.0**	**Yes**
Census tract 2.05	10.4	9.8	0.5	No
Census tract 2.06	10.7	8.7	2.4	No
Census tract 3	14.3	**39.5**	5.9	**Yes**
Census tract 4	6.9	13.4	2.4	No
Census tract 5.01	14.6	**36.2**	4.3	**Yes**
Census tract 5.02	9.9	**23.6**	3.1	**Yes**
Census tract 7	**18.1**	17.3	4.4	**Yes**
Census tract 8.01	8.3	**22.9**	2.6	**Yes**
Census tract 8.02	**17.2**	**24.6**	**11.5**	**Yes**
Census tract 9.01	10.2	4.3	3.5	No
Census tract 9.02	6.9	6.6	2.6	No
Census tract 10.01	6.8	15.3	0.3	No
Census tract 10.02	**23.8**	4.3	1.9	**Yes**
Census tract 11	**18.8**	11.6	**16.4**	**Yes**
Census tract 12	16.0	**22.9**	**10.3**	**Yes**
Census tract 13.02	9.9	5.6	0.5	No
Census tract 13.03	10.1	10.9	3.4	No
Census tract 13.04	7.8	4.3	0.7	No
Census tract 14.01	11.7	9.9	4.8	No
Census tract 14.02	12.4	7.8	3.5	No
Census tract 15.01	2.8	7.4	0.0	No
Census tract 15.02	9.5	8.1	4.0	No
Census tract 16.01	10.4	3.5	3.6	No
Census tract 16.02	0.3	9.0	0.0	No
Census tract 18.01	**38.6**	10.6	**35.5**	**Yes**
Census tract 18.02	10.0	8.3	1.7	No
Census Tracts in Ravalli County				
Census tract 1	**18.5**	3.5	6.1	**Yes**
Census tract 2.01	5.9	**18.3**	3.3	**Yes**
Census tract 2.03	7.4	2.8	1.6	No
Census tract 2.04	5.2	5.0	1.2	No
Census tract 3	**19.1**	7.0	2.8	**Yes**
Census tract 4.01	11.5	14.5	3.1	No
Census tract 4.02	9.4	11.8	5.1	No
Census tract 5.01	6.4	0.0	0.0	No
Census tract 5.02	8.4	14.4	3.2	No
Census tract 6.01	1.0	**22.1**	0.0	**Yes**
Census tract 6.02	7.2	13.7	1.8	No

Geographic Area	Percentage of Minority Population	Percentage of Low-Income Population	Percentage of Tribal Population	Environmental Justice Community**
Census tract 7	8.4	14.1	1.9	No
Census tract 8	2.2	13.1	1.0	No

Sources: Census Bureau 2021a, 2021b
— = not applicable
* The bold percentages in the table are those census tracts that are identified as environmental justice populations.
** The threshold for environmental justice population determination is at least 5 percentage points greater than the reference areas' respective population (minority, below poverty, and Tribal). For census tracts in Missoula County, the minority threshold is 17.2 percent, the poverty threshold is 17.6 percent, and the Tribal population threshold is 9.2 percent. For census tracts in Ravalli County, the minority threshold is 14.2 percent, the poverty threshold is 15.8 percent, and the Tribal population threshold is 7.9 percent.

Environmental Consequences of No Action

Issue 1: How would the no-action alternative impact jobs and income?

Direct and Indirect Effects

Under the no-action alternative, the Bitterroot National Forest would continue to contribute to the local and regional economies through employment, labor income, and economic output from its resources and the Forest Service's management decisions. Commercial and noncommercial timber harvest would provide employment, wages, and economic output through several industries, such as forestry, logging, and sawmills.

Table 14 shows the direct response coefficients, or multipliers, for employment and wages in Montana by industry sector. The multipliers are the rate of economic impacts for forest-related activities; they highlight the per unit economic impacts from a direct change in input expenditures, employment, or other industry changes. The economic model used to calculate the regional impacts of changes in industries is linear; therefore, these multipliers can be multiplied by a direct change in an industry or resource (for example, amount of timber harvested) to calculate the total impact on the number of employees and labor income.

Table 14. Employment and wage direct response coefficient (multiplier) by industry sector in Montana

Industry Sector	Employees (number of jobs per million cubic feet of timber harvested)	Wages (2011$ per employee)
Forestry and logging	12	40,000
Softwood sawmills	14	40,000
Residue (sawmills)	5	55,000
Softwood plywood/veneer	32	45,000
Residue (plywood/veneer)	4	55,000
Roundwood for pulp and paper	9	75,000
Energy—large	2	60,000
Energy—small	10	30,000
Post and pole	14	30,000
Utility pole	14	30,000
House log/log home	100	30,000
Log furniture	125	30,000
Residue (other mills)	2	30,000

Source: Sorenson et al. 2016

When compared across industries, log furniture and log homes have the highest employment multiplier of about 125 and 100 per million cubic feet of timber harvested, respectively; however, roundwood for pulp and paper and the large-scale energy industries have the highest multiplier for wages (about $75,000 and $60,000, respectively).

Under the no-action alternative, the total magnitude of impacts from the timber industry sectors on employment and income in the analysis area depends on the actual timber harvested. In fiscal year 2019, the timber products harvested from the Bitterroot National Forest included about 2,040 hundred cubic feet (CCF) of sawtimber, 10,340 CCF of fuelwood, and 680 CCF of pulp, posts, poles, and other timber products (USFS 2019b). The economic contribution from the timber harvested in 2019 resulted in about 50 total jobs (including 20 direct jobs), about $2.2 million in total labor income (including about $1.2 million in direct labor income), and about $3.8 million in total gross domestic product (including about $2.1 million in direct gross domestic product; see table 15).

Table 15. Forest products' economic contributions from the Bitterroot National Forest, 2019

Impact	Employment (number of jobs)	Labor Income ($)	Gross Domestic Product ($)
Direct	20	$1,198,000	$2,127,000
Indirect/induced	30	$1,006,000	$1,679,000
Total	50	$2,204,000	$3,806,000

Sources: USFS 2019b, 2019c, 2019d

Since the late 1980s, there has been a large decline in the timber industries due to declines in timber harvests, which has impacted the local and regional economies. In Ravalli County, timber harvests dropped 71 percent from the late 1980s to 2018. This decline resulted in a loss of 514 jobs, a loss of about $32.6 million in income per year, and a decrease of about $113 million in annual economic output (Barkey et al. 2018). Similar trends have occurred in Missoula County and across Montana (Morgan et al. 2018). Under the no-action alternative, with no additional allowable commercial and noncommercial timber harvesting, these trends in declining timber harvest and economic contributions associated with the timber industries are expected to continue. These continuing trends would result in long-term impacts on the surrounding economies, especially those communities in rural areas, where the timber industry plays a bigger role in the overall economy.

Overall, under the no-action alternative, the economic contributions from timber harvest in the project area would likely be small and would likely continue to decrease over time.

Under the no-action alternative, the Forest Service would continue to provide economic value to the communities through restoration projects. As mentioned in the discussion on existing conditions above, the Bitterroot National Forest supports about 510 jobs, $19 million in labor income, and $26 million in gross domestic product through the Bitterroot National Forest staff's day-to-day operations, which could include services and activities, such as restoration projects, and recreation visits (USFS 2019a).

Recreation in the Bitterroot National Forest is a key resource that supports many jobs and economic output throughout the analysis area, especially in Ravalli County. In 2019, about 540,000 recreationists visited the Bitterroot National Forest, which amounted to about $15.3 million in recreation expenditures (USFS 2019b). The recreation expenditures contributed to about 170 total jobs, $5.1 million in total labor income, and $7.8 million in total gross domestic product (USFS 2019b, 2019d). In the event of a large wildfire, there could be reductions in the number of recreation visitors throughout the Bitterroot National Forest due to the potential destruction of facilities, historic resources, and cultural resources and the impaired visual scenery. When wildfires are within 12 miles, recreation visitors, as indicated by rates such as the camper occupancy rate, could be about 6.4 percentage points less than the average rate (Gellman et al. 2022). Also, the size of the area burned has been shown to have an impact on the percentage decrease in visitors, with the larger the area burned, the larger the decrease in visitation (Hesseln et al. 2004).

The reduction in the number of visitors due to a catastrophic wildfire could negatively impact the local economy through a reduction in expenditures, jobs, labor income, and total economic output associated with recreation industries. Under the no-action alternative, the risks associated with devastating wildfires would continue, which could result in a continued risk of reductions in economic contributions associated with recreation. Additionally, the reduction in recreation visitors and economic contributions during a catastrophic wildfire would likely be larger than during prescribed burning, as in the proposed action, because prescribed burnings tend to be smaller and more localized than wildfires.

In addition to economic impacts from recreation during a catastrophic wildfire, there could also be costs of wildfire suppression, healthcare costs from long-term health effects from smoke, and damages to property, infrastructure, and cultural or historic resources (Hunter and Taylor 2022; U.S. Department of Interior 2012). It is difficult to quantify these costs because they often depend on the wildfires' size or severity and location. Under the no-action alternative, the risks of the surrounding communities incurring these costs would continue to be large.

Issue 2: How would the no-action alternative impact ecosystem services?

Direct and Indirect Effects

Since the 1940s, the frequency and severity of wildfires have increased; this is partially due to unsustainable management of ecosystems (Millennium Ecosystem Assessment 2005). Under the no-action alternative, the risk of severe, uncharacteristic wildfires would continue. Uncharacteristic fire (that is, high-intensity, large fires) can affect forest ecosystems, the safety of the residents in the surrounding areas, the potential for property damage, health impacts from smoke, impacts on scenery and the quality of life, potential damage to unique and sensitive cultural resources, and decreased outdoor recreational opportunities on public lands. These adverse impacts on ecosystem services would be above and beyond the economic and market impacts discussed above.

Issue 3: Would the no-action alternative result in disproportionate adverse impacts on environmental justice communities?

Direct and Indirect Effects

Under the no-action alternative, the risk of severe wildfires would continue. During a wildfire, there could be the potential for damage to or the destruction of property, such as homes and public facilities, and important cultural resources. These impacts could disproportionately and adversely affect environmental justice communities who place a higher importance on cultural resources. These impacts also could disproportionately and adversely affect environmental justice communities because the damage to property could result in a heavier burden on low-income communities.

A severe wildfire could also affect the visual scenery and affect the health of the local community through the smoke and particulate matter. The impacts on health would affect all communities; however, individuals who work outdoors or who have limited abilities to adapt, by changing jobs or moving, can be disproportionately affected (D'Evelyn et al. 2022).

Cumulative Effects

Visitation to the analysis area will likely increase in the future as the population in the surrounding area increases and due to reasonably foreseeable future actions that plan to construct and expand trailheads, campgrounds, and other facilities. The increase in visitors and population could lead to an increase in people in areas with an elevated fire risk, which could contribute to cumulative effects under the no-action alternative, and increase the risk of severe damages if a wildfire should occur.

Environmental Consequences of the Proposed Action

Issue 1: How would the proposed action impact jobs and income?

Direct and Indirect Effects

Under the proposed action, commercial timber harvesting would occur on about 32,390 acres, and noncommercial timber harvesting would occur on about 38,690 acres. This increase in harvesting directly impacts the local and regional economies, which could result in increased jobs, income, and economic output, compared with the no-action alternative. However, the increase in economic contributions from an increase in forest products would likely be small, given the current size of the timber and forestry industries, and the impact would be short term.

Under the proposed action, the Forest Service would provide additional services for restoration and noncommercial vegetation and fuels treatments. These projects would not likely impact the amount of commercial timber harvesting; however, these projects would support service contracts, which would likely increase the number of jobs, labor income, and economic output through the expenditures on these contracts and restoration costs. Mechanical vegetation treatments would cost about $1,500 per acre, and hand thinning would cost about $300 per acre. These expenditures on restoration activities under the project would likely have large direct and indirect effects on the local economy.

Under the proposed action, the risk of catastrophic wildfires would be reduced due to vegetation management, such as prescribed fire, compared with under the no-action alternative. In the short term, recreation visitors could decrease due to the prescribed fires; this could temporarily reduce the economic contributions associated with recreation-related industries in the analysis area. However, in the long term, once the Bitterroot National Forest starts recovering from the prescribed fires and the biodiversity and visual scenery return, recreation visitation would likely return. Because the risk of severe wildfires would be reduced under the proposed action, the impacts on recreation and economic contributions from recreation are likely to be less than under the no-action alternative. Recreation is a key resource in the Bitterroot National Forest, and the local economies rely heavily on recreation; therefore, under the proposed action, the reduction in impacts on recreation could have a relatively large and important impact on the economies and communities in the analysis area.

In addition to the increased jobs, labor income, and output from increased restoration activities, recreation, and forest products, the economic benefits of vegetation treatments under the proposed action could include the reduction or avoidance of costs that could occur in the event of a catastrophic wildfire, compared with under the no-action alternative. Under the proposed action, the value of the benefits from the avoided costs would depend on the location of the fuels treatments and the reduction in the level of risk of catastrophic wildfires. Overall, the combined benefits from avoided costs from a catastrophic wildfire would likely exceed the costs of the vegetation treatments (Hunter and Taylor 2022).

Issue 2: How would the proposed action impact ecosystem services?

Direct and Indirect Effects

In the short term, under the proposed action, the prescribed fires and vegetation management could impact visual scenery and health across the surrounding communities due to smoke. The prescribed fires could also impact the ecosystem by reducing wildlife and plants. However, these impacts would only last until the prescribed fire management is complete; after this, the plant life and ecosystems would regenerate and restore their biodiversity.

In the long term, the Forest Service's management decisions regarding fire and fuels management aim to provide for resilient and resistant landscapes. These landscapes would protect fire-adapted communities by reducing the fire hazard and improving safe and effective wildfire response. Historically, unsustainable management of ecosystems is considered to be a factor in increasing the frequency and severity of wildfires (Millennium Ecosystem Assessment 2005). A change in management practices and the measures taken under the proposed action would likely reduce the risk of fire hazard. Management decisions that result in fewer or less severe wildfires could support ecosystem services; the safety and health of the communities in the surrounding area by reducing the risk of smoke and particulate matter from wildfires; and increased visual scenery, which increases the quality of life throughout the community.

Issue 3: Would the proposed action result in disproportionate adverse impacts on environmental justice communities?

Direct and Indirect Effects

Under the proposed action, prescribed fires would be used to restore the forests and manage the risk of much more severe wildfires in the future. These prescribed fires could impact the visual scenery and health of the surrounding communities due to the prevalence of smoke during the time of the prescribed fires (Huang et al. 2019; Hu et al. 2008). The health impacts from smoke would be short term and last only until the prescribed burning is complete. The impacts on scenery would likely last 1 to 2 years or growing seasons; in the long term, however, as biodiversity returns, the scenery also would likely return (see the Specialist Report on scenery effects, located in the project file, for more information [PF-SCENERY-001]). Prescribed burning would most likely impact the surrounding communities as a whole; however, the impacts of prescribed fires could disproportionately impact environmental justice populations, if the prescribed fires are in areas with more minority or low-income individuals (Johnson Gaither et al. 2019).

In the long term, under the proposed action, the Forest Service's management decisions would better help to support the forest's health and decrease the risk of a severe, uncharacteristic wildfire, compared with under the no-action alternative. Wildfires have health impacts on the surrounding communities due to smoke and particulate matter. With the increases in the frequency of fires in recent years, these health impacts have also increased. As mentioned above with regards to prescribed fires, even short-term exposure to fire smoke has adverse health impacts, and destructive wildfires can lead to more severe health impacts than prescribed fires, which tend to be more localized (Huang et al. 2019; Zou et al. 2019; Navarro et al. 2018). The proposed management for reducing the risk for severe wildfires and the health impacts associated with the fires could provide large benefits to the surrounding communities and environmental justice populations, especially those nearest to the forests and in areas of severe fire risk.

Cumulative Effects

Visitation to the analysis area will likely increase in the future as the population in the surrounding area increases and due to reasonably foreseeable future actions that plan to construct and expand trailheads, campgrounds, and other facilities. The increase in visitors could result in an increase in the economic contributions of the local areas through the resources that are provided and managed by the Forest Service. This increase in visitors could result in cumulative impacts on the economic contributions of the analysis area.

The completed and ongoing fuels reduction, vegetation treatments, and timber harvesting that reduce the likelihood of severe wildfires could result in cumulative impacts on ecosystem services by providing additional support for healthy forest ecosystems. Ongoing prescribed burning projects could contribute to cumulative impacts on the health of local communities. However, these impacts would be short term and only last during the active burning.

Recreation and Designated Areas

Introduction

The Bitterroot Front project area covers 143,340 acres in western Montana and provides a remote and natural recreation setting. The project area is bordered by private lands to the east and the Selway-Bitterroot Wilderness to the west. It includes 22 miles of WSR-eligible segments, 92,520 acres of IRAs, and numerous recreation areas, including Lake Como and the Blodgett Day Use Area.

The recreation and designated areas analysis evaluates the effects on these resources from the no-action alternative and the proposed action. Existing recreation conditions and designated areas are detailed in the Recreation and Designated Areas Specialist Report (PF-RECREATION-001).

The proposed action proposes vegetation treatments that would potentially have short- to mid-term effects on recreation and designated areas resulting from temporary road closures, smoke, and noise associated with fuels management activities.

Analysis Methodology

The analysis focused on the following issues:

- Issue 1: How would the proposed action affect access to recreational sites and change the recreation opportunity spectrum, as outlined by the forest plan?
- Issue 2: How would the proposed action affect WSR eligibility in the project area?
- Issue 3: How would the proposed action affect the wilderness character and IRAs in the project area?

Analysis Indicators

Indicators for recreation effects include:

- Changes to the recreation experience and recreational opportunities in the project area

Indicators for WSR eligibility effects include:

- Changes to outstandingly remarkable values (ORVs)

Indicators for IRAs and wilderness character effects include:

- Changes to IRA character
- Changes to wilderness character

Spatial and Temporal Context for the Effects Analysis

Spatial Bounds: The spatial bounds for the effects analysis of recreation include anywhere within the 143,340-acre project area where people recreate. Spatial bounds for the effects analysis of WSRs, IRAs, and wilderness include any eligible WSRs, designated IRAs, or areas with existing wilderness characteristics found within the project area.

Temporal Bounds: The temporal bound for the effects analysis of recreation and designated areas is the life of this EA.

Existing Conditions

Recreation

The portion of the Bitterroot National Forest that makes up the project area provides diverse recreational opportunities, ranging from developed recreation sites and campgrounds to dispersed and primitive camping opportunities. Within the Bitterroot National Forest, the project area receives the heaviest recreational use. Many types of recreation take place in the project area, including hiking, horseback riding, climbing, mountain biking, camping, trail running, fishing, picnicking, driving for pleasure, all-terrain vehicle riding, motorized and nonmotorized water activities, hunting, firewood gathering, huckleberry picking, photography, snowmobiling, cross-country skiing, snowshoeing, and ice fishing (Hammer 2023).

According to the 2017 National Visitor Use Monitoring report, nearly half (42 percent) of visits to the Bitterroot National Forest were for hiking and walking activities. The overall satisfaction results were exceptionally high. Over 80 percent of people surveyed indicated they were very satisfied with their overall recreation experience, and another 14 percent were somewhat satisfied (USFS 2017).

Lake Como, one of the project area's most popular destinations, includes a beach, boat launch, swimming areas, and multiple trailheads. Most visitor use in the project area is concentrated in the developed sites within the Lake Como Recreation Area; visitation to Lake Como is estimated at approximately 200,000 visitors each year. Another popular location is the Bass Creek Recreation Area, which is at a low elevation and easily accessible. Approximately 70,000 people visit the Bass Creek Recreation Area annually (USFS 2017).

Other recreation areas within the project area include the Blodgett Day Use Area, which experiences heavy activity in the summer and fall, and the Lost Horse Creek corridor, which provides dispersed camping, fishing, off-highway vehicle (OHV) riding, and climbing opportunities; in the winter, a track is groomed for snowmobiling. The project area contains 23 hiking trailheads and 32 miles of routes open to motorized recreational use, including 15 miles open to motorcycles and 17 miles open to wheeled OHVs (USFS GIS 2023).

Wild and Scenic Rivers

Congress created the National Wild and Scenic River System (NWSRS) in 1968 to preserve rivers with ORVs, which could include recreation, cultural attributes, scenery, or other regionally important values. The Forest Service follows a two-step process to determine whether river segments should be recommended to Congress to be included in the NWSRS. The first step determines eligibility, and the second step determines suitability.

After a river segment is determined to be eligible—meaning that it is free flowing and possesses one or more ORV—it receives a tentative classification (USFS 2008a). Rivers are classified as wild, scenic, and recreational. The classification system refers to accessibility and development. Wild rivers are generally inaccessible and undeveloped, scenic rivers are more accessible but are still largely primitive, and recreational rivers are readily accessible and may have some development along their shorelines (rivers.gov 2023). If a river is determined to be suitable, it will be recommended to Congress for inclusion in the NWSRS.

The project area contains 22 miles of WSR-eligible segments from two separate creeks, Blodgett Creek and Lost Horse Creek. Blodgett Creek is classified as scenic; its ORVs are geology, history, recreation, scenery, and important fish habitat due to the presence of bull trout. Lost Horse Creek is classified as recreational and includes the same ORVs as described for Blodgett Creek (American Rivers 2022). There are 2,130 acres of priority fire treatment areas (labeled priority level 1 or 2) within 1 mile of eligible WSRs in the project area (USFS GIS 2023).

Inventoried Roadless Areas

The 2001 Roadless Rule[4] (USFS 2000) describes IRAs as having the following characteristics:

- High-quality or undisturbed soil, water, or air
- Sources of public drinking water
- Diversity of plant and animal communities
- Habitat for threatened, endangered, proposed, candidate, and sensitive species and species dependent on large, undisturbed areas of land
- Primitive, semiprimitive nonmotorized, and semiprimitive motorized classes of dispersed recreation
- Reference landscapes
- Natural-appearing landscapes with high scenic quality
- Traditional cultural properties and sacred sites
- Other locally identified unique characteristics

The changes to these attributes and characteristics, and corresponding changes to the IRA quality, will inform how impacts are analyzed under both alternatives. The 2001 Roadless Rule prohibits timber cutting and road construction or reconstruction within designated IRAs unless it meets the exceptions outlined in 36 CFR 294.12(c) and 36 CFR 294.13(b) (USFS 2001):

- 36 CFR 294.12 (c) identifies that maintenance of classified roads is permissible in inventoried roadless areas.
- 36 CFR 294.13(b) identifies that timber may be cut, sold, or removed in IRAs if the responsible official determines that one or more of the four circumstances exist (see the two that apply to this project below). The cutting, sale, or removal of timber in these areas is expected to be infrequent.

Two of the four circumstances applicable to the Bitterroot Front project that result in potential exceptions to the 2001 Roadless Rule are as follows:

[4] The 2001 Roadless Rule established prohibitions on road construction, reconstruction, and timber harvesting on 58.5 million acres of IRAs on National Forest System lands. The intent of the rule was to provide lasting protection for IRAs and the roadless expanse within the National Forest System in the context of multiple-use management.

- The cutting, sale, or removal of generally small-diameter timber is needed for one of the following purposes and will maintain one or more of the roadless area characteristics as defined in 36 CFR 294.11:
  - To maintain or restore the characteristics of the ecosystem composition and structure, such as to reduce the risk of uncharacteristic wildfire effects, within the range of variability that would be expected to occur under natural disturbance regimes of the current climate period.
- The cutting, sale, or removal of timber is incidental to the implementation of a management activity not otherwise prohibited by 36 CFR 294.11.

The project area contains 92,520 acres of IRAs made up of two roadless areas, the Lolo Creek IRA (580 acres) and the Selway-Bitterroot IRA (91,940 acres). The Lolo Creek IRA is in the far northwestern section of the project area. The majority of the Lolo Creek IRA is within the Lolo National Forest, though this small portion is within the Bitterroot National Forest (USFS 1984a). The Forest Service inventoried the Selway-Bitterroot IRA for possible inclusion in the wilderness preservation system in the 1970 Roadless Area Review and Evaluation Process. The Selway-Bitterroot IRA borders the eastern boundary of the Selway-Bitterroot Wilderness along the majority of the project area and is defined by creeks and canyons that are enclosed by high ridgetops. This setting provides high-quality solitude and multiple primitive and challenging recreational opportunities (USFS 1984b). There are 11,970 acres of priority fire treatment areas within IRA boundaries in the project area (USFS GIS 2023). Treatments would likely occur in these areas.

Wilderness

The forest plan identifies recommended wilderness areas located within Management Area 6 (USFS 1987). Recommended wilderness areas are areas that contain the following characteristics:

- Rare plant or animal communities or rare ecosystems. Rare can be determined locally, regionally, nationally, or within the system of protected designations.
- Outstanding landscape features, such as waterfalls, mountains, viewpoints, waterbodies, or geologic features
- Historic and cultural resource sites
- Potential or existing research natural areas
- High-quality water resources or important watershed features

Recommended wilderness areas are identified during the preparation or revision of forest plans. Wilderness area designations are based on recommendations to Congress, who is responsible for designating wilderness areas. Management Area 6 is 48,305 acres and includes the mouths of 16 canyons that make up the recommended additions to the Selway-Bitterroot Wilderness. The upper portions of these canyons are currently designated as wilderness. The forest plan recommends that the Forest Service manage these areas to maintain currently existing wilderness characteristics and the potential for inclusion in the wilderness system (USFS 1987). The recommended wilderness areas that are included in Management Area 6 have not yet been designated and do not have the Federal protections or management requirements of designated wilderness or wilderness study areas (USFS 2008b).

Environmental Consequences of No Action

Issue 1: How would the no-action alternative affect access to recreational sites, the quality of experience, and the diversity and type of recreational opportunities?

Direct and Indirect Effects

Under the no-action alternative, there would be no changes in management that would result in direct adverse effects on recreational opportunities. Under the no-action alternative, the forest in the project area would continue to be highly susceptible to disturbance from wildfires, disease, and insects, despite existing small-scale vegetation treatments. This could result in indirect adverse effects on recreation from an increase in dead trees, which would also pose a threat to visitor safety and potentially block access to roads and trails. However, the presence of abundant deadwood would increase opportunities for firewood collection.

In the event of a wildfire, the resulting damage to forest resources could create a highly degraded recreational experience and diminish opportunities to encounter recreational destinations. Additionally, wildfires and the associated responses could cause temporary forest road closures, which would restrict access, further details are available in the Transportation Specialist Report in the project file (PF-TRANSPORTATION-001). Under the no-action alternative, access for recreationists would not change.

Issue 2: How would the no-action alternative affect WSR eligibility in the project area?

Direct and Indirect Effects

There is the potential for indirect impacts on WSR eligibility under the no-action alternative. The ORVs that are essential to WSR eligibility classifications for Blodgett and Lost Horse Creeks could be damaged if scenery, habitat, or recreational values are degraded due to diminished forest health or an uncharacteristic and high-intensity wildfire, as described under Issue 1. However, there would be no direct impact on WSRs from the no-action alternative.

Issue 3: How would the no-action alternative affect the wilderness character and IRAs in the project area?

Direct and Indirect Effects

Under the no-action alternative, there could be indirect impacts on the wilderness character of recommended wilderness and IRAs. Under this alternative, existing small-scale vegetation and fuels reduction treatments would continue within the project area. However, project area–wide, there would likely be decreases in forest health and quality in areas that are not treated. As a result, there would be the potential for a high-intensity wildfire to destroy the unique qualities currently present in these locations. There would be an increased risk of damage to corresponding wilderness qualities, such as primitive recreation and apparent naturalness, and IRA characteristics, such as landscape character and integrity. However, there would be no direct impacts on wilderness characteristics or IRAs from the no-action alternative.

Cumulative Effects

Cumulative effects from past, present, and reasonably foreseeable future actions under the no-action alternative may occur within the project area. Under the no-action alternative, there would continue to be vegetation and fuels reduction treatments throughout the Bitterroot National Forest, including within the project area. Additionally, expansion of recreational opportunities within the project area, such as enhanced campgrounds, new trail construction, and water access improvements, would continue as currently planned (see PF-PROPOSED ACTION-002 in the project file). These would increase visitation. Outfitters and guides would continue to operate within the project area.

The indirect impacts from a potential uncharacteristically severe wildfire that could occur due to the limited effectiveness of previous and ongoing fuels reduction treatments under the no-action alternative could cumulatively affect the recreational opportunities and development in the project area. Additionally, increased visitation may result in a higher risk of human-caused fires in the project area. The indirect impacts due to existing fuels management in and around designated areas would also result in cumulative changes in characteristics necessary for designation, as described above.

Environmental Consequences of the Proposed Action

Issue 1: How would the proposed action affect access to recreation sites, the quality of experience, and the diversity and type of recreational opportunities?

Direct and Indirect Effects

The proposed action would result in both direct and indirect effects on recreation-related access and the quality or character of recreational experiences due to the implementation of site-specific projects. For the duration of project implementation, public access to roads, trails, and dispersed recreational opportunities in the project area could be temporarily and intermittently disrupted, resulting in short-term user displacement and potential dissatisfaction. There could be additional nuisances to recreationists, such as noise from mechanical treatments or smoke from prescribed burning, depending on the type of vegetation treatment implemented. These impacts would be especially incompatible with recreation that is enhanced by a sense of solitude, such as hiking and hunting.

Over the long term, however, due to site-specific actions and project design features, recreationists would experience improved forest health and benefit from greater protection against potential wildfire hazards. This would maintain the high level of visitor satisfaction currently experienced.

Issue 2: How would the proposed action affect WSR eligibility in the project area?

Direct and Indirect Effects

Currently, no rivers or creeks are included in the NWSRS within the project area. However, the proposed action would directly and indirectly benefit Blodgett and Lost Horse Creeks, which comprise the 22 miles of WSR-eligible streams in the project area. Improvements to forest health could benefit WSR eligibility and potential suitability in the project area by supporting natural and scenic values. There is the potential for short-term increases in creek sedimentation, which is important to designation viability, due to the proposed action and related runoff occurrences, additional details are located in the Aquatics Specialist Report in the project file (PF-AQUATICS-001). However, it is not expected that these impacts would cause substantial, long-term effects on water quality.

Issue 3: How would the proposed action affect the wilderness character and IRAs in the project area?

Direct and Indirect Effects

The proposed action would cause both direct and indirect impacts on IRAs and recommended wilderness. For the purposes of the Bitterroot Front project, timber cutting, removal, or sale in IRAs would be incidental to the implementation of prescribed fire. Fuels treatments could be implemented in IRAs in the project area to maintain or restore the characteristics of ecosystem composition and structure, reduce the risk of uncharacteristic wildfire effects, and improve wildlife habitat. Under the proposed action, all mechanical harvesting within the IRAs would be within a quarter of a mile from existing roads.

During the implementation of project actions, there would likely be short-term impacts due to vegetation treatments that could produce noise, which is incompatible with a remote setting. Additionally, there would likely be short-term impacts on opportunities for primitive recreation; these effects would be limited to those periods when implementation activities take place. Recreationists could also be displaced from locations where project implementation occurs, and the impacts of prescribed burns could diminish the scenic quality in the short term.

No designated wilderness areas are in the project area; however, the nearby Selway-Bitterroot Wilderness could be indirectly impacted by smoke and noise created by the vegetation treatments. However, most treatments bordering the wilderness area would be prescribed burns, with other actions involving limited potential for noise. Any potential noise and smoke impacts would only occur during project implementation.

The proposed action would support forest resiliency in the long term, maintaining wilderness characteristics and the overall natural and remote setting. Attributes such as apparent naturalness and landscape integrity would be better protected due to proposed treatments. Additionally, forest managers would be allowed more opportunities to let fire play its natural role in the ecosystem, protecting diverse plant and animal communities. As a result, the proposed action would provide for the attributes and characteristics necessary for potential future wilderness designation and maintenance of the IRA character.

Cumulative Effects of the Proposed Action

Recreation

Due to past, present, and reasonably foreseeable future actions in the project area, it is likely that visitation would increase over time as campground expansions, new trail construction, and previous and ongoing localized vegetation treatments in high-use areas, as currently planned in separate projects (see PF-PROPOSED ACTION-002 in the project file), result in improved recreational opportunities. Combined with the proposed action, these projects would have cumulative effects on recreation within the project area. There would be greater demand on related infrastructure in the project area; as a result, higher levels of visitation would put greater stress on visitor services and Forest Service staff to handle crowding in popular areas and to avoid user conflicts. The impacts from the proposed action would better support the recreational experience in the project area by improving natural integrity and wildfire resiliency. However, there would be no change in visitor access or amenities under the proposed action, and future actions may be needed to manage increases in visitor use.

Wild and Scenic Rivers

Past, present, and reasonably foreseeable future actions will have minimal cumulative effects on WSR values in the project area. There would be limited changes to ORVs and WSR classifications in the long term for Blodgett and Lost Horse Creeks. However, forest treatments under the proposed action could better support forest health compared with the no-action alternative. As visitation increases, especially in popular recreation destinations such as Lost Horse Creek, improved resiliency to recreation’s effects, such as wildfire or surface impacts from camping or OHV riding, would be beneficial for maintaining the ORVs.

Inventoried Roadless Areas

Similar to WSRs, there would be minimal cumulative effects on IRAs. All proposed and future prescribed burns and fuel treatments in the surrounding area are expected to have short-term effects on the landscape character and integrity of the area. Also, they are expected to have a positive long-term effect on important habitats by restoring natural ecological processes. Visual impacts related to the proposed action on scenic quality can be found in the Scenery Specialist Report located in the project file (PF-SCENERY-001).

Wilderness

There would be minimal cumulative effects on areas with wilderness characteristics. Under the proposed action, locations with high levels of wilderness attributes would remain unchanged in the long term. The vegetation treatments under the proposed action would have a positive long-term effect by restoring balance to the natural ecological processes.

Scenery

Introduction

Scenery provides the setting, identity, and sense of place for local communities close to the Bitterroot National Forest, for visitors coming from farther away, and for those who may never have personally visited. Each forest setting consists of scenic attributes that are derived from the topography, geology, and climate. Forest vegetation is also an important component of scenery.

The activities proposed by the Bitterroot Front project (see **chapter 2**) would affect the composition of forest vegetation as well as the road system, potentially affecting the current and future condition of scenic resources. A primary project purpose is to restore a resilient forest ecosystem and improve the resilience of forest vegetation to disturbances, such as insects, disease, and fire. Managing vegetation to achieve this purpose would potentially affect the current visual quality but would indirectly make the scenery resource more stable and resilient to the visual effects from undesirable disturbance.

Existing scenery conditions and figures are detailed in the Scenery Specialist Report (PF-SCENERY-001).

Analysis Methodology

The analysis focused on the following issue:

Issue 1: How would the proposed action affect visual quality in the project area?

This analysis is consistent with the principles of the Visual Management System handbook (USFS 1973, 1974). National forest landscape management is the art and science of planning and administration of forestland use in a way to maintain or upgrade the quality of the visual environment. The Visual Management System provides the framework to inventory visual resources and provide measurable standards for the management of visual resources (USFS 1973, 1974). Because the forest plan (USFS 1987) has not been updated to follow the updated Scenery Management System, terminology used in this analysis follows the Visual Management System as outlined in the forest plan. The Scenery Management System provides the overall framework for orderly inventory, analysis, and management of scenery and was published for nationwide use in 1995 (USFS 1995).

Visual quality indicates the degree of intactness and wholeness of the landscape character. Visual quality is evaluated by measuring the degree of alteration in line, form, color, and texture from the natural or natural-appearing landscape character or from the established landscape character accepted over time by the public. This is done by measuring changes in the scale, intensity, and pattern against the attributes of that landscape character.

The Forest Service assessed project effects on visual resources by determining the potential for change to the visual quality relative to the forest plan direction. Measurable visual elements, such as dominance, the degree of deviation, and intactness, define the level of visual quality. Concern levels and distance zones relative to viewsheds define visibility. The viewshed analysis was generated from key observation points (KOPs), which helped in identifying the extent of potential changes.

The Forest Service identified the following eight specific locations within and outside the project area where a concern for visual quality may exist:

- Downtown Stevensville
- U.S. Highway 93
- Bitterroot River
- Lake Como access road
- Downtown Hamilton
- Blodgett Canyon
- Blodgett Canyon access road
- Lake Como

Some of these locations (that is, U.S. Highway 93 and the Bitterroot River) are linear or cover a large area; therefore, they have multiple observation points from which to adequately assess views. Due to high recreation visitation and traffic, there is a high concern for visual quality in the project area; therefore, the Forest Service chose to include several recreation sites as observation points. Several recreation sites within the project area were not selected as observation points, however, because there are limited to no views of proposed treatment areas.

Potential changes to the existing visual quality were evaluated by estimating the degree of visible disruption of the existing landscape character from specific locations within and outside the project area. The visual quality analysis incorporated consideration of treatment units in management areas that may exceed 40 acres. The analysis assumes that all design features relative to visual quality would be implemented for the project, including specific design features for the larger units referenced above. To ensure project activities meet the forest plan's standards for visual quality, use of the Bitterroot Front scenery activity key[5] (PF-SCENERY-002) would be incorporated into project planning and implementation.

Analysis Indicators

- Acres of visual quality objectives under the alternatives and a qualitative discussion of potential effects on visual quality from management activities

Spatial and Temporal Context for the Effects Analysis

Spatial Bounds: The direct, indirect, and cumulative effects analyses are focused entirely within the project area boundary.

Temporal Bounds: The time frame considered is approximately 20 years in the future, at which time the proposed treatment activities would be completed, and vegetation and fuels response to those treatments

[5] The Bitterroot Front scenery activity key is a key by which planners would determine whether activities would meet the assigned visual quality objective by management area on an implementation level. The key includes design mitigations.

would be stabilized. Short-term effects are considered between 2 and 3 years. The cumulative effects analysis considered past natural and management activities from as early as the 1970s.

Existing Conditions

In accordance with the forest plan, the project area contains several visual quality objectives: modification, partial retention, preservation, and retention. Visual quality objectives provide objectives and measurable standards for visual quality and are used to describe the degree of alternation that may occur to the natural landscape (USFS 1974). The modification visual quality objective means that management activities may visually dominate the original characteristic landscape. The preservation visual quality objective only allows ecological changes, and it applies to wilderness areas, primitive areas, and unique management units. The retention visual quality objective provides for management activities that are not visually evident. The partial retention visual quality objective allows for management activities, but it requires that these activities remain visually subordinate to the characteristic landscape (Bacon 1979).

Most of the project area has a retention visual quality objective, and there are also large areas with preservation or partial retention visual quality objectives (USFS GIS 2023). This means that most of the project area's visual landscape should not be dominated by management activities.

The forest plan identified that the Smith Creek, Spoon-McCoy, and Moose Ridge areas needed to be rehabilitated; however, as of 2020, these areas are meeting or exceeding their visual quality objectives. The Tin Cup and Tin Cup Modification sale area still has evidence of harvests from the 1980s; as of 2020, the area is meeting the lower end of partial retention and moving toward meeting its visual quality objective. As of 2020, the McCalla Creek area associated with the McCall Creek, Saint Mary Peak, Sharrot Creek, and Stevensville West Central timber sale is still showing evidence of harvests from the late 1970s, early 1980s, and late 1990s. That area is at the lower end of meeting the partial retention visual quality objective and is naturally moving toward fully meeting that visual quality objective (USFS 2020c).

Wildfire, insect activity, and vegetation treatments in the project area have affected visual quality. High-severity wildfires have been increasing in western U.S. forests as climate change has led to warmer and drier fire seasons (Parks 2020). See the "Fire and Fuels" section for more information about wildfires in the project area.

Environmental Consequences of No Action

Issue 1: How would the no-action alternative affect visual quality in the project area?

Direct and Indirect Effects

If no action is taken, there would be no direct management-driven effects on the visual quality. The existing scenery conditions in the project area would remain the same. Therefore, the Tin Cup and Tin Cup Modification sale area and the McCalla Creek area associated with the McCalla Creek, Saint Mary Peak, Sharrot Creek, and Stevensville West Central timber sale would continue on the lower end of partial retention while naturally moving toward fully meeting their visual quality objectives. Other areas currently meet their existing visual quality objectives as discussed in the forest plan; however, without vegetation treatments, existing conditions would deteriorate toward a less stable landscape over the long term.

Treating fuels minimizes mortality associated with insects and disease. Regenerating fire-disturbed areas maintains and reestablishes long-lived, early seral species. An increased risk of visual quality-destructive disturbances associated with vegetation conditions, including high-severity wildfires and insects and disease mortality, could indirectly result in undesirable visual quality. This would change the sense of place for all forest visitors. For more information, see the “Vegetation Effects Analysis” section.

Cumulative Effects

A variety of past natural activities (wildfire and insect activity) and management activities (vegetation treatments) in the project area have affected the visual quality. There are still effects on visual quality from past harvest in the Tin Cup and Tin Cup Modification sale area and the McCalla Creek area associated with the McCalla Creek, Saint Mary, Sharrot Creek, and Stevensville West Central timber sale. Additionally, there are still some effects on visual quality from the Gash and Big Creek Fires in the first decade of the 21st century in Smith Creek and from the Roaring Lion Fire in Management Area 5. Additionally, the McCalla Creek area still has evidence of harvest from the late 1970s, early 1980s, and late 1990s. However, as mentioned previously, the landscape within the project boundary and adjacent land generally has largely recovered from historical activities that potentially affected visual quality.

Currently, the area has high visual quality. Despite these past activities, it is natural appearing with no other evident modifications visible from primary access routes and observation points.

From past, present, and future low-severity prescribed burns near the project area, there would be some cumulative impacts for 2 to 3 years. Under the proposed action, there would be an additional 66,720 acres affected across the project area where the low-severity prescribed burns would also lead to cumulative impacts over 2 to 3 years.

Environmental Consequences of the Proposed Action

Issue 1: How would the proposed action affect visual quality in the project area?

Direct and Indirect Effects

Commercial timber harvest would affect 32,150 acres and would cause a direct effect on scenery from viewer access points. All proposed and future prescribed burns and fuel treatments in the surrounding area would have short-term effects on the landscape character and integrity of the area and have a positive long-term effect on important habitats by restoring natural ecological processes. The effect would be for a relatively short duration, especially from intermediate treatments within IRAs. See the “Recreation” section for more information on IRAs.

These intermediate treatment activities have the potential to directly impact visual quality attractiveness in middle to background views. This is because they open canopies, expose the forest floor, and decrease the density of the dark-green, uniform forest landscape to a patchwork of dense, dark-green trees intermixed with shades of brown and green on open land or white with snow cover, depending on the time of year. The treatments could alter the line, color, and texture; however, the areas where these activities would occur would be minimally noticeable from observation points and travel access routes. This is because they would be infrequently visible—if they are even noticed at all—for only a short duration of time, most likely 2 to 5 years.

The potential for larger treatment patches to affect visual quality is evaluated for each KOP. Visual effects from proposed treatments would occur in various areas that are visible from 1 KOP to as many as 16 KOPs.

Depending on the scale and magnitude of treatments carried out in these areas, and the distance between the selected KOP and the treatment area, there could be a decreased likelihood that the treatments would be visible to the casual observer. Furthermore, mandatory design features for visual quality would reduce the potential unnatural appearance in these units. These design features would include:

- To the extent possible, mimic and borrow natural topographic and vegetation forms, lines, textures, colors, and use changes in these features for boundaries.
- To the extent possible, vary the tree clumping size, shape, and distribution.

For a full list of design features, see the Bitterroot Front scenery activity key (PF-SCENERY-002).

Prescribed burning would affect 52,270 acres; of these, 22,670 acres have a visual quality objective of preservation. Prescribed burning would have a direct effect on visual quality by altering primarily the foreground views; it would be indiscernible from background views. Most prescribed burn areas would remove dense understory trees and fuel accumulations, resulting in a more open-appearing stand and increasing opportunities to view greater distances across the forest landscape. Initially, these effects would be quite noticeable, but they would begin to blend with the surrounding vegetation typically within 1 to 2 years.

Burning slash piles and underbrush would affect 14,450 acres; of these, only 90 acres have a visual quality objective of preservation. Burning slash piles and underbrush would alter the fine-green matrix of the small trees scattered in the visual foreground to an orange-brown matrix from fallen needles. Eventually, the orange-brown appearance would be replaced by shades of green and brown as shrubs and grasses colonize these areas within 2 to 5 years.

The proposed prescribed burns would be designed to burn at mixed severity, which mimics the historical fire regime. This could result in tree mortality and a mosaic of burn patterns, creating a change in color. Areas of black and gray would be interspersed within areas of unburned vegetation, which would be evident. Depending on the intensity of areas burned in most of the project area, visual impacts from prescribed burns could last from approximately 2 to 5 years. If some areas experience high-intensity burns, impacts could last more than 5 years; however, it is anticipated that these areas would occur in a smaller percentage of the total area, and an even smaller percentage would be noticed from travel access routes.

Although the proposed treatments could temporarily affect visual quality, as described above, none of the treatments either individually or collectively would reduce the existing visual quality.

Cumulative Effects

The cumulative effects from the proposed action are the effects on scenery from past, present, and foreseeable future actions in the Bitterroot Front project area. To contribute to cumulative impacts, the visual effects from these projects must overlap in time and space.

A variety of past natural activities (wildfire and insect activity) and management activities (vegetation treatments) in the project area have affected the visual quality. There are still effects on visual quality from past harvest in the Tin Cup and Tin Cup Modification sale area and the McCalla Creek area associated with the McCalla Creek, Saint Mary, Sharrot Creek, and Stevensville West Central timber sale. Additionally, there are still some effects on visual quality from the Gash and Big Creek Fires in the first decade of the 21st century in Smith Creek and from the Roaring Lion Fire in Management Area 5. Additionally, the McCalla Creek area still has evidence of harvest from the late 1970s, early 1980s, and late 1990s. However, as mentioned previously, the landscape within the project boundary and adjacent land generally has largely recovered from historical activities that potentially affected visual quality.

Currently, the area has high visual quality. Despite these past activities, it is natural appearing with no other evident modifications visible from primary access routes and observation points.

From past, present, and future low-severity prescribed burns near the project area, there would be some cumulative impacts for 2 to 3 years. Under the proposed action, there would be an additional 66,720 acres affected across the project area where the low-severity prescribed burns would also lead to cumulative impacts over 2 to 3 years.

Soils

Introduction

Soils are important components of ecosystem sustainability because they supply air and water, nutrients, and mechanical support for the sustenance of plants. Soils also absorb water during infiltration. By doing so, they provide storage for water and act as a conduit that delivers water slowly from upstream slopes to channels where it contributes to streamflow (Neary et al. 2005). Surface disturbance that reduces soil quality and soil organic matter can negatively affect the beneficial functions of soils.

Analysis Methodology

The analysis focused on the following issues:

- Issue 1: How would the proposed action affect soil quality?
- Issue 2: How would the proposed action affect soil organic matter?

Analysis Indicators

Soil Quality

Forest Service Manual (FSM) 2550 defines soil quality as "the capacity of a specific kind of soil to function, within natural or managed ecosystem boundaries, to sustain plant and animal productivity, maintain or enhance water and air quality, and support human health and habitation and ecosystem health." Soil quality is influenced by dynamic soil properties and can be influenced by management activities. In Region 1, soil quality standards are used to identify measurable soil characteristics and set detrimental disturbance thresholds related to soil function for these characteristics. For example, soil compaction can negatively impact soil bulk density, which can result in reduced function of soil-water infiltration and root penetration abilities; therefore, this measurable attribute (compaction) can be used as a proxy for the inverse of soil quality. Detrimental soil disturbances (DSDs) for individual soil physical properties are defined in the Soil Specialist Report (PF-SOILS-001), according to FSM Region 1 Supplement 2500-2014-1 (USFS 2014b). A DSD over 15 percent on a per area basis is the indicator for effects on soils quality.

Soil Organic Matter

Coarse woody debris (CWD) is important to maintain soil productivity, assist in soil carbon storage, and provide structure for small mammals. Since the forest plan was developed, scientific information became available regarding the amount of CWD present in different fire groups (Fischer and Bradley 1987; Graham et al. 1994; Brown and Smith 2000; Brown et al. 2003). This information provides more refined measures to guide project implementation to contribute to achieving forest plan goals and objectives. The components for CWD integrate managing the risk of wildfire, the habitat requirements of species requiring high densities of logs, soil function, and the ecological processes resulting from fire (Bull et al. 1997; Bull 2002).

Upon completion of commercial harvest and prescribed fire activities, the levels of coarse woody material (greater than 3 inches diameter), as shown in table 16, will be established. This material encompasses both standing dead and downed woody fuels and is based on the amount of woody material that allows for soil function and process, successful regeneration, and mammal habitat, birds, insects, microbes, etc. while not creating a fuel loading hazard (Harvey et al. 1988; Graham et al. 1994; Bull 2002; Atchley et al. 2021).

Table 16. CWD debris requirements by fire group

Fire Group	CWD (Tons per Acre)
Scree, rock, meadows, grasslands	0–5
1, 2, 4 = Warm, dry ponderosa pine; warm-dry Douglas-fir	5–10
5, 6 = Cool, dry Douglas-fir; moist Douglas-fir	10–20
7, 8, 9, 10 = Cool lodgepole; dry lower subalpine fir; moist lower subalpine fir; cold, moist upper subalpine and timberline	8–24
11 = Warm, moist grand fir, western redcedar, and western hemlock	20–30

Sources: Based on Brown and Smith 2000; Graham et al. 1994; Fischer and Bradley 1987

The forest floor is the equivalent of a soil O horizon, which is made up of mostly soil organic matter and lesser amounts of mineral soil, compared with underlying soil horizons. The organic matter includes freshly fallen plant litter, partially decomposed litter, and more decomposed humic materials (Binkley and Fisher 2013). The forest floor is a habitat for soil organisms that function in soil mixing, decomposition, and nutrient cycling (Binkley and Fisher 2013).

Spatial and Temporal Context for the Effects Analysis

Spatial Bounds: Direct and indirect impacts on soils are analyzed within the proposed activity areas. The FSM Region 1 Supplement 2500-2014-1 (USFS 2014b) defines an activity area as the land area affected by a management activity to which soil quality standards are applied. Activities outside the activity areas proposed are not subject to a cumulative effects analysis because they do not overlap spatially with the lands being proposed for management in the Bitterroot Front project area. The loss of soil quality in a treatment unit would not lead to a loss of soil quality in an adjacent stand or other areas in the watershed. Therefore, the analysis area for cumulative effects is the same area used for the direct and indirect effects analysis.

Temporal Bounds: The direct impacts of the no-action alternative and proposed action are DSD and loss of organic matter in the short term (immediately and up to 5 years following treatment). Indirect impacts of the no-action alternative and proposed action are DSD and loss of organic matter more than 5 years after the project. Both types of impacts would occur within the spatial boundaries of the treated areas. For past, present, or future activities to overlap in time, the effects on soils from the activities must overlap. Soil physical changes (detrimental compaction, detrimental displacement, detrimental erosion, severe burning, and puddling) can persist on the landscape for greater than 20–40 years following management activities. Biological soil conditions change more quickly. For example, revegetation occurs within 5 years (under most situations), and organic matter begins to rebuild in 10 years but may take more than 50 years to reform humus. Therefore, for the cumulative effects analysis to cover both the physical and biological aspects of the soil, the past activities include those dating to at least the 1960s.

Existing Conditions

Since 1989, Forest Service soil scientists have been collecting post-implementation monitoring data for DSD. During 2013–2017, post-implementation DSDs were lower when compared with previous years

(1989 to 2012). The data show that vegetation activities typically resulted in disturbance of less than 10 percent for the last 5 years, which is well under the forest plan standards. Use of design features has also been important for implementation of these activities (USFS 2022).

The long-term data indicate that summer ground-based skidding of logs has the highest detrimental effects on soils in the forest. The two methods of vegetation management that have had effects greater than 15 percent DSD include summer skidding with dozer piling and summer skidding with whole tree yarding with no dozer piling. Operations since 2000 have had less soil disturbance and have not exceeded Region 1 soil quality standards (15 percent DSD) since 2005; this is due to the development of design features, sale administration, and operator awareness of soil disturbance. The greatest concern for soil disturbance remains for existing and future summer ground-based skidding projects, including those on slopes that near the 40 percent threshold for ground-based skidding. Units with a high percentage of slopes close to 40 percent often have the highest DSD following operations due to displacement of topsoil from the torque required by the machine on the steeper slopes (USFS 2022).

Past harvested areas in the Bitterroot Front project area total approximately 40,700 acres (USFS GIS 2023). Depending on the type and intensity of yarding, these areas could have potential DSD persisting from past operations. Major (frequently used) skid trails in ground-based harvest units are the most likely past harvest activity to have persistent DSD (USFS 2009).

Some soils in the project area have properties that make them more sensitive to disturbance. Wet soils and heavy soils (those with greater than 35 percent clay content) are the most susceptible to disturbance. A detailed comparison of soil moisture and texture and their combined physical properties are described in appendix B of the Soil Specialist Report (PF-SOILS-001). Approximately 13,930 acres (10 percent) of soils in the project area have high clay content and compaction potential (USFS 2023c). Areas with ash surfaces are also susceptible to disturbance due to their low bulk density and high soil porosity. This means they are more subject to compaction from machinery. They may also have a higher tendency toward mass movement. Approximately 101,910 acres (71 percent) of soils in the project area have ash surfaces; of these, approximately 14,130 acres have a potential for compaction (USFS GIS 2023).

Environmental Consequences of No Action

Issue 1: How would the no-action alternative affect soil quality?

Direct and Indirect Effects

No new soil disturbances would result from management activities. The existing soil quality would be maintained in the short term. Soil disturbances in the project area would recover in the long term, while some detrimental impacts would persist on the landscape. The no-action alternative would not include resource benefits associated with ameliorative proposed treatments, such as low-severity, prescribed burning.

As demonstrated by past events, soils in the project area could be affected by future wildfires. Forest management, such as fuels reduction and vegetation removal, that would reduce the potential for severe wildfires would not occur. Large fires and those with high burn severity are more likely to result in large-scale soil erosion and mass movement (Cannon et al. 2003). In the event of a large, high-severity wildfire, soil disturbance and erosion would greatly exceed those caused by prescribed fire treatments (Neary and Leonard 2021), such as those proposed in this project. In addition, forest restoration activities, including overstory thinning, reduce wildfire severity and can also improve the health and resiliency of native plant communities; this ultimately improves soil nutrient inputs and water-holding capacity, and limits erosion (Powers 2002).

Cumulative Effects

There would be no treatment activities under the no-action alternative with the potential to overlap with the past, present, or reasonably foreseeable actions; therefore, this alternative would not result in cumulative effects on soil quality.

Issue 2: How would the no-action alternative affect soil organic matter?

Direct and Indirect Effects

Impacts would be similar to those described under Issue 1. Existing CWD levels and the forest floor would be maintained in the short term but could decrease in the event of a large, high-severity wildfire.

Cumulative Effects

There would be no treatment activities under the no-action alternative with the potential to overlap with the past, present, or reasonably foreseeable actions; therefore, this alternative would not result in cumulative effects on soil organic matter.

Environmental Consequences of the Proposed Action

Issue 1: How would the proposed action affect soil quality?

Direct and Indirect Effects

Activities from the proposed action, as described in the Soil Specialist Report (PF-SOILS-001), would have the potential to result in DSD. Most detrimental effects would be concentrated on primary skid trails and landings, where heavy equipment could compact, displace, or rut soil, thereby reducing pore spaces and impeding root growth. Of the forest management activities, ground-based yarding typically incurs some of the highest soil disturbance, whereas maintenance and prescribed burning treatments are typically of low severity and have a low risk of affecting soil quality. Currently, the forest plan does not allow for ground-based yarding on slopes steeper than 40 percent. To further minimize disturbances, ground-based yarding operations in the Bitterroot National Forest are generally restricted to slopes less than 35 percent.

The proposed treatment areas would be harvested using designated trails and landings that are laid out to spatially occupy less than 15 percent of the activity unit. To the extent feasible, trails and landings would use existing roads and trails, which would limit new disturbance. When mechanical operations occur under dry soil conditions, or over snow and frozen ground, soils are less prone to compaction and rutting. Coarse-textured soils with high coarse fragment contents and ample drainage are less prone to compaction, rutting, and loss of soil structure when driven upon, making them conducive to less DSD than some other soil types. Soils with high coarse fragment contents and limited vegetation cover, however, can be more susceptible to displacement. Implementation of project design features (including, but not limited to, operating within specific soil moisture conditions, adhering to the prescribed season of operation, and operating exclusively on designated trails and landings) would minimize the risk of detrimental topsoil displacement.

Fire is necessary to remove excess fuels, expedite biogeochemical cycling, and invigorate seed sources and understory (Brown et al. 2003; DeLuca and Sala 2006; Ball et al. 2010). Localized areas of heavy fuel loading can cause soil heating that may result in areas of DSD and cause a short-term increase in erosion potential. On a project scale, prescribed fire activities would remove fuel loading in a controlled environment. This would protect the soil from widespread areas of heavy fuel buildup that could create large areas of high soil burn severity in a wildfire situation (Parsons et al. 2010). In a prescribed fire environment, areas of high soil burn severity are generally localized (less than 100 square feet) and do not result in large areas of DSD or resulting erosion (USFS 2022).

While DSD is not completely avoidable during project activities, the proposed action would incorporate a comprehensive suite of design features (see PF-SOILS-001, appendix A) to minimize soil disturbances that would cause irreversible damage to soil quality. As described above, long-term soil monitoring in the Bitterroot National Forest has shown that implementation of standard design features, best management practices, and site-specific mitigations limit soil disturbance effects and ensure soil quality is maintained (USFS 2022). The Region 1 soil quality standards establish a 15 percent DSD threshold for determining loss of soil quality at a landscape scale; while soil disturbance could occur from the proposed activities, the DSD is not expected to exceed 15 percent in any activity area.

The implementation of design features and site-specific resource protection measures reviewed during the Soil Risk Evaluation Framework pre-implementation review, as described in the Soil Specialist Report (PF-SOILS-001), would ensure soil quality is maintained within the project area in accordance with all relevant laws and policies. A project soil scientist would remain engaged in project implementation.

In areas where soil quality may be at risk, field reviews would be required to assess existing site DSD following the Soil Risk Evaluation Framework, as described in the Soil Specialist Report (PF-SOILS-001).

Cumulative Effects

Past activities in the project area include timber harvest, grazing, road construction, recreation, restoration, and fires. Some soils in the project area have reduced soil quality due to DSD that occurred over 60 years ago. Logging systems from the 1960s constructed terraces, a feature that was known to promote fast and efficient tree growth and harvesting systems, but they left several sites in the project area with long-term disturbances. These soils were compacted, displaced by skidding, and had significant topsoil and subsoil mixing, which stunts long-term soil development.

Ongoing commercial and noncommercial timber harvesting and thinning projects may have treated acreages that overlap the potential treatment areas under the proposed action. Harvest and thinning projects may contribute to DSD, especially if the activities use ground-based equipment. Continued nonmotorized recreation, fuels reduction, and grazing are other reasonably foreseeable activities that could overlap any of the potential treatment areas under the proposed action that would affect soil resources. Fires are always a possibility and may overlap proposed treatment areas.

During project implementation, a soil scientist would review the desired treatment activities and effectiveness of design criteria at the unit level. Because of the effectiveness of design features to minimize DSD, it is anticipated that proposed activities would not result in cumulative DSD above Region 1’s 15 percent soil quality threshold. The proposed activities would add to cumulative soil effects in the project area; however, all treatment units would have 15 percent cumulative DSD or less after treatment and would meet Region 1 soil quality standards. Previous forest plan monitoring shows that DSD in the project area has been limited to less than 15 percent when standard design features, such as operating on dry soils and limiting ground-based yarding to less than 35 percent slope, are used.

Issue 2: How would the proposed action affect soil organic matter?

Direct and Indirect Effects

The proposed action would not result in long-term changes in CWD (Powers et al. 2005) as long as guidance within the project design features is followed. Soil organic matter should be preserved if the loss of CWD, soil porosity, and topsoil is limited (Powers 2002). By maintaining organic matter, including CWD and ground cover on at least 85 percent of the site, nutrient cycling and availability would not be altered (Page-Dumroese et al. 2000; Graham et al. 1994). For commercial harvest, localized losses could occur at landings, on skid trails, or on temporary road footprints; however, outside these locations, large areas (greater than 100 square feet) with detrimental levels of organic matter removal are not expected as long as design features are followed, and implementation is monitored to ensure that adequate CWD is left on-site.

Forest floor displacement moves the forest floor and topsoil from one place to another. In the absence of fire or erosion, when displacement events can be exacerbated by the loss of vegetation cover, the displaced material is not lost from the site. Page-Dumroese et al. (2000) reports that while productivity losses from forest floor displacement may initially be high in localized areas less than 100 square feet, productivity losses may not be significant to site sustainability when compared with large-scale losses from fire or erosion. Powers et al. (2004) noted that complete organic matter removal on long-term soil monitoring plots across the nation had no impact on total vegetative production after 10 years.

For mechanized thinning treatments, localized losses may occur at landings and skid trails, or where temporary roads are utilized. Besides these areas, the Forest Service does not anticipate large areas (greater than 100 square feet) with detrimental levels of organic matter removal. Region 1 soil quality standards, design features, and CWD recommendations for the Bitterroot National Forest (table 16) would ensure that adequate CWD would be left on-site. For prescribed fire activities, treatments would reduce organic matter and CWD in the short term. In the long term, regrowth of vegetation, needle drop, and falling snags would continue to replace CWD and maintain soil organic matter.

In areas where the soil quality may be at risk, field reviews would be required to assess the existing site CWD following the Soil Risk Evaluation Framework (see PF-SOILS-001).

Cumulative Effects

Past, present, and reasonably foreseeable actions would be the same as described under Issue 1, “Cumulative Effects.” Some areas, such as previously used landings, burn piles, and major skid trails, have minimal organic surface development, and mineral soils are vulnerable to erosion or weed colonization. Compaction has longer-lasting effects on soil types with fine textures, especially clay loam soils. There are minimal clay loam-textured soils present in the project area, and coarse-textured, sandy loam soils are common. This inherent geology lends the project area to less compaction from future activities. Natural recovery of subsurface compaction would continue over time through the freeze/thaw cycles and root penetration.

Based on existing field surveys from previous projects, such as the Trapper Bunkhouse, Como, and Westside projects, most soils in previously disturbed areas from activities implemented during the 1960s are recovering. Previously displaced areas have redeveloped organic horizons and are developing productive topsoil horizons in most areas. More site-specific conditions that are directly connected to planned units within this project would be assessed prior to implementation. Should these more current planned surveys present less-than-desirable conditions, management options would be adjusted to protect the soil resources within the forest plan standards and guidelines.

Rare Plants

Introduction

The diverse geology and topography in the Bitterroot Front project area provide habitat for several rare plant species. Limited habitat and presence surveys were carried out in small portions of the Bitterroot Front project area. Because the Forest Service is using a condition-based planning process, it is not known whether habitat or plants exist where disturbance may occur. Rare plants were located during these limited surveys, and additional surveys must be conducted once implementation areas have been identified. For additional information on rare plants, rare plant habitat, and species surveys, see the specialist report in the project file (PF-RAREPLANTS-001).

Thirty-three rare plant species have been found in the project area, but there is a large amount of suitable habitat for other species as well (table 17). Species present include whitebark pine, which has been listed as threatened under the Endangered Species Act (ESA), effective January 17, 2023 (USFWS 2022). Other rare plant species include sensitive plants that have been identified by the regional forester for which there is "concern for population viability, within a state, as evidenced by a significant current or predicted downward trend in populations or habitat." Species of concern have been determined by the State of Montana as rare or threatened plants with declining populations. Additional detailed information about whitebark pine can be found in the Wildlife Specialist Report (PF-WILDLIFE-001).

Analysis Methodology

The analysis focused on the following issues:

Issue 1: How would the proposed action affect the abundance and viability of rare plant species in the project area?

Analysis Indicators

The Montana Natural Heritage Program (MNHP) database, spatial information, and Bitterroot National Forest records were reviewed to identify known rare plant populations in or near the project area. The change in the presence or abundance of rare plants will indicate how the proposed action and the no-action alternative affect the abundance and viability of rare plant species in the project area.

Spatial and Temporal Context for the Effects Analysis

Spatial Bounds: The direct, indirect, and cumulative effects analyses are focused entirely within the project area boundary. Since knowledge of most species in the Bitterroot National Forest rare plant list is still limited, it is important to be aware that species may be found in areas outside of what is currently thought to be suitable habitat.

Temporal Bounds: The time frame for the short-term effects analysis occurs within 5 years while the long-term effects analysis occurs anytime 5 years and beyond.

Existing Conditions

Table 17 provides a list of rare plant species that were known to occur within the Bitterroot Front project area or had the potential to occur in the area; the table also provides a description of their habitat. Given the size of the project area, comprehensive rare plant surveys have not been conducted throughout the entire area. Instead, table 17 presents existing knowledge of potentially occurring rare plants, and additional surveys would be conducted when areas are identified for project implementation. See the

Specialist Report in the project file (PF-RAREPLANTS-001) for more detailed information about the biology, ecology, and population trend of each species.

Table 17. Rare plants and rare plant habitat found in the project area

Species	Habitat	Species Range in the Project Area (Acres)[6]
USFWS Threatened, Endangered, and Proposed Species		
Pinus albicaulis Whitebark pine	Mixed-conifer stands at tree line	57,928
Forest Service Region 1 Vascular Sensitive Species (2023)		
Ageratina occidentalis Western boneset	Talus sites	3
Allium columbianum Columbian onion	Moist swales along vernal ponds and streams in valleys	33
Allium parvum Dwarf onion	Grasslands and open ponderosa pine	7
Athysanus pusillus Sandweed	Vernally moist rocky areas	53
Botrychium simplex Least moonwort	Montane meadows and grasslands in disturbed sites from low to moderate elevations	<1
Carex scoparia Pointed broom sedge	Wet soil along rivers and sloughs in valleys	10
Castilleja covilleana Coville's Indian paintbrush	Grasslands, ponderosa pine, and rocky alpine	3
Draba daviesiae Bitterroot draba	Rocky slopes and talus near or above timberline	31
Draba densifolia Dense-leaf draba	Gravelly, open on rocky slopes and exposed ridges	<1
Dryopteris cristata Crested shield-fern	Fens, bogs, and wetland areas	25
Heterocodon rariflorum Western pearl-flower	Canyon seeps	881
Idahoa scapigera Scalepod	Vernally moist rocky areas	9
Micranthes tempestiva Storm saxifrage	Alpine vernal rocky areas	7
Mimulus ampliatus Stalk-leaved monkeyflower	Open seeps and vernally moist soil along slopes, cliffs, and streams from the valleys to the subalpine zones	144
Pedicularis contorta var. *rubicunda* Selway coil-beaked lousewort	Ridgetops and meadows in upper subalpine to alpine	321
Penstemon flavescens Yellow beardtongue	Open or wooded, often rocky slopes in mountains	499
Penstemon Lemhiensis Lemhi penstemon	Grasslands, ponderosa pine stands, and sagebrush areas	6

[6] Exact acres have not been mapped; individuals have been observed and occur throughout the project area (MNHP 2023).

Species	Habitat	Species Range in the Project Area (Acres)[6]
Forest Service Region 1 Non-Vascular Sensitive Species (2023)		
Meesia triquetra Three-angled threadmoss	Fens and bogs	70
Peltigera gowardii Western waterfan lichen	Aquatic, mountain streams or springs; on rock; rarely on wood	<1
Sphagnum fuscum Brown hair peatmoss	Top of hummocks, wet soil, and peat	<1
MNHP Vascular Species of Concern		
Carex scoparia Pointed broom sedge	Wet soil along rivers and sloughs in valleys	8
Mimulus floribundus Floriferous monkeyflower	Moist to wet places in lower elevations	<1
Satureja douglasii Yerba buena	Partial to deep shade in moist forests in the montane zones	5
MNHP Non-Vascular Species of Concern		
Sphagnum magellanicum Magellan's peatmoss	Along the edges of bogs or fens	106
Lobaria linita Cabbage lungwort lichen	Montane to alpine habitats; alpine sod or mossy rocks	5
Normandina pulchella Elf-ear lichen	Bark and mosses in moist habitats	8
Parmeliella triptophylla Lead lichen	Moist habitats on tree bases, rocks, and moss found on other rocks	18
Ramalina obtusata Hooded ramalina lichen	Tree and shrub bark in low-elevation riparian forests	124
MNHP Potential Species of Concern		
Allotropa virgata Candystick	Lodgepole stands	311
Forest Service Species of Interest		
Camassia quamash Small camas	Wet meadows and along streams	<1
Lewisia pygmaea var. *nevadensis* Nevada lewisia	Moist meadows and open forests	<1
Lewisia rediviva var. *rediviva* Bitter root	Rocky, open, dry soils	<1

Source: USFS 2023d

Environmental Consequences of No Action

Issue 1: How would the no-action alternative affect the abundance and viability of rare plant species in the project area?

Direct and Indirect Effects

Under the no-action alternative, the Forest Service would not implement the Bitterroot Front project. There would be no direct effects on rare plants because no actions would be carried out. In the short term, invasive plants would continue to spread within the project area. However, the rate of introduction and spread under the no-action alternative from ground-disturbing activities would not increase in the long term because ground disturbance associated with the project would not occur. There would still be some potential for invasive plant spread because of canopy openings created by insect- or disease-killed trees losing needles and/or falling over. These impacts could adversely impact some rare plant habitat; however, they should not adversely impact the abundance and viability of the species found in the project area.

With continued fire suppression under the no-action alternative, species acclimated to open habitats with frequent fire regimes would decline as continued vegetation succession would increase canopy cover and decrease suitable habitat. Further, increased fuel loading may result in intense fires, soil heating, and seed mortality, as well as damage to rare plant habitat and the loss of individual rare plants and populations. Increases in areas of bare soil could allow invasive species to establish and spread.

Vegetation conditions would continue to be influenced by fire suppression actions and natural influences, including climate change, increased fire severity and intensity, and unnaturally dense forest stands. Vegetation conditions would continue to trend away from desired conditions and would have reduced ecological resilience and diversity to support rare plant viability.

Whitebark pine abundance and viability may continue to decline without proposed treatments to remove other trees that compete with the whitebark pine. This would improve tree vigor, health, and natural resilience to insects and disease. See the wildlife specialist report (PF-WILDLIFE-001) for more information on whitebark pine.

Cumulative Effects

Under the no-action alternative, the extent to which rare plants and their habitat have been impacted by past management activities is unknown. It is probable that more suitable habitat existed prior to fire suppression activities and the introduction of invasive species. Invasive plant spread may be attributed to many factors, including wildlife grazing, road construction, timber harvest, recreational use, fire, and drought. However, it is still unknown what the status of rare plant populations were in the past; therefore, the impacts of any such activities on these populations would be speculative at this time.

Continued fire suppression with no fuel reduction activities in the project area would result in more forest encroachment on these open forest habitats. This could increase the risk of a more severe fire event in the coming years. A more severe fire could contribute to the further spread and abundance of invasive species across the landscape.

Environmental Consequences of the Proposed Action

Issue 1: How would the proposed action affect the abundance and viability of rare plant species in the project area?

Direct and Indirect Effects

Currently, 33 known rare plant species (see table 17) were found in the project area. The proposed action could have an impact on all individuals or habitat present within the project area; however, it would not likely result in a trend toward Federal listing or reduced viability for the population or species. The areas with known rare plant populations may not all be treated or affected. Species such as western boneset, sandweed, bitter root, bitterroot draba, dense-leaf draba, scalepod, storm saxifrage, crested shield-fern, three-angled threadmoss, and Magellan’s peatmoss are found in rocky or wetland habitats where vegetation treatments are not likely to occur; therefore, the proposed action may not affect these species.

Prescribed Burn

In the short term, prescribed burning treatments would reduce fuel loads and open the forest canopy, which would improve sensitive plant habitat for species that are fire adapted. However, these same practices would indirectly affect rare plants by facilitating the spread of invasive species, especially spotted knapweed on south- or west-facing slopes. Rare plant species would be particularly vulnerable since there are fewer populations and individuals in the populations.

Bitterroot, dwarf onion, and Lemhi penstemon are all adapted to open, dry ponderosa pine habitat types. Lemhi penstemon is also adapted to the moister mixed ponderosa pine/Douglas-fir habitats. These habitat types burned historically at 5- to 25-year intervals (USFS 2020b). Dwarf onion, Lemhi penstemon, and bitterroot are adapted to frequent, low- to moderate-severity fires (Arno 1976). However, fire suppression has increased the fire interval to about 50 years, creating higher fuel loads and the potential for high-severity fires. Spotted knapweed and cheatgrass appear to thrive and spread to new areas following wildfire, particularly after high-severity burns (Sutherland 2003).

Although the proposed treatments pose a risk of adverse indirect effects, treatments would also indirectly benefit many rare plant populations. Prescribed burning treatments would reduce the fuel loads, which would lower the severity of wildfires across the landscape. Less severe wildfires would reduce ground disturbances, the initial spread of invasive species, and the potential for damage to the rare plant seed bank.

Noncommercial Thinning

Noncommercial thinning is proposed for the project area. Noncommercial units that are not plantation units would retain forest overstory. In these units, the focus would be on retaining healthy, large ponderosa pine and Douglas-fir trees while thinning out small-diameter trees in the understory. The majority of noncommercial units would be thinned by hand using no heavy equipment. Soil disturbance would be minimal and limit invasive plant introduction and spread. In the short term, equipment would create soil disturbance by potentially removing native plants from areas where the equipment operates. The potential would exist for invasive species to occupy the disturbed areas. Treatment in these units would benefit species that require open habitats by removing trees that are encroaching on populations and habitat. Currently, these plant populations are being shaded by encroaching conifers, which reduces the habitat quality for the rare plants that grow in open conditions.

Over the long term, invasive species would likely continue to spread, which could adversely impact rare plant habitat. However, project design features (see appendix A for details) to prevent invasive species and protect rare plant populations would reduce the likelihood of adverse impacts on rare plant populations.

Commercial Timber Harvest

Commercial harvest is proposed for the project area. In the short term, these proposed activities would cause soil disturbance, remove vegetation, alter rare plant habitat, and potentially kill individual rare plants. Harvesting activities disturb soil, which can either damage or kill individual plants and increase the potential for invasive plant colonization. Some rare plant species, such as least moonwort, Lemhi penstemon, and brown hair peatmoss, are more sensitive to harvesting activities than others. However, the proposed activities would be located to avoid known rare plant populations during harvest. These mitigations would avoid any actions that would damage rare plants. Known rare plant populations would be buffered from harvest activities to protect populations from direct impacts and limit indirect impacts on populations.

Ground-disturbing activities (for example, timber harvest and noncommercial thinning) associated with the proposed action could indirectly affect rare plants by facilitating the adverse introduction and spread of invasive plant species in rare plant habitats. Populations of invasive plants do occur within the project area and could increase with logging disturbance and a more open forest canopy. Invasive plants thrive in disturbed areas; they can outcompete native plants and reduce the suitability of habitats to support rare plants. Many invasive species release compounds that actively inhibit native plant species (Thiebaut et al. 2019). Habitat quality for rare plants could diminish if invasive plants increase in the project area, as most invasive plant species aggressively compete with many native plants (Leger and Espeland 2010). Rare plant species are particularly vulnerable since there are fewer populations and individuals in the populations. Nonnative, invasive species are the biggest threat to nearly all of the rare plant species listed in table 17. The likelihood of establishment and spread of invasive plants varies based on the elevation, aspect, and variations in treatment methods. For more details, see the Range and Weeds and Vegetation Specialist Reports in the project file (PF-RANGE-001 and PF-VEGETATION-001).

Over the long term, design features in the project area would help limit the spread of invasive plants. These features have been applied to other timber sales and would apply to heavy equipment moving over the ground, as well as to skid trails necessary for tree removal. Project design features and best management practices to control and manage invasive species would avoid or reduce adverse impacts from proposed surface disturbance and prescribed fire.

With implementation of design features, the likelihood for invasive plant introduction or spread would be reduced and allow for native plant populations to reestablish, compared with the no-action alternative. This is because vegetation treatments, combined with posttreatment herbicide application, would move vegetation toward desired conditions and promote native plant establishment. Herbicide treatments would be completed where necessary for effective postburn management to suppress invasive plants and noxious weed establishment. Herbicide treatments would follow the guidance in the proposed project vegetation management activity card. For more detail, see appendix A.

Cumulative Effects

The temporal extent of the cumulative effects analysis for rare plants is 20 years, which is the expected time frame that project effects could extend (after 10–12 years, effects would be primarily due to ongoing maintenance burning). The spatial boundary for the cumulative effects analysis is the boundary of the Bitterroot Front project area. This boundary was selected because there is no mechanism for the effects described (for example, direct plant mortality, introduction of invasive species, or habitat alterations) to affect rare plants outside the project boundary.

Past actions affecting rare plants include establishment of invasive plants and historical fire suppression that has created fuel loadings and reductions in open-canopy habitats important for some rare plant species. Ongoing vegetation treatments and prescribed burning projects in the project area include the Stevensville West Central Project (approximately 7,734 acres), Trapper Bunkhouse Land Stewardship Project (approximately 5,827 acres), Como Forest Health and Protection (approximately 1,300 acres of commercial timber harvest and 731 acres of noncommercial thinning), Elk Bed Restoration Project (noncommercial thinning of up to 208 acres and ponderosa pine restoration on 101 acres), and Larry Bass Burn Project (approximately 1,112 acres). Ongoing actions in the project area are currently affecting rare plant abundance and viability, including actions that continue to facilitate establishment of invasive plants.

The potential direct and indirect effects described under the proposed action have the potential to adversely affect rare plant habitat, individual rare plants, and local populations. However, if the project design features and rare plant mitigation measures are followed, potential effects are expected to be minimal and within the area of the project. As a result, there is no mechanism for effects on rare plants or habitat within one implementation area to combine with effects from another implementation area to cumulatively result in a trend toward Federal listing or reduced viability for the population or species.

Transportation

Introduction

Primary access into the Bitterroot Front project area is via U.S. Highway 93 and a network of NFSRs. These NFSRs provide access for a variety of uses, including recreation, forest management, and emergency response. Successful implementation of the project requires changes to these roads, including administrative changes, such as road reclassification, and physical changes, such as the realignment of existing roads to improve watershed health.

The transportation section describes the effects on the NFSRs by the proposed action and the no-action alternative. Additional details are provided in the Transportation Specialist Report located in the project file (PF-TRANSPORTATION-001).

Analysis Methodology

The analysis focused on the following issues:

- Issue 1: How would new roads affect the Bitterroot National Forest?
- Issue 2: How would the Forest Service maintain roads affected by this project?

Analysis Indicators

Indicators for transportation effects include:

- Miles of new roads required to successfully complete forest treatments
- Miles of existing roads that change status to successfully support forest treatments and administrative use
- Impacts of potential temporary closures on travel and access

Spatial and Temporal Context for the Effects Analysis

Spatial Bounds: The spatial bounds for the effects analysis of transportation management includes anywhere within the 143,340-acre project area that includes existing identified or proposed routes.

Temporal Bounds: The temporal bound for the effects analysis of transportation management is the life of this EA.

Existing Conditions

The project area is bordered by private lands and U.S. Highway 93 to the east and the Selway-Bitterroot Wilderness to the west. Access into the project area is via numerous east–west Ravalli County roads extending from U.S. Highway 93 up into the foothills of the Bitterroot Range and National Forest System of roads. These roads typically service and are used for recreation, access to private homes, and the Forest Service staff’s efforts in maintaining forest health and visitor safety.

Currently, 478.28 total miles of roadways are identified within the project area; table 18 identifies the existing condition of these roads. There are 439.63 miles of existing roads identified in the Natural

Resource Manager (NRM) database, which tracks known roads on National Forest System lands. An additional 38.65 miles of undetermined roads were identified by lidar[7] survey. The roads identified by lidar data are not included in the NRM database.

Undetermined roads are not open to the public and are not maintained. Most existing identified roads are NFSRs; others are authorized for private use and maintained by local landowners, or they were previously decommissioned. Roads were decommissioned, or removed from the system, in the past because it was determined that they served no purpose for future management needs, or they were causing adverse effects on natural resources. See **appendix A** for additional information on decommissioning treatments. The vast majority of these identified roads, about 350 miles, are naturally surfaced (USFS GIS 2023).

Table 18. Existing condition of road status in the project area

Existing Condition	Miles
NFSRs	371.30
Private roads	12.93
Previously decommissioned roads	33.21
Undetermined roads	60.84
Total	478.28

Source: USFS GIS 2023

National Forest System Roads

NFSRs make up the majority of roads within the project area. NFSRs may be open all year, closed seasonally, or closed year-round to street-legal public travel. They vary by vehicle type, season of use, surface type, and maintenance level. All NFSRs closed to the public are only utilized for administrative uses. For administrative roads that are not currently in use, basic custodial care is performed to support adjacent resources and to perpetuate the road for potential future needs (USFS 2015). Decommissioned roads have been removed from the National Forest System of roads and returned to the productive land base; this is because they were no longer needed for access, or they were causing adverse effects on natural resources.

Undetermined Roads

Undetermined roads are existing road prisms, or areas previously disturbed by road construction, on the landscape developed for past management activities (often during the 1950s and 60s). See the Bitterroot Front Transportation Analysis Report in the project file (PF-TRANSPORTATION-002) for more detail on the origin of undetermined roads. The Bitterroot Front project area contains 22.19 miles of undetermined roads identified in the NRM database. Lidar data revealed an additional 38.65 miles of undetermined routes in the project area.

2001 Roadless Rule

The 2001 Roadless Rule established prohibitions on road construction, reconstruction, and timber harvesting on 58.5 million acres of IRAs on National Forest System lands. The intent of the rule was to provide lasting protection for IRAs and the roadless expanse within the National Forest System in the context of multiple-use management. In the project area, there are 92,520 acres of IRAs where no new

[7] Lidar, which stands for light detection and ranging, is a remote sensing method that uses light, usually utilized from a plane or helicopter, to generate precise information about the shape of the Earth and its surface characteristics, including roads (U.S. Department of Commerce, National Oceanic and Atmospheric Administration 2023).

road construction would be allowed (see PF-RECREATION-001 in the project file for more information on IRAs).

Environmental Consequences of No Action

Issue 1: How would new roads affect the Bitterroot National Forest?

Direct and Indirect Effects

No changes to the existing transportation system are proposed under this alternative. Visitors to the project area would continue to have the same level of access and the same road conditions that currently exist. No proposed vegetation treatments to minimize wildfire risk would occur; therefore, no new construction of roads, including temporary roads, would be required.

The potential occurrence of an uncharacteristically severe wildfire could destroy roads that are naturally surfaced, which is the majority of roads within the project area. The heat present during wildfires is known to create hydrophobic soil, which repels water. This phenomenon leads to further erosion issues due to a higher rate of water runoff, which could cause immense damage to road systems (Moench and Fusaro 2012). Wildfire occurrences could also restrict movement by blocking certain roads that would be necessary in evacuations. Additionally, wildfire response operations could temporarily close roads within the project area to control the wildfire spread (USFS 2020a). In the event of an uncharacteristically severe wildfire, it would take considerable investment to rehabilitate the NFSRs and provide a similar level of access compared with what exists currently.

Issue 2: How would the Forest Service maintain roads affected by this project?

Direct and Indirect Effects

Under the no-action alternative, there would be no change in existing road statuses. No roads would be built, decommissioned, or obliterated related to this project. Ongoing maintenance for existing NFSRs would continue under existing maintenance levels. The resulting impacts would be similar to those described under Issue 1. Undetermined roads would continue to exist under the no-action alternative, requiring the Forest Service staff to continue monitoring unneeded roads.

Cumulative Effects

Past, present, and reasonably foreseeable actions include minor, temporary road-building activities to support vegetation treatments, as well as ongoing road maintenance activities. However, there would be no additional fuels treatment activities or changes to the transportation system under the no-action alternative with the potential to overlap these actions. Therefore, this alternative would not result in cumulative effects on transportation.

Environmental Consequences of the Proposed Action

Issue 1: How would new roads affect the Bitterroot National Forest?

Direct and Indirect Effects

National Forest System Roads

There would be no net gain of NFSRs and no change in public access under the proposed action. Additional figures detailing the proposed action can be found in the Transportation Specialist Report in the project file (PF-TRANSPORTATION-001). New road construction in Chaffin Creek and McCoy Creek would benefit water resources by eliminating timber haul on adjacent streamside sections of road (appendix C, figures 2-3 and 2-4). In addition, the new construction of NFSRs in Chaffin Creek, which would be an extension of NFSR 74982, also would provide access to timber stands currently only accessed from NFSRs 13226, 74972, 74973, and 74982. The planned work in the stands accessed by NFSR 13226 was not accomplished the Trapper Bunkhouse Land Stewardship Project (USFS 2008c) because of an insufficient corner at the intersection with NFSR 374. The new construction would extend road 74982 for approximately 0.67 miles and intersect NFSR 62886, allowing timber haul to go down NFSR 374 in Little Trapper Creek.

There would be 1.31 miles of new construction in McCoy Creek that would provide alternative access to areas currently only accessed by NFSR 62892. This new road would eliminate timber haul on roads adjacent to McCoy Creek and one of McCoy Creek's tributaries.

While under construction, these new roads could cause short-term, direct impacts on travel and access due to temporary closures, increased traffic, and the presence of heavy machinery. During construction, traffic control measures would mitigate impacts on vehicular access and movement. These impacts would be minimal and short term, and impacts on travel would be mitigated through proper traffic planning. Additional effects related to NFSRs can be found in the Watershed and Aquatics Specialist Report (PF-AQUATICS-001).

Temporary Roads

The impacts resulting from the development of temporary roads would be similar to the impacts described above for the construction of new NFSRs. Because temporary roads would be implemented only for the purpose of facilitating forest treatments and providing access to the project areas for workers, temporary roads would have no impact on access to the transportation system in general. After use, temporary roads would be returned to their previous condition in the natural land base to minimize impacts and prevent future unauthorized use. Best management practices and design features that would be utilized for temporary road construction and decommissioning can be found in **appendix A**. Additional impacts related to temporary road construction can be found in the Watershed and Aquatics Specialist Report (PF-AQUATICS-001).

Issue 2: How would the Forest Service maintain roads affected by this project?

Direct and Indirect Effects

The Forest Service would make decisions on 60.84 miles of undetermined roads, including adding 8.54 miles to the National Forest System of roads. These additional miles would provide access to a snow telemetry[8] (SNOTEL) site under a special use permit with the NRCS in the headwaters of Lost Horse Creek. The added roads also would provide needed access for commercial and noncommercial fuels reduction activities in Bunkhouse Creek, Chaffin Creek, Hart Bench Leven's Gulch, and Little Trapper Creek drainages. These roads would be in Management Areas 2, 3a, 3c, and 5, as defined in the forest plan (USFS 1987). The additions in Management Area 5 would also be in a research natural area in the headwaters of Lost Horse Creek, and they would access the permitted NRCS SNOTEL site.

[8] SNOTEL sites are used to monitor snowpack, precipitation, temperature, and other climatic conditions (NRCS 2023).

Obliteration treatments on 51.60 miles of undetermined road prisms would return approximately 190 acres back to the productive land base. No roads proposed for obliteration are currently open to the public. There would be no change to public access as a result of obliteration treatments.

Newly constructed roads and undetermined roads added to the National Forest System of roads would be stored after use and not be available for public motorized travel. See the Wildlife (PF-WILDLIFE-001) and Watershed and Aquatics (PF-AQUATICS-001) Specialist Reports for further discussions regarding the impacts of new road construction.

Under the proposed action, the Forest Service would also decommission 10.08 miles of NFSRs. These miles include streamside roads and roads that were determined to be redundant. Treatments would return road alignments to the productive land base. One road, Shannon Gulch, would be decommissioned as a road, but it would maintain its status as a National Forest System trail. Existing recreational OHV use (for vehicles less than 50 inches wide) would continue unchanged. No roads set for decommissioning under the proposed action are currently open to public motorized highway vehicle use; therefore, there would be no change in related public access as a result of decommissioning. See the Transportation Specialist Report (PF-TRANSPORTATION-001) for additional figures detailing proposed decommissioning actions.

Road storage would be planned on 18.76 miles of NFSRs; 11.55 of these miles would be needed for project implementation prior to storage. These roads would be available for future administrative use, remain as ML 1 NFSRs under basic custodial care, and closed year-round to motorized use. No road planned for storage is currently open for public use; therefore, there would be no change in public access as a result of road storage.

The Forest Service would implement treatments where roads are causing adverse environmental effects (see PF-AQUATICS-001 in the project file). These treatments would support improved riparian habitat or serve to return the road alignment to the productive land base; this would limit the occurrence of adverse motorized use on decommissioned or obliterated roads in the project area. Table 19 summarizes the proposed changes to NFSRs in the project area. See **appendix A** for additional information on treatments that would occur on decommissioned and obliterated roads.

Table 19. Proposed changes to National Forest System of roads mileage

Road Status or Proposed Action	Miles
Existing of National Forest System of Roads mileage	371.30
Construct new NFSRs	+1.98
Add undetermined road to National Forest System of roads	+8.54
Decommission NFSRs	-10.08
Decommission NFSRs and maintain as National Forest System trails	-0.62
Total National Forest System of roads mileage after project implementation	371.12

Source: USFS GIS 2023

Under the proposed action, the change in miles of NFSRs would be negligible (0.18 miles). Although there would be 1.98 miles of roads constructed, the mileage would be offset by the decommissioning, storage, and restoration of other roads. As a result, there would be a minimal change to the National Forest System of roads network compared with the no-action alternative.

Cumulative Effects

Combined with past, present, and reasonably foreseeable future actions, there is the possibility for cumulative effects on the transportation system under the proposed action. The improved forest health resulting from proposed treatments, facilitated by NFSRs and temporary roads, would support previous and ongoing vegetation management actions in the Bitterroot Front project area. These combined treatments would result in the minimization of tree disease, invasive species, and fuels risks that contribute to the uncharacteristically severe wildfires that could damage, disrupt, and destroy the transportation system. The extent of the benefits from combining the recently completed, ongoing, and proposed treatments, supported by changes to the transportation system, is greater than each's individual impacts.

Though there are currently no additional planned changes to the transportation system outside of the proposed action, potential future actions in the project area responding to dynamic forest needs may be proposed to access locations not defined in this project. If this occurs, the changes to the road system under the proposed action would be combined with those future impacts, and additional analyses of environmental impacts would be conducted. Overall, when these reasonably foreseeable actions are taken into consideration, adverse cumulative impacts on the transportation system from the proposed action would be minimal. There would be no change in access for the general public and no net gain in road mileage. The immediate impacts during project implementation would not affect the transportation system in the long term.

Vegetation

Introduction

Ecosystems are healthy when their components and processes are functioning properly. A healthy and resilient forest ecosystem includes resilient species composition, stand densities, structures, and size class diversity across the landscape to meet the multiple resource objectives for the area, including for fire and fuels, wildlife, and aquatics.

The analysis for the forest vegetation focuses on how the proposed action and no-action alternative would affect the capacity of forest vegetation to respond to disturbance by evaluating key components related to resiliency: forest species composition, stand density, structure stage, and size class diversity (landscape scale) in the Bitterroot Front project area. These factors affect how the forest vegetation in the project area would respond to future disturbances, such as insects, disease, fire, and a warming climate. The Bitterroot Front project area is prone to and has been impacted by mountain pine beetle, Douglas-fir beetle, western spruce budworm, dwarf mistletoe, and other insects and diseases. Historically, fire played a major role in the successional cycle. Fire suppression over the last century, plus past management actions in the 1950s–1970s, has had an impact on the area.

Analysis Methodology

The analysis focused on the following issues:

- Issue 1: How would altering forest vegetation through treatment affect the resilience of vegetation to disturbances such as insects, diseases, wildfires, and climate change?
- Issue 2: How would the proposed action affect the old-growth character and abundance, and the resilience of old-growth stands?

Analysis Indicators

The measurement indicators specific to Issues 1 and 2 are described in table 20. For more detailed information on each indicator and methods to evaluate them, see the Vegetation Specialist Report (PF-VEGETATION-001).

Table 20. Analysis issues and measurement indicators for measuring change to resiliency

Indicator	Measure	Address/Scale
Species composition	Early seral species percent (acres improved)	Forest health and resiliency at the stand and landscape scale
Stand density	Trees per acre basal area (acres improved)	Forest health and resiliency at the stand and landscape scale
Structural stage	Size class distribution (acres per size class)	Landscape heterogeneity (resiliency)
Old growth	Change in the minimum number of live trees per acre meeting age and DBH thresholds, and a minimum stand density measured as basal area (square feet per acre of live trees greater than or equal to 5 inches DBH improved)	Forest health and resiliency at the stand and landscape scale

Sources: USFS 2014a; Green et al. 2011

Spatial and Temporal Context for the Effects Analysis

Spatial Bounds: The spatial boundaries for analyzing the direct, indirect, and cumulative effects on vegetation are discussed at the Bitterroot Front project area scale. The project boundary encompasses 143,340 acres. This size of the project area is large enough to capture the treatments' effects on the vegetation resource in terms of changes to the species composition, stand density, structure, and size class distribution at the stand level and the landscape scale. Cumulative effects will be analyzed for the adjacent Federal, State, and private lands.

Temporal Bounds: The temporal boundary for analyzing the direct, indirect, and cumulative effects is approximately 20 years into the future. In this analysis, short-term effects last 0 to 5 years while long-term effects last up to 20 years. Cumulative effects include the direct and indirect effects of the proposed action plus the past, present, and reasonably foreseeable future actions. The existing conditions reflect the cumulative effects of past activities.

Existing Conditions

The Bitterroot Front project area consists of primarily two main forest types: stands dominated by warm and dry ponderosa pine and Douglas-fir, and cool and moist stands containing a mix of lodgepole pine, Douglas-fir, subalpine fir, and Engelmann spruce. High-elevation, cold forest types containing whitebark pine, subalpine fir, and lodgepole pine are also found in the project area. Table 21 lists the existing vegetation cover types with a stand dominance of 40 percent or greater within the project area.

Table 21. Existing vegetation cover types

Existing Cover Type (≥ 40 Percent Stand Dominance)	Acres	Percentage of the Project Area
Ponderosa pine (*Pinus ponderosa*)	31,248	21.8
Douglas-fir (*Pseudotsuga menziesii* [Mirb.] Franco)	23,458	16.4
Subalpine fir (*Abies lasiocarpa* [Hook.] Nutt.)	19,302	13.5
Lodgepole pine (*Pinus contorta* Douglas ex Loudon)	16,501	11.5
Areas in early regeneration phase	11,030	7.7
Spruce (*Picea* spp.)	6,785	4.7
Mixed, shade-intolerant conifers (ponderosa pine, Douglas-fir, western larch, and lodgepole pine)	6,327	4.4
Subalpine larch (*Larix lyallii* Parl.)	4,797	3.3
Whitebark pine (*Pinus albicaulis* Engelm.)	1,734	1.2
Western larch (*Larix occidentalis Nutt.*)	1,278	0.9
Mixed, shade-tolerant conifers (grand fir, cedar, spruce, and subalpine fir)	1,087	0.8
Xeric (dry) shrubs	1,102	0.8
Grass	1,170	0.8
Non-vegetated areas (sparse vegetation, water, rocky areas, etc.)	17,450	12.1
Total acres	143,270	99.9

Source: USFS 2021

Existing vegetation cover types vary across different habitat groups. Table 22 lists and describes 11 of the forest habitat types found within the project area.

Table 22. Habitat type grouping for forestwide integrated target stands

Broad Potential Vegetation Types	Region 1 Habitat Type Groups	Habitat Type Group Description
Warm and dry	1 – Warm and dry	Dry and open-grown, park-like stands of ponderosa pine (predominately) and Douglas-fir with bunchgrass. Hot and dry, low-elevation, west and south aspects. Fire interval 5 to 25 years maintaining park-like stands with low-severity underburns. Ponderosa pine and dry Douglas-fir climax.
	2 – Moderately warm and dry	Open ponderosa pine and Douglas-fir with grass and brush. Low elevation on many aspects; higher elevations with mainly southerly and westerly aspects. Fire interval 5 to 50 years with low and moderate severity. Ponderosa pine, Douglas-fir, and drier grand fir climax.
	3 – Moderately warm and moderately dry	Variable, transition dry to moist. Mixed species of ponderosa pine, Douglas-fir, western larch, lodgepole pine, and grand fir. Fire interval of 15 to 50 years with mixed severity.
Warm and moist	4 – Moderately warm and moist	Warm and moist habitats on lower slopes. Highly diverse with nearly all conifer species potentially occurring. Fire intervals range from 50 years on drier aspects to 200 years in moist areas; mixed-severity fire.
	5 – Moderately cool and moist	Upland cedar and hemlock with high species diversity (western red cedar, western hemlock, Douglas-fir, Engelmann spruce, grand fir, lodgepole pine, mountain hemlock, western larch, and whitebark pine). Fire highly variable with intervals 50 to 200+ years. (Not common in the Bitterroot National Forest)
	6 – Moderately cool and wet	Wet, forested riparian areas and associated wetlands. Long fire interval of 50 to 200+ years. Centuries without stand-replacing fires. (Not common in the Bitterroot National Forest)

Broad Potential Vegetation Types	Region 1 Habitat Type Groups	Habitat Type Group Description
Cool and moist	7 – Cool and moist	Cool and moist site conditions. High diversity in tree species. Fire interval more than 120 years. Western larch, Douglas-fir, whitebark pine, Engelmann spruce, lodgepole pine, alpine fir, and grand fir possible.
	8 – Cool and wet	Wet, forested riparian areas and associated wetlands. Due to wet conditions, fire interval can be long (90 to 130+ years).
	9 – Cool and moderately dry	Cool and drier alpine fir types. Fire interval 50 to 130 years with low to moderate fire intensity, except in lodgepole pine, which has high-intensity, stand-replacing fires. Early seral stages of lodgepole pine, Douglas-fir, and western larch are common.
Cold (capable of whitebark pine)	10 – Cold and moist to moderately dry	Upper-elevation, cold, dry sites. Whitebark pine, lodgepole pine, mountain hemlock, alpine larch, Engelmann spruce, and alpine larch are common. Fire interval is 35 to 300+ years with variable types.
	11 – Cold near Timberline	High-elevation and cold sites near timberline; whitebark pine, mountain hemlock, alpine fir, Engelmann spruce, and alpine larch. Fire interval 35 to 300+ years. Whitebark pine and alpine larch climax types.

Source: USFS 2020b

A detailed description of the existing and desired future condition of forest vegetation and evaluation methodologies can be found in the Vegetation Specialist Report (PF-VEGETATION-001).

Old Growth

The Forest Service recognizes the many important values associated with old-growth forests, such as biological diversity, wildlife and fisheries habitat, recreational opportunities, aesthetics, soil productivity, and water quality (Green et al. 1992, errata 2011). The following describes existing and desired conditions within old growth, as well as site-specific amendments for old growth.

Executive Order 14072, Strengthening the Nation's Forest, Communities, and Local Economies

Executive Order 14072, Strengthening the Nation's Forests, Communities, and Local Economies, which was signed on April 22, 2022, indicates it is a policy of the Biden administration to manage forests on Federal lands, which include mature forests, to promote their continued health, resilience, and other benefits. To further this policy, the executive order requires the Forest Service to pursue wildfire mitigation strategies to reduce the threat of catastrophic wildlife on mature and old-growth forests. It also requires a national-level inventory of mature and old-growth forests. These two actions are ongoing on a national scale and do not require any project-specific considerations or assessments.

Although the executive order does not include project-level requirements, the Bitterroot Front project's purpose and need is to improve landscape resilience to disturbances, such as insects, diseases, and fire, by modifying forest structure, composition, and fuels. The proposed action would change the forest composition, structure, and successional stages in treated areas. Moreover, the proposed action is designed to help meet the land management plan's desired conditions by trending toward increasing the large size class of trees and increasing the resilience of large trees to disturbance and drought. The treatment goal is to promote stand resistance and resilience to disturbance and stress factors, such as insects, disease, competition, and fire in the project area. The intent is to maintain insects and diseases at endemic levels and modify potential fire behavior by reducing the burn severity.

Executive Order 14072 must be considered in balance with the Multiple-Use Sustained-Yield Act of 1960, the National Forest Management Act, the Healthy Forest Restoration Act, the Inflation Reduction Law, and the Bipartisan Infrastructure Law. All of these support forest management or the reduction of hazardous fuels, or both.

Executive Order 14072 directed the Forest Service to inventory old-growth and mature forests on National Forest System lands. The old-growth amendment will allow for consistent and reliable project-level identification and a statistically valid forestwide inventory of old-growth acres by applying criteria from Green et al. (2011) Old-growth Forest Types of the Northern Region; these criteria align the forest plan definition with the national inventory effort published on April 20, 2023. An accurate inventory is the first step in promoting the continued health and resilience of old forest stands, retaining and enhancing carbon storage, conserving biodiversity, mitigating the risk of wildfires, enhancing climate resilience, enabling subsistence and cultural uses, providing outdoor recreational opportunities, and promoting sustainable local economic development.

Existing Condition

As described in the warm and dry forest type section above, frequent, low-severity fire was the primary disturbance process responsible for creating conditions suitable for ponderosa pine old growth, which is the most commonly found old-growth species in the Bitterroot Front project area. Old-growth stands dominated by Douglas-fir or others can be found in the project area; however, the general discussion to follow will focus on the most common old-growth stand characteristics. These old-growth stands often have a patchy distribution of larger-diameter, old trees with canopy cover on approximately one-third of the stand; the other two-thirds of the stand contain canopy openings where understory vegetation and associated wildlife thrive in this open and clumpy environment (Kaufmann et al. 2007). The scattered legacy ponderosa pine found in the project area are distributed in clumps and scattered individuals. Many of these stands have a dense understory of Douglas-fir that has regenerated under them; often, this Douglas-fir is suppressed with large witches' brooms because of dwarf mistletoe infection.

Past management practices often removed the trees with the greatest value in these stands, leaving behind the poorly formed Douglas-fir with defects. This form of selective harvest left the trees with disease, physical damage, and poor genetics on-site to populate the next age class. However, past management actions did retain some of the biggest legacy ponderosa pine. Other stands that have not had past timber harvest—but have experienced a century of fire exclusion—have high stand densities with multiple age classes and size classes of Douglas-fir growing among the legacy pines (Arno et al. 1995).

Some old-growth stands within the warm and dry habitat types are observed to have relatively high fuel loading with both surface and abundant ladder fuels, creating a stand structure not conducive to providing resilience to low-intensity wildfire events. Instead, the stands would experience high-severity, stand-replacing events, emphasizing the departure from historical fire regimes. The analysis indicates that 6,511 to 8,122 acres of old-growth stands in the Bitterroot Front project area could be potentially impacted by greater than 20-foot flame lengths between early August and late August. The greatest impacts would potentially be across the warm and dry, broad potential vegetation types (see table 8 in the Vegetation Specialist Report in the project file [PF-VEGETATION-001]). At higher elevations, mixed- to high-severity wildfire events are more representative of historical fire regimes, particularly when discussing the cooler end of the spectrum regarding broad potential vegetation types.

Historically, these old-growth ponderosa pine grew in uneven-aged stands. Ponderosa pine is a shade-intolerant species; this means it cannot regenerate in the shade of other trees. It is also fire adapted and fire dependent, requiring openings to regenerate a new age class (Fiedler et al. 2007; Arno and Fiedler 2005). Current stand densities in the project area preclude the regeneration of ponderosa pine needed to recruit new trees for the future. Periodic regeneration is essential to sustain all stands, including old growth. Many stands in the Bitterroot Front project area have little to no natural ponderosa pine regeneration present in untreated areas.

Climatic changes plus higher stand densities have increased competition for water, nutrients, and sunlight, which has caused increased tree stress. Stress-weakened trees are at greater risk for insects; also, high densities offer a greater opportunity for the spread of insects and disease. In general, if conditions continue on the same trajectory, there will continue to be a decline in old growth in the frequent fire ecosystem found in the Bitterroot Front project area. The old trees are dying, and the stands are at higher vulnerability to insects, disease, and fire. Greater densities and canopy cover have lower plant diversity, forage quantity, and quality (Keane et al. 2002).

Desired Conditions

The amount of old growth increases relative to existing conditions. The location and condition of old growth are dynamic over time. Old-growth stands are influenced by succession, natural disturbance regimes, and climate. Landscape-level resiliency is provided by promoting a mosaic of younger forests to replace old growth when it is killed by stand-replacing events. The desired condition of old growth is described below in table 23.

Table 23. Forestwide desired and existing conditions of old growth

Region 1 Habitat Type Groups[1]	Existing Condition (90 percent confidence interval)[2]	Desired Condition
Forestwide	9.90 percent (8–12 percent)	Old growth is distributed widely across the forest, and levels vary depending on available compositions and structures, disturbance levels, and management objectives. The amount of old growth is generally similar to or greater than that of the existing condition; however, the amount of old growth may be subject to the likelihood of increased extent and/or severity of natural disturbances, such as insects, diseases, and wildfire. Old-growth distribution that complements habitat connectivity is desired. Old growth is resilient to impacts that might result in the loss of old-growth characteristics, such as insect infestations, wildfire, and drought. Old growth contains components that contribute to high-quality habitat, including large or very large live trees with rot or broken tops, snags, downed woody material, and a diversity of tree size classes and canopy layers. A variety of old-growth types are present.
Cold	11 percent (6–18 percent)	Old growth in this potential vegetation type generally consists of whitebark pine, Engelmann spruce, and subalpine fir. Stand-level resiliency and open structures are desired in whitebark pine types versus spruce/fir types, which may be denser and more layered.

Region 1 Habitat Type Groups[1]	Existing Condition (90 percent confidence interval)[2]	Desired Condition
Cool Moist Cool Wet Cool Moderately Dry	13 percent (9–19 percent)	Old growth in these potential vegetation types may be subject to wider pulses of availability, due to the preponderance of lodgepole pine and high-severity, low-frequency disturbance regimes. Old growth includes stands dominated by spruce and Douglas-fir, often with dense canopy layers, as well as even-aged lodgepole pine.
Moderately Warm Dry Moderately Warm - Moderately Dry Moderately Warm Moist	8 percent (5–10 percent)	Old growth is dominated by ponderosa pine and Douglas-fir, often in large patches with an uneven-aged and irregular tree distribution. Stands are resilient to low-severity disturbance. Other species such as juniper and aspen are valuable habitat components.
Warm Dry	2 percent (0–6 percent)	Old growth is dominated by pure stands of large, fire-resistant ponderosa pine, in various patch sizes with an uneven-aged and irregular tree distribution. Stands are resilient to low-severity disturbance.

Source is Northern Region Summary Database, Forest Inventory and Analysis data, Hybrid 2015

1. Old-growth forests are defined specifically as forests that meet the minimum criteria established for the Northern Region of the Forest Service (see the glossary).

2. Existing condition shown is the mean percentage of old growth (see the glossary) with the 90 percent confidence interval shown in parenthesis.

Carbon Storage and Climate

Forests play an important role in the global carbon cycle by taking up and storing carbon in plants and soil. They take up and store atmospheric carbon as they grow through photosynthesis and release carbon through mortality due to aging or disturbances. Following mortality events, forests regrow, and the cycle continues. Forests can store carbon in soils and plant material as well as in harvested wood products outside the forest ecosystem. Forest carbon stocks in the Bitterroot National Forest remained stable from 1990 to 2013, suggesting the Bitterroot National Forest is neither a carbon source nor a carbon sink. The reduction of carbon stocks caused by disturbances and environmental conditions has been modest and has been matched by forest growth. Fire has been the primary disturbance agent influencing carbon stocks in the Bitterroot National Forest. Management, including timber harvest, with the objective to improve landscape resilience to fire, insects, and disease, and to establish new and productive age classes, is desired to improve carbon stores on National Forest System lands. See the carbon assessment for additional information (PF-CLIMATE-001).

Carbon storage gains and losses in the Northern Region (Region 1) are greatly impacted by natural disturbances and climate change. Recent changes in climate have resulted in increasingly warmer temperatures and drought conditions that, in turn, have led to longer and more intense wildfires and fire seasons. Historical fire suppression has caused stand-age distribution to be less diverse, with most stands older than 80 years old. Stands regrow at different rates depending on the forest type and site conditions. Forests are generally most productive when they are young to middle aged. Increasing temperatures, drought, and older, less productive stands have consequently resulted in an accumulated decline of carbon stocks in forests (Birdsey 2019).

One of the most common approaches to managing for the unknown is to manage for resiliency. A resilient forest is one that has the ability to adapt to a rapidly changing environment while trending toward pre-disturbance conditions either naturally or assisted through conservation management (Millar et al. 2007).

Halofsky et al. (2018) recommend strategies for conserving native systems, focusing on increasing resilience to chronic low soil moisture, drought, and more frequent and extensive disturbances, including wildfire and insects. These strategies align with the desired future conditions and include managing landscapes to reduce the severity and range of disturbances, encouraging fire to occur naturally, and protecting habitats where fire-sensitive species are persistent. Moreover, increasing species' genetic and landscape diversity will greatly reduce the risk of major loss of forest cover (Halofsky et al. 2018).

Departure from Early-Settlement/Natural Conditions

Knowledge of the historical ecosystem structure and processes and the range in which they varied offer a better understanding of how disturbance, vegetation, and other ecosystem components interact and in turn how their interaction affects biophysical elements such as plants, animals, fish, and soil and water resources. Historical perspectives increase our understanding of the dynamic nature of landscapes and provide a frame of reference for assessing current and future patterns and processes. Knowledge obtained from the past can aid understanding of how climate change may affect future landscape conditions.

One of the more impactive forces acting on trees in the project area is fire exclusion, which has led to early seral ponderosa pine stands being converted to climax stands of mostly Douglas-fir and some true firs. This creates instability in terms of susceptibility to the insects and diseases discussed above. It also predisposes stands to drought stress, particularly in a warming climate. Ponderosa pine is better adapted to drought and dry conditions than Douglas-fir. This is due to ponderosa pine's deep tap roots and ability to control its stomata during dry conditions, whereas Douglas-fir keeps its stomata open and continuing to consume water.

In the absence of fire, stand density has increased from historical conditions (Hessburg et al. 1999; Hessburg et al. 2005). Moreover, the landscape is becoming dominated by shade-tolerant, mid- to late-successional species. The stands are becoming more heavily stocked with dense layers of shade-tolerant species. At the landscape scale, the forest has shifted to a more homogenous late-successional stage dominated by mature and overmature size classes (more than 10.0 inches DBH). There is a significant decrease in the number of younger structural stages, and there are smaller size classes.

Connectivity in terms of landscape diversity describes how homogenous a landscape is. Connectivity in the Bitterroot Front project area has increased as forests age, fires are suppressed, and there becomes less diversity in species composition, stand densities, structural stages, and size classes. Past management in small blocks has also negatively decreased connectivity by creating too many patch sizes smaller than the average natural range of patch size variability found as a result of natural disturbances (Hardy et al. 2005).

Fire

Fire was historically the dominant agent of change and filled a very important role in Rocky Mountain ecosystems. Fires are natural modifiers of the vegetation. Sometimes they kill all trees and aboveground parts of vegetation (high-severity, stand-replacement fire); sometimes they kill only smaller trees or no trees at all and only burn understory grasses and shrubs (low severity). In the northern Rockies, low-severity fire regimes are primarily confined to forests where ponderosa pine was historically dominant. Low-severity fires burn ununiformly. They consume the litter and undergrowth; leave an open overstory of larch, ponderosa pine, and Douglas-fir largely intact; and create small canopy gaps. Mixed-severity fire regimes are found across a broad range of forest types, including Douglas-fir and western larch, lodgepole pine, whitebark pine, and some relatively moist ponderosa pine types (Arno et al. 2000).

Fire releases nutrients to soil and streams. Fires affect the amount of dead, woody material and snags on a site. The historical frequency and intensity of fires were highly variable across the Bitterroot landscape, depending on such factors as elevation, aspect, vegetation and fuel conditions, terrain, and weather. Most fires were caused by lightning. However, fires set by Indigenous people living in this area before white settlement played a significant role, particularly in the lower-elevation forest types (Arno 1976; Barrett 1981). In some of the drier ponderosa pine forest types, low-intensity fires burned through the stand every 6 to 7 years (Arno 1976). Currently, as you move into the moister and cooler forest types, intervals between fires generally increase, and high-severity fires are more common.

Several studies have found a marked decrease in the number of fires occurring in the Bitterroot Mountains since around 1920 and a corresponding increase in fire intensity (Arno 1976; McCune 1983; Brown et al. 1994). A detailed study of the entire inland portion of the northwestern United States also concluded that areas historically in low- or mixed-severity fire regimes have shifted into stand-replacement regimes (Arno et al. 2000). Possible reasons for this change are increased fuel loads, weather, and successful fire suppression, especially of lower-intensity fires. Suppression of fire in these ecosystems during the 20th century is likely the most important factor that has influenced the state of vegetation across the Bitterroot National Forest landscape. Please see the Fire and Fuels Specialist Report in the project file (PF-FIRE AND FUELS-001) for more information.

Insects and Diseases

The Region 1 Forest Insect Hazard Rating System has developed hazard ratings to aid in identifying stands that are at risk for significant insect activity. Forest insects and diseases can dramatically alter the structure, composition, and age class distribution. Populations of western pine beetle and populations of mountain pine beetle are currently low in the project area. However, forest conditions are suitable to increase populations and increase tree mortality. Douglas-fir beetle is currently very active in the project area. Within the project area, current conditions, such as host species, size, and stand density, create moderate to high conditions beyond the historical range. The damage, range, and hazard ratings of insects and diseases impacting the Bitterroot National Forest are detailed in the Vegetation Specialist Report (PF-VEGETATION-001).

Environmental Consequences of No Action

Issue 1: How would the no-action alternative affect the resilience of vegetation to disturbances such as insects, disease, wildfires, and climate change?

Direct and Indirect Effects

Species Composition

Under the no-action alternative, there would be no proposed activities to change the species' composition. Over time, mid- and late-seral species (Douglas-fir, grand fir, and subalpine fir) would dominate the landscape. In the warm and dry forests, shade-tolerant species, such as Douglas-fir, would outcompete early seral species, such as ponderosa pine, for space. Ponderosa pine would continue to have less regeneration success due to overcrowded stand conditions and less presence on the landscape in the future. In the cool and moist forests, subalpine fir would continue to establish in the understories. This would create even denser stands, easily spreading insects and disease. It also would continue to increase the risk of large, stand-replacing fires. In cold forests, lodgepole pine and subalpine fir would outcompete whitebark pine. Over time, this threatened keystone species would fade out of the project area and the larger ecosystem.

Stand Density

Stand densities would remain at high stocking levels and continue to increase with the ingrowth of shade-tolerant species. Dense stands would be more prone to risks from disturbances such as insects, disease, and wildfire.

Structural Stages

The stand structure and size class within the project area would remain at current levels or drift further from desired conditions. Thus, the project area would be less resilient to disturbances and less diverse in the species' composition, structural stages, and size classes. Over time, in the absence of fire, the project area would continue to shift toward mature stands containing more insect- and disease-prone species, such as Douglas-fir, subalpine fir, and grand fir.

Insects and Disease

Insects and diseases would continue to attack trees in the Bitterroot Front project area, and forest health would continue to trend downward. Greater stand densities, a greater percent species composition of desired host species, and a greater number of canopy layers in aging stands would continue to provide ideal conditions for insects and diseases to spread with ease.

Fire and Fuels

Heavy fuel loading from increased tree mortality and ladder fuels from the increased ingrowth of shade-tolerant species in the understories would continue to be abundant in the project area. Standing, dead trees from insect-related mortality would continue to fall over, converting the fuel loading to a more lethal horizontal arrangement. The continuity of dense, older stands and/or stands with high mortality would allow fire to spread easily at high intensity over larger areas.

Climate and Carbon

The project area would not make shifts toward a more resilient landscape. Temperatures would continue to increase, shifting the species' composition, increasing stand densities, and decreasing diverse size class distribution. More frequent and extensive wildfires and insect outbreaks would occur throughout the project area, and the landscape would likely not have the ability to return to its prior condition following higher-severity disturbances.

Carbon storage would continue to decline as aging stands decrease in productivity and experience greater mortality. If the area were to continue on the current path, a potential large wildfire would cause significant carbon emissions and a reduction in carbon storage. This would be magnified by the shift in species' composition away from fire-tolerant species and the increased stand density that leads to stressed and aging trees that are at greater risk to insect- and disease-related mortality and eventually wildfire. These wildfires would potentially burn at higher intensities for longer periods of time over greater areas.

Issue 2: How would the no-action alternative affect the old-growth character and abundance, and the resilience of old-growth stands?

Direct and Indirect Effects

Under the no-action alternative, current conditions within old-growth stands would continue to decline. Departure from historical fire regimes across all broad potential vegetation types within the Bitterroot Front project area would continue to exacerbate, due to a combination of over a century of fire suppression, and a lack of past management activities across the Bitterroot Front project area. Stand structure, species composition, and fuel loadings in the current state of old-growth stands within the project area would be conducive to mixed- and high-severity fire effects. It is important to mention that mixed- to high-severity fire is appropriate within the higher-elevation range of the broad potential vegetation types. A departure from historical fire regimes in these broad potential vegetation types means stands would likely continue to decline due to other ecological processes.

The greatest impact on old growth under the no-action alternative would be to the warm and dry broad potential vegetation types, as previously described in the old growth existing condition section. Even though fire-adapted species (that is, ponderosa pine) can remain proportionally a larger component at the stand level within these sites, they would not be able to endure a high-severity, stand-replacing fire; in turn, this could potentially result in a substantial reduction of stands meeting old-growth status.

Cumulative Effects

There would be no treatment activities under the no-action alternative with the potential to overlap the past, present, or reasonably foreseeable actions; therefore, this alternative would not result in cumulative effects on forest vegetation resiliency.

Environmental Consequences of the Proposed Action

This section discloses the environmental impacts of the proposed action. The proposed action would include modifying the forest structure, vegetation composition, and fuels to improve the landscape's resilience to disturbance, reduce the potential for extreme fire behavior in community protection zones, and promote low-severity fire regimes. Vegetation treatments and the maximum potential of treated acres are described in table 12 of the Vegetation Specialist Report in the project file (PF-VEGETATION-001).

Site-Specific Forest Plan Amendment for Old Growth

Purpose of and Need for Change

Since the forest plan was approved, the Northern Region developed ecological descriptions for old-growth forests by specific forest type and biophysical settings in the northern Rocky Mountains as described in Old-Growth Forest Types of the Northern Region (Green et al. 1992, errata corrected 2011). Green et al. (1992, errata 2011) include quantitative and qualitative criteria that are measured in the field by the National Forest Inventory Assessment data collection program, site-specific stand exams, and walk-through exams.

A site-specific, project-level forest plan amendment is needed to meet the Bitterroot Front project's purpose and need to improve landscape resilience to disturbances, such as insects, diseases, and fire, in the face of climate change.

Unlike the criteria in the forest plan, Green et al. (2011) provide measurable criteria for designating old growth based on forest types and habitat type groups in Montana and Idaho:

- Criteria for live trees: a minimum number of live trees per acre meeting age and DBH thresholds, and a minimum stand density measured as basal area (square feet per acre of live trees greater than or equal to 5 inches DBH)
- Associated characteristics, such as pieces per acre of down woody material that is at least 9 inches in diameter on the large end, the number of canopy layers, the presence of trees with broken or missing tops, trees with decay, and the number of snags greater than 9 inches DBH

Additionally, Executive Order 14072 directed the Forest Service to inventory old-growth and mature forests on National Forest System lands. This amendment will allow for consistent and reliable project-level identification and a statistically valid forestwide inventory of old-growth acres by applying the criteria from Green et al. (2011); these criteria align the forest plan definition with the national inventory effort published on April 20, 2023. An accurate inventory is the first step in promoting the continued health and resilience of old forest stands, retaining and enhancing carbon storage, conserving biodiversity, mitigating the risk of wildfires, enhancing climate resilience, enabling subsistence and cultural uses, providing outdoor recreational opportunities, and promoting sustainable local economic development.

The forest plan includes a forestwide standard for old growth (USFS 1987, p. II-20) that states: Stand conditions that qualify as old growth will vary by habitat type and landform. Current plan criteria to consider for identifying old growth include:

- large trees, generally 15 per acre greater than 20 inches DBH for species other than lodgepole pine and 6 inches DBH for lodgepole pine; canopy closure at 75 percent of site potential
- stand structure usually uneven aged or multistoried
- snags, generally 1.5 per acre greater than 6 inches DBH and 0.5 per acre greater than 20 inches
- more than 25 tons per acre of downed material greater than 6 inches diameter
- heart rot and broken tops in large trees are common; and
- mosses and lichens are present.

This definition (based on Franklin et al.) was the best information the Forest Service had for describing old-growth attributes when the plan was developed in the 1980s (USFS 1987, p. IV-61). However, this definition has several limitations. These criteria were developed for the Douglas-fir forest type in the Cascade Mountains, with its Pacific maritime climate, which is not representative of conditions or the fire return intervals found in the Bitterroot National Forest. Additionally, these criteria do not address the variability in old-growth conditions across various biophysical settings (habitat type groups) or variability of species' diameter as it relates to age. Many of the attributes in this definition cannot be accurately measured in the field; they also are not part of standard data collection protocols. Therefore, they cannot be assessed at a forestwide scale to determine whether goals and objectives of the plan are being achieved. Current climatic conditions on a drying trend also make the criteria from Franklin et al. (1981) an inappropriate scenario of conditions in the Bitterroot National Forest.

Additionally, the current forest plan addresses the retention of old-growth forests within the wildlife management standards. The forest plan provides standards for old-growth maintenance in each MA within each third-order drainage. The Bitterroot Front project proposes treatments in MAs 1, 2, 3a, and 3c. For MA 1, the forest plan states that old-growth stands should be 40 acres or larger, distributed over the MA. Within each third-order drainage, 3 percent of the suitable timberland will be maintained in old growth. This standard is the same for MAs 2, 3a, and 3c, except 8 percent of the suitable timberland will be maintained in old growth.

The amendment for old growth instead proposes to use the stand characteristics to define and measure old growth using the quantitative and qualitative factors found in Old-Growth Forest Types of the Northern Region by Green et al. 1992, errata corrected 2011. Green et al. (1992, errata 2011) represent the Northern Region of the U.S. Forest Service (Region 1's) best available scientific information to define old growth. Unlike the criteria in the forest plan, in Old-Growth Forest Types of the Northern Region provides measurable criteria for designating old growth based on forest types and habitat type groups in Montana and Idaho, as described above.

Using the criteria described by Green et al. (2011), MA direction related to old growth would also be modified. MAs 1, 2, 3a, and 3c each have a standard related to old-growth stand size and percentage. The requirement to only designate stands that are sized 40 acres and larger when maintaining old growth in a third-order drainage would also be modified in this EA. Stand size is not identified by Green et al. (2011) as a driving factor in whether a stand should be classified as old growth; this is because even small patch sizes provide important ecological values and increase ecosystem diversity. The percentage of old growth by third-order drainage by MA would also be removed because old growth would be managed on the landscape rather than a narrowly defined area with little ecological significance (PF-VEGETATION-007).

The amendment is site specific in nature and serves to replace current language in the forest plan. The amendment language will guide Forest Service's management actions for site-specific actions within the Bitterroot Front project area. The analysis within this report is based on how the proposed language changes may indirectly or cumulatively affect old growth. Future management projects will still need to analyze project-specific effects at a site-specific level. Minimum characteristics described by Green et al. (2011) are not prescriptive. Stand prescriptions would be written by a certified silviculturist based on site-specific conditions and objectives. For detailed information on the environmental consequences of the site-specific amendment for old growth, see PF-VEGETATION-001.

Issue 1: How would the proposed action affect the resilience of vegetation to disturbances such as insects, disease, wildfires, and climate change?

Direct and Indirect Effects

Table 24 summarizes the direct and indirect effects of the proposed treatments on the forest vegetation in the Bitterroot Front project area. Treatment types would not be exclusive in any location and would overlap. Outside of IRAs and RWAs, all vegetation treatment options would be allowed, except in MA 6. Within MA 6, only prescribed fire would be utilized, and existing trails and natural features would be used for control lines. Treatments within RWAs would not have an irretrievable impact.

Table 24. Direct and indirect effects of silvicultural treatments

Proposed Treatments	Direct Effects	Indirect Effects
Commercial intermediate harvest	Reduced amount and arrangement of fuels; decreased canopy density; temporary reduction in carbon storage	Increase in fire-resistant species and individual trees; a landscape that allows for low-intensity fire to burn through a stand
Noncommercial stand improvement and slashing	A shift in species composition, a reduction in stand density, and an improved stand structure achieved by shifting the stand toward the number of desired canopy layers	Stand level: Lowered stand densities, increased tree vigor, increased tree resilience to insects and disease, reduced ability of insects and disease to spread, and reduced risk of high-intensity wildfire. Landscape level: Increased resilience to climate change by reducing the dense, overstocked stands and maintaining productive growing stands for carbon storage.

Proposed Treatments	Direct Effects	Indirect Effects
Prescribed burn	A reduction in forest floor litter and a reduction in understory, shade-tolerant, small-diameter trees. Individual or small areas of trees of all size classes could die through primary or secondary fire effects from direct flame or heat or indirectly from beetles.	Stimulation and basal sprouting of forage species; improved habitat for fire-adapted native plants; reduced canopy cover; reduced stand density; increased base canopy height; species composition shift to fire-tolerant, early seral species; and lowered risk of high-intensity wildfire

Species Composition

Direct

Implementation of the proposed action would directly affect the species' composition by harvesting (removing) or thinning predominantly shade-tolerant species, such as Douglas-fir. Early seral species are often the most fire-tolerant and drought-tolerant species for their desired site. In the warm and dry forests, where early seral species are present, healthy ponderosa pine would be retained. Mature ponderosa pine is a priority species of focus to improve landscape resistance and resilience to disturbance; this is due to its natural characteristics that help it survive wildfire and drought plus its natural historical presence in the Bitterroot National Forest.

In the cool and moist forests, healthy Douglas-fir, if available, would primarily be retained. If present, whitebark pine would be retained across all habitat types. Prescribed fire treatments would also favor the early seral species that are the most tolerant of fire. The result would be a shift from shade-tolerant species to early seral, shade-intolerant species.

Indirect

Under the proposed action, the species composition would eventually shift toward desired forest conditions. Fire-dependent, early seral, shade-intolerant species would be retained. These species would offer long-term benefits to the forest's resilience to natural disturbances, including fire and a warming climate.

Stand Density

Direct

The proposed treatments would directly reduce stand densities. Regeneration treatments would have the biggest direct effect on stand density; however, intermediate treatments, noncommercial thinning, and slashing would greatly reduce the basal area and the number of trees per acre. Prescribed fire also would reduce the stand density to varying degrees in low-severity to mixed-severity applications.

Indirect

Indirectly, trees in more open-grown forests with lower stand densities would have more resources (water, sunlight, and nutrients) to enhance growth and naturally resist insects and disease. Insects such as the western spruce budworm and the parasitic plant dwarf mistletoe would have less success spreading from crown to crown in more open-grown stands. Reduced stand densities tend to burn at a lower severity if ladder fuels are not present. The removal of ladder fuels would reduce the canopy density and raise the canopy base height. This alteration would allow crown spacing and prevent the ease of fire spreading through the crowns.

Structural Stage Diversity

Direct

The proposed treatments would improve the desired structure within stands at the treatment-unit scale and increase the size class diversity at the landscape scale. Each treatment would vary based on the site conditions. In the warm and dry forests, treatments, including harvest, noncommercial treatments, and prescribed fire, would all directly reduce the amount of shade-tolerant species encroaching in both plantations and wild stands. Intermediate harvests would be applied to stands dominated by Douglas-fir overstory where the basal area and stand structure need alteration to facilitate the reintroduction of low-intensity wildfire to return to historical fire regimes. Noncommercial thinning treatments would be applied to dense stands of single-aged plantations to alter the species' composition and promote health and vigor in early seral species. This treatment could allow for stands to be managed as uneven aged in the future.

In the cool and moist forests, noncommercial thinning treatments would be applied to canopy layers to lower the stand densities enough to reduce the risk of insects and disease. Throughout all forest types, horizontally spread out age classes are desired for early seral species' dominance and to reduce the spread of insects and disease.

Indirect

At the landscape scale, a variety of treatments that would create conditions to support a variety of stand size classes would increase the landscape heterogeneity. Specifically, regeneration harvests and mixed-severity fire would create conditions for a new age class of trees to establish (seedling/sapling size class). Intermediate treatments would improve stand-level conditions in the pole to early mature structural stages. Intermediate treatments, such as improvement cuts or uneven-aged treatments (such as group selection and individual tree selections), could improve stand conditions to manage for mature to overmature later structural stages. This combination of treatments would improve the landscape heterogeneity by creating a mosaic of size classes across the project area.

Carbon and Climate

Direct

The proposed action would manage for the most drought- and fire-tolerant species in each forest type. The direct effects would reduce stand densities and the amount of shade-tolerant ingrowth. This would cause an immediate reduction of forest fuels, insect and disease host species, and the associated overall size class and structure. Reducing stand densities would reduce forest carbon storage in the short term, until the desired tree species begin to regenerate. At the landscape scale, treatments would increase the structural diversity and size class diversity across the project area. Treatments in high-elevation, cold forests would focus on reducing the risk of fire, insects, and disease for species such as whitebark pine, which are at a greater risk from climate change.

Indirect

By reducing the risk of large wildfires, the largest source of carbon emissions, the proposed action would lower the potential for increased emissions. Additionally, establishing new and vigorously growing age classes would improve carbon storage and increase genetic diversity based on site-specific conditions (Birdsey et al. 2019). Shifting the species' compositions to early seral, fire-tolerant species; reducing stand densities; reducing ladder fuels associated with the ingrowth of shade-tolerant species; and increasing the size class diversity across the landscape would reduce fuels and the risk of larger and higher-severity wildfires. Forest thinning followed by a prescribed burn treatment could reduce the severity of wildfires; however, this method does not apply to all forest types (Hessburg et al. 2021). See the Fire and Fuels Effects Analysis Specialist Report.

Insect and Disease Disturbance

The proposed treatments would improve the forest vegetation resilience to insects and disease by shifting the species' composition toward the desired species, decreasing stand densities, reducing the structure associated with the ingrowth of shade-tolerant species, increasing the structural stage diversity, and increasing the size class diversity across the landscape.

Direct

The proposed action would decrease stand densities, which could result in a temporary increase in insect and disease activity. The slash produced from treatments could attract tree-killing bark beetles that pose a dangerous threat to coniferous forest habitats (Fettig et al. 2007). However, a reduction in stand densities would increase airflow and bole heating, and reduce water and nutrient stressors; these would allow the trees to better defend themselves and increase stand resilience to future beetle attacks. Stands infected with dwarf mistletoe are present throughout the project area in warm and dry and cool moist forest types. The locations of the greatest concern are the habitat types that feature Douglas-fir and lodgepole pine as early seral species. Removal of trees infected with dwarf mistletoe would slow the spread within stands across the landscape.

Indirect

The proposed action would produce lower stand densities that would increase individual tree vigor, increase the trees' natural defense mechanisms to resist insects and disease and risk of spread, and reduce the risk of high-intensity wildfire. On the landscape scale, thinning would increase resilience to a changing climate by reducing dense, overstocked stands and maintaining productive growing stands for carbon storage. Young, healthy stands offer age class diversity and landscape heterogeneity, which would increase the landscape's resilience to natural disturbance processes (Halofsky et al. 2018).

Issue 2: How would the proposed action affect the old-growth character and abundance, and the resilience of old-growth stands?

Direct and Indirect Effects

Under the proposed action within old-growth stands, treatments would be designed to promote and maintain stands meeting old-growth criteria. These stands would be verified via a stand examination (in the form of a common stand exam or a Field Sampled Vegetation (FSveg) spatial walk through) prior to implementation. Treatments applied within old-growth stands would modify the stand structure and species' composition with respect to the broad potential vegetation type and maintenance of old-growth status. The ability to effectively apply treatments and MA direction dictate whether an entry is warranted; not all stands meeting old-growth criteria can or would be treated. In the instances where the Forest Service would not treat the trees, succession and other ecological processes would progress naturally. Intermediate treatments, including harvest within the warm and dry broad potential vegetation types, would make up a majority of prescribed activities. These treatments would allow prescribed fire to be reintroduced in intervals more reminiscent of the historical fire regimes by reducing the likely hood of flame lengths greater than 20 feet.

In regard to harvest, it is important to note that the minimum criteria from Green et al. (2011) are measurable stand components identified to assist in old-growth designation. Using the criteria from Green et al. (2011) to define old growth instead of using the existing forest plan definition increases the number of stands that could be designated and managed as old growth, while also putting tighter restrictions in place for any management activities in old growth. These numbers are not prescriptive, and there are no plans to reduce any old-growth stands to these minimum thresholds. A functioning old-growth stand must remain as a functioning old-growth stand after harvest based on the criteria from Green et al. (2011). The Forest Service would apply this science and manage locally based on site-specific conditions considered in the silvicultural prescription and analyzed by an IDT of specialists. Under the Bitterroot National Forest's natural disturbance regimes, old-growth forest can develop through multiple different successional pathways, usually with fire and other disturbances along the way.

Cumulative Effects

The Forest Service evaluated past, present, and reasonably foreseeable future actions for cumulative effects on forest vegetation. Notable past projects have occurred and projects are reasonably foreseeable to occur near the project area. Some of the notable past projects that were completed in or near the project area include the Canyon Creek Fuels Reduction Project (approximately 206 acres), Chaffin (approximately 250 acres of underburning), Lake Como Hazardous Fuel Reduction Project (approximately 350 acres), Gash Fire Salvage and Reforestation (salvage harvest on 250 acres or less and tree planting on 462 acres), and Westside Collaborative Vegetation Management Project (approximately 2,327 acres of commercial and noncommercial forest treatments). For more information on past timber harvests and non-harvest management activities, see table 6 and 7 in the "Affected Environment" section of the Vegetation Specialist Report in the project file (PF-VEGETATION-001). These past vegetation management projects have helped drive forest conditions toward desired conditions while promoting forest resilience within the treatment areas.

Ongoing and current vegetation treatments and prescribed burning projects include the Stevensville West Central Project (approximately 7,734 acres), Trapper Bunkhouse Land Stewardship Project (approximately 5,827 acres), Como Forest Health and Protection Project (approximately 1,300 acres of commercial timber harvest and 731 acres of noncommercial thinning), Elk Bed Restoration Project (noncommercial thinning of up to 208 acres and ponderosa pine restoration on 101 acres), and Larry Bass Burn Project (approximately 1,112 acres). These projects would continue promoting forest resilience, and treatments would move vegetation toward desired conditions over the longer term.

With the exception of the potential spread of fire outside treatment boundaries (discussed in the Fire and Fuels Specialist Report PF-FIRE AND FUELS-001), the Bitterroot Front project treatment unit's direct effects would not have the potential to affect forest vegetation outside the boundaries of the localized treatment areas. However, the indirect effects of the treatments, combined with the other adjacent and intermixed planned activities, collectively and synergistically would increase the treated stands and the greater landscape's resiliency to fire, insects, and disease. The treatments break up the landscape and change the way fire is able to spread across a large area. The beneficial change in species' composition to feature early seral species, the reduction in stand densities to more site-appropriate densities, the modification in canopy layers that would reduce ladder fuels, and the increase in age class diversity, which are strategically located in treatment units across the project area, all work together and offer a greater combined landscape resilience to natural disturbances.

These changes in stand characteristics also increase the resilience in old-growth stands and increase the landscape's ability to cope with changing climates. These treatments reduce the risk of fire, insects, and disease. They also increase the ecosystem's ability to bounce back after disturbance. It is impossible to estimate the spatial extent of the increased resilience, but the Bitterroot Front project would contribute to an overall cumulative increase in landscape resilience to natural disturbances within and beyond the project boundary for approximately 20 to 50 years.

Overall, the proposed action would trend the landscape toward desired conditions and improve the landscape's resilience to natural disturbances such as insects, disease, fire, and drought. Every acre treated would be designed to improve the species' composition, stand density, and stand structure; this would create size class diversity across the landscape that would collectively improve the Bitterroot Front project area's resiliency to disturbances. The purpose and need would be met by:

- Increasing the amount of early seral species (fire-tolerant species) on the landscape and restoring species' composition typical of functioning, fire-dependent ecosystems.
- Reducing stand density through commercial and noncommercial treatments to densities that promote tree health and vigor and enhance the trees' natural defenses against insects and disease. Lower stand densities reduce the ease of spread for insects, disease, and fire.
- Improving stand structure by reducing the ingrowth of shade-tolerant species; this would create growing conditions for uneven-aged stands to thrive, featuring horizontally spread out age classes. Reducing the number of canopy layers reduces the spread of insects and disease; it also reduces the ladder fuels and the risk of stand-replacing fires.
- Increasing size class diversity across the landscape by establishing stands of seedlings and saplings, managing for uneven-aged ponderosa pine, and creating conditions that support current and future development of mature, old-growth trees.

Watershed and Aquatics

Introduction

This section summarizes the existing condition of watersheds and species and habitat in the project area. The analysis for aquatic species and habitat focuses on bull trout, a threatened species under the ESA, and westslope cutthroat trout, designated as sensitive by the regional forester. The watershed analysis focuses on impacts on water quantity and quality.

Analysis Methodology

The analysis focused on the following issues:

- Issue 1: How would the project's activities, including use and management of roads, affect water quality and quantity?
- Issue 2: How would the project's activities affect aquatic species and aquatic habitat conditions?

Analysis Indicators

Water Quantity

Water quantity or water yield refers to streamflow quantity and timing and is a function of water, soil, and vegetation interactions. In this analysis, equivalent clearcut area (ECA) analysis, a tool used to determine the relationship between water yield and the extent of forest canopy openings (for example, canopy openings created from fire, harvest, and roads), is used to determine the probable increased water yield due to tree harvest (Garn 1974; Callahan 1996). Generally, basal area in a fully forested watershed must be reduced by approximately 20 to 25 percent to produce a detectable water yield increase (Stednick 1996, Troendle et al. 2010).

Water Quality

Water quality parameters include temperature, conductivity, dissolved oxygen, nutrients, and sediment or turbidity, bacteria, and pollutants such as metals or oil. Water quality indicators in this report focus on changes to sediment delivery and in-stream turbidity levels caused by project-related increased sedimentation into streams. Active erosion of the landscape naturally yields sediment to streams and is related to rainfall, runoff, and channel stability. When an excess amount of sediment is delivered to a stream, the stream's ability to route the sediment out of the system is diminished, and water quality is reduced. Excess sediment causes increased turbidity, which reduces habitat conditions for many aquatic species. Potential for increased sedimentation due to project activities was evaluated based on the miles of roads and riparian roads (roads within 100 feet of streams) that would be subject to project road activities, the Water Erosion Prediction Process (WEPP) model, and a qualitative assessment of the sediment production risk from the types of activities proposed in the Bitterroot Front project area.

Aquatic Species and Habitat Conditions

This indicator focuses on potential alterations to habitats for native trout species—that is, bull trout (*Salvelinus confluentus*) and westslope cutthroat trout (*Oncorhynchus clarkii lewisi*), as these species are representative of all aquatic species habitat conditions. Both species require clean stream substrates for spawning and rearing; cold water for survival; complex habitats, including streams with riffles and deep pools, undercut banks, and many large logs; and connected migratory habitats to fulfill life histories (spawning, rearing, and overwintering) and to access refugia during disturbance. The likelihood and quantity of project-related sediment affecting fish habitat and populations were assessed based on the miles of riparian roads (roads within 100 feet of streams) with known native trout populations that would be subject to project road activities, the duration of effects (short term or long term), and a qualitative assessment of the sediment production risk from the types of activities proposed in the Bitterroot Front project area.

Spatial and Temporal Context for the Effects Analysis

Spatial Bounds: The direct, indirect, and cumulative effects analyses are focused entirely within the project area boundary.

Temporal Bounds: The timeframe considered is approximately 20 years in the future, at which time the proposed treatment activities would be completed and vegetation and fuels response to those treatments would be stabilized. Short-term effects are considered between 0 to 5 years from implementation of project actions; long-term effects are typically 5 years and beyond and depend on how long a vegetation type takes to stabilize.

Existing Conditions

Watersheds

The 143,340-acre project area includes 29 subwatersheds (HUC12 [hydrologic unit code]). Watershed conditions in the project area are a result of both natural processes and human activities. Past human-related activities include road building and maintenance, recreation, fire suppression, grazing, and previous harvest and thinning activities. Past harvest and existing roads have had the most impact, with some increases in water yield and sediment yield. Several large fires have occurred in the project area, including the Roaring Lion fire in the Lick and Sawtooth HUCs (2016), Observation fire in the Lick and Lost Horse HUCs (2016), and the recent Lolo Peak fire in the Sweeney, Lower Lolo, Bass, and Larry Creeks HUCs (2017). Erosion and sediment contributions from these fires are near pre-fire conditions due to the time (3-year recovery) since the fires occurred; even so, aquatic systems have likely been affected by sediment contributions from these recent fires.

Past harvest data, road miles, and wildfire data were used to calculate the ECA for each hydrologic unit in the project area (table 2 in the Watersheds and Aquatics Specialist Report). High ECAs were noted in the One Horse HUC (18.3 percent), Lower Lolo (35.77 percent), Sawtooth (20.81 percent), Sweathouse (15.08 percent), and Lick Creek (13.7 percent). Hydrologic units where roads contribute the most to the ECA include Chaffin, Lick, Lloyd, and Sweathouse Creek. While ECA recovers as the vegetation recovers in harvest and wildfire areas, the ECA contribution from roads does not change over time. Wildfire is a major source of vegetation changes at the hydrologic unit scale and a major contributor to ECA throughout the project area.

The 303(d) List, required by the Federal Clean Water Act, focuses on waters in the state that have been assessed as having one or more of their beneficial uses impaired by human-caused pollutants/pollution. There are 12 streams in the project area currently listed as Impaired for Water Quality by MDEQ for the 2020 cycle (2022 is not yet available). The streams include Bass, Bear, Blodgett, Kootenai, Lick, Lost Horse, McClain, Mill, Roaring Lion, Sweathouse, Tin Cup, and the West Fork Bitterroot River.

Aquatic Species and Habitat

The Bitterroot Front planning area provides habitat for 10 native fish and 10 nonnative fish species. Of particular interest are bull trout, which are listed as a threatened species under the ESA, and westslope cutthroat trout, which are a Forest Service Region 1 sensitive species. Bull trout and westslope cutthroat trout habitat conditions are representative of all aquatic species habitat conditions. This is because bull trout are highly sensitive to changes in habitat quality and are considered bioindicators of overall aquatic ecosystem health (Fraley and Shepard 1989; Rieman and McIntyre 1993). Additionally, the 1987 Bitterroot National Forest Land and Resource Management Plan (forest plan) [USFS 1987] requires the project analysis to use the westslope cutthroat trout as an indicator of change. The Biological Assessment provides detailed information on the status of these species in the planning area (USFS 2023e).

Habitat for native fishes in the project area primarily consists of west–east-trending narrow canyons with streams that flow directly into the Bitterroot River. At least 18 streams in the planning area are known to contain bull trout, and 9 streams have been designated as critical habitat, for a total of 29 critical habitat miles in the project area (USFS GIS 2023). Table 4 in the Watersheds and Aquatics Specialist Report lists the bull trout populations known to occur in the action area and summarizes their status and threat level (PF-AQUATICS-001).

Westslope cutthroat trout are also widely distributed across the planning area, with approximately 8,680 westslope cutthroat trout occurrence acres in the project area. There are at least 40 streams in the action area that contain westslope cutthroat trout, not counting the lower ends of the named and unnamed tributaries that enter the canyon streams in the wilderness. Table 5 in the Watersheds and Aquatics Specialist Report lists the streams in the action area that contain westslope cutthroat trout and summarizes their connectivity and genetic status.

Environmental Consequences of No Action

Issue 1: How would the project's activities, including use and management of roads, affect water quality and quantity?

Direct and Indirect Effects

The no-action alternative would not directly affect water quality or quantity. This is because no additional fuels reduction and vegetation treatments or associated ground-disturbing activities would occur. Additionally, road density and use would not change. As such, there would be a trend toward increased sediment delivery and water yield due to vegetation removal and road deterioration caused by use, until funding is allocated for repairs.

However, as demonstrated by previous wildfires that have recently occurred in the project area, watersheds and aquatic habitat conditions in the project area could be affected by future wildfires. This is because active forest management, such as fuels reduction and vegetation removal, to reduce the potential for uncharacteristically severe wildfires would not occur. Large fires and those with high burn severity can alter water quantity and quality by reducing vegetation cover, which would increase runoff, reduce streambank stability, and lead to erosion and delivery of sediment, nutrients, and metals to water resources (Cannon et al. 2003; USGS 2023). In the event of a large, high-severity wildfire, soil disturbance and erosion would greatly exceed those caused by prescribed fire treatments (Neary and Leonard 2021), such as those proposed in this project.

Forest restoration activities, including overstory thinning and planting of native vegetation, can also improve the health and resiliency of native plant communities; this ultimately improves water-holding capacity and limits erosion (Powers 2002). Because such treatments would not be conducted, water yield, sediment delivery, and streambank stability would be at continued risk of degradation from natural disturbances.

Issue 2: How would the project's activities affect aquatic species and aquatic habitat conditions?

Direct and Indirect Effects

The no-action alternative would not directly affect aquatic habitats or aquatic species because stream channels and adjacent riparian areas would not be disturbed from additional fuels reduction or vegetation treatments.

However, as described above, aquatic species and habitat conditions in the project area could be affected by future wildfires. Increased sediment inputs from severely burned soils could negatively impact water quality and habitat for aquatic species by increasing turbidity, suspended sediment, and percentage of fine particles within the stream. High levels of suspended sediment and turbidity can result in direct mortality of fish by damaging and clogging gills, smothering eggs, and impeding fry emergence. It can also reduce primary productivity and alter macroinvertebrate communities or populations, which would reduce food sources for native trout. Other effects on aquatic habitat include changes in water quality, degradation of spawning and rearing habitat, simplification and damage to habitat structure and complexity, loss of habitat, and decreased connectivity between habitats. These habitat alterations could lead to underutilization of stream habitat, abandonment of traditional spawning habitat, and avoidance or displacement of fish from their preferred habitat (USFWS 2010).

Additionally, high fire intensity could result in widespread loss of streamside forest, reducing shade and increasing solar exposure and water temperature. Increased water temperatures would reduce habitat conditions for native trout species such as bull trout, which require cold water temperatures (often less than 54˚ F [12 ˚ C]). Combined with predicted continued warming of stream temperatures under climate change, if streams are burned at high severity, the speed and magnitude of the temperature increases and are likely to be accelerated and more pronounced (Isaak et al. 2017). Increased stream temperatures would favor fish species tolerant of warmer conditions, leading to changes in fish communities.

Cumulative Effects

Because the proposed fuels reduction treatment activities would not occur under the no-action alternative, there would be no contribution to cumulative effects from forest management actions. However, future wildfires could impact watersheds and aquatic species and habitat to varying degrees. Depending on the size and severity of future wildfires, forested habitat could be reduced in quality and quantity in the short term, which could lead to increased water yield and sediment delivery. As demonstrated by past events, "pulse" disturbance events in the form of wildfires can deliver large, one-time inputs of sediment to streams in portions of the action area. Examples include Blodgett and Mill Creeks in the first three years following the 2000 fires, and Roaring Lion Creek from 2016–2018, following the 2016 Roaring Lion wildfire. Current erosion rates from the burned areas have now diminished to pre-fire levels and much of the sediment that was contributed to streams has been transported out of the system. However, some of the sediment that was delivered by the fires is still being stored in the bottoms of pools and low-velocity habitat types, where it has impacted water quality and aquatic habitat conditions. These deposits likely are transported downstream only during very high flows, and it may take several decades to clean them out entirely. The lack of fuels treatments could lead to increased potential for uncharacteristically severe wildfires, which could lead to similar impacts on watersheds and aquatic resources.

Environmental Consequences of the Proposed Action

Issue 1: How would the project's activities, including use and management of roads, affect water quality and quantity?

Direct and Indirect Effects

Activities from the proposed action, as described in the Watershed and Aquatics Specialist Report, would have the potential to impact water quality and quantity. These impacts are summarized below; refer to the specialist report for more detail.

Impacts on Water Quantity/Water Yield

Vegetation treatments (harvest, thinning, prescribed burning, and restoration efforts such as revegetation and weed removal) would be authorized under the proposed action and could potentially impact water yield. However, the specific timing and locations of treatments have not been identified. Rather, the timing and location of treatments would be based on where in the project area environmental conditions occur that would warrant an action during implementation of the project. The Implementation Process is described in chapter 2, "Proposed Action." The acres treated would be limited to the maximum acres identified in chapter 2.

The percentage increase in ECA is used as an indicator of change in water yield resulting from reductions in forest canopy, such as those associated with vegetation treatments and road construction. A lower ECA value corresponds to a lower likelihood that undesirable effects of increased water yield (for example, elevated channel and bank scour) would occur. An ECA value of less than 20 percent would be unlikely to result in changes to water yield that would cause stream channel instability.

Based upon ECA modeling and stream visits, project area streams are generally stable and would be able to withstand increases in water yield and maintain channel stability (table 2 in the Watersheds and Aquatics Specialist Report [PF-AQUATICS-001]). The level to which proposed action activities would increase ECA depends on the acres of vegetation removed within each watershed. Table 6 in the Watersheds and Aquatics Specialist Report includes estimates of potential additional ECA acres that could occur by watershed to suggest a potential limit of harvest acres for project planners. Note that any new road construction, including temporary roads, will be included in the ECA totals calculated during the Implementation Phase.

Generally, an ECA value below 20 percent at the HUC12 scale is unlikely to result in changes to the water yield that would cause stream channel instability (Stednick, 1996; Troendle et al. 2010). The thresholds presented in table 6 in the Watersheds and Aquatics Specialist Report represent the additional acres of harvest needed to reach 20 percent, 18 percent, and 13 percent ECA– they do not represent the desired level of harvest. It is not advisable to approach the 20 percent threshold, as this would not leave space for other actions, both anthropogenic or natural (fire, insect, disease), that might contribute to ECA in the future without risking channel stability and water quantity and quality. Design features (appendix A) would protect streams from harvest-related changes in water yield by establishing an ECA threshold of 20 percent per watershed resulting from the implementation of project activities.

A large increase in ECA percentages and associated increases in water yields would not be expected with implementation of the proposed action because ECA levels are relatively low in most hydrologic units. Based on stream site visits in 2020, project area streams are generally stable and could withstand increases in water yield and maintain channel stability (PF-AQUATICS-002). When treatments are proposed, the location in the watershed, number of acres, and crown cover removed would be reviewed to determine the effects on the ECA. Where the ECA is predicted to increase into the 20 percent, 18 percent, and 13 percent ECA categories, additional analysis would occur to ensure that additional harvest would not cause channel instability or decreased water quality. Under the proposed action, additional time would be needed for field verification to determine the risk to water yield and channel stability prior to implementation. This field verification would allow for high-priority treatments while limiting the risk of increases in streamflow that may cause channel adjustments and degrade water quality and quantity.

Water Quality/Sediment Yield

Of the proposed project activities, harvest, prescribed fire, the use of the existing road system, temporary and/or permanent road construction, and other road-related activities have the potential to increase erosion production and sediment delivery into streams within and adjacent to treatment units over the short term (0–5 years). This would be mitigated with the use of design features in appendix A. As ground cover is reestablished, hillslope erosion would diminish over the time span of 0–5 years.

Transportation management activities could increase sediment delivery to streams during implementation and in the short term (up to 5 years) after implementation. Road actions associated with the proposed action are summarized in table 3 of the Transportation Specialist Report (PF-TRANSPORTATION-001). Those proposed road actions that would occur within HUC12 watersheds and less than 100 feet from streams at the HUC12 watershed level are shown in table 8 in the Watersheds and Aquatics Specialist Report (PF-AQUATICS-001). In total, approximately 92 miles of proposed road actions would occur within HUC12 watersheds and approximately 7 miles of proposed road actions would occur within 100 feet of streams (values exclude administrative-only actions). Those actions that would occur within 100 feet of streams were considered to have the highest potential to deliver sediment to streams, and, therefore, influence water quality.

Proposed road actions could cause temporary increases in sediment delivery due to short-term pulses of sediment from road construction, maintenance, and use that would occur during project implementation. This is because construction and maintenance activities (for example, use of equipment or vegetation removal) as well as increased road use can cause soil compaction, erosion, and displacement, all of which can increase sediment delivery to streams and impact water quality. Roads on steep slopes are a greater potential source for soil erosion from water runoff (Sugden and Woods 2007). The potential for erosion is lowest for soils on slopes less than 40 percent. Most roads in the forest (311 miles) are on slopes less than 40 percent, and there are no roads on sensitive soils with slopes greater than 60 percent.

The proposed action proposes decommissioning approximately 11 miles of road within HUC12 watersheds and approximately 1 mile within 100 feet of streams. Most roads proposed for decommissioning or storage have not been used for many years. The surfaces of these roads are already densely vegetated and ground disturbance would not be required to move them into “decommissioned” or “storage” status. These projects would employ a variety of design features intended to reduce the likelihood that sediment associated with ground disturbance could be carried into stream channels, including mulching, revegetation, and placing slash to disperse overland flow (appendix A). Road decommissioning and storage indirectly benefit aquatic habitats by reducing or removing the risk of chronic erosion and landslides over the long term (Switalski et al. 2004).

Under the proposed action, approximately 2 miles of new road construction to reduce impacts on riparian habitat would occur within the following HUC12 watersheds: Chaffin Creek–Bitterroot River, Town of Darby–Bitterroot River, and Trapper Creek. No new road construction would occur within 100 feet of streams (USFS GIS 2023). There would be no net increase in NFSR roads because approximately 11 miles of NFSRs within HUC12 watersheds and approximately 1 mile within 100 feet of streams would be decommissioned (USFS GIS 2023). Additionally, any new permanent roads constructed would only be open to administrative access; temporary roads would be restored after activities have been completed. Therefore, no long-term changes to sediment or water quality from road construction activities are anticipated from transportation management activities.

Log hauling on project area roads and the maintenance activities needed to facilitate hauling have potential to deliver sediment to streams. Numerous studies have shown that log-truck traffic substantially increases sediment production from forest roads (Reid and Dunne 1984; Foltz 1996; Luce and Black 1999 and 2001; Ziegler et al. 2001; Sheridan et al. 2006; Van Merrveld et al. 2014; Sosa-Perez and MacDonald 2016). In comparison with light-vehicle traffic, the weight of log trucks, combined with the friction between the tire and surface aggregate, degrades the surface aggregate into smaller sizes pieces. This increases sediment yield by increasing the availability of fine sediment on the road surface (Foltz and Truebe 1995). When hauling during wet conditions, the weight of the truck on the road layer may also cause fine sediment from the subgrade to move upward to the surface in a process known as pumping (Koerner 1998 as reported in Miller 2014). These smaller, fine particles are then more easily mobilized in surface runoff.

Sweathouse is the only stream listed as sediment impaired by the MDEQ that could be impacted by proposed road actions within 100 feet (table 8 in the Watersheds and Aquatics Specialist Report). Because this stream is already listed as impaired for water quality, short-term increases in sediment delivery could cause a relatively greater magnitude of impacts on water quality. Water quality in an impaired stream may take longer to recover since it is already compromised.

Available data indicates that considerably more sediment is delivered at stream crossings than along near-stream road segments (MDEQ 2005). Since the number of stream crossings would not change under the proposed action and the miles of roads within 100 feet of streams would decrease overall, large increases in sediment delivery are not expected to occur from proposed road actions. Road-related sediment delivery resulting from proposed road actions was modeled using the WEPP software, as modified for roads analysis (WEPP:Road model; Elliot and Foltz 2001). The WEPP:Road model uses road- and physical environment-related variables to estimate sediment production under various scenarios of use, location, design, and maintenance. Modeling focused on road segments within 100 feet of streams and stream crossings, due to general scientific consensus that these areas produce and deliver most road-related sediment.

The WEPP:Road model (table 25) estimated that proposed road activities within 10 to 100 feet of streams would contribute approximately 862 to 4,000 pounds of sediment over the short term (5 years). Overall, a reduction in sediment delivery of approximately 331 to 1,938 pounds (within 10 to 100 feet of streams) is expected to occur due to decommissioning and obliterating roads. This is because there would be a net decrease in use of roads within 100 feet of streams over the long term (20 years).

In this analysis, the WEPP:Road model estimates presented in table 25 represent a worst-case scenario of predicted sediment delivery to streams as a result of the proposed road actions. In particular, the "undetermined roads, obliterate" road action has a short-term sediment delivery estimate of 538 (for roads with a 100-foot buffer) to 2,500 pounds (for roads with a 10-foot buffer). This assumes that these roads would require active, on-the-ground treatment to return them to the productive land base, reduce erosion, and reduce risk of mass failures and subsequent sedimentation of streams. However, recent field surveys show that in many cases, these undetermined roads would not require intensive on-the-ground obliteration techniques, as many present no watershed resource issues or risk of failure and are naturally recovered. Additionally, actions and use of roads within 100 feet of streams were considered to have the greatest potential to deliver sediment into streams. Therefore, the estimated values account for project area roads with 10- and 100-foot buffers from streams as the worst- (closest to streams) and best- (farthest from streams) case scenarios.

Additionally, the proposed action is expected to reduce sediment delivery to streams associated with wildfire-related vegetation loss over the long term (more than 5 years after implementation). This is because fuels reduction and vegetation treatments would reduce the risk of uncharacteristically severe wildfires, and, therefore, widespread vegetation loss that could otherwise expose bare soil and increase sediment delivery.

The proposed action would incorporate a comprehensive suite of design features to minimize impacts on watersheds. For example, temporary roads would not be built in riparian habitat conservation area (RHCAs) and road maintenance would follow the minimization measures for each road activity type (appendix A). In addition, design features such as operating within specific soil moisture conditions, adhering to the prescribed season of operation, and operating exclusively on designated trails and landings would minimize the risk of increased sediment erosion and sediment delivery. These and other measures would reduce or mitigate impacts on water quality associated with transportation management activities.

Table 25. Estimates of sediment delivery and reductions from proposed road actions

Proposed Road Action	Miles Within Less Than 100 Feet of Streams	Short-term (5 Years) Sediment Delivery from Road Actions within 10 Feet of Streams (pounds) [1]	Short-term (5 Years) Sediment Delivery from Road Actions within 100 Feet of Streams (pounds) [1]	Long-term (20 Years) Sediment Delivery from Road Actions within 10 Feet of Streams (pounds)[2]	Long-term (20 Years) Sediment Delivery from Road Actions within 100 Feet of Streams (pounds)[2]
Decommission NFSRs	1	500	108	-323	-55
Decommission NFSRs, maintain as NFSTs	0	0	0	0	0
New construction NFSRs	0	0	0	0	0
Store NFSRs	0	0	0	0	0
Store NFSRs after use	1	500	108	323	55
Undetermined road added as NFSRs	0	0	0	0	0
Undetermined road, maintain as NFST	0	0	0	0	0
Undetermined road, obliterate	5	2,500	538	-1,615	-276
Undetermined road, obliterate after use	1	500	108	-323	-55
Total	7	4,000	862	-1,938	-331

Source: USFS GIS 2023; USFS 2023f

Note: Totals may not equal the sum of individual elements due to rounding.

Model assumptions: Sediment delivery is constant along a given length of road. The actions and use of roads within 100 feet of streams were considered to have the greatest potential to deliver sediment into streams. Therefore, the estimated values consider project area roads with 10- and 100-foot buffers from streams to represent the worst- (closest to streams) and best- (farthest from streams) case scenarios. Project road actions and use would cause sediment delivery corresponding to the "low traffic" model parameter. Active or natural revegetation of obliterated and decommissioned roads would occur.

[1]All proposed road actions listed were assumed to have potential to contribute to sediment delivery over the short term due to use and activities associated with the proposed action. Administrative-only actions were not considered to have potential to impact watersheds because there would be no on-the-ground actions and were, therefore, excluded from the WEPP:Road analysis.

[2]Road actions such as decommissioning and obliterating roads are assumed to contribute to reduced sediment delivery over the long term due to lack of use and active or natural revegetation once project activities are complete. Therefore, long-term sediment delivery from decommissioned or obliterated roads is reported as negative values.

Issue 2: How would the project's activities affect aquatic species and aquatic habitat conditions?

Project activities, including vegetation treatments (harvest, thinning, prescribed burning, and restoration efforts such as revegetation and weed removal) and transportation management (new road construction, road maintenance, and increased road use) could impact aquatic species and habitat conditions by increasing sediment delivery to streams within and adjacent to treatment units over the short term (0–5 years).

Increased sediment loads can alter a stream's natural biotic community (algae, macrophytes, invertebrates, and fishes) and affect the quality and abundance of rearing habitat for both bull trout and westslope cutthroat trout. Excessive contributions of fine-sediment fill-channel margins and the interstitial places between benthic particles and pools reduce the quality and abundance of these habitats, and, ultimately, the carrying capacity of aquatic habitats. Sediment affects trout directly by smothering/burying their redds; the number of eggs that survive to fry is strongly affected by the amount of sediment in the stream bottom (Bjornn and Reiser, 1991; Chapman, 1988; Everest et al. 1987). Increased sediment also leads to poorer juvenile trout survivorship by reducing hiding cover and by altering aquatic insect composition (the main food source for juvenile trout), decreasing the abundance of prey. Other indirect effects of sediment on native trout include reduced abundance of macroinvertebrates, which are one of the primary food sources for westslope cutthroat trout and a competitive advantage on nonnative brook trout that are present in the project area (Hausle and Coble 1976; Irving and Bjornn 1984; Weaver and Fraley 1991).

The impacts from specific project activities are described below.

Proposed Road Actions

Proposed road actions such as log hauling, road construction, and decommissioning that occur within 100 feet from streams (table 11 in the Watersheds and Aquatics Specialist Report [PF-AQUATICS-001]) could impact aquatic species and habitat conditions by increasing sediment delivery to streams during implementation and for 1 to 5 years after implementation of these activities. However, with well-maintained roads, design features (appendix A), and the proper application and maintenance of Best Management Practices, the amount of sediment that project-related road use, and particularly log hauling, would potentially deliver into aquatic habitat would be minimized as much as possible. For example, establishing no harvest RHCA, operating within specific soil moisture conditions, adhering to the prescribed season of operation, and operating exclusively on designated trails and landings would minimize the risk of sediment delivery to aquatic habitats. As a result, the sediment increases that would occur in the short term from these activities are expected to be too small and scattered to be visually detectable and measurable.

As described under Issue 1, the WEPP:Road model (table 25) estimated that proposed road activities within 10 to 100 feet of streams would contribute approximately 862 to 4,000 pounds of sediment over the short term (5 years). Overall, a reduction in sediment delivery of approximately 331 to 1,938 pounds (within 10 to 100 feet of streams) is expected to occur due to decommissioning and obliterating roads. This is because there would be a net decrease in use of roads within 100 feet of streams over the long term (20 years). This would contribute to an overall improvement in aquatic habitat conditions due to decreased potential for sedimentation and turbidity.

Road Decommissioning/Storage

The proposed action proposes decommissioning approximately 11 miles of road within HUC12 watersheds and approximately 1 mile within 100 feet of streams. Most roads proposed for decommissioning or storage have not been used for many years, and the surfaces of these roads are already densely vegetated and ground disturbance would not be required to move them into "decommissioned" or "storage" status. These projects would employ a variety of design features intended to reduce the likelihood that sediment associated with ground disturbance could be carried into stream channels, including mulching, revegetation, and placing slash to disperse overland flow (appendix A). Road decommissioning and storage indirectly benefit aquatic habitats by reducing or removing risk of chronic erosion and landslides over the long term (Switalski et al. 2004).

New Road Construction

There would be no new road construction within 100 feet of any stream, no additional stream crossing, and no net increase in NFSR roads (USFS GIS 2023). The proposed new road segments along McCoy Creek (1.31 miles) and Chaffin Creek (0.67 miles) would be largely located outside of RHCAs and would not occur within 100 feet of streams. Because of this avoidance of RHCAs, new road construction would not impact aquatic species or habitat conditions. Additionally, any new permanent roads constructed would only be open to administrative access, and temporary roads would be restored after activities have been completed. Therefore, no long-term changes to aquatic habitat conditions from road construction activities are anticipated. Construction of new roads would eliminate log haul along more problematic near-stream segments, which would minimize sediment delivery to bull trout and westslope cutthroat trout habitat in Chaffin Creek.

Log Haul and Road Maintenance

As described under Issue 1, log hauling on project area roads and the maintenance activities needed to facilitate hauling have potential to deliver sediment to fish-bearing streams. Surface erosion from roads is a concern because the eroded sediment from roads is typically comprised of fine particles that pose the greatest risk to salmonids (Bilby 1985; Everest et al. 1987). The amount and likelihood of sediment delivery from roads to fish-bearing streams is dependent on factors such as the presence of stream crossings along the haul route, the proximity of haul roads to streams, and road-related features such as slope, road shape, and surfacing. The greater the number of log-truck loads, the greater the risk of sediment production from haul routes (Van Merrveld 2014; Sheridan et al. 2006; Ziegler et al. 2001; Luce and Black 1999; Reid and Dunne 1984). The longer the timeframe for hauling (for example, years the project is active), the longer the duration of effects. Additionally, risk of sediment delivery increases where routes are located within 300 feet of stream channels, particularly within 100 feet of channels (table 11 in Watershed and Aquatics Specialist Report [PF-AQUATICS-001]).

Timber Harvest and Prescribed Burning

Timber harvest includes activities (felling, skidding, yarding) that occur within or adjacent to (log landings) timber harvest units. Tractor skid trails, skyline corridors, and log landings are potential sediment sources because they remove vegetation, expose bare soil to precipitation, and increase soil erosion. The steeper the slope the soil disturbance occurs on, the higher the potential for erosion and off-site movement of sediment. Prescribed burning is also a potential sediment source because it removes vegetation and exposes bare soil. Under the proposed action, the **timing and location of treatments would be based on where environmental conditions warrant an action during implementation of the project (**the “Implementation Process” is described in chapter 2). The levels of treatments (acres treated and miles of roads) would be limited to the maximum acres identified in chapter 2.

The design features listed in appendix A would minimize impacts on aquatic species and habitats from vegetation and transportation activities. For example, RHCAs would be established with buffers ranging from 100 feet on intermittent streams (the narrowest), to 300 feet on fish-bearing streams (the widest). Timber harvest, yarding of logs, and log landings would be located outside of RHCAs (FI-3, FI4). Ground-based equipment would not enter the RHCAs without prior approval of the fisheries’ biologists or hydrologists (FI-5). These RHCA buffers would prevent the timber harvest activities from being able to deliver sediment to streams. Although some soil erosion and sediment production would occur within the boundaries of the harvest units, the sediment produced would not be able to exit the units in visible or measurable quantities, pass through the RHCA buffers that border the units, and enter streams.

Low- to moderate-intensity prescribed fire could have short-term impacts on aquatic habitat conditions, including water chemistry, quality, macroinvertebrates, and physical stream habitat (Beche et al. 2005; Harris et al. 2007). Overall, the low-severity nature of prescribed burns maintains a functioning duff layer, which preserves soil infiltration capacity and greatly reduces the potential for impacts, including overland flow and sediment delivery to streams (Robichaud, 2000; Wondzell and King, 2003). It is anticipated that prescribed burning under the proposed action would be predominantly of low severity, most stream banks in the action area would remain unburned, and the duff layer would be preserved on the surrounding upland slopes. Therefore, prescribed burning and its associated manual thinning treatments would deliver insignificant amounts of sediment to bull trout and/or westslope cutthroat trout habitat.

Over the long term (more than 5 years after implementation), the proposed action is expected to reduce sediment delivery to streams associated with wildfire-related vegetation loss. This is because fuels reduction and vegetation treatments would reduce the risk of uncharacteristically severe wildfires, and, therefore, widespread vegetation loss that could otherwise expose bare soil and increase sediment delivery. This would ultimately improve habitat conditions for aquatic species, including native trout, which require low levels of turbidity, suspended solids, sediment, and siltation.

Cumulative Effects

The cumulative effects analysis includes a discussion of the combined incremental effects of proposed activities with consideration of past, present, proposed, and reasonably foreseeable actions, regardless of landownership. For actions to contribute to cumulative effects, their effects need to overlap in both time and space with the effects anticipated from the proposed action. The cumulative effects discussion only considers activities that affect the issues and indicators described above during the cumulative effects timeframe (for example, water yield, sediment delivery, and aquatic habitat conditions).

Past activities in the project area include timber harvest, road construction and road use, restoration, noxious weed treatments, prescribed burning, and wildfire. Review of past harvest, roads, and existing stand conditions shows that most harvest occurred prior to 1990 and vegetation has recovered. Ongoing commercial and noncommercial timber harvesting, thinning, and burning projects may overlap spatially at the watershed scale with potential activities under the proposed action. Commercial harvest and prescribed burning can contribute to the existing ECA and have the potential to alter water yield. Prior to implementation, existing ECA will be reassessed for each watershed to consider any changes to canopy cover as well as to include proposed project activities as they are finalized.

Past, present, and ongoing vegetation treatments and road activities (including road use) may overlap spatially with potential activities under the proposed action. Several wildfires have delivered large, one-time inputs of sediment to streams in portions of the action area. Examples include Blodgett and Mill Creeks in the first 1 to 3 years following the 2000 fires, and Roaring Lion Creek from 2016–2018 following the 2016 Roaring Lion wildfire. Current erosion rates from the burned areas have now diminished to pre-fire levels and much of the sediment that was contributed to streams has been transported out of the system. However, some of the sediment that was delivered by the fires is still being stored in the bottoms of pools and low-velocity habitat types.

Proposed action activities would incrementally contribute to cumulative effects on water quantity, water quality, and aquatic habitat conditions (such as increased water yield and sediment delivery resulting from commercial harvest and wildfire) by causing temporary increases in ECA and short-term pulses of sediment from vegetation and transportation management activities. Estimated quantities of sediment generated by proposed action activities are described above. When combined with sediment that could be contributed by past, present, proposed, and reasonably foreseeable actions, the proposed action would contribute to a cumulative increase in sediment and subsequent reduction in aquatic habitat quality for up to 5 years. The greatest cumulative effects would be in the vicinity of project activities such as streams within 100 feet of roads with proposed road actions. The quantity of project-derived sediment that makes its way further downstream is expected to be too small and widely dispersed/diluted to have a detectable effect on water quality or aquatic habitat to measurably contribute to cumulative effects. Because there would be no net increase in roads and no changes in stream crossings, the proposed action is not expected to have long-term contribution to cumulative increases in sediment delivery or water quality/aquatic species habitat.

The proposed action would incrementally contribute to beneficial cumulative impacts, such as those that may occur from other restoration and/or fuels reduction treatments, by preventing water yield sediment delivery to streams associated with wildfire-related vegetation loss. This is because the proposed action is intended to reduce the risk of uncharacteristically severe wildfires, and, therefore, widespread vegetation loss that could otherwise expose bare soil and increase water yield and sediment delivery. This would ultimately improve watershed conditions, water quality, and habitat conditions for aquatic species.

Wildlife & Federally Listed Species

Introduction

Species considered in this analysis include federally listed proposed, threatened, and endangered species; regional forester's sensitive species; and forest plan management indicator species (MIS) (USFS 1987). Collectively, federally recognized species and regional forester's sensitive species are known as special status species.

Analysis Methodology

The analysis focused on the following issues:

- Issue 1: How would the alternatives affect federally threatened, endangered, proposed, and candidate species (federally recognized species)?
- Issue 2: How would the alternatives affect other special status species (regional forester sensitive species and MIS)?

Analysis Indicators

The indicators for wildlife are:

- ESA section 7 effects determinations
- Changes in the quantity and quality of species' habitat
- Potential and extent of disturbance to individual species due to project-related activities
- Changes in ecological resilience of species' habitats

The analysis methodology differs for each species, depending on the type and amount of data available, including recent and past literature on life history, habitat needs, movement and dispersal, and home range analyses; professional expertise and knowledge; and other pertinent information. Information on federally recognized species comes primarily from the U.S. Fish and Wildlife Service's (USFWS) Environmental Conservation Online System (USFWS 2023). Most other special status species' information comes from the MNHP (MNHP 2023). Data are evaluated and assimilated, along with peer-reviewed research, for each analyzed species, in addition to any local surveys collected by Forest Service personnel or other agencies. These sources offer the best available science at the time of analysis. Known habitat requirements are evaluated with the most current condition data to inform species' potential use and occurrence based on the suitability of the habitat.

Assumptions relevant for the wildlife analysis include the following.

- Effects on wildlife are closely related to the quality of their associated vegetation type. For example, the associated vegetation types with better quality (that is, within the natural range of variation, resilient to insects and disease, and within natural fire regimes) can better support the viability of species that occur in and depend on them.
- Not all wildlife species contained within the project area are analyzed. The Forest Service analyzes all species mandated by law, regulation, or policy; these species serve as a proxy to assess the

effects of management activities on general wildlife populations and the populations of other species with similar habitat needs that the analyzed species may represent.

- Implementation of the proposed action would reduce the risk of uncharacteristically severe wildfire as well as reduce the risk or extent of tree mortality due to insects and disease. Therefore, the proposed action would better maintain forest resiliency and wildlife habitat over the long term compared with the no-action alternative, under which the project area would remain at high risk of loss from wildfire and insects and disease.

Spatial and Temporal Context for the Effects Analysis

Spatial Bounds: The direct, indirect, and cumulative effects analyses are focused entirely within the project area boundary.

Temporal Bounds: The timeframe considered is approximately 20 years in the future, at which time the proposed treatment activities would be completed and vegetation and fuels response to those treatments would be stabilized. Short-term effects are considered between 0 to 5 years from implementation of project actions; long-term effects are typically 5 years and beyond, and depend on how long a vegetation type takes to stabilize.

Existing Conditions

Table 26 provides a list of wildlife species considered in this EA that are known or suspected of occurring in the Bitterroot National Forest, their status, their habitat preference, whether the habitat or species are present in the project area, and whether the habitat or species would be impacted by proposed treatments. Although not all wildlife species are specifically considered, special status species (including ESA recognized species and forester sensitive species) and MIS species provide a proxy for project effects on all general wildlife in the project area.

Table 26. Species considered for analysis with the potential to occur in the project area

Common Name ***Scientific Name***	**Status**[1]	**Habitat**	**Potential Occurrence in the Project Area**	**Analysis**
Canada lynx *Lynx canadensis*	FT	Generally associated with spruce/true fir forests that receive abundant snowfall and support populations of snowshoe hares.	This species is most likely to occur in the project area as transient individuals. There are no recent detections in the project area or elsewhere in the Bitterroot National Forest.	The analysis is below under issue 1 and in the biological assessment (USFS 2023e).

Common Name ***Scientific Name***	**Status[1]**	**Habitat**	**Potential Occurrence in the Project Area**	**Analysis**
Grizzly bear *Ursus arctos horribilis*	FT	Habitat generalist that prefers areas with low road densities.	The project area is contained within the Bitterroot Grizzly Bear Experimental Population Area and is adjacent to the Bitterroot Grizzly Bear Recovery Area. Grizzly bears may be present as transient individuals. One transient male was confirmed within the recovery area, but not within the project area, in summer 2019. However, the latest USFWS grizzly bear “may-be-present” habitat modeling has some overlap with the project area.	The analysis is below under issue 1 and in the biological assessment (USFS 2023f).
North American wolverine *Gulo gulo luscus*	FPT	Habitat generalist that prefers higher-elevation areas with ample snowpack.	Numerous individuals that are widely distributed throughout the project area and adjacent Selway-Bitterroot Wilderness were confirmed at bait stations from 2013 to 2023.	The analysis is below under issue 1 and in the biological assessment (USFS 2023g).
Yellow-billed cuckoo *Coccyzus americanus*	FT	Breeds in riparian habitat; prefers mature or late-successional cottonwood/willow associations with a dense understory.	This species is unlikely to occur in the project area; high-quality, suitable riparian habitat does not occur in the project area.	Design features would protect riparian habitat. No further analysis will be completed.
Bull trout *Salvelinus confluentus*	FT	Requires clean, cold, complex, and connected stream habitats.	There are 29 stream miles of bull trout critical habitat in the project area.	The analysis is below under issue 1, in the biological assessment (USFS 2023h), and in the Watersheds and Aquatics Effects Analysis report (PF-AQUATICS-001).
Monarch butterfly *Danaus plexippus*	FC, FSS	Generally associated with prairies, meadows, and grasslands and along roadsides. Requires milkweed (*Asclepias* spp.) and flowering plants.	Known occurrences and suitable habitat are in the project area.	The analysis is below under issue 1.

Common Name ***Scientific Name***	**Status[1]**	**Habitat**	**Potential Occurrence in the Project Area**	**Analysis**
Whitebark pine *Pinus albicaulis*	FT	Populations are found in higher-elevation areas in subalpine and krummholz[9] habitats. They are also found with lodgepole pine.	Known populations of whitebark pine have been found throughout the project area.	The analysis is below under issue 1 and in the biological assessment (USFS 2023i).
Black swift *Cypseloides niger*	FSS	Nests in remote areas on wet rock faces, in moist caves, or on ledges near waterfalls.	Known occurrences and suitable habitat are in the project area.	Design features would protect the habitat; no anticipated project impacts are expected in nesting habitat. No further analysis will be completed.
Peregrine falcon *Falco peregrinus*	FSS	Generally present in breeding territories from early March through September.	This species is a migratory aerial predator that nests on high cliffs in at least 14 canyons within the project area.	Design features would protect nesting individuals; no anticipated project impacts are expected. No further analysis will be completed.
Bald eagle *Haliaeetus leucocephalus*	FSS	Resident predator that nests in trees along large lakes and rivers.	Most known nests are along the Bitterroot River, but a nest near the shore of Lake Como has been active since at least 2001. This species may forage in high-mountain lakes west of the project area.	Design features would protect nesting individuals; no anticipated project impacts are expected. No further analysis will be completed.
Bighorn sheep *Ovis canadensis*	FSS	Grasslands or open forests with steep, rocky escape cover. Semi-open to open vegetation types preferred.	No resident herds are known to occur in the project area, although a few individuals (presumably transient rams) have been reported.	The analysis is below under issue 2. Proposed action activities would benefit sheep habitat.
Black-backed woodpecker *Picoides arcticus*	FSS	Strongly associated with areas burned by moderate to severe wildfire within the past 7 years.	About 19,450 acres have burned within the project area since 2012; they may provide suitable habitat for this species.	The analysis is below under issue 2.
Coeur d'Alene salamander *Plethodon idahoensis*	FSS	Resident lungless amphibian associated with perennially damp areas near waterfalls and fractured bedrock.	There are known occurrences at several sites within the project area, but they would not be impacted by the proposed action.	Design features would protect the habitat. No further analysis will be completed.

[9] Stunted forest characteristic of timberline

Common Name ***Scientific Name***	**Status[1]**	**Habitat**	**Potential Occurrence in the Project Area**	**Analysis**
Fisher *Pekania pennanti*	FSS	Resident mesocarniove associated with mature, mesic forests with dense canopies, complex understories, and coarse woody debris.	This species is apparently uncommon in the project area, but several individuals have been documented at bait stations over the past few years.	The analysis is below under issue 2.
Flammulated owl *Psiloscops flammeolus*	FSS	Migratory, insectivorous cavity nester associated with open, mature to overmature ponderosa pine and/or mixed ponderosa pine/Douglas-fir forests.	There are numerous records in the southern quarter of the project area and a few records in the northern portion of the project area. However, owls may nest in older pine forests in the canyons where they would be difficult to detect.	The analysis is below under issue 2.
Gray wolf *Canis Lupus*	FSS	Resident predator considered to be a habitat generalist.	Montana Fish, Wildlife and Parks (MDFWP) conservatively estimates that 35 wolves in five to six packs may currently inhabit portions of the project area (Parks et al. 2022).	The analysis is below under issue 2.
Harlequin duck *Histrionicus histrionicus*	FSS	Breeds mainly along whitewater rivers in subalpine and coastal habitats and winters on rocky, windswept coasts.	Suitable habitat is present within the project area. Occurrence data are limited for the project area.	Design features would protect riverine habitat. No further analysis will be completed.
Northern bog lemming *Synaptomys borealis*	FSS	Small mammal associated with sphagnum bogs and other marshy areas.	Some potential habitat is present within the project area, with one known occurrence in the riparian area along a stream; however, it would not be impacted by the proposed action.	Design features would protect the habitat. No further analysis will be completed.
Northern leopard frog *Rana pipiens*	FSS	Found in low-elevation ponds, springs, marshes, and riparian areas.	Some potential habitat is within the project area; however, it is likely too high of an elevation, and there are no known occurrences. The species is extirpated from Ravalli County.	Design features would protect the habitat. No further analysis will be completed.
Little brown myotis *Myotis lucifugus*	FSS	Small bat species that uses a wide range of habitats and often uses human-made structures for resting and maternity sites. They typically roost in caves and mines in the winter.	No known suitable mines or caves are in the project area, but individuals may roost under loose bark or in hollow trees, snags, or human-made structures. Suitable habitat is present within the project area. Occurrence data are limited for the project area.	The analysis is below under issue 2.

Common Name ***Scientific Name***	**Status[1]**	**Habitat**	**Potential Occurrence in the Project Area**	**Analysis**
Townsend's big-eared bat *Corynorhinus townsendii*	FSS	Semi-migratory bat species that uses mines and caves as maternal roosts and hibernacula.	No known suitable mines or caves are in the project area, but individuals may roost under loose bark or in hollow trees or snags. Several known occurrences are in or near the project area.	The analysis is below under issue 2.
Western bumblebee *Bombus occidentalis*	FSS	Requires habitats with rich supplies of floral resources with continuous blooming from spring to autumn. Primarily nests underground, typically in abandoned rodent nests.	One incidental occurrence in the Bitterroot National Forest is confirmed (iNaturalist 2023), but occurrence data are limited. Suitable habitat is present in the project area.	The analysis is below under issue 2.
Western toad *Anaxyrus boreas*	FSS	Breeds in ponds or slow-moving streams, but is an upland habitat generalist outside the spring breeding season.	Several known breeding sites are within the project area.	The analysis is below under issue 2.
Marten *Martes americana*	MIS	Associated with mature, mesic forests with dense canopies, complex understories, and coarse woody debris; however, they are more tolerant of deep snow than fishers.	They appear to be fairly common and well distributed in suitable habitat across the project area.	The analysis is below under issue 2.
Pileated woodpecker *Dryocopus pileatus*	MIS	Associated with mature and overmature conifer forests at lower to mid-elevations, and cottonwood gallery forests along rivers and larger streams.	This species is well distributed throughout the project area.	The analysis is below under issue 2.
Rocky Mountain elk *Cervus canadensis nelsoni*	MIS	Largely a habitat generalist that tends to be associated with high-quality foraging. Elk prefer areas where they are secure from human harassment.	This species is widely distributed across the project area. MDFWP 2022 elk counts found 971 elk in the Bitterroot Elk Management Unit within or near the project area (MDFWP 2022).	The analysis is below under issue 2.

Sources: MNHP 2023; Forest Service draft sensitive species list 2023

[1]Status Codes: FT = federally threatened; FPT = federally proposed threatened; FC = Federal candidate; FSS = Forest Service sensitive species; MIS = management indicator species

Environmental Consequences of No Action

Issue 1: How would the alternatives affect federally listed threatened, endangered, proposed, and candidate species?

Direct and Indirect Effects

Under the no-action alternative, the Forest Service would not implement the Bitterroot Front project. Current management plans would continue to guide activities within the project area, and the existing land and resource conditions would be unaffected except through natural processes. No management actions would be taken to influence the direction (or rate) of change for moving existing conditions toward desired conditions. As such, the wildfire risk to federally recognized species' habitat would remain high.

In addition, ecological resilience to other disturbances, such as climate change effects and insect and disease outbreaks, would continue to decline in the project area. This would pose a primary threat of habitat loss to federally recognized species. Although there would be no adverse, short-term habitat modifications or disturbances to federally recognized species under the no-action alternative, over the long term, these species' populations would be in jeopardy of continued existence due to habitat loss and habitat degradation associated with uncharacteristic wildfire and insect and disease tree mortality. Furthermore, without active vegetation treatments to manage fuel loads and manage fire behavior prior to wildfires, emergency firefighting actions to protect human safety and properties are more likely. These emergency actions tend to cause more disturbance to animals and modification to wildlife habitat compared with pre-wildfire treatments, such as those described under the proposed action.

For example, whitebark pine benefits from periodic, low-severity fire to decrease the amount of competitor conifer seedlings and to create patches of exposed soil for seedling establishment (Arno 2001). In addition, vegetation treatments aimed at daylighting whitebark pine trees would mimic historical disturbances, reduce competition, and support seedling establishment. Treatments also would include removal of infected trees to reduce the spread of blister rust and pine beetle. No whitebark pine treatments would be included under the no-action alternative; therefore, the no-action alternative would most likely result in the continued decline of this species in the project area.

Issue 2: How would the alternatives affect other special status species (regional forester sensitive species and MIS)?

Direct and Indirect Effects

Similar to Issue 1, the Bitterroot Front project would not be implemented, and there would be no effects on other special status species or their habitats from treatments or actions. Special status species habitat would continue to be at a high risk of wildfire and would trend away from desired conditions with reduced ecological resilience to disturbances and climate change effects.

Cumulative Effects

Given the lack of direct and indirect effects from the no-action alternative in which no fuels reduction treatment activities of the proposed action would occur, there would be no cumulative effects from forest management actions. However, future wildfires could impact wildlife and federally recognized species' habitat to varying degrees. Depending on the size and severity of future wildfires, forested habitat could be reduced in quality and quantity in the short term. Low-intensity and mixed-severity wildfire might provide for greater habitat diversity and ecological resilience in the long term, but high-severity wildfires and wildfires occurring at greater frequencies compared with historical conditions could remove or degrade wildlife habitat that would have long-term effects. Habitat loss due to high-severity wildfires has been identified as a primary threat for many special status species, including federally recognized species. Wildfires have been increasing in severity and frequency due to historical fire suppression practices and climate change effects. In the recent past, there have been major fires such as the 2000 Blodgett, 2005 Rockin, 2006 Gash, 2009 Kootenai, 2012 Sawtooth, 2016 Roaring Lion, 2017 Lolo Peak, and 2022 Blodgett/Mill complex wildfires that have burned portions of the project area (Irwin 2023 personal communication). Many of these burned at moderate to high fire severity and demonstrate how uncharacteristic wildfire poses a primary threat to wildlife, including special status species, and their habitats. Without coordinated and complementary active vegetation and fuels treatments across the landscape, severe wildfire would continue to be a primary threat for wildlife and their habitat.

Environmental Consequences of the Proposed Action

Issue 1: How would the alternatives affect federally threatened, endangered, proposed, and candidate species?

Direct and Indirect Effects

Detailed analyses of the species' analysis areas, the environmental baseline, the existing condition, and effects on these species with regards to the ESA are documented in the draft biological assessments and Wildlife and Federally Recognized Species Specialist Report (USFS 2023e-i, PF-WILDLIFE-001).

Implementation of the proposed action could temporarily affect federally recognized species' distribution, habitat suitability, or habitat quality. Changes in habitat arrangement, diversity, distribution, or fragmentation could occur due to vegetation management activities. Individual species could be disturbed by project activities, if the species are present during implementation. However, with consideration of the regional context and with implementation of design features to avoid or minimize adverse effects, implementation of the proposed action is expected to have minor, short-term adverse effects and long-term beneficial effects for federally recognized species.

The context of change largely depends on federally recognized species' presence in the project area, life history, and susceptibility to disturbances from management activities; see the individual species' discussion below and refer to the draft biological assessment.

The intensity of likely effects on federally recognized species is closely tied to effects on the vegetation communities and habitat characteristics they are associated with; treatments that move vegetation communities toward desired conditions over the long term would benefit the associated wildlife species. See also the specialty reports for the Vegetation Effects Analysis (PF-VEGETATION-001) and the Watershed and Aquatics Effects Analysis (PF-AQUATICS-001).

Impacts on federally recognized species rely heavily on life history requirements, including habitat preference and home range. The proposed action and applicable design features would minimize effects so that project activities may affect, but are not likely to adversely affect, threatened species or their critical habitat. They also are not likely to jeopardize proposed or candidate species (table 27). See the draft biological assessments for each ESA species for more details (USFS 2023e-i).

Table 27. Summary of projected determinations for federally recognized species

Species	Status[1]	Projected Determination[2]
Canada lynx	FT	NLAA
Grizzly bear	FT	NLAA
North American wolverine	FPT	NLJ
Bull trout	FT	LAA
Monarch butterfly	FC	NLJ/BE
Whitebark pine	FT	LAA/BE

Source: USFS 2023e

[1]**Status Codes**: FT: federally threatened; FPT: federally proposed threatened; FC: Federal candidate

[2]**Definitions of Summary Determination Abbreviations**: These potential determinations are currently in consultation review with Fish & Wildlife Service for effects from the project activities. For threatened and endangered species: LAA = likely to adversely affect; NLJ = not likely to jeopardize; NLAA = not likely to adversely affect; BE = beneficial effect, LAA = likely to adversely affect

Issue 2: How would the alternatives affect other special status species (regional forester sensitive species and MIS)?

Direct and Indirect Effects

This section addresses the potential effects on regional forester sensitive species present in the Bitterroot National Forest from implementing the proposed action. Regional forester sensitive species are “Those plant and animal species identified by a Regional Forester for which population viability is a concern, as evidenced by: (a) Significant current or predicted downward trends in population numbers or density, and (b) Significant current or predicted downward trends in habitat capability that would reduce a species’ existing distribution” (Forest Service Manual 2670.5). The proposed action fulfills the project’s stated purpose and need to “Improve habitat and forage quality for bighorn sheep, mule deer, elk, and other regionally sensitive species.”

Implementation of the proposed action could temporarily affect special status species’ distribution, habitat suitability, or habitat quality. Changes in the habitat arrangement, diversity, distribution, or fragmentation could occur due to vegetation management activities, including thinning, prescribed fire, and fuel break construction. Project activities could disturb individual species if they are present during implementation. However, with consideration of the regional context with ample surrounding habitat and with implementation of design features to avoid or minimize adverse effects, implementation of the proposed action is expected to have minor, short-term adverse effects and long-term, beneficial effects for special status species. The context of the change largely depends on the species’ presence in the project area, life history, primary threats, and susceptibility to disturbances from management activities; see individual species’ discussions below.

The intensity of likely effects on wildlife is closely tied to effects on the vegetation communities they are associated with; treatments that move vegetation communities toward desired conditions over the long term would benefit the associated wildlife species. See also the Vegetation Effects Analysis specialist report.

Impacts on other special status species depend heavily on life history requirements, including habitat preference, tolerance to disturbances, and home range. The proposed action and applicable design features would minimize effects such that project activities may impact individuals or habitat, but the activities would not lead toward a trend of Federal listing or loss of viability for regional forester sensitive species. MIS habitat would be maintained and improved over the long term with implementation of proposed activities; see the individual species’ discussions below.

Table 28. Summary of determinations for special status species

Common Name	Status[1]	Summary of Determination[2]
Bighorn sheep	FSS	MIIH/BI: Most proposed activities are outside suitable habitat and would have minimal short-term impacts. Moving vegetation toward desired conditions in suitable habitat would have long-term benefits for bighorn sheep habitat.
Black-backed woodpecker	FSS	MIIH/BI: Project activities could disturb nesting woodpeckers and potentially remove nesting snags in the short term. Prescribed fire actions could produce more snags and improve foraging habitat in the long term.
Fisher	FSS	MIIH: The project would not substantially decrease suitable fisher habitat. Fisher detections in the project area are minimal, and the project area is likely dispersal/marginally suitable habitat. Most of the proposed treatments would occur outside fisher habitat in dry forest types, and those within fisher habitat would retain large trees in any treatment areas.
Flammulated owl	FSS	MIIH: Flammulated owl habitat is abundant and widely distributed in the project area. Project activities could disturb nesting owls and potentially remove cavities used for nesting. In the long term, project activities would enhance forest stands and improve foraging habitat.
Gray wolf	FSS	MIIH: Individual wolves might be displaced temporarily by project disturbance, but wolves would likely move to another portion of their large territory. Moving treated areas toward desired conditions would improve wolf habitat over the long term.
Townsend’s big-eared bat	FSS	MIIH: Implementation of the proposed project would not affect any mines, caves, or tunnels that could provide important habitat for Townsend’s big-eared bat maternal colonies or hibernacula. In the short term, vegetation treatments and prescribed burning could modify habitat and cause localized disturbances to bats, if they are present. However, the vegetation treatments and prescribed burning would improve bat foraging and movement habitat over the long term.
Little brown myotis	FSS	MIIH: Implementation of the proposed project would not affect any mines, caves, or tunnels that could provide important habitat for little brown myotis maternal colonies or hibernacula. In the short term, vegetation treatments and prescribed burning could modify habitat and cause localized disturbances to bats, if they are present. However, the vegetation treatments and prescribed burning would improve bat foraging and movement habitat over the long term.
Western bumble bee	FSS	MIIH: Proposed activities could harm and displace individual bees, if present in treatment areas. However, the reduction of dense tree stands, opening of forest canopies, and invasive species control proposed under the project would improve and increase potential western bumble bee habitat.
Western toad	FSS	MIIH: Project design features would protect western toad aquatic breeding habitat. Individuals could be lost or harmed during treatment implementation, but these effects would be short term and localized. Implementation of the proposed action would move vegetation communities toward desired conditions that would improve western toad upland habitat.
Marten	MIS	Proposed activities could disturb and displace marten temporarily through noise, human activities, or prescribed fire. Proposed treatments would improve old-growth stands and reduce potential for severe wildfire.
Pileated woodpecker	MIS	Proposed activities could disturb nesting woodpeckers through noise or potential removal of nest trees by felling or burning. Indirect effects could be both beneficial and slightly adverse. Proposed activities are designed to favor retention of large-diameter trees and old-growth characteristics.

Common Name	Status[1]	Summary of Determination[2]
Elk	MIS	Proposed activities could disturb and displace elk temporarily through noise, human activities, or prescribed fire. Indirect effects would be largely beneficial. Targeted treatment areas for prescribed fire and invasive species would enhance forage.

[1]**Status Codes**: FSS = Forest Service sensitive species; MIS = management indicator species identified in the forest plan (USFS 1987)

[2]**Definitions of Summary Determination Abbreviations**: For sensitive species: MIIH = may impact individuals or habitat, but will not likely result in a trend toward Federal listing or reduced viability for the population or species; BI = beneficial impact

Cumulative Effects

Past, present, and reasonably foreseeable actions were evaluated for cumulative effects on these species. Several other prescribed fire and shaded fuels break projects have occurred or are reasonably foreseeable to occur near the project area. Notable past projects completed in or near the project area include Lake Como Hazardous Fuels Reduction Project (approximately 350 acres), Canyon Creek Fuels Reduction Project (approximately 206 acres), Chaffin (approximately 250 acres of under burning), Lake Como Hazardous Fuels Reduction Project (350 acres), Larry-Bass Burn Project (improve forest resilience), and Gash Fire Salvage and Reforestation (salvage harvest on about 250 acres). These small past projects moved forest conditions toward desired conditions and promoted forest resilience where treatments occurred. These projects would provide long-term beneficial effects on wildlife habitat, when combined with the proposed action.

Ongoing prescribed fire and vegetation treatment projects include Trapper Bunkhouse (approximately 5,800 acres), Westside Collaborative Vegetation Management Project (approximately 2,327 acres), Lake Como Forest Health and Protection (approximately 1,300 acres of commercial timber harvest and 731 acres of noncommercial thinning), Elk Bed Restoration Project (thinning up to 208 acres and ponderosa pine restoration on 101 acres), Larry-Bass Burn Project (prescribed fire across 1,112 acres), and Stevensville West Central Project (fuels and vegetation treatments on 7,734 acres) (Irwin 2023). These projects would have similar and complementary vegetation and fuels treatments to move vegetation and wildlife habitat toward desired conditions over the long term.

In the short term, ongoing projects could cause localized habitat modification and disturbance to individual species, similar to those described above. However, most of these projects are small scale and would be spaced out over time and area to not considerably degrade large, continuous wildlife or special status species habitats. In combination with the proposed action and with consideration of the availability of suitable wildlife habitat in the region, cumulative effects are not likely to jeopardize the continued existence or viability of wildlife species, including special status species, in the Bitterroot National Forest. Over the long term, coordinated and complementary active vegetation and fuels treatments across the landscape would reduce the risk of severe wildfire and would minimize this primary threat for wildlife and their habitat.

Effects of Project Forest Plan Amendments

In order to achieve the Bitterroot Front project objectives, project-specific amendments to remove or modify plan standards are needed. This includes amending plan content for Elk Habitat Objectives (elk habitat effectiveness, thermal cover, and hiding cover), old growth, coarse woody debris, and snag retention. Currently, the Forest Service is undertaking an effort to officially amend some of the plan components in the 1987 Forest Plan for all future projects. The Bitterroot Front project-specific amendments incorporate and are consistent with this effort. See appendix D from the Bitterroot Front project environmental assessment for more information and project-specific amendments.

Elk Habitat Amendments

The project-specific variance from the elk habitat effectiveness standard is intended to allow six third-order drainages in the analysis area to not meet Elk Habitat Effectiveness standards. The small size of the third-order watersheds in this project area limits the number of roads that can be present on the ground. In order to meet the standards, the miles of roads needed to be closed would limit forest management access to proposed treatment areas and reduce public use.

The 1987 Forest Plan says Lyon et al. (1983) should be applied to third order drainages. There are 398 third order drainages in the Bitterroot National Forest with a range of 3 – 9,625 acres in size. Only 75 drainages (19 percent) are larger than 3,000 acres, although Lyon et al. (1983) says these standards should be applied to an area larger than 3,000 acres.

Furthermore, the plan standard does not state what roads would be considered (all roads, all publicly open roads, or only roads open during hunting season). Most recently, the Bitterroot National Forest was using all roads open at any point during the year, maximizing the number of drainages that do not meet the standard. The elk population in the Bitterroot National Forest increased dramatically since the 1987 Forest Plan was written, despite numerous project plan amendments to this standard in 110 drainages (out of 398 drainages across the Bitterroot National Forest). Elk habitat “effectiveness” is related more to forage abundance and quality than road density (Ranglack et al. 2016, Crane et al. 2016).

Generally, winter range is limited to project area lower elevations. Most of the project area is too high to be classified as winter range, and it does not meet either the 20 percent optimal thermal cover percentage referenced in the Guides for Elk Habitat Objectives (USDA Forest Service 1978), nor the 25 percent minimum standard for thermal cover in winter range set in the Bitterroot Forest Plan ROD. Thermal cover is difficult to accurately measure on the landscape. Procedures outlined in the Guides for Elk Habitat Objectives (USDA Forest Service, 1978) are no longer used because these standards are expressed in crown closure not canopy cover.

The purpose of the 1987 Forest Plan thermal cover requirement was to provide habitat that, at that time, was believed to be necessary to meet the 1987 Forest Plan goals and objectives of maintaining the State’s population goals for elk. However, recent research questioned the necessity of thermal cover for wintering elk survival (Cook et al. 1998, Cook et al. 2004). The researchers found “no significant, positive effect of thermal cover on the condition of elk during any of their six experiments. In contrast, dense cover provided a costly energetic environment, resulting in significantly greater over-winter mass loss, fat catabolism, and (in one winter) mortality.” Whether thermal cover is necessary for individual elk survival or elk population viability is unclear. As discussed in PF-WILDLIFE-001 (wildlife specialist report), large amounts of winter range thermal cover do not seem necessary to support the State’s elk population goals in the Bitterroot National Forest.

Effects of Elk Habitat Amendments

With the plan-specific amendments, the project would continue to provide and improve habitat in the project area for elk and other ungulates. While the effects of the amendments would provide a variance for the amount of thermal cover maintained in the project area and provide a variance for some third order drainages to meet the elk habitat effectiveness standard, these effects would be minimal. The amendments to thermal cover would allow for treatments that would enhance elk forage across the project area. Although the elk habitat effectiveness standard would not be met, elk secure habitat would be increased. It is likely that there would be little discernable change in elk viability as a result of implementing elk habitat amendments.

Cumulative Effects

There were 14 project-specific amendments related to elk habitat effectiveness since the approved 1987 Forest Plan. There were 10 project-specific amendments related to thermal and hiding cover. Despite these amendments, elk populations remain stable and the 1987 Forest Plan objective of maintaining the 1987 level of big-game hunting opportunities continues to be achieved. Current best available science for managing elk populations and collaboration with the Montana Department of Fish, Wildlife, and Parks to maintain elk populations across the Bitterroot National Forest proved to be better than the 1987 elk habitat standards. Furthermore, the proposed activities, in combination with past and reasonably foreseeable future actions in the analysis area, would not be expected to cumulatively degrade elk populations.

The most recent project-specific amendments for Gold Butterfly and Mud Creek applied the same management guidance as proposed here. Therefore, cumulative effects would be null as the elk habitat effectiveness and thermal cover guidance in the Gold Butterfly and Mud Creek amendments would be the same guidance in this amendment.

Old-Growth Amendments:

The proposed amendment is based on the purpose of the project, which is to improve landscape resilience to disturbances such as insects, diseases, and fire by modifying forest structure and composition as well as fuels. There is a need to amend the 1987 Forest Plan old growth definition to ensure the project maintains old growth as a key characteristic of terrestrial integrity.

The Planning Rule at 36 CFR 219.(a)(2)(i) requires plan components, including standards and guidelines, to maintain or restore diversity of ecosystems and habitat types throughout the plan area. In doing so, the plan must include plan components to maintain or restore: (i) key characteristics associated with terrestrial and aquatic ecosystem types. Application of this planning rule requirement would be achieved through Forest Plan goals, objectives, and standards for old growth. All plan standards to maintain old growth would still apply, but the amendment improves the method for measuring the amount of old growth in the project area and evaluating project effects by modifying the criteria used to identify old growth based on better scientific information than was used in 1987 when the Bitterroot Forest Plan was developed. This plan amendment also applies the requirements through the project design, which supports achieving forest-wide objectives for old growth as a key characteristic of the plan area’s terrestrial ecosystems.

Effects of Old-growth Amendments

The project interdisciplinary team designed the proposed action to retain old growth status for any stands being treated that meet the Green et al. (1992, errata corrected 2011) criteria. This would allow the Forest the flexibility to treat conditions related to the purpose and need of this project while retaining the old growth status of stands (as well as enhancing stands that may soon meet the old growth criteria) within the project area. With the project-specific amendment, the plan standards to maintain old growth would still apply, but the amendment would improve the method for measuring the amount of old growth in the project area and evaluating project effects by modifying the criteria used to identify old growth based on better scientific information than was used in 1987 when the Bitterroot National Forest Plan was developed. No change to effects on wildlife species associated with or dependent on old growth would be expected from this amendment.

Cumulative Effects

There are two other projects currently being planned on the Bitterroot National Forest that also include site-specific plan amendments related to old growth, Gold Butterfly and Mud Creek. These project-specific amendments propose to make the same changes to the definition of old growth (consistency with Green et al. 1992 errata 2011). This would align all three projects in regard to old growth classification.

The intent of the Forest Plan old growth direction would be to ensure sufficient habitat for wildlife, including two indicator species, pine marten and pileated woodpecker. Pileated woodpeckers and marten are not old growth dependent species. They are associated with mature and over-mature forests that contain habitat components such as large trees, large snags, and down woody material that are often found in old growth forests, but they also make use of younger forests that contain some of those habitat components and forage in a variety of forest types (Mellen et al. 1992). Therefore, forests that do not meet the old growth definitions can and do provide habitat that contributes to the viability of these species at several scales.

The anticipated effects of the plan amendments associated with Gold Butterfly and Mud Creek would be similar to those analyzed and disclosed in this document. When taking these projects into account with the amendment proposed here, the cumulative impact of all three amendments would have the benefit of providing a consistent, nonsubjective method of identifying old growth in these areas. Updating the definition of old growth would not affect the amount of habitat available for species, such as pileated woodpeckers or marten.

Coarse Woody Debris

proposed site-specific amendment is intended to modify coarse woody debris requirements for the Bitterroot Front project to support achieving goals and objectives in the Forest Plan for soil productivity while achieving the project purpose and need to improve landscape resilience to disturbances such as insects, diseases, and fire. This amendment would help ensure the amount of coarse woody debris to be left on the ground aligns with the historical ranges identified for the fire groups present within the project area.

Effects of Coarse Woody Debris Amendments

Amending the plan site specifically to modify direction related to coarse woody debris would still help achieve the forest plan’s goals and objectives of maintaining soil productivity, providing wildlife habitat, reducing fuels backlog, and fire management. Modifying plan direction would allow for current science-based fuels management, as the amount of coarse woody debris left on site will better align with the levels that would have been present historically within each representative fire groups. Maintaining coarse woody debris within historic ranges would reduce fire severity and impacts on soils from long-duration burning of excessive large wood. This would improve wildlife habitat resiliency to disturbances.

The modified plan direction would allow proposed project activities to occur that would maintain or restore ecological integrity by moving stand conditions toward their historical composition and function. There would be an increased opportunity to return fire to the landscape and move the project area toward having historical fire-return intervals.

The proposed fuels treatments would leave slash on the ground through the winter and into late summer/fall before prescribed burning would be completed. This would provide an opportunity for the nutrients in the slash to be leached into the soil to support soil productivity.

Cumulative Effects

The coarse-woody debris requirements are based on current science, which varies from the amounts shown in the 1987 Forest Plan. The amended coarse-woody debris requirements for this project would encompass less than 0.1 percent of the Bitterroot National Forest because very little of the project area is in Fire Groups 2 or 4. Since the 1987 Forest Plan, forest plan amendments were made to adjust coarse-woody debris levels. Site-specific forest plan amendments were needed to ensure coarse-woody debris retention in fuel reduction treatments were based on current science. Previous Forest Plan amendments in combination with Alternative 2 of this project cumulatively amount to 1.5 percent of the overall acreage for the Bitterroot National Forest. The modifications of the coarse-woody debris requirements for this project would not have appreciable cumulative effects at the site or forest scale.

Cumulatively, by implementing this site-specific standard for coarse-woody debris, the Bitterroot Front project area would be expected to have appropriate levels of coarse-woody debris by fire group, over time, fully supporting the Bitterroot National Forest goals and objectives.

Snags Amendment

The proposed amendment is intended to modify snag requirements for the Bitterroot Front project to support achieving goals and objectives in the 1987 Forest Plan for wildlife (USDA Forest Service 1987, pp. II-20). This amendment would remove the forest-wide standard (e)(3) in section F.1 of chapter II of the 1987 Forest Plan that states “All snags that do not present an unacceptable safety risk will be retained” (USDA Forest Service 1987, p. II-20). Snag retention in treated stands would be based on findings from Harris (1999), Bollenbacher et al. (2009), Bush and Reyes (2023), and numerous scientific papers by Evelyn Bull and others. Stands targeted for treatment should retain a suitable number of snags in a variety of size classes, depending on habitat type groups. This also would resolve the discrepancy in the existing 1987 Forest Plan that allows for salvage and sanitation harvest and firewood gathering while also stating that snags shall be retained if they do not present an unacceptable safety risk. The proposed change would provide sufficient snag habitat for wildlife while also allowing for the removal of excess snags, where necessary, to address fuel loading or to meet restoration objectives through sanitation and salvage treatments (Harris 1999, Spiering and Knight 2005). With the recent listing of whitebark pine as a threatened species, a standard is proposed to prevent the felling of whitebark pine by firewood cutters. Since the 1987 Forest Plan was signed, additional science is available regarding the number of snags that would be expected in different habitat type groups (Harris 1999; Bollenbacher et al 2009; Bush and Reyes 2023), which provides more refined guidelines for meeting the Forest Plan goals and objectives. Concurrently, the Bitterroot National Forest is working on amending outdated or conflicting Forest Plan components for all future projects, including snag retention management.

The project-specific amendment would incorporate and be consistent with relevant new planning components for snag management, as proposed in the Forest Plan Amendment EA. See appendix D.

Effects of Snags Amendment

Due to changed conditions, including wildfire and insects and disease increasing tree mortality, since the creation of the 1987 Forest Plan, snags are no longer a limiting habitat element for wildlife species and the abundance of snags contributes to increased fire severity. Currently, high-severity fires and more frequent fires have been determined to be a primary threat to wildlife, including special status species and their habitats. Concentrations of snag areas are also apparent on the east- and west-facing slopes of the Bitterroot Front and Sapphire Range from wildfires in recent decades. The snag amendment applies to the desired number of snags across the landscape and minimum number of snags to remain as residuals after vegetation treatment to provide for structural diversity, wildlife habitat, and future coarse woody debris. Snags may be clustered or scattered across the landscape, as long as the number of snags retained on average meets habitat needs (Bull et al. 1997).

The project plan snag amendments would still provide for appropriate distribution, size classes, and number of snags across the project area and Bitterroot National Forest to support snag-associated wildlife species such as pileated woodpeckers. Snag retention is based on best available science and would retain snags that are most beneficial to wildlife and desired forest conditions. The amendments would be consistent with the forest plan's desired conditions for snags and intentions to protect wildlife while being able to meet the purpose and need to reduce fire severity.

Cumulative Impact of Snag Amendment

Snag density desired conditions are based on Forest Inventory and Analysis data representing current conditions (Bush and Reyes 2023) in wilderness and roadless areas, which only provide a snapshot in time in areas generally undisturbed by vegetation management, but include recent fire disturbance and or/beetle-caused mortality. While these data accurately represent the existing number of snags on the landscape, they also demonstrate how the number of snags on the landscape was increasing due to increasing rates of bark beetle epidemics and wildfire (Bollenbacher et al. 2009). A more appropriate basis for snag density desired conditions is a combination of: historical conditions, landscape averages, inventory and monitoring data, and wildlife needs. While dead trees, particularly larger diameter ones, play a crucial ecological role, they also have the capacity to significantly increase wildfire risk when present and concentrated at densities above historical averages. This has highlighted the need to cluster large snags in such a way to provide adequate resting, denning, and nesting habitat for multiple species.

Since the number of snags in the Bitterroot National Forest is no longer a limiting factor for snag-associated wildlife, the project-specific plan amendment, in combination with other vegetation-modification projects, would not result in a loss of wildlife viability. The ability for projects to remove excess snags in order to move vegetation and fire regimes toward desired conditions would better support wildlife and wildlife habitat by reducing the primary threat to most wildlife of high-severity fires across the landscape.

Chapter 4 – Consultation and Coordination

Public scoping began on April 20, 2022 with the publication of a legal notice in the *Ravalli Republic*. The Forest Service also published a column in the *Bitterroot Star* on May 4, 2022 inviting the public to review and comment on the project.

The 30-day comment period ended on May 20, 2022. The Forest Service received a total of 418 public comments via the Comment Analysis and Response Application (CARA), cumulating in 376 substantive and unique comments, 38 form letters, and 4 duplicate responses. All scoping comments that were received can be viewed in the CARA reading room[10].

After the scoping period ended, the Forest Service reviewed the public comments to identify concerns related to the proposed action and the potential effects the proposed action could have on the Bitterroot National Forest. These concerns were addressed through:

- project design criteria
- resource-specific design features
- environmental effects analysis

The Forest Service contacted the Confederated Salish and Kootenai Tribes (CSKT) and the Nez Perce Tribe to invite them to consult on the Bitterroot Front Project throughout the public comment period. This began during the initial project planning and it will continue through project implementation. The letter invited the Tribes to collaborate with the Forest Service to ensure the Forest Service would meet its trust responsibilities for ceded territory and ancestral lands.

The Forest Service and the CSKT signed a memorandum of understanding providing the CSKT with participating agency status. With this memorandum of understanding in place, the CSKT accepted the invitation to participate at the planning table from the beginning of the project. The CSKT provided constructive feedback addressing the proposed action, and they have been fully integrated into the project development process. Also, they have a standing invitation to all interdisciplinary team meetings; they have participated as time allowed, otherwise, they have been fully briefed at regular intervals on all proposed actions by the Stevensville District Ranger.

A complete list of participants in this environmental assessment (EA) process are as follows: Federal, state, and local agencies

- U.S. Department of Agriculture Natural Resources Conservation Service
- U.S. Fish and Wildlife Service
- Montana Fish, Wildlife and Parks
- Montana Department of Environmental Quality
- Montana Department of Natural Resources and Conservation
- Montana State Historic Preservation Office
- Ravalli County Board of Commissioners

[10] https://cara.fs2c.usda.gov/Public/ReadingRoom?project=57341

Tribes

- Confederated Salish and Kootenai Tribes
- Nez Perce Tribe

Others

- Bitterroot Forest Collaborative
- Ravalli County Off-Road Users Association
- Ravalli County Collaborative
- Bitterroot Resource Conservation & Development
- Corvallis Rural Fire District
- Darby Rural Fire District
- Florence Rural Fire District
- Hamilton Volunteer Fire Department
- Pinesdale Rural Fire District
- Stevensville City Fire Department
- Stevensville Rural Fire District
- Three Mile Rural Fire District
- Victor Rural Fire District
- National Wild Turkey Federation
- Bitterroot chapter of the Back Country Horseman

National Phasing Programmatic Agreement

The Forest initiated consultation under the National Phasing Programmatic Agreement (NPA), which is an agreement that allows for a phased identification process for large-scale, multi-year undertakings. The NPA allows the development of a Heritage Implementation Plan (HIP) in lieu of an individual programmatic agreement to document how the phased Section 106 process would be completed. A draft version of the HIP is included in the draft EA project file (PF-CULTURAL-002) and the final EA would include the final draft of the HIP.

List of Preparers

Preparers and Contributors

The following Forest and non-Forest individuals contributed during the development of the Bitterroot Front project and EA. The tables below list the specific roles of the interdisciplinary team members who prepared sections of this document.

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Chapter 5 – Literature Citations

Agee, J.K. 1998. The Landscape Ecology of Western Forest Fire Regimes. Northwest Science 72, 24-34.

Agee, J.K. and C.N. Skinner. 2005. Basic Principles of forest fuels reduction treatments. Forest Ecology and Management. 211 (2005) 83-96.

American Rivers. 2022. Wild and Scenic River Eligibility Report: Lolo and Bitterroot National Forests. Internet website: https://www.americanrivers.org/wp-content/uploads/2023/02/American-Rivers-Lolo-Bitterroot-Wild-and-Scenic-Rivers-Eligibility-Report-2022.pdf.

Arno, S.F. 1976. The Historical Role of Fire on the Bitterroot National Forest. Ogden, UT: U.S. Department of Agriculture (USDA) Forest Service, Intermountain Forest and Range Experiment Station. Res. Pap. INT-187.

Arno, S.F. 2001. Community types and natural disturbance processes. *In:* Whitebark pine communities: Ecology and restoration (D.F. Tomback, S.F. Arno; and R.E. Keane, eds.). Washington, D.C.: Island Press: 74-88. Internet website: https://books.google.com/books?id=ql6IRxfM-U8C&lpg=PP1&pg=PP1#v=onepage&q&f=false.

Arno, S.F. and C.E. Fiedler. 2005. Mimicking Nature's Fire Restoring Fire-Prone Forests in the West, Island Pres.

Arno, S.F., M.G. Harrington, C.E. Fiedler, C.E. Carlson. 1995. Restoring fire dependent ponderosa pine forest in Western Montana. Pacific Northwest Reports. Restoration & Management Notes. Summer 13(1). 32-36.

Arno, S.F., D.J. Parsons, and R.E. Keane. 2000. Mixed severity fire regimes in the northern Rocky Mountains: Consequences of fire exclusion and options for the future. In *Wilderness Ecosystems, Threats, and Management*. Proceedings RMRS-P-15-vol. 5. Fort Collins, CO: USDA Forest Service, Rocky Mountain Research Station. pp. 225-232.

Atchley, A.L., R. Linn, A. Jonko, C. Hoffman, J.D. Hyman, F. Pimont, C. Sieg, and R.S. Middleton. 2021. Effects of Fuel Spatial Distribution on Wildland Fire Behaviour. International Journal of Wildland Fire. pp. 179-189. Internet website: https://www.publish.csiro.au/wf/WF20096.

Bacon, W.R. 1979. The visual management system of the Forest Service, USDA. In: Elsner, Gary H., and Richard C. Smardon, technical coordinators. 1979. Proceedings of our national landscape: a conference on applied techniques for analysis and management of the visual resource Incline Village, Nev., April 23-25, 1979 . Gen. Tech. Rep. PSW-GTR-35. Berkeley, CA. Pacific Southwest Forest and Range Exp. Stn., Forest Service, U.S. Department of Agriculture: pp. 660-665.

Ball, P.N., M.D. MacKenzie, T.H. DeLuca, and W.E. Holben. 2010. Wildfire and charcoal enhance nitrification and ammonium-oxidizing bacterial abundance in dry montane forest soils. *Journal of Environmental Quality* 39: 1243–1253.

Barkey, P.M., T.A. Morgan, E.A. Simmons, D.R. Loeffler, and S.W. Hayes. 2018. The Impact of Timber Harvest Declines on the Ravalli County Economy. Bureau of Business and Economic Research. University of Montana. Internet website: https://bber.umt.edu/pubs/econ/RavalliHarvest2018.pdf.

Barrett, S.W. 1981. Relationship on Indian-caused fires to the ecology of western Montana Forests. University of Montana.

Beche, L.A., S.L. Stephens, and V.H. Resh. 2005. Effects of prescribed fire on a Sierra Nevada (California, USA) stream and its riparian zone. Forest Ecology and Management 218:37-59.

Bessler-Hackett, Diane. 2023. Personal communication between Diane Bessler-Hackett, range and invasive species program lead, and Liza Schill, consultant. March 30, 2023.

Bilby, R.E. 1985. Contributions of road surface sediment to a western Washington stream. Forest Science 31: 827-838.

Binkley, D. and R.F. Fisher. 2013. *Ecology and Management of Forest Soils*, Fourth Edition. John Wiley & Sons, Ltd. Hoboken, New Jersey. pp. 40–41.

Birdsey, R.A., A.J. Dugan, S.P. Healey, K. Dante-Wood, F. Zhang, G. Mo, J.M. Chen, et al. 2019. Assessment of the Influence of Disturbance, Management Activities, and Environmental Factors on Carbon Stocks of U.S. National Forests. Gen. Tech. Rep. RMRS-GTR-402. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station.

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

Bollenbacher, B., R. Bush, and R. Lundberg. 2009. Estimates of snag densities for western Montana forests in the northern region, Report 09-05 v1.3. Region One Vegetation Classification, Mapping, Inventory and Analysis Report, U.S. Department of Agriculture, Forest Service, Region One, Missoula, MT.

Brown, J.K., S.F. Arno, S.W. Barrette, and J.P. Menakis. 1994. Comparing the Prescribed Natural Fire Program with Presettlement Fires in the Selway-Bitterroot Wilderness. International Journal of Wildland Fire. Vol 4(3): pp. 157-168.

Brown, J.K., E.D. Reinhardt, and K.A. Kramer. 2003. Coarse woody debris: Managing benefits and fire hazard in the recovering forest. Gen. Tech. Rpt. RMRS-GTR-105. Ogden, UT: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station.

Brown, J.K. and J.K. Smith. 2000. Wildland fire in ecosystems: Effects of fire on flora. Gen. Tech. Rep. RMRS-GTR-42-vol. 2, U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Ogden, UT.

Bull, E.L. 2002. The Value of Coarse Woody Debris to Vertebrates in the Pacific Northwest. Proceedings of the symposium on the ecology and management of dead wood in western forests; 1999 November 2-4; Reno, NV. Gen. Tech. Rep. PSW-GTR-181. U.S. Department of Agriculture, Forest Service, Pacific Southwest Research Station. Albany, CA. pp. 171-178.

Bull, E.L., C.G. Parks, and T.R. Torgersen. 1997. Trees and logs important to wildlife in the interior Columbia River basin. Gen. Tech. Rep. PNW-GTR-391, U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station, Portland, OR.

Bureau of Economic Analysis (BEA). 2021. Table CAEMP25N. Total full-time and part-time employment by NAICS. Number of jobs. Selected geographies: Montana and Missoula and Ravalli Counties in Montana. Internet website: https://apps.bea.gov/iTable/?reqid=70&step=1&acrdn=6#eyJhcHBpZCI6NzAsInN0ZXBzIjpbMSwyNCwyOSwyNSwzMSwyNiwyNywzMF0sImRhdGEiOltbIlRhYmxlSWQiLCIzMyJdLFsiQ2xhc3NpZmljYXRpb24iLCJOQUlDUyJdLFsiTWFqb3JfQXJlYSIsIjQiXSxbIlN0YXRlIixbIjMwMDAwIl1dLFsiQXJlYSIsWyIzMDAwM.

Bush, R. and B. Reyes. 2023. Estimates of snag and live tree densities for western Montana forests in the northern region based on FIA hybrid 2015 analysis dataset. 3 April 2023 edition. 22-20 V 3.0.

Callahan, C.P. 1996. Water yield recovery in the Northern Rockies. Master's Thesis. University of Montana. https://scholarworks.umt.edu/etd/7734.

Cannon, S.H., J.E. Gartner, C. Parrett, and M. Parise. 2003. Wildfire-related debris-flow generation through episodic progressive sediment-bulking processes, western USA. *In:* International Conference on Debris-Flow Hazards Mitigation: Mechanics, Prediction, and Assessment, Proceedings (D. Rickenmann and C. Chen, eds). Davos, Switzerland: Millpress Rotterdam Netherlands. pp. 71–82.

Chapman, D.W. 1988. Critical review of variables used to define effects of fines in redds of large salmonids. Transactions of the American Fisheries Society. 117(1): 1-21.

Cook, J.G., L.L. Irwin, L.D. Bryant, R.A. Riggs, and J.W. Thomas. 1998. Relations of forest cover and condition of elk: A test of the thermal cover hypothesis in summer and winter. Wildlife Monographs. No. 14 1: 14 1.

Cook, J.G., L.L. Irwin, L.D. Bryant, R.A. Riggs, and J.W. Thomas. 2004. Thermal cover needs of large ungulates: A review of hypothesis tests. *In:* Transactions of the 69th North American Wildlife and Natural Resources Conference. pp. 708–726. Internet website: https://www.fs.usda.gov/research/treesearch/24695.

Council on Environmental Quality (CEQ). 1997. Environmental Justice Guidance under the National Environmental Policy Act. Internet website: https://www.epa.gov/environmentaljustice/ceq-environmental-justiceguidance-under-national-environmental-policy-act.

DeLuca, T.H. and A. Sala. 2006. Frequent fire alters nitrogen transformations in ponderosa pine stands of the inland northwest. *Ecology* 87: 2511–2522.

D'Evelyn, S.M., J. Jung, E. Alvarado, J. Baumgartner, P. Caligiuri, R.K. Hagmann, S.B. Henderson, et al. 2022. "Wildfire, Smoke Exposure, Human Health, and Environmental Justice Need to be Integrated into Forest Restoration and Management." *Curr Envir Health Rpt* 9:366–385. Internet website: https://doi.org/10.1007/s40572-022-00355-7.

Elliot, W.J. and M. Foltz. 2001. Validation of the FS WEPP Interfaces for Forest Roads and Disturbances. Paper 01-8009, Proceedings of the 2001 American Society of Agricultural Engineers (ASAE) Annual International Meeting, Sacramento, CA. http://asae.frymulti.com/request.asp?JID=5&AID=5553&CID=sca2001&T=2.

Everest, F.H., R.L. Beschta, J.C. Scrivener, K.V. Koski, J.R. Sedell, and C.J. Cederholm. 1987. Fine Sediment and Salmonid Production: A Paradox. *Streamside management: Forestry and Fishery Interactions*. University of Washington, College of Forest Resources, Seattle. Frissell, C. A., W. J. Liss, C. Pages 98-142.

Fettig, C.J., K.D. Klepzig, R.F. Billings, A.S. Munson, T.E. Nebeker, J.F. Negrón, and J.T. Nowak. 2007. The Effectiveness of Vegetation Management Practices for Prevention and Control of Bark Beetle Infestations in Coniferous Forests of the Western and Southern United States. *Forest Ecology and Management* 238 (2007) 24–53. doi:10.1016/j.foreco.2006.10.011.

Fiedler, C.E., P. Friederici, M. Petruncio, C. Denton, and W.D. Hacker. 2007. Managing for old growth infrequent-fire landscapes. Ecology and Society 12(2): 20. Internet website: URL:http://www.ecologyandsociety.org/vol12/iss2/art20/.

Fischer, W.C. and A.F. Bradley. 1987. Fire ecology of western Montana forest habitat types. Gen. Tech. Rep. INT-GTR-223, U.S. Department of Agriculture, Forest Service, Intermountain Research Station, Ogden, UT.

Foltz, R. 1996. Traffic and No-Traffic on an Aggregate Surfaced Road: Sediment production differences. In Proceedings of the Seminar on Environmentally Sound Forest Road and Wood Transport, June 17-22, 1996, 195-204.

Foltz, R.B. and M.A. Truebe. 1995. Effect of aggregate quality on sediment production from a forest road. Transportation Research Board, Sixth International Conference on Low-Volume Roads, Minneapolis, Minnesota, 49-57.

Fraley, J.J. and B.B. Shepard. 1989. Life history, Ecology and Population Status of Migratory Bull Trout (*Salvelinus confluentus*) in the Flathead Lake and River System. Northwest science., 63(4).

Franklin, J.F., K. Cromack, Jr., W. Denison, A. McKee, C. Maser, J. Sedell, F. Swanson, and G. Juday. 1981. Ecological characteristics of old-growth Douglas-fir forests. U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. Portland, Oregon.

Garn, H.S. 1974. Water Yield Analysis Procedure and Forest Management Guidelines to Predict the Hydrologic Effects of Forest Cover Alteration. USDA Forest Service.

Gellman, J., M. Walls, and M. Wibbenmeyer. 2022. Wildfire, smoke, and outdoor recreation in the western United States. Forest Policy and Economics. Volume 134. 2022. 102619. ISSN 1389-9341. Internet website: https://doi.org/10.1016/j.forpol.2021.102619.

Graham, R.T., A.E. Harvey, M.F. Jurgensen, T.B. Jain, J.R. Tonn, and D.S. Page-Dumroese. 1994. Managing coarse woody debris in forests of the Rocky Mountains. Report INT-RP-477. Department of Agriculture, Forest Service, Intermountain Research Station.

Graham, R.T., S. McCaffrey, and T.B. Jain, technical editors. 2004. Science basis for changing forest structure to modify wildfire behavior and severity. General Technical Report RMRS-GTR-120, USDA Forest Service Rocky Mountain Research Station, Fort Collins, CO. 43 p.

Green, P., J. Joy, D. Sirucek, W. Hann, A. Zack, and B. Naumann. 1992. Old-growth Forest Types of the Northern Region. R-1 SES 4/92 (errata corrected 2005, 2007, 2008, 2011). USDA Forest Service Northern Region, Missoula, Montana.

Grinspoon, E., J. Schaefers, R. Periman, J. Smalls, C. Manning, and T.L. Porto. 2014. Striving for Inclusion – Addressing Environmental Justice for Forest Service NEPA. United States Department of Agriculture Forest Service BASS Publishing Arts. Internet website: https://www.resolutionmineeis.us/sites/default/files/references/grinspoon-et-al-2014.pdf.

Halofsky, J.E., D.L. Peterson, S.K. Dante-Wood, L. Hoang, J.J. Ho, and L.A. Joyce, eds. 2018. Climate Change Vulnerability and Adaptation in the Northern Rocky Mountains. Gen. Tech. Rep. RMRS-GTR-374. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. Part 1. pp. 1–273.

Hammer, David. 2023. Personal communication between David Hammer, recreation program lead, and David Jaeger, consultant. June 23, 2023.

Hardy, C., R. Keane, and C. Stewart. 2005. USDA Forest Service Proceedings RMRS-P-17.

Harris, R.B. 1999. Abundance and characteristics of snags in western Montana forests. Gen. Tech. Rep. RMRS-GTR-31, U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Ogden, UT.

Harris, R.M., C.F. Clifton, and S.M. Wondzell. 2007. Hillslope erosion rates in areas with volcanic parent materials and the effects of prescribed fires in the Blue Mountains of eastern Oregon and Washington, USA. In Furniss et al., editors, 2007. Advancing the fundamental sciences: proceedings of the Forest Service National Earth Sciences Conference, San Diego, CA, 18-22 October 2004. PNW-GTR-689. USDA Forest Service, Pacific Northwest Research Station, Portland, Oregon. Internet website: http://www.stream.fs.fed.us.afsc/pdfs/Harris.pdf.

Hart, J.A. 1974. Plant Taxonomy of the Salish and Kootenai Indians of Western Montana. Master of Arts thesis, University of Montana, Missoula.

______. 1979. "The Ethnobotany of the Flathead Indians of Western Montana." *Botanical Museum Leaflets, Harvard University* 27(10):261–307.

Harvey, A.E., M.F. Jurgensen, and R.T. Graham. 1988. The role of woody residues in soils of ponderosa pine forests. Ponderosa pine: The species and its management: Symposium proceedings; 1987 September 29 – October 1; Spokane, WA. Washington State University Cooperative Extension. pp. 141-147.

Hausle, D.A. and D.W. Coble. 1976. Influence of Sand in Redds on Survival and Emergence of Brook Trout (*Salvelinus fontinalis*). Trans. Am. Fish. Soc. l05(l):57-63. Henny, D. C. 1927.

Hessburg, P.F., J.K. Agee, and J.F. Franklin. 2005. Dry forests and wildland fires of the inland Northwest USA: Contrasting the landscape ecology of the pre-settlement and modern eras. *Forest Ecology and Management, 211,* 117-139. doi:http://dx.doi.org/10.1016/j.foreco.2005.02.016.

Hessburg, P.F., S.J. Prichard, R.K. Hagmann, N.A. Povak, and F.K. Lake. 2021. Wildfire and climate change adaptation of western North American forests: a case for intentional management. Ecological Applications 31(8). Internet website: https://doi.org/10.1002/eap.2432.

Hessburg, P.F., B.G. Smith, S.D. Kreiter, C.A. Miller, R.B. Salter, C.H. McNicoll, and W.J. Hann. 1999. Historical and Current Forest and Range Landscapes in the Interior Columbia River Basin and Portions of the Klamath and Great Basins. Part I: Linking vegetation patterns and landscape vulnerability to potential insect and pathogen disturbances. Gen. Tech. Rep. PNW-GTR-458. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station.

Hesseln, H. J. Loomis, and A. González-Cabán. 2004. The Effects of Fire on Recreation Demand in Montana. Western Journal of Applied Forestry. 19(1):47-53. Doi: 10.1093/wjaf/19.1.47. Internet website: https://academic.oup.com/wjaf/article/19/1/47/4717677?login=false.

Hu Y., M.T. Odman, M.E. Chang, W. Jackson, S. Lee, E.S. Edgerton, K. Baumann, and A.G. Russell. 2008. “Simulation of air quality impacts from prescribed fires on an urban area.” *Environ Sci Technol.* 42(10):3676–82. Doi: 10.1021/es071703k. PMID: 18546707.

Huang, R., Y. Hu, A.G. Russell, J.A. Mulholland, and M.T. Odman. 2019. “The Impacts of Prescribed Fire on $PM_{2.5}$ Air Quality and Human Health: Application to Asthma-Related Emergency Room Visits in Georgia, USA.” *Int. J. Environ. Res. Public Health* 16(13):2312. Internet website: https://doi.org/10.3390/ijerph16132312.

Hunter, M.E. and M.H. Taylor. 2022. The Economic Value of Fuel Treatments: A Review of the Recent Literature for Fuel Treatment Planning. Forests 2022, 13, 2042. Internet website: https://doi.org/10.3390/f13122042.

iNaturalist. 2023. Western Bumble Bee (Bombus occidentalis), Research Grade Observation. Observation Date: 05-10-2023 at 9:29 Am MDT. Ravalli County, MT, USA. Internet website: https://www.inaturalist.org/observations/161070456. Accessed on June 6, 2023.

Irving, J.S. and T.C. Bjornn. 1984. Effects of substrate size composition on survival of kokanee salmon and cutthroat and rainbow trout embryos. Completion report to: U.S. Department of Agriculture, Forest Service, Intermountain Forest and Range Experiment Station, Moscow, ID.

Irwin, Jesse. 2023. Personal communication between Julie Remp, Wildlife Biologist, EMPSi, and Jesse Irwin, Wildlife Biologist, Bitterroot National Forest. December 14, 2022.

Isaak, D., S. Wenger, E. Peterson, J. VerHoef, D. Nagel, C. Luce, S. Hostetler, J. Dunham, B. Roper, S. Wollrab, G. Chandler, D. Horan, and S. Parkes-Payne. 2017. The NorWeST summer stream temperature model and scenarios for the western U.S.: A crowd-sourced database and new geospatial tools foster a user community and predict broad climate warming of rivers and streams. Water Resources Research, 53: 9181-9205. Internet websites: https://doi.org/10.1002/2017WR020969 and https://www.fs.usda.gov/rm/boise/AWAE/projects/NorWeST.html.

Johnson Gaither, C., S. Afrin, F. Garcia-Menendez, M.T. Odman, R. Huang, S. Goodrick, and A. Ricardo da Silva. 2019. “African American Exposure to Prescribed Fire Smoke in Georgia, USA.” *Int. J. Environ. Res. Public Health* 16(17):3079. Internet website: https://doi.org/10.3390/ijerph16173079.

Kaufmann, M.R., D. Binkley, P.Z. Fule, M. Johnson, S.L. Stephens, and T.W. Swetnam. 2007. Defining Old Growth for Fire-Adapted Forests of the Western United States. Ecology and Society.

Keane, R.E. 2000. The importance of wilderness to whitebark pine research and management. *In:* Wilderness science in a time of change conference—Volume 3 (Stephen F. McCool, David N. Cole, William T. Borrie, and Jennifer O’Loughlin, comps). Wilderness as a place for scientific inquiry; 1999 May 23–27; Missoula, MT. Proceedings RMRS-P-15-VOL-3. Ogden, UT: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. pp. 84–92.

Keane R.E., K.C. Ryan, T.T. Veblen, C.D. Allen, J. Logan, and B. Hawkes. 2002. Cascading effects of fire exclusion in Rocky Mountain ecosystems: A literature review. USDA Forest Service, Rocky Mountain Research Station, General Technical Report RMRS-91. Ogden, UT.

Koerner, R.M. 1998. Designing with Geosynthetics, Prentice Hall, Upper Saddle River, New Jersey.

Kuhnlein, H.V. and N.J. Turner. 1991. Traditional Plant Foods of Canadian Indigenous Peoples. Gordon and Breach Publishers, Philadelphia, Pennsylvania.

LANDFIRE: LANDFIRE Fire Regime Groups layer. 2014. U.S. Department of Interior, Geological Survey, and U.S. Department of Agriculture. Internet website: https://www.landfire.gov/frg.php [2023, July 21].

LANDFIRE: LANDFIRE Vegetation Departure layer. 2022. U.S. Department of Interior, Geological Survey, and U.S. Department of Agriculture. Internet website: https://www.landfire.gov/vdep.php [2023, July 21].

Leger, E.A. and E.K. Espeland. 2010. Coevolution between native and invasive plant competitors: implications for invasive species management. Evolutionary Applications 3(2):169-78.

Luce, C.H. and T.A. Black. 1999. Sediment Production from Forest Roads in Western Oregon. Water Resources Research 35, 2561-2570.

Luce, C.H. and T.A. Black. 2001. Spatial and Temporal Patterns in Erosion from Forest Roads. In Influence of Urban and Forest Land Uses on the Hydrologic-Geomorphic Responses of Watersheds, Edited by M.S. Wigmosta and S.J. Burges. pp. 165-178 in Water Resources Monographs, American Geophysical Union, Washington, D.C.

Lyon, L.J. 1983. Road density models describing habitat effectiveness for elk. Journal of Forestry 81:592-613.

Macmeeken, S., C. Mayn, T. Opperman, and D. Lockman. 2007. Coarse Woody Debris (CWD) Recommendations for the Bitterroot National Forest. Darby, MT: U.S. Department of Agriculture, Forest Service, Bitterroot National Forest.

Mangold, J. 2019. Montana Noxious Weed List, February 2017. Montana State University: Mountains and Minds. Internet website: https://www.montana.edu/extension/invasiveplants/documents/mt_noxious_weeds/2017_mt_noxious_weeds.html.

McCune, B. 1983. Fire Frequency Reduced Two Orders of Magnitude in the Bitterroot Canyons, Montana. Canadian Journal of Forest Research 13, 212-218.

McLeod, M.C. 2003. Site Identification Strategy Prepared for Bitterroot, Flathead, and Lolo National Forests. USDA Forest Service, Northern Region. With contributions by Timothy Light and Mary Hortsman Williams.

McLeod, M.C. and D. Melton. 1986. The Prehistory of the Lolo and Bitterroot National Forests: an Overview. USDA Forest Service, Northern Region, Lolo and Bitterroot National Forests, Missoula and Hamilton, Montana.

Merrell, C. and J.T. Clark. 2001. Peeled lodgepole pine: A disappearing cultural resource and archaeological record. *Northwest Anthropological Research Note*, 35(1): 27–43.

Millar, C.I., N.L. Stephenson, and S.L. Stephens. 2007. Climate change and forests of the future: Managing in the face of uncertainty. *Ecological Applications, 17(*8), 2145-2151. doi:10.1890/06-1715.1.

Millennium Ecosystem Assessment. 2005. Ecosystems and Human Well-being: Synthesis. Island Press, Washington, D.C. Internet website: https://www.millenniumassessment.org/documents/document.356.aspx.pdf.

Miller, R.H. 2014. Influence of Log Truck Traffic and Road Hydrology on Sediment Yield in Western Oregon. Rebecca H. Miller for the degree of Master of Science in Water Resources Engineering, Oregon State University, Corvallis, OR. 116 pp.

Moench, R. and Fusaro, J. 2012. Soil Erosion Control after Wildfire. Colorado State University. Internet website: https://extension.colostate.edu/docs/pubs/natres/06308.pdf.

Montana Department of Environmental Quality (MDEQ). 2005. Water Quality Restoration Plan and Total Maximum Daily Loads for the Bitterroot Headwaters Planning Area. Montana Department of Environmental Quality. Helena, Montana.

Montana Fish, Wildlife and Parks (MDFWP). 2022a. Montana Wolf Conservation and Management Planning Document. Draft. Rocky Mountain Wolf Recovery Annual Reports 23. Internet website: https://digitalcommons.unl.edu/wolfrecovery/23.

_____. 2022b. Montana 2022 Elk Counts. Internet website: https://fwp.mt.gov/binaries/content/assets/fwp/conservation/elk/2022-mt-elk-counts.pdf

Montana Forest Action Advisory Council. 2020. Montana Forest Action Plan. Internet website: https://www.montanaforestactionplan.org/.

Montana Natural Heritage Program (MNHP). 2023. Montana Field Guide. Montana Natural Heritage Program and Montana Fish, Wildlife and Parks. Helena, Montana. Internet website: https://FieldGuide.mt.gov.

Morgan T.A., M.J. Niccolucci, and P.E. Polzin. 2018. Montana's Forest Industry Employment and Income Trends. Forest Industry Technical Report No. 8. Internet website: https://bber.umt.edu/pubs/forest/workforce/MTEmplAndInc2018.pdf.

Munger, B. 1993. Whitebark Pine: A Prehistoric Food Source at Timberline in the Bitterroot Mountains of Western Montana. Paper presented at the Rocky Mountain Anthropology Conference, Jackson, Wyoming. Abstract. Internet website: https://rockymtnanthro.org/resources/RMAC1993.pdf.

Natural Resources Conservation Service (NRCS). 2023. Automated Snow Monitoring. Internet website: https://www.nrcs.usda.gov/wps/portal/wcc/home/aboutUs/monitoringPrograms/automatedSnowMonitoring/.

Navarro, K.M., D. Schweizer, J.R. Balmes, and R. Cisneros. 2018. "A Review of Community Smoke Exposure from Wildfire Compared to Prescribed Fire in the United States." *Atmosphere* 9:185. Internet website: https://doi.org/10.3390/atmos9050185.

Neary, D.G. and J.M. Leonard. 2021. Chapter 12: Restoring Fire to Forests: Contrasting the Effects on Soils of Prescribed Fire and Wildfire. In: Soil and Landscape Restoration (J. A. Standturf and M. A. Callaham, Jr., editors). Elsevier Inc. Cambridge, Massachusetts.

Neary, D.G., K.C. Ryan, and L.F. DeBano, (editors). 2005. Wildland Fire in Ecosystems: Effects of Fire on Soils and Water. General Technical Report RMRS-GTR-42-vol.4 (revised 2008). Ogden, UT, USA: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 250 pages.

Northern Region Summary Database, Forest Inventory and Analysis data, Hybrid. 2015. U.S. Department of Agriculture, Forest Service, Northern Region, Bitterroot National Forest, Hamilton, Montana.

Northern Rockies Coordination Center (NRCC). 2023. Northern Rockies Coordination Center year-to-date and historical incident data. Internet website: https://gacc.nifc.gov/nrcc/predictive/intelligence/ytd_historical/ytd_historical.htm [2023, July 21].

Omi, P.N. and E.J. Martinson. 2004. Effectiveness of thinning and prescribed fire in reducing wildfire severity. pp. 87-92 *In:* Proceedings of the Sierra Nevada science symposium: Science for management and conservation; Murphy, D.D.; Stine, P.A.; editors. General Technical Report PSW-193, USDA Forest Service, Albany, CA.

Page-Dumroese, D.S., M.F. Jurgensen, W. Elliot, T.M. Rice, J. Nesser, T. Collins, and R. Meurisse. 2000. Soil quality standards and guidelines for forest sustainability in northwestern North America. *Forest Ecology and Management* 138: 445–462.

Parks, S. A. and J.T. Abatzoglou. 2020. Warmer and Drier Fire Seasons Contribute to Increases in Area Burned at High Severity in Western US Forests From 1985 to 2017. Geophysical Research Letters, 477, e2020GL089858. Internet website: https://doi.org/10.1029/2020GL089858.

Parsons, A., P.R. Robichaud, S.A. Lewis, C. Napper, and J.T. Clark. 2010. Field guide for mapping post-fire soil burn severity. General Technical Report RMRS-GTR-243. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station.

Powers, R.F. 2002. Effects of soil disturbance on the fundamental, sustainable productivity of managed forests. General Technical Report PSW-GTR-183. Albany, CA: Pacific Southwest Research Station, Forest Service, U.S. Department of Agriculture. pp. 63–82. A. Callaham, Jr., editors. Elsevier Inc. Cambridge, Massachusetts.

Powers, R.F., F.G. Sanchez, D.A. Scott, and D. Page-Dumroese. 2004. The North American Long-term Soil Productivity Experiment: Coast-to-coast Findings from the First Decade. In: Silviculture in Special Places (W. D. Shepperd and L. G. Eskew, eds). Proceedings of the National Silviculture Workshop, Proceedings RMRS-P-34. USDA Forest Service Rocky Mountain Research Station, Fort Collins, Colorado. pp. 191–206.

Powers, R.F., D.A. Scott, F.G. Sanchez, R.A. Voldseth, D. Page-Dumroese, J.D. Elioff, and D.M. Stone. 2005. The North American long-term soil productivity experiment: Findings from the first decade of research. *Forest Ecology and Management* 220: 31–50.

Prichard, S.J., A. Nicholas, M. Povak, .C. Kennedy, and D.W. Peterson. 2020. Fuel treatment effectiveness in the context of landform, vegetation, and large, wind-driven wildfires. Ecological Applications 00(00):e02104. 10.1002/eap.2104.

Ranglack, D., B. Garrott, J. Rotella, K. Proffitt, J. Gude, and J. Canfield. 2016. Evaluating elk summer resource selection and applications to summer range habitat management.

Reid L.M. and T. Dunne. 1984. Sediment production from forest road surfaces. Water Resources Research 20, pp. 1753-1761.

Reinhardt, E.D., R.E. Keane, D.E. Calkin, and J.D. Cohen. 2008. Objectives and considerations for wildland fuel treatment in forested ecosystems of the interior western United States, Forest Ecology and Management. 256: 1997-2006.

Rieman, B.E. and J.D. McIntyre. 1993. Demographic and habitat requirements for conservation of bull trout. USDA Forest Service, Intermountain Research Station. General Technical Report INT-GTR-302, Boise, ID.

Rivers.gov. 2023. About the WSR Act. Internet website: https://www.rivers.gov/wsr-act.php.

Robichaud, P. 2000. Fire effects on infiltration rates after prescribed fire in Northern Rocky Mountain forests, USA. Journal of Hydrology 231:220-229.

Rothermel, R.C. 1983. How to predict the spread and intensity of forest and range fires. General Technical Report GTR-INT-143. Ogden, UT: USDA Forest Service, Intermountain Forest and Range Experiment Station.

Ryan, K.C. 2010. Effects of fire on cultural resources. *In*: VI International Conference on Forest Fire Research (D.X. Vegas, editor). 15-18 November 2010; Coimbra, Portugal.

Scott, J.H. 2019. Glossary of wildfire hazard and risk.

Sheridan, G.J., P.J. Noske, R.K. Whipp, and N. Wijesinghe. 2006. The effect of truck traffic and road water content on sediment delivery from unpaved forest roads. Hydrol. Process. 20 (8), 1683–1699. Internet website: http://dx.doi.org/10.1002/hyp.5966.

Sorenson, C.B., C.E. Keegan III, T.A. Morgan, C.P. McIver, and M.J. Niccolucci. 2016. "Employment and Wage Impacts of Timber Harvesting and Processing in the United States." *J. For.* 114(4):474–482. Internet website: https://bber.umt.edu/pubs/forest/workforce/JournalForestryJul2016.pdf.

Sosa-Pérez, G. and L.H. MacDonald. 2016. Wildfire Effects on Road Surface Erosion, Deposition, and Road-Stream Connectivity. Earth Surface Processes and Landforms. Published online in Wiley Online Library. DOI: 10.1002/esp.4018.

Stednick, J.D. 1996. Monitoring the effects of timber harvest on annual water yield. Journal of Hydrology, 176(1-4), 79-95. Internet website: https://doi.org/10.1016/0022-1694(95)02780-7.

Stephens, S.L, et al. 2012. The Effects of Forest Fuel Reduction Treatments in the United States. BioScience June 2012/Vol. 62 No. 6. 13 p.

Stratton, R.D. 2004. Assessing the effectiveness of landscape fuel treatments on fire growth and behavior. Journal of Forestry, Oct.-Nov. 102(7): 32-40.

Sugden, B.D. and S.W. Woods. 2007. Sediment production from forest roads in western Montana. Journal of the American Water Resources Association 43(1):193–206.

Sutherland, S. 2003. Post-Fire Weed Response on the Bitterroot National Forest. Preliminary results of an ongoing research project (on file at Bitterroot National Forest Supervisor's Office, Hamilton, MT).

Sutherland, S. 2004. Fuels planning: Science synthesis and integration; environmental consequences fact sheet 07: Fire and weeds. Fort Collins, CO: U.S. Department of Agriculture, Rocky Mountain Research Station. Internet website: https://catalog.libraries.psu.edu/catalog/18671969.

Switalski, T.A., J.A. Bissonette, T.H. DeLuca, C.H. Luce, and M.A. Madej. 2004. Benefits and impacts of road removal. Frontiers in Ecology and the Environment 2:21–28.

Thiébaut, G., M. Tarayre, and H. Rodríguez-Pérez. 2019. Allelopathic Effects of Native Versus Invasive Plants on One Major Invader. *Front. Plant Sci*. 10:854. Internet website: https://www.frontiersin.org/articles/10.3389/fpls.2019.00854/full.

Troendle, C.A., L.H. MacDonald, C.H. Luce, and I.J. Larsen. 2010. Cumulative watershed effects of fuel management in the western United States. Gen Tech. Rep. RMRS-GTR-231. (pp.126-148). USDA Forest Service, Rocky Mountain Research Station. Internet website: https://www.fs.usda.gov/treesearch/pubs/34312.

U.S. Census Bureau (Census Bureau). 2000. Decennial Census 2000. Profile of General Demographic Characteristics: 2000. Internet website: https://data.census.gov/table?g=040XX00US30_050XX00US30063,30081&y=2000&tid=DECENNIALDPSF22000.DP1.

_____. 2021a. American Community Survey 5-Year Estimates Data Profiles. Table DP05: Demographic and Housing Estimates. Internet website: https://data.census.gov/table?text=dp05&g=040XX00US30_050XX00US30063,30063$1400000,30081,30081$1400000&tid=ACSDP5Y2021.DP05&moe=false.

_____. 2021b. American Community Survey 5-Year Estimates Data Profiles. Table S1701: Poverty Status in the Past 12 Months. Internet website: https://data.census.gov/table?text=s1701&g=050XX00US30063,30063$1400000,30081,30081$1400000&tid=ACSST5Y2021.S1701&moe=false.

U.S. Department of Agriculture, Forest Service (USDA, USFS). 1973. USDA. Forest Service. Agriculture Handbook 434. National forest landscape management: Vol. 1. Washington D.C.

_____. 1974. Agriculture Handbook 462. National forest landscape management: Vol. 2. Washington D.C.

_____. 1984a. Roadless Areas: 01805 - Lolo Creek, Bitterroot and Lolo National Forests. Hamilton, MT, USA: U.S. Department of Agriculture, Forest Service, Northern Region, Bitterroot National Forest.

_____. 1984b. Roadless Areas: 01067 – Selway-Bitterroot, Bitterroot National Forest. Hamilton, MT, USA: U.S. Department of Agriculture, Forest Service, Northern Region, Bitterroot National Forest.

_____. 1987. Bitterroot National Forest Land and Resource Management Plan. U.S. Department of Agriculture, Forest Service, Northern Region, Bitterroot National Forest, Hamilton, Montana.

_____. 1995. Agriculture Handbook Number 701, Landscape Aesthetics, A Handbook for Scenery Management. U.S. Government Printing Office: Washington, D.C.

_____. 2000. Forest Service Roadless Area Conservation. Final Environmental Impact Statement. USDA Forest Service Headquarters, Washington D.C. Internet website: https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5057895.pdf.

_____. 2001. Special Areas; Roadless Area Conservation. Federal Register. Internet website: https://www.federalregister.gov/documents/2001/01/12/01-726/special-areas-roadless-area-conservation#h-42.

_____. 2003. Final Environmental Impact Statement Noxious Weed Treatment Project. Bitterroot National Forest, Hamilton, Montana.

______. 2008a. Eligibility and Suitability, What's the Difference? Internet website: https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5127263.pdf.

______. 2008b. Wilderness Roadless Area Questions. Internet website: https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fsbdev3_000250.pdf.

______. 2008c. Final Environmental Impact Statement: Trapper Bunkhouse Land Stewardship Project. Darby Ranger District, Bitterroot National Forest. Ravalli County, Montana.

______. 2009. Soil-Disturbance Field Guide. 0819 1815—SDTDC. San Dimas, CA: U.S. Department of Agriculture, Forest Service, San Dimas Technology and Development Center.

______. 2014a. *FSM 2400 - Forest Management Chapter 2470 - Silvicultural Practices.* Washington, D.C.: U.S. Department of Agriculture, Forest Service.

______. 2014b. FSM 2500 - Watershed and Air Management, Chapter 2550 - Soil Management. Missoula, MT: U.S. Department of Agriculture, Forest Service, Northern Region.

______. 2015. Travel Analysis Report 2015, Bitterroot National Forest. U.S. Department of Agriculture, Forest Service, Northern Region, Bitterroot National Forest, Hamilton, Montana.

______. 2016. Forest plan monitoring program transition: Lolo and Bitterroot National Forests. U.S. Department of Agriculture, Forest Service, Missoula, MT.

______. 2017. Visitor Use Report. Bitterroot National Forest. USDA Forest Service, Region 1. National Visitor Use Monitoring Data. Collected Fiscal Year 2017. Internet website: https://apps.fs.usda.gov/nvum/results/ReportCache/2017_A01003_Master_Report.pdf.

______. 2019a. Jobs, Income, and GDP: Economic Contributions at a Glance. Bitterroot National Forest. Internet website: https://publicdashboards.dl.usda.gov/t/NRE_PUB/views/EconomicContributionsReportView_16843416905910/JobsIncomeandGDPEconomicContributionsataGlance?%3Aembed=y&%3Aiid=2&%3AisGuestRedirectFromVizportal=y.

_______. 2019b. Resource Management Outputs from Forest Service Lands. Bitterroot National Forest. Internet website: https://publicdashboards.dl.usda.gov/t/NRE_PUB/views/EconomicContributionsReportView_16843416905910/JobsIncomeandGDPEconomicContributionsataGlance?%3Aembed=y&%3Aiid=2&%3AisGuestRedirectFromVizportal=y.

_______. 2019c. Job Contributions by Program. Bitterroot National Forest. Internet website: https://publicdashboards.dl.usda.gov/t/NRE_PUB/views/EconomicContributionsReportView_16843416905910/JobsIncomeandGDPEconomicContributionsataGlance?%3Aembed=y&%3Aiid=2&%3AisGuestRedirectFromVizportal=y.

_______. 2019d. Labor Income and GDP Contributions by Program. Bitterroot National Forest. Internet website: https://publicdashboards.dl.usda.gov/t/NRE_PUB/views/EconomicContributionsReportView_16843416905910/JobsIncomeandGDPEconomicContributionsataGlance?%3Aembed=y&%3Aiid=2&%3AisGuestRedirectFromVizportal=y.

_____. 2020a. Forest Service Special Orders and Emergency Closure Orders. U.S. Department of Agriculture, Forest Service. Internet website: https://winapps.umt.edu/winapps/media2/wilderness/toolboxes/documents/VUM/Forest-Service-Special-Orders-and-Emergency-Closure-Orders.pdf.

_____. 2020b. Habitat Type Grouping Crosswalk for the Bitterroot National Forest. U.S. Department of Agriculture, Forest Service, Bitterroot National Forest, Montana.

_____. 2020c. Need for Change Worksheet. Resource: Scenery/Visuals Unacceptably Low (Specific Need for Change Locations Identified). Hamilton, MT, USA: U.S. Department of Agriculture, Forest Service, Northern Region, Bitterroot National Forest.

_____. 2021. Project Area Vegetation Composition. U.S. Department of Agriculture, Forest Service, Bitterroot Front National Forest, Montana.

_____. 2022. Biennial Monitoring Evaluation Report for the Bitterroot National Forest. Bitterroot National Forest, Darby, MT.

_____. 2023a. Current Invasive Plants. USDA Forest Service FSGeodata Clearinghouse - Download National Datasets. Internet website: https://data.fs.usda.gov/geodata/edw/datasets.php?xmlKeyword=inventory%2B.

_______. 2023b. Resource Management. Internet website: https://www.fs.usda.gov/resources/bitterroot/landmanagement/resourcemanagement.

_____. 2023c. Soils data and information supplied by the Bitterroot National Forest for the Bitterroot Front Project. Darby, MT: U.S. Department of Agriculture, Forest Service, Bitterroot National Forest.

_____. 2023d. Threatened and Endangered Species Population Occurrence. U.S. Department of Agriculture, Forest Service, Bitterroot National Forest, Montana.

_____e. 2023 unpublished. Biological Assessment for Canada Lynx. Bitterroot National Forest Service.

_____f. 2023 unpublished. Biological Assessment for Grizzly Bear. Bitterroot National Forest Service.

_____g. 2023 unpublished. Biological Assessment for North American Wolverine. Bitterroot National Forest Service.

_____h. 2023 unpublished. Biological Assessment for Bull Trout. Bitterroot National Forest Service.

_____i. 2023 unpublished. Biological Assessment for Whitebark Pine. Bitterroot National Forest Service.

_____. 2023j. WEPP: Road Results Version 2015.03.02 Based on WEPP VERSION 2010.100 by Hall and Anderson; Project leader Bill Elliot. USDA Forest Service, Rocky Mountain Research Station, Moscow, ID 83843.

U.S. Department of Commerce, National Oceanic and Atmospheric Administration (NOAA). 2023. What is lidar? Internet website: https://oceanservice.noaa.gov/facts/lidar.html.

U.S. Department of the Interior (DOI). 2012. Wildland Fire Management Program Benefit-Cost Analysis: A Review of Relevant Literature. Internet website: https://www.doi.gov/sites/doi.gov/files/migrated/ppa/upload/Wildland_fire_literature_review_060812FINAL.pdf.

United States Fish and Wildlife Services (USFWS). 2010. Biological Effects of Sediment on Bull Trout and their Habitat-guidance for Evaluating Effects. Prepared by Jim Muck, U.S. Fish and Wildlife Service Washington Fish and Wildlife Office, Lacey, WA, July 13, 2010.

_____. 2022. Endangered and Threatened Wildlife and Plants; Threatened Species Status With Section 4(d) Rule for Whitebark Pine (Pinus albicaulis). Federal Register, Department of Interior. govinfo.gov/content/pkg/FR-2022-12-15/pdf/2022-27087.pdf.

_____. 2023. Information for Planning and Consultation (IPAC), Environmental Conservation Online System (ECOS). Internet website: https://ecos.fws.gov/ipac/.

U.S. Forest Service Geographical Information Systems .(USFS GIS). 2023. Supplied by the Bitterroot National Forest for the Bitterroot Front Project. Darby, MT: U.S. Department of Agriculture, Forest Service, Bitterroot National Forest.

United States Geological Survey (USGS). 2023. Water Quality After Wildfire. Internet website: https://www.usgs.gov/mission-areas/water-resources/science/water-quality-after-wildfire#overview.

United States Global Change Research Program. 2023. Impacts on Society. Accessed July 7, 2023. Internet website: https://www.globalchange.gov/climate-change/impacts-society.

Van Merrveld, H.J., E.J. Baird, and W.C. Floyd. 2014. Controls on sediment production from an unpaved resource road in a Pacifc maritime watershed. Water Resour. Res. 50 (6), 4803–4820. Internet website: http://dx.doi.org/10.1002/2013WR014605.

Van Wagner, C.E. 1977. Conditions for the start and spread of crown fire. Can. J. For. Res. (7) 23-34. [0620].

Weaver, T. and J. Fraley. 1991. Fisheries habitat and fish populations. Flathead basin forest practices, water quality and fisheries cooperative program. Kalispell, MT: Flathead Basin Commission. p 47.

Werle, M. 2023a. Personal communication between Matthew Werle, heritage program manager, Bitterroot National Forest and Andrew Wilkins, cultural resource consultant. May 26, 2023.

_____. 2023b. Personal communication between Matthew Werle, heritage program manager, Bitterroot National Forest, and Andrew Wilkins, cultural resource consultant. May 12, 2013.

Westerling, A.L, et al. 2006. Warming and Earlier Spring Increase Western US Forest Wildfire Activity. Science Magazine, Published online 6 July 2006; 10.1126/science.1128834. 940-943.

Wondzell, S.M. and J.G. King. 2003. Post-Fire Erosional Process in the Pacific Northwest and Rocky Mountain Regions. Forest Ecology and Management (178) 75-87.

Ziegler, A.D., R.A. Sutherland, and T.W. Giambelluca. 2001. Interstorm Surface Preparation and Sediment Detachment by Vehicle Traffic on Unpaved Mountain Roads', Earth Surface Processes and Landforms, 26, 235-250.

Zou, Y., S.M. O'Neill, N.K. Larkin, E.C. Alvarado, R. Solomon, C. Mass, Y. Liu., et al. 2019. "Machine Learning-Based Integration of High-Resolution Wildfire Smoke Simulations and Observations for Regional Health Impact Assessment." *Int. J. Environ. Res. Public Health* 16(12):2137. Internet website: https://doi.org/10.3390/ijerph16122137.

Zouhar, K. 2001. Centaurea maculosa. In: Fire Effects Information System [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Internet website: http://www.fs.fed.us/database/feis/plants/forb/cenmac/introductory.html.

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Appendix A

Bitterroot Front Environmental Assessment – Design Features and Activity Cards

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Appendix A – Bitterroot Front Environmental Assessment – Design Features and Activity Cards

Resource Specific Guidelines and Design Elements

<table>
<tr><th>Design Element</th><th>Ensures Compliance with</th><th>Applicable Area/Timing</th><th>Applicable Activity Cards: Vegetation Management</th><th>Applicable Activity Cards: Fuels Management</th><th>Applicable Activity Cards: Travel Management</th></tr>
<tr><td colspan="6">Botany</td></tr>
<tr><td>BT-1 Areas of potentially suitable habitat for rare plants within the proposed treatment areas would be determined following the R1 Botany evaluation process. A qualified botanist would approve the evaluation and habitat determination.</td><td rowspan="3">Forest Plan Standard, Forest Service Manual (FSM 2600, 2670) 2005, National Environmental Policy Act (NEPA), National Forest Management Act (NFMA) 1976, Forest and Rangeland Renewable Resources Planning Act 1974, and Region One Botany Survey and Analysis Protocol.</td><td>Project-wide. Pre-implementation.</td><td rowspan="3">VM-03
VM-05
VM-06
VM-07
VM-08
VM-09
VM-10
VM-11
VM-12
VM-13
VM-14</td><td rowspan="2">FM-01
FM-02
FM-03
FM-04
FM-05
FM-06
FM-07
FM-08
FM-09
FM-10</td><td rowspan="3">TRM-01
TRM-02
TRM-03
TRM-04
TRM-05
TRM-08</td></tr>
<tr><td>BT-2 If potentially suitable rare habitat is identified during the evaluation process, botany surveys would be completed to verify habitat and presence of rare plants. Surveys would be completed prior to project implementation during the survey window. A qualified botanist would approve the survey information following the R1 Botany Survey and Analysis Protocol.</td><td>Project-wide. Pre-implementation. During the appropriate season for surveys to be conducted.</td></tr>
<tr><td>BT-3 Microsites of highly suitable rare plant habitat that occur within proposed treatment units, including seeps, springs, and other seasonally or perennially wet areas, would be protected from all project activities by site-specific buffers established by a qualified Forest botanist.</td><td>Project-wide. Pre-implementation. During implementation.</td><td>Not Applicable</td></tr>
</table>

Design Element	Ensures Compliance with	Applicable Area/Timing	Applicable Activity Cards: Vegetation Management	Applicable Activity Cards: Fuels Management	Applicable Activity Cards: Travel Management
BT-4 A qualified botanist would determine if identified rare plant populations and habitats require a buffer from specific activities. If required, exclusions would be flagged and excluded on field maps for avoidance from specific project activities proposed in that area.		Project-wide. Pre-implementation.		FM-05 FM-06 FM-07 FM-08 FM-09 FM-10	
BT-5 If operations are found to disturb or damage any known/identified rare plant species/area, the contractor would be required to halt its operations in the immediate vicinity of the identified plants until the site is buffered and continued operations are authorized.		Project-wide. Implementation.		FM-01 FM-02 FM-03 FM-04 FM-05 FM-06 FM-07 FM-08 FM-09 FM-10	
BT-6 Whitebark pine trees of all size classes would be protected from damage to the extent possible. All mature whitebark pine would be marked and retained. When marking is necessary, marking would occur in a manner that does not cause damage to the tree. Retain whitebark pine greater than 3 inches in diameter at breast height (dbh) to the extent possible. It would be standard practice to directionally fell trees away from any existing whitebark pine trees. Skids trails and skyline corridors must be approved by the timber sale administrator and they would be placed in units so that whitebark pine trees would be avoided or not damaged, to the extent possible. If mature whitebark pine	Forest Plan Standard, Forest Service Manual (FSM 2600, 2670) 2005, NEPA, National Forest Management Act (NFMA) 1976, Forest and Rangeland Renewable Resources Planning Act 1974, Region One Botany Survey and Analysis Protocol, Endangered Species Act (ESA) (1973); U.S. Department of Interior, Fish and Wildlife Service. 2022. Endangered and Threatened Wildlife and Plants; Threatened	Project-wide. Pre-implementation and implementation.	VM-03 VM-05 VM-06 VM-07 VM-08 VM-09 VM-10 VM-11 VM-12 VM-13 VM-14		

Design Element	Ensures Compliance with	Applicable Area/Timing	Applicable Activity Cards: Vegetation Management	Applicable Activity Cards: Fuels Management	Applicable Activity Cards: Travel Management
individuals are found during pre-implementation surveys, individuals would be marked and avoided to the extent possible.	Species Status for Pinus albicaulis (Whitebark Pine) with Section 4(d) Rule. Federal Register, Vol. 87, No. 240, Thursday, December 15, 2022.				
BT-7 Whitebark pine would be protected, to the extent possible, from potential fire mortality in prescribed burning areas through directional felling of trees away from whitebark pine, reducing fuel loads adjacent to whitebark by pulling slash away or piling slash, designing ignition patterns to limit fire intensity, and creating fire line to protect whitebark pine individuals, as needed. Reduce fuel loads adjacent to whitebark by pulling slash away or piling slash greater than 3 inches dbh 10 to 20 feet (depending on tree size) or reduce slash away from the dripline (whichever is the greater distance) and implement ignition to reduce fire intensity to whitebark individuals. When appropriate, implement a variety of fuels reduction techniques, such as prescribed fire, fuel augmentation, and/or pile burning to reduce shade tolerant trees and promote whitebark pine habitat.					

Design Element	Ensures Compliance with	Applicable Area/Timing	Applicable Activity Cards: Vegetation Management	Applicable Activity Cards: Fuels Management	Applicable Activity Cards: Travel Management
BT-8 Where feasible, proposed roads would be moved so that whitebark pine individuals would not be damaged. If individuals are removed during road construction, rust-resistant whitebark pine trees would be planted adjacent to road construction.					
BT-9 Herbicide spot treatments would be maintain a minimum distance of 3.3 ft from a whitebark pine tree. Ground-based broadcast applications would be maintain a minimum distance of 10 ft from the trunk of a whitebark pine tree.		During and post-implementation.			
BT-10 Rust-resistant whitebark pine seedlings would be be utilized in planting efforts. Change would be to would.					
BT-11 Buffers would be established around plants prior to implementation of prescribed fire if: • risk of invasion or spread of invasive plant species could not be mitigated through herbicide application or other means; • it can be demonstrated that the proposed activities would cause effects to rare plant populations beyond "May Impact Individuals and Habitat" and contribute to a need for listing under the ESA.	Forest Plan Standard, Forest Service Manual (FSM 2600, 2670) 2005, NEPA, National Forest Management Act (NFMA) 1976, Forest and Rangeland Renewable Resources Planning Act 1974, Region One Botany Survey and Analysis Protocol.	Project-wide. Implementation.	Not Applicable	FM-01 FM-02 FM-03 FM-04 FM-05 FM-06 FM-07	Not Applicable

Design Element	Ensures Compliance with	Applicable Area/Timing	Applicable Activity Cards: Vegetation Management	Applicable Activity Cards: Fuels Management	Applicable Activity Cards: Travel Management
Fisheries					
FI-1 The Inland Native Fish Strategy (INFISH) riparian habitat conservation area (RHCA) buffers (USDA Forest Service, 1995) that are applicable to this project are: • 300 feet on each side of fish-bearing streams • 150 feet on each side of perennial, non-fish bearing streams; • 100 feet on each side of intermittent streams; and • 50 feet on each side of wetlands smaller than 1 acre in area. A map of the RHCAs in the project area is available in the project file.	Forest Plan as amended by INFISH (1995).	All RHCAs in the project area. No timing restrictions.	VM-03 VM-05 VM-09	Not Applicable	
FI-2 RHCA boundaries would be designated and marked on the ground in consultation with the fisheries biologist or hydrologist and botanist if rare plant protections may apply.					
FI-3 The following activities would be prohibited in the RHCAs: • Timber harvest • Yarding of logs	INFISH standards TM-1a, TM-1b, and RF-2b				
FI-4 Log landings would be located outside of RHCAs. Exceptions may be granted for previously used landings or natural openings that are located within RHCAs. These sites would not be used for landings until field reviewed and approved by the fisheries biologist or hydrologist.	INFISH standard RF-2b				

Design Element	Ensures Compliance with	Applicable Area/Timing	Applicable Activity Cards: Vegetation Management	Applicable Activity Cards: Fuels Management	Applicable Activity Cards: Travel Management
FI-5 Ground-based equipment would not enter the RHCAs without prior approval of the fisheries biologist or hydrologist. In situations where existing roads cross RHCAs, ground-based equipment could drive on the roads without approval of the fisheries biologist or hydrologist.	Montana Streamside Management Zone Law (1994).				
FI-6 Ground-based equipment would be prohibited from entering streamside management zones (SMZ) without the appropriate variance from Montana Department of Natural Resources and Conservation (DNRC) (SMZ Rule #4).					
FI-7 In RHCAs, trees could be felled when they pose a safety risk. Felled hazard trees would be left on-site unless their removal is deemed necessary for safety reasons by the Timber Sale Administrator (TSA). If a felled safety tree in an RHCA falls across a road, the portion of the felled tree blocking the road would be cut up and rolled/thrown into the nearby RHCA. All portions of the felled tree not blocking the road would be left on site.	INFISH standard RA-2				
FI-8 If trees are felled outside of the RHCAs land or if they roll into the RHCAs, their boles may be removed, but the tops and limbs would be left behind in the RHCAs.	INFISH standards TM-1a and TM-1b				

Design Element	Ensures Compliance with	Applicable Area/Timing	Applicable Activity Cards: Vegetation Management	Applicable Activity Cards: Fuels Management	Applicable Activity Cards: Travel Management
FI-9 Generally, there would be no storing fuels, mixing of fuels, or refueling equipment in RHCAs. If there would be no alternatives, refueling in RHCAs may occur, but it must be pre-approved by the fisheries biologist or hydrologist, and have an approved spill containment plan. Small pumps (for example, Mark III) and chainsaws could be refueled within the RHCA as long as proper spill containment actions are implemented.	INFISH standard RA-4		VM-03 VM-05 VM-06 VM-09 VM-10 VM-13		
FI-10 There would be no manual thinning, piling of slash, or pile burning within 50 feet of streams and wetlands (SMZ Rule #5).	Programmatic Biological Assessment for Timber Stand Improvement (TSI) Program (1999) INFISH standard TM-1b		VM-06 VM-09 VM-10 VM-13		
FI-11 Log hauling would occur when roads are adequately frozen or dry. Hauling will cease during periods that are wet enough to produce movement of fines on the road surface. The Timber Sale Administrator (TSA) is responsible for determining when conditions are too wet to haul and they have the authority to suspend hauling during those times. The TSA or resource specialists would monitor road conditions during log hauling operations.	INFISH standards RF-2c(5) and RF-2d Road-Related Activities Biological Opinion (2015)	All haul roads in the project area. Hauling restricted to times when roads are adequately frozen or dry.	VM-7		

Design Element	Ensures Compliance with	Applicable Area/Timing	Applicable Activity Cards: Vegetation Management	Applicable Activity Cards: Fuels Management	Applicable Activity Cards: Travel Management
FI-12 Drainage from haul roads would be maintained during all hauling periods. This includes, but is not limited to, providing water access to ditches and inlets of ditch relief pipes, and ensuring that outlets are kept free of blockage. Holes in snow berms would be established during the first plowing and kept open throughout the duration of winter hauling.	INFISH standards RF-2c(3), RF- 2c(6), RF-2d(2), RF-2e, and RF-2f Road-Related Activities Biological Opinion (2015)	All haul roads in the project area. Applies at all times.			
FI-13 Project-related traffic (all types of vehicles, not just log trucks) would be regulated during wet periods to minimize erosion and sediment delivery to streams.	INFISH standards RF-2c(5) and RF-2d Road-Related Activities Biological Opinion (2015)				
FI- 14 Side-casting of road material (during road grading and snow plowing) in RHCAs is prohibited (SMZ Rule #8).	INFISH standard RF-2f Montana Streamside Management Zone Law (1994) Road-Related Activities Biological Opinion (2015)				
FI-15 Road maintenance activities (including snow plowing and dust abatement) would follow the minimization measures for each road activity type specified in the April 2015 Road-Related Activities Biological Opinion (USFWS 2015b).					
FI-16 If drafting from streams occurs, intake hoses would be fitted with a screen mesh equal to or smaller than 3/32 inch.	INFISH standard RA-5 Road-Related Activities Biological Opinion (2015)	All water drafting sites. Applies at all times.			

Design Element	Ensures Compliance with	Applicable Area/Timing	Applicable Activity Cards: Vegetation Management	Applicable Activity Cards: Fuels Management	Applicable Activity Cards: Travel Management
FI-17 Prior to entering the project area, equipment that has the potential to come into contact with water must be inspected, clean, and dry. Do not transfer water, sediment, or vegetation when moving between drafting sites. Operators would be encouraged to clean and dry their drafting equipment when moving between water sources and before the equipment comes in contact with water.	INFISH standard RA-5	All water drafting equipment. Applies at all times.			
FI-18 Roads used for log hauling would be brought up to current best management practices standards prior to hauling and would include addition or improvement of existing drivable dips, grading, and shaping roads. Special attention will be paid to eliminate or otherwise reduce the effect of ditches that drain into streams.	INFISH standards RF-1, RF-2c-f, RF-3a and RF-3b Road-Related Activities Biological Opinion (2015)	All haul roads in the project area. Best management practices must be installed prior to hauling.	VM-07		

Design Element	Ensures Compliance with	Applicable Area/Timing	Applicable Activity Cards: Vegetation Management	Applicable Activity Cards: Fuels Management	Applicable Activity Cards: Travel Management
FI-19 On reconditioned or reconstructed roads, the grading that occurs at stream crossings will: • Leave as much of the existing vegetation on the travelway as possible. • Avoid sidecasting road material within RHCAs (sidecasting is prohibited in RHCAs). • Install driveable dips on the uphill approach within 100-200 feet of the stream crossings to divert water and sediment from the travelway prior to the road entering the stream crossing area. The exact location of the dips will depend on individual site conditions such as road slope, presence of ditch in the road design, rock outcrops, and channel location. • Gravel stream crossings are on open roads. Addition of surface rock on Maintenance Level 1 and 2 roads at stream crossings would be dependent upon site conditions and consultation with engineering, fisheries, or hydrology.	INFISH standards RF-1, RF-2c-f, RF-3a and RF-3b Road-Related Activities Biological Opinion (2015)	Reconditioned or reconstructed roads. Applies at all times.	VM-12		

Design Element	Ensures Compliance with	Applicable Area/Timing	Applicable Activity Cards: Vegetation Management	Applicable Activity Cards: Fuels Management	Applicable Activity Cards: Travel Management
FI -20 Prior to any herbicide applications, aquatic specialists would complete and document toxicity calculations that show that the active ingredient applied will be of a LOWER CONCENTRATION than the 96-hour LC50 value divided by 25 (LC50/25) found in the literature for either rainbow trout or cutthroat trout, whichever is lowest. The LC50/25 is known as the “maximum acceptable toxicant concentration (MATC)”. Toxicity would be calculated at the subwatershed scale (e.g. Larry Creek, Smith Creek, Gash Creek, etc.), NOT the HUC 12 scale.	INFISH standard RA-3	Project-wide. Applies at all times.	VM-12		
FI-21 Herbicides would not be applied in RHCAs.	INFISH standard RA-3	All RHCAs in the project area Applies at all times.	VM-12		
FI-22 Only ground-based methods (backpack sprayers and/or vehicle-mounted sprayers) w=would be used to apply herbicides. Herbicides will be applied according to label directions.	INFISH standard RA-3	Project-wide always applies.	VM-12		
FI-23 Helicopter ignition would not occur in RHCAs. Fire would be allowed to back into and burn across the RHCAs.	INFISH standards FM-1 and FM- 4 Programmatic Biological Assessment / Evaluation for Prescribed Burning (2001)	All RHCAs in the project area. Applies at all times.	Not Applicable	FM-01 FM-02 FM-03 FM-04 FM-05 FM-06 FM-07 FM-08 FM-09 FM-10	Not Applicable
FI-24 Hand ignition would not occur within 50 feet of streams and wetlands (SMZ Rule #3). Fire would be allowed to back into and burn across the RHCAs.					

Design Element	Ensures Compliance with	Applicable Area/Timing	Applicable Activity Cards: Vegetation Management	Applicable Activity Cards: Fuels Management	Applicable Activity Cards: Travel Management
FI-25 If drafting from streams occurs, intake hoses would be fitted with a screen mesh equal to or smaller than 3/32 inch.	INFISH standard RA-5 Road-Related Activities Biological Opinion (2015)	All water drafting sites. Applies at all times.		FM-01 FM-02 FM-03 FM-04	TRM-03
FI-26 Prior to entering the project area, equipment that has the potential to come into contact with water must be inspected, cleaned, and dried. Do not transfer water, sediment, or vegetation when moving between drafting sites. Operators would be encouraged to clean and dry their drafting equipment when moving between water sources and before the equipment comes in contact with water.	INFISH standard RA-5	All water drafting equipment. Applies at all times.		FM-01 FM-02 FM-03 FM-04 FM-05 FM-06 FM-07 FM-08 FM-09 FM-10	TRM-03
FI-27 There would be no manual thinning, piling of slash, or pile burning within 50 feet of streams and wetlands (SMZ Rule #5).	Programmatic Biological Assessment for Timber Stand Improvement Program (1999). INFISH standard TM-1b.	All RHCAs in the project area. Applies at all times.		FM-05 FM-06 FM-07 FM-08	Not Applicable
FI-28 Ground-based equipment would not enter the RHCAs without prior approval from the fisheries biologist or hydrologist. In situations where existing roads cross RHCAs, ground-based equipment could drive on the roads without approval of the fisheries biologist or hydrologist.	Montana Streamside Management Zone Law (1994).			FM-06 FM-07 FM-08 FM-09 FM-10	
FI-29 Ground-based equipment would be prohibited from entering SMZs without the appropriate variance from Montana DNRC (SMZ Rule #4).					

Design Element	Ensures Compliance with	Applicable Area/Timing	Applicable Activity Cards: Vegetation Management	Applicable Activity Cards: Fuels Management	Applicable Activity Cards: Travel Management
FI-30 Generally, hand fireline would not be dug in the RHCAs. If needed, hand fireline can be dug in the RHCAs and must 1) avoid wetlands, 2) contain proper drainage structures, and 3) be recontoured and covered with slash upon completion of the burn. Machine fireline is prohibited in RHCAs. Allowing prescribed fire to back into RHCAs and wetlands negates the need for firelines near these areas.	INFISH standards FM-1 and FM- 4. Programmatic Biological Assessment / Evaluation for Prescribed Burning (2001).			FM-07	
FI-29 Avoid constructing specified roads in RHCAs. Where avoidance is not possible, minimize the length of new specified road in RHCAs to the shortest extent possible. There would be no new crossings on fish-bearing streams.	INFISH standard RF-2b		Not Applicable		TRM-01
FI-30 Temporary roads would not be built in RHCAs. Where road prisms already exist in RHCAs (such as undetermined roads), and there are culverts at the stream crossings, those prisms may be used for temporary roads as long as dirt is not side-casted within the RHCA.	INFISH standard RF-2b				TRM-02

Design Element	Ensures Compliance with	Applicable Area/Timing	Applicable Activity Cards: Vegetation Management	Applicable Activity Cards: Fuels Management	Applicable Activity Cards: Travel Management
FI-31 There would be no side-casting of soils in RHCAs. This prohibition applies to all types of road (including temporary) and trail (including tracked line machine [TLM]) construction activities. Side-casting of road material in RHCAs is prohibited (SMZ Rule #8). All new road and trail segments constructed in RHCAs must employ full bench construction with no side-casting.	INFISH standard RF-2f Montana Streamside Management Zone Law (1994) Road-Related Activities Biological Opinion (2015)				TRM-01 TRM-02
FI-32 Recontoured and decompacted roads and trails would be seeded, fertilized, and slashed. Weed-free straw mulch is required on sites located within 300 feet of streams.	INFISH standard RF-3c. WR-1 Road-Related Activities Biological Opinion (2015).	All temporary roads, recontoured roads, decompacted roads, and TLM trails. No timing restrictions.			TRM-02 TRM-04 TRM-05 TRM-08
FI-33 Road maintenance activities (including snow plowing and dust abatement) would follow the minimization measures for each road activity type specified in the April 2015 Road-Related Activities Biological Opinion (USFWS 2015b).	INFISH standard RF-2f. Montana Streamside Management Zone Law (1994). Road-Related Activities Biological Opinion (2015).	All roads in the project area. Applies at all times.			TRM-03
FI-34 Side-casting of road material (during road grading and snow plowing) in RHCAs is prohibited (SMZ Rule #8).		All roads in the project area. Applies at all times.			TRM-03
FI-35 Where culverts with flowing water would be removed, a straw bale check dam would be installed below the outlet prior to removing the culvert.	INFISH standard WR-1 Road-Related Activities Biological Opinion (2015)	All culvert removal sites with flowing water. Applies at all times.			TRM-04 TRM-05

Design Element	Ensures Compliance with	Applicable Area/Timing	Applicable Activity Cards: Vegetation Management	Applicable Activity Cards: Fuels Management	Applicable Activity Cards: Travel Management
Fuels					
FU-1 Slash disposal would be accomplished through a combination of related fuels management activities. Site specific slash treatment plans based on existing and desired future conditions would be developed and incorporated into implementation planning and contracts prior to award.	Forest Plan Standards. Forest Service Handbook 2409.19	All vegetation management activities that produce slash. Prior to award and implementation.	VM-03 VM-05 VM-06 VM-07 VM-09 VM-10 VM-13	Not Applicable	TRM-03
FU-2 Prescribed burning would take place under the guidelines set forth in an approved prescribed fire burn plan that meets the requirements of the Interagency Prescribed Fire Implementation Guide and objectives of the silvicultural prescription.	Interagency Prescribed Fire Im-plementation Guide. PMS 484, Interagency Standards for Fire and Fire Aviation Operations (Red Book), Forest Service Manual 5140, Decision Document	All prescribed fire activities within the project area. No timing restrictions.	Not Applicable	FM-01 FM-02 FM-03 FM-04 FM-05 FM-06 FM-07 FM-08 FM-09 FM-10	Not Applicable
FU-3 Prescribed burning would be implemented in full compliance with the Montana Department of Environmental Quality (DEQ) air quality program through coordination with the Montana/Idaho Airshed Group.	Clean Air Act MTDEQ Major Open Burn Permit Decision Document	All prescribed fire activities within the project area. Prior to ignition.			

<table>
<tr><th>Design Element</th><th>Ensures Compliance with</th><th>Applicable Area/Timing</th><th>Applicable Activity Cards: Vegetation Management</th><th>Applicable Activity Cards: Fuels Management</th><th>Applicable Activity Cards: Travel Management</th></tr>
<tr><td colspan="6">Heritage</td></tr>
<tr><td>HR-1 Avoid adverse effects to Historic Properties.</td><td>NHPA</td><td>Project-wide / Prior to implementation</td><td rowspan="3">VM-03
VM-05
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VM-15</td><td rowspan="3">FM-01
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FM-10</td><td rowspan="3">TRM-01
TRM-02
TRM-03
TRM-04
TRM-05
TRM-08</td></tr>
<tr><td>HR-2 Cease activities in areas where a post-review or inadvertent discovery of a heritage resource occurs.</td><td>NHPA, NAGPRA, and Inadvertent Discovery Protocol</td><td>Project-wide/During implementation</td></tr>
<tr><td>HR-3 Avoid impacts to religious sites and American Indian Religious Sites.</td><td>AIRFA and Executive Order 13007</td><td>Project-wide/Consultation prior to implementation and mitigations placed during implementation</td></tr>
<tr><td colspan="6">Invasive Plants (Noxious Weeds)</td></tr>
<tr><td>NX-1 A qualified botanist or weed specialist will conduct a site-specific risk assessment to determine the presence of invasive species.</td><td rowspan="3">Executive Order 13112 (1999). Forest Service Manual (FSM) 2900. 2019 Montana Noxious Weed List. Montana Department of Agriculture.</td><td>Project-wide/ prior to treatment</td><td>VM-03
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VM-14</td><td rowspan="3">FM-01
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FM-10</td><td rowspan="3">TRM-01
TRM-02
TRM-03
TRM-04
TRM-05
TRM-08</td></tr>
<tr><td>NX-2 Treat high-risk invasive species (Priority 1A, 1B, and 2A Montana Listed Noxious Weeds) prior to project implementation.</td><td>Project-wide/ prior to treatment</td><td rowspan="2">VM-03

VM-05
VM-06
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VM-10
VM-13</td></tr>
<tr><td>NX-3 Avoid areas with infestations of Priority 1A, 1B, and 2A Montana Listed Noxious Weeds.</td><td>Project-wide</td></tr>
</table>

Design Element	Ensures Compliance with	Applicable Area/Timing	Applicable Activity Cards: Vegetation Management	Applicable Activity Cards: Fuels Management	Applicable Activity Cards: Travel Management
NX-4 Remove all mud, dirt, seed and plant parts from all equipment before moving into the project area. Cleaning must occur off Forest lands (this does not apply to service vehicles that would stay on the roadway, traveling frequently in and out of the project area).		Project-wide/ prior to and during treatment	VM-03 VM-05 VM-06 VM-07 VM-08 VM-09 VM-10 VM-11 VM-12 VM-13 VM-14		
NX-5 Regularly inspect, remove, and properly dispose of weed seed and plant parts found on clothing and equipment.		Project-wide/ prior to and during treatment			
NX-6 In order to minimize invasive species establishment and spread, reestablish vegetation on bare ground exceeding 100 square feet caused by implementation disturbance. Utilize a Forest approved, "blue- tag" certified weed-free native species seed mix for revegetation purposes. Shrub planting may also be used as a revegetation technique. Contact the botanist/native plant coordinator for local seeding guidelines, seed sources, for detailed procedures, and appropriate mixes. Seeding should occur in spring and fall. Preserve adjacent vegetation and local native seed sources (adjacent soil, soil and native species on surface of proposed ground disturbance, etc.) as much as feasible. Consult with the Forest native plants coordinator or the botanist if changes to the seed mix are necessary due to supply or site conditions. Do not include restricted species (FSM 2070 and Region One	Forest Service Manual (FSM 2070) 2008; Native plant materials policy: A strategic Framework 2012; Northern Region Native Plant Handbook 1995; Region One use of Vegetative Materials on National Forests 1993; Region One native Plant Materials Program Strategy Plan 2012; Region One Do Not Use List 2014; National Seed Strategy 2015.	Project-wide. During and post implementation.	VM-03 VM-05 VM-06 VM-09 VM-10 VM-13		

Design Element	Ensures Compliance with	Applicable Area/Timing	Applicable Activity Cards: Vegetation Management	Applicable Activity Cards: Fuels Management	Applicable Activity Cards: Travel Management
Do Not Use List). Monitor the site to ensure proper establishment of native species.					
NX-7 Minimize the creation of sites suitable for weed establishment. Soil disturbance should be minimized to meet project objectives.		Project-wide		FM-06 FM-07 FM-08 FM-09 FM-10	
NX-8 Treat haul routes prior to and following completion of project implementation.	Executive Order 13112 (1999) Forest Service Manual (FSM) 2900	Project-wide/prior to & following treatment	VM-07	Not Applicable	Not Applicable
NX-9 All gravel sources would be clean and free of weed seed.	Executive Order 13112 (1999) Forest Service Manual (FSM) 2900	Project-wide/prior to treatment	Not Applicable		TRM-01 TRM-02 TRM-03
NX-10 Treat weed infested roads that are accessible to spray equipment prior to decommissioning.	Executive Order 13112 (1999) Forest Service Manual (FSM) 2900	Project-wide/ prior to & following completion of treatment			TRM-04
Recreation Resources					
RR-1 Protect all signs and recreation infrastructure along roads and within campgrounds. Recreation facilities would be marked on the ground and the contract map.		Developed recreation sites Pre-Implementation and during implementation.	VM-03 VM-05 VM-06 VM-09 VM-10	FM-01 FM-02 FM-03 FM-04 FM-05 FM-06 FM-08 FM-09	Not Applicable
RR-2 Close roads/areas, as necessary, for public safety during active harvest operations and log hauling; place closure devices and signs on roads and trails, as needed, to inform the public and protect the public by restricting access into the area. Refer to closure design feature in the Public Health and Safety section of this table.		Developed recreation sites or other areas of high recreational use.	VM-03 VM-05 VM-06 VM-07 VM-09	FM-06 FM-07	

Design Element	Ensures Compliance with	Applicable Area/Timing	Applicable Activity Cards: Vegetation Management	Applicable Activity Cards: Fuels Management	Applicable Activity Cards: Travel Management
RR-3 Develop timing of project activities, when practical, that are in or near high use developed recreation sites or rental facilities, or along roads that access high use recreation sites, to reduce disruptions of public use and reduce potential site closures during seasons of high use. If project activity occurs in or near high use recreation sites during high use seasons, then work with recreation staff on best methods to inform the public in advance of activities and determine best mitigations for public safety.		Developed recreation sites or other areas of high recreational use.	VM-03 VM-05 VM-06 VM-09	FM-01 FM-02 FM-03 FM-04 FM-08 FM-09	TRM-03
RR-4 To control unauthorized vehicluar travel, use signage, slash, downed logs, earthen humps or berms, or boulders as well as increased Forest presence in the area.		Adjacent to motor vehicle use map (MVUM) authorized vehicle routes and Forest boundaries.		FM-06 FM-07	Not Applicable
RR-5 Official Forest system trails would be marked on the ground and the contract map for protection. All trees or posts with trail signs or related information shall remain in place or be replaced in-kind. Where feasible, use existing Forest system trails for skidding and temporary road, to avoid new skid trails running parallel to existing recreational trails. When skid trails must cross Forest system trails, they would do so at a right angle whenever possible. All Forest system trails and their constructed features in the project area would be maintained, restored, or		Forest Service System Trails		FM-01 FM-02 FM-03 FM-04 FM-05 FM-06 FM-08 FM-09	

Design Element	Ensures Compliance with	Applicable Area/Timing	Applicable Activity Cards: Vegetation Management	Applicable Activity Cards: Fuels Management	Applicable Activity Cards: Travel Management
replaced in-kind to their original design according to the USDA Forest Service Standard Trail Plans and Specifications.					
RR-6 Unauthorized OHV trails may be obliterated and rehabilitated by: sub-soiling, seeding, fertilizing, and covering with slash. If illegal off-highway vehicle (OHV) trails are used for skidding operations, contractor would be required to perform erosion control rehabilitation, as described in the water quality and fisheries design features. Contractor will not be required to sub-soil.	Travel Plan	Project-wide		Not Applicable	
RR-7 Develop silvicultural prescriptions unique to the specific recreation site to maintain and enhance vegetation that provides privacy screening between sites and roads and provides shade.		Developed recreation sites			
RR-8 If work occurs adjacent to developed recreation sites, pile slash, burn piles, chip, or mastication.		Developed recreation sites	VM-06 VM-09 VM-10	FM-06 FM-07 FM-08 FM-09 FM-10	
RR-9 Log hauling may be restricted on weekends or Federal holidays.		Haul routes near high-use recreation areas	VM-07	Not Applicable	
RR-10 Use existing FS system trails as a fireline instead of constructing a new fire line close to a trail. Rehabilitate fireline if fireline takes off of a Forest system trail. If any timber structures are present on a trail that would be used as a fireline,		FS System Trails	Not Applicable	FM-06 FM-07	

Design Element	Ensures Compliance with	Applicable Area/Timing	Applicable Activity Cards: Vegetation Management	Applicable Activity Cards: Fuels Management	Applicable Activity Cards: Travel Management
clear woody debris and vegetation 24 inches away from the structure.					
RR-11 Evenly disperse chips downhill side of Forest system trail		FS System Trails		FM-10	
RR-12 Use signage, slash, downed logs, earthen humps or berms, boulders, or other physical barriers at the entrance of the decommissioned temporary road.		On temporary roads that can be accessed via Forest system roads/trails that are open to motorized use.	Not Applicable		TRM-02
RR-13 Where feasible, use existing Forest system trails for skidding and temporary road, to avoid new skid trails running parallel to existing recreational trails. When skid trails must cross NF system trails, they will do so at a right angle whenever possible.		In areas that contain FS system trails.			TRM-02
RR-14 All Forest system trails and their constructed features in the project area would be maintained, restored, or replaced in-kind to their original design according to the USDA Forest Service Standard Trail Plans and Specifications.		In areas that contain FS system trails.	VM-03 VM-05 VM-06 VM-07	FM-01 FM-02 FM-03 FM-04 FM-05 FM-06 FM-07 FM-08 FM-09 FM-10	TRM-02
RR-15 Maintain a footprint to accommodate historical nonmotorized recreational use of the road where feasible to do so while still meeting the decommissioning objectives to reduce adverse environmental effects.		On roads that have historical non-motorized recreational use or on roads that could create new non-motorized recreation opportunities	Not Applicable		TRM-04

Design Element	Ensures Compliance with	Applicable Area/Timing	Applicable Activity Cards: Vegetation Management	Applicable Activity Cards: Fuels Management	Applicable Activity Cards: Travel Management
Scenery Resources					
SR-1 Ensure visual quality objective (VQO) would be met or exceeded. To the extent possible: mimic and borrow natural topographic and vegetation forms, lines, textures, colors, and use changes in these features for boundaries.	Forest Plan Forest-wide Goal #4 Forest Plan MA1 (b1) Forest Plan MA1 (b2) Forest Plan MA2 (b1) Forest Plan MA3a (b1)	In MA 1 if area is within 300 feet of a major fishing stream, trail, or road. In MA 1 or 2 if area is visible from an identified high concern level viewing platform (see visibility model output) and it is isolated from other treatments. In MA 3a.	VM-03 VM-05 VM-06 VM-09 VM-10	FM-01 FM-02 FM-03 FM-04 FM-06 FM-07 FM-09	Not Applicable
SR-2 Ensure VQO would be met or exceeded. To the extent possible, vary leave tree clumping size, shape, and distribution.	Forest Plan Forest-wide Goal #4 Forest Plan MA3a (b1)	In MA 3a and 3c.		Not Applicable	
SR-3 Ensure VQO would be met or exceeded. Create a gradient and feathered edge along boundaries with nontreatment edges. Fire may be used to create feathered edges.	Forest Plan Forest-wide Goal #4 Forest Plan MA3a (b1)	In MA 3a and 3c if area is visible from an identified high concern level viewing platform (see visibility model output).		FM-01 FM-02 FM-03 FM-04	
SR-4 Ensure VQO would be met or exceeded. Use harvest tree marking or harvest by species. If leaf tree marking is required use black paint to mask visible markings post implementation.	Forest Plan Forest-wide Goal #4 Forest Plan MA3a (b1)	In MA 3a and 3c if area is visible from and within 100 feet of an identified high concern level viewing platform (see visibility model output).		Not Applicable	
SR-5 Ensure VQO would be met or exceeded. If linear feature is parallel to topography and slope, vary leaf trees downslope of the feature to screen and vary appearance. Avoid construction of a linear feature bisecting topography and slope. If it must bisect, do so for the shortest distance possible and vary leaf trees around it.	Forest Plan Forest-wide Goal #4 Forest Plan MA3a (b1)	In MA 3a and 3c if area is visible from an identified high concern level viewing platform (see visibility model output) and activity includes construction of fuel break or fire line.	VM-03 VM-09 VM-10	FM-01 FM-02 FM-03 FM-04 FM-06 FM-07	TRM-02 TRM-03 TRM-04

Design Element	Ensures Compliance with	Applicable Area/Timing	Applicable Activity Cards: Vegetation Management	Applicable Activity Cards: Fuels Management	Applicable Activity Cards: Travel Management
SR-6 Ensure VQO would be met or exceeded. Plant for artificial regeneration in a manner that mimics the natural vegetation pattern, texture, form, color, and scale	Forest Plan Forest-wide Goal #4 Forest Plan MA1 (b2) Forest Plan MA3a (b1)	Areas where artificial regeneration would be proposed in either MA1 and within 300 feet of a major fishing stream, trail or road, or in MA3a.	VM-03 VM-05 VM-06 VM-09 VM-10	Not Applicable	
SR-7 Ensure VQO would be met or exceeded. Consult with a landscape architect for design features. Landscape architect would complete pre-implementation fieldwork and surveys based on activity and visibility.	Forest Plan Forest-wide Goal #4 Forest Plan MA5 (b1) Forest Plan MA8a (b1)	MA5 and MA 8a if adjacent MA is MA5.	VM-10 VM-13		
SR-8 Ensure VQO would be met or exceeded. Consult with a landscape architect for design features because the existing condition and scenic character of the area may have changed.	Forest Plan Forest-wide Goal #4 Forest Plan MA1 (b2) Forest Plan MA3a (b1)	Areas where a natural ignition fire has occurred within the previous fifteen years and overlaps the proposed activities in space and it is in either in MA1 and within 300 feet of a major fishing stream, trail or road, or in MA3a and 3c.	VM-03 VM-05 VM-09 VM-10		
SR-9 Ensure VQO would be met or exceeded. Consult with a landscape architect for design features because the concern level-based visibility may have changed.	Forest Plan Forest-wide Goal #4 Forest Plan MA1 (b1) Forest Plan MA1 (b2) Forest Plan MA2 (b1) Forest Plan MA3a (b1)	Areas where a trail has been built within 0.5 mile of the proposed activities, and it is in MA1, MA2, MA3a, and MA3c.	VM-03 VM-05 VM-06 VM-09 VM-10		
SR-10 Ensure VQO would be met or exceeded. Consult with a landscape architect for design features because monitoring may indicate the need to change to design features.	Forest Plan Forest-wide Goal #4 Forest Plan MA1 (b2) Forest Plan MA3a (b1)	Areas where vegetation activities have occurred within the previous ten years or are adjacent to an area where entry has occurred within the previous 10 years and is in either MA1 and within 300 feet of a major fishing stream, trail or road, or in MA3a and MA3c.			

Design Element	Ensures Compliance with	Applicable Area/Timing	Applicable Activity Cards: Vegetation Management	Applicable Activity Cards: Fuels Management	Applicable Activity Cards: Travel Management
SR-11 Ensure VQO would be met or exceeded. Reduce skyline corridor width and vary distance between corridors. Many narrow corridors are preferable to a few wide ones.	Forest Plan Forest-wide Goal #4 Forest Plan MA3a (b1)	In MA 3a and 3c if area is visible from an identified high concern level viewing platform (see visibility model output) and it is an intermediate-like harvest an aerial based logging system for harvesting.	VM-03 VM-05 VM-09 VM-10		
SR-12 Ensure VQO would be met or exceeded. If lop and scatter is applied, disperse material to reduce discernible material build-up in a manner that mimics the natural vegetation death and decay pattern, texture, form, and scale.	Forest Plan Forest-wide Goal #4 Forest Plan MA3a (b1)	In MA 3a and 3c if area is visible from and within 100 feet of an identified high concern level viewing platform (see visibility model output).	VM-06 VM-09 VM-10		
SR-13 Ensure VQO would be met or exceeded. Create a gradient and feathered edge along boundaries with nontreatment edges. Fire may be used to create feathered edges.	Forest Plan Forest-wide Goal #4 Forest Plan MA3a (b1)	In MA 3a and 3c if area is visible from an identified high concern level viewing platform (see visibility model output).	Not Applicable	FM-01 FM-02 FM-03 FM-04 FM-06 FM-07	Not Applicable
SR-14 Ensure VQO would be met or exceeded. Consult with a landscape architect for design features because the concern level-based visibility may have changed.	Forest Plan Forest-wide Goal #4 Forest Plan MA1 (b1) Forest Plan MA1 (b2) Forest Plan MA3a (b1)	Areas where a trail has been built within 0.5 mile of the proposed activities, and it is in MA1, MA3a, or MA3c.		FM-01 FM-02 FM-03 FM-04 FM-05 FM-06 FM-07 FM-08 FM-09 FM-10	
SR-15 Ensure VQO is met or exceeded. Burn piles completely or scatter material that does not fully burn.	Forest Plan Forest-wide Goal #4 Forest Plan MA3a (b1)	In MA 3a and 3c if area is visible from and within 100 feet of an identified high concern level viewing platform (see visibility model output).		FM-05 FM-08	

Design Element	Ensures Compliance with	Applicable Area/Timing	Applicable Activity Cards: Vegetation Management	Applicable Activity Cards: Fuels Management	Applicable Activity Cards: Travel Management
SR-16 Ensure VQO would be met or exceeded. To the extent possible, reuse existing open areas or previous landing/piling locations. If not possible, then locate landings/piling locations more than 100 feet from viewing platform, or fully remove all material within 100 feet of viewing platform within one growing season.	Forest Plan Forest-wide Goal #4 Forest Plan MA1 (b1) Forest Plan MA1 (b2) Forest Plan MA3a (b1)	In MA 3a and 3c if area is visible from and within 100 feet of an identified high concern level viewing platform (see visibility model output).			
SR-17 Ensure VQO is met or exceeded. To the extent possible, vary leaf tree clumping size, shape, and distribution.	Forest Plan Forest-wide Goal #4 Forest Plan MA3a (b1)	In MA 3a and 3c if area is visible from an identified high concern level viewing platform (see visibility model output).		FM-06 FM-09	
SR-18 Ensure VQO would be met or exceeded. Use harvest tree marking or harvest by species. If leave tree marking is required, use black paint to mask visible markings post implementation.	Forest Plan Forest-wide Goal #4 Forest Plan MA3a (b1)	In MA 3a and 3c if area is visible from and within 100 feet of an identified high concern level viewing platform (see visibility model output).			
SR-19 Ensure VQO would be met or exceeded. Disperse or remove chipped material to reduce discernible material build-up in a manner that mimics the: natural vegetation death and decay pattern, texture, form, and scale.	Forest Plan Forest-wide Goal #4 Forest Plan MA3a (b1)	In MA 3a and 3c if area is visible from and within 100 feet of an identified high concern level viewing platform (see visibility model output).			
SR-20 Ensure VQO would be met or exceeded. If linear feature is parallel to topography and slope, vary leaf trees downslope of the feature to screen and vary appearance. Avoid construction of a linear feature bisecting topography and slope. If it must bisect, do so for the shortest distance possible and vary leaf trees around it.	Forest Plan Forest-wide Goal #4 Forest Plan MA3a (b1)	In MA 3a and 3c if area is visible from an identified high concern level viewing platform (see visibility model output).	Not Applicable		TRM-01 TRM-02 TRM-03

Design Element	Ensures Compliance with	Applicable Area/Timing	Applicable Activity Cards: Vegetation Management	Applicable Activity Cards: Fuels Management	Applicable Activity Cards: Travel Management
SR-21 Ensure VQO would be met or exceeded. To the extent possible, mimic and borrow natural topographic forms, lines, textures, and colors.	Forest Plan Forest-wide Goal #4 Forest Plan MA1 (b1) Forest Plan MA1 (b2) Forest Plan MA3a (b1)	In MA 1 if area is within 300 feet of a major fishing stream, trail, or road. In MA 3a if area is visible from an identified high concern level viewing platform (see visibility model output).			TRM-01 TRM-02 TRM-03
SR-22 Ensure VQO would be met or exceeded. Consult with a landscape architect for design features. Landscape architect may need to complete pre-implementation fieldwork and surveys based on activity and visibility.	Forest Plan Forest-wide Goal #4 Forest Plan MA3a (b1) Forest Plan MA5 (b1) Forest Plan MA8a (b1)	In MA 3a and 3c if area is visible from an identified high concern level viewing platform (see visibility model output). MA5 MA8a if adjacent to MA5 or to MA3a and it is visible from an identified high concern level viewing platform (see visibility model output).			TRM-01 TRM-02 TRM-04 TRM-05
Silviculture					
SI-1 Minimize the spread of Annosus root disease. • Apply borate compound to freshly cut ponderosa pine stumps greater than 12 inches diameter (inside bark). • Powder borate shall be applied within 24 hours and liquid borate shall be applied within 72 hours. • Minimize damage to residual trees during harvest operations.	Forest Health and Protection pathologist recommendations based on past local studies and project trip reports.	Ponderosa pine stumps larger than 12” diameter within 24-72 hours of cutting.	VM-03 VM-05 VM-06 VM-09 VM-15	FM-06 FM-09	Not Applicable
SI-2 Minimize the risk of pine engraver beetle (Ips pini) population increases. Consider limiting vegetation management activities in ponderosa pine and lodgepole pine from October through June. If this is not feasible,	Forest Health and Protection entomologist recommendations based on past local projects and trip reports.	Project-wide for slash creating activities October through June.	VM-03 VM-05 VM-06 VM-09 VM-10 VM-15	FM-06 FM-08	

Design Element	Ensures Compliance with	Applicable Area/Timing	Applicable Activity Cards: Vegetation Management	Applicable Activity Cards: Fuels Management	Applicable Activity Cards: Travel Management
the following requirements would be applied: *Commercial Harvest*: • Pile slash in large-sized pile to provide suitable host material in the center of the pile to lure Ips beetles deeper into the pile. Ideally, piles should be at least 10 x 10 x 20 feet in height, width, and length. Where feasible, fresh slash and logs would be located several yards away from living host trees. *Non-commercial Harvest*: • Green slash exceeding 3 inches in diameter would be lopped into 4-6 foot lengths and scattered in areas with direct exposure to sunlight. Where feasible, fresh slash and logs would be located several yards away from living host trees. • Should small piles be constructed October through June, any infested material shall be burned, chipped, or otherwise destroyed prior to beetle emergence in early July. • Surveys of host material prior to July can indicate the risk of tree mortality or top-kill to residual stems within the treatment unit. In high-risk areas where Ips mitigation options are limited, mass trapping of Ips with pheromone lures and Lindgren					

Design Element	Ensures Compliance with	Applicable Area/Timing	Applicable Activity Cards: Vegetation Management	Applicable Activity Cards: Fuels Management	Applicable Activity Cards: Travel Management
funnel traps may also reduce Ips-related damage to residual stems.					
SI-3 Maintain old growth stand characteristics, as defined by Green et al. 1992, errata corrected 2011. *Stand Diagnosis*: Determine stand level old growth status in potential treatment units, during the implementation phase, through the collection of old growth stand characteristics via Stand Diagnosis, R1 Walk Through Survey, or R1 Common Stand Exam protocols. *Silvicultural Prescription*: A silvicultural prescription would be written to prescribe the vegetation treatment(s) appropriate for the site-specific stand conditions. Commercial harvest treatments may take place within old growth stands as long as the resulting treatment maintains the old growth characteristic specific for the site. No treatment would take an old growth stand out of old growth status.	Green et al. 1992, errata corrected 2011 Site-specific Forest Plan Amendment for the Bitterroot Front	Project-wide for all commercial harvest treatments	VM-03 VM-05 VM-06 VM-09 VM-10 VM-15	FM-01 FM-02 FM-03 FM-04 FM-05 FM-06 FM-07 FM-08 FM-09 FM-10	
Soils					
SL-1 Reduce detrimental soil disturbance (DSD) and maintain soil productivity by using skid trails or access roads to the extent possible. Calculate existing DSD per the Soil Risk Evaluation Framework (SREF) developed for the Bitterroot Front project area and follow recommendations outlined within the Implementation Plan. Winter	Forest Service Region 1 Guidelines. Bitterroot National Forest Plan (1987). Forest Service Manual (FSM 2550).	Ground Based Yarding	VM-03 VM-05 VM-09 VM-15	Not Applicable	

<table>
<tr><th>Design Element</th><th>Ensures Compliance with</th><th>Applicable Area/Timing</th><th>Applicable Activity Cards: Vegetation Management</th><th>Applicable Activity Cards: Fuels Management</th><th>Applicable Activity Cards: Travel Management</th></tr>
<tr><td>operations could be utilized in the ground-based units if the following conditions are met: snow depth, distribution, and air temperatiures must be such that ground -based operations maintain the following combination of snow depth and frozen soil conditions:

<table>
<tr><th>Depth of Compacted Snow needed below equipment (Inches)</th><th>Minimum thickness of Frozen Soil under wheel or track tread (Inches)</th></tr>
<tr><td>10 or more</td><td>0</td></tr>
<tr><td>7 to 10</td><td>1</td></tr>
<tr><td>4 to 7</td><td>2</td></tr>
<tr><td>Less than 4</td><td>4</td></tr>
</table>
</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>SI-2 The following is a recommended practice to help attain winter logging conditions:
Pre-trailing- Pre-trailing selected skid trails a day or so prior to skidding or other heavy trail use is a way to achieve this objective. If average, pre-compacted snow depth along the proposed trail is more than 15 inches, pre-trailing could be done whether or not the soil is frozen. If pre-compacted snow depth is 8 to 15 inches; pre-trailing should be done only if the soil is solidly frozen in the top one inch or more. Otherwise, pre-trailing should be delayed until more</td><td></td><td></td><td></td><td></td><td></td></tr>
</table>

Design Element	Ensures Compliance with	Applicable Area/Timing	Applicable Activity Cards: Vegetation Management	Applicable Activity Cards: Fuels Management	Applicable Activity Cards: Travel Management
snow falls to accumulate to the 15 inch or more depth. To further aid soil protection, pre-trailing should be done using an "easy-does-it" approach, including slow ground speeds and steady movements. Avoid spinning tires and bouncing equipment around on trails as much as possible. Adequate pre-trailing air temperatures generally are in the low 20s Fahrenheit or lower. For more information about pre-trailing conditions, consult with the Forest soil scientist. Some proposed Ground-Based Yarding Units may have inclusions of slopes that exceed 40 percent gradient. Forest Plan standards do not allow ground-based yarding equipment on slopes exceeding 40 percent. Directional felling, ground lead, or alternative methods of yarding would be required to remove trees from steep slope inclusions. Ground-based commercial yarding units less than 15 acres, in general, landings internal to units should not exceed 0.1 acre (approximately 65 x 65 feet) to minimize DSD within these activity areas.					
SL-3 The silvicultural prescriptions would be designed to account for future large coarse woody debris (CWD) (larger than 15 inches diameter) recruitment that would meet acceptable levels in stands		Project-wide	VM-03 VM-05 VM-06 VM-09 VM-10		

Design Element	Ensures Compliance with	Applicable Area/Timing	Applicable Activity Cards: Vegetation Management	Applicable Activity Cards: Fuels Management	Applicable Activity Cards: Travel Management
where CWD is less than minimum levels before treatment. CWD would be left in these stands to the extent feasible to meet minimum requirements that do not pose a fuels hazard. (See CWD requirements outlined in the Implementation Plan.)					
SL-4 Activities would comply with best management practices (BMPs) to minimize effects to soil and water resources.		Ground Based Yarding. Project-wide.	VM-03 VM-05 VM-07 VM-09 VM-12 VM-15	FM-01 FM-02 FM-03 FM-04 FM-05 FM-06 FM-07 FM-08 FM-09 FM-10	TRM-01 TRM-02 TRM-03 TRM-04 TRM-05 TRM-08
SL-5 Ground disturbing activities would occur when soils are dry (test soil moisture by forming soil into a ball in your hand and lightly toss several times; if soil maintains ball shape, then moisture is too high for ground-based equipment; if soil crumbles, then moisture levels are low enough to allow ground-based equipment).		Ground Based Equipment. Project-wide.		FM-06 FM-07 FM-08 FM-09 FM-10	Not Applicable
SL-6 When feasible, allow time for nutrients to leach from slash prior to burning. The slash would be left through one winter after cutting to allow for initial decomposition and nutrient leaching.		Project-wide	VM-06 VM-10	FM-01 FM-02 FM-03 FM-04 FM-05	Not Applicable
SL-7 Calculate existing DSD per the SREF developed for the Bitterroot Front Project area and follow		Project-wide	VM-03 VM-05 VM-06	FM-01 FM-02 FM-03	

Design Element	Ensures Compliance with	Applicable Area/Timing	Applicable Activity Cards: Vegetation Management	Applicable Activity Cards: Fuels Management	Applicable Activity Cards: Travel Management
recommendations outlined within the Implementation Plan.			VM-09 VM-10 VM-15	FM-04 FM-05 FM-06 FM-07 FM-08 FM-09 FM-10	
SL-8 Reduce DSD and maintain soil productivity by using existing skid trails or access roads to the extent possible.		Equipment Use			
SL-9 CWD will be left in these stands to the extent feasible to meet minimum requirements that do not pose a fuels hazard. (See CWD requirements outlined in Implementation Plan.)		Project-wide			
SL-10 CWD larger than 15 inches in diameter would not be intentionally ignited during hand lighting. It is understood that once hand crews light the fire, fire may burn into and combust some large CWD.		Project-wide			
SL-11 Upon completion of prescribed fire or maintenance burning, at least 70 percent ground cover is necessary to prevent detrimental accelerated erosion and loss of soil productivity. In those cases where ground cover is less than 70 percent prior to burning, consumption and loss of ground cover should not exceed 15 percent. Ground cover includes: duff, organic soil horizons, tree basal area, fine woody debris, CWD, and surface coarse fragments. Fire prescriptions would be designed to meet these soil protection requirements.		Project-wide	Not Applicable	FM-01 FM-02 FM-03 FM-04 FM-05 FM-08 FM-09 FM-10	
SL-12 Prescribed fire of mixed severity, used to mimic patch and patterns naturally found on the		Project-wide	Not Applicable		

Design Element	Ensures Compliance with	Applicable Area/Timing	Applicable Activity Cards: Vegetation Management	Applicable Activity Cards: Fuels Management	Applicable Activity Cards: Travel Management
landscape within mixed severity fire regimes, may increase the amount of high severity soil effects in some locations. Sites identified with low soil resilience based on SREF analysis may require additional mitigation measures to ensure burn effects do not lead to greater than 15 percent cumulative DSD within units as outlined in the R1 soil quality standards. Coordination amongst soils, silviculture and fuels would occur during implementation planning.					
SL-13 Pile burning should occur during moist conditions to minimize duff consumption and high severity burn impacts on soils. Hand pile sizes, not associated with landings, would average 6-8 feet in diameter so localized areas of soil disturbance would be less than about 50 square feet. Where feasible, pile and burn slash where DSD already exists, such as on old log landings, skid trails, and roads associated with the past harvest units. By piling and burning thinning slash in areas where soil disturbance currently exists, no new areas of DSD would result from the proposed activities.		Project wide	Not Applicable	FM-05 FM-08	
SL-14 Rehabilitation activities of temporary roads, skid trails, and landings include recontouring cut and fill areas, slashing with readily available debris, and applying organic		Disturbed sites project-wide	Not Applicable		TRM-04

Design Element	Ensures Compliance with	Applicable Area/Timing	Applicable Activity Cards: Vegetation Management	Applicable Activity Cards: Fuels Management	Applicable Activity Cards: Travel Management
fertilizer and native plant seed. Use local seeding guidelines for detailed procedures and appropriate mixes. Refer to the Bitterroot National Forest Seed Mix and Fertilizer Specifications (FSM 2070.3)					
SL-15 Full bench construction would be required for sections of road on which the natural slope exceeds 60 percent. This applies to reconstruction of existing prisms as well as new construction. Sidecasting of material is prohibited.		Disturbed sites project-wide			TRM-01 TRM-02
SL-16 Construction activities that cause temporary ground disturbance would cover exposed soil with readily available debris, and application of organic fertilizer and native plant seed. Use local seeding guidelines for detailed procedures and appropriate mixes. Refer to the Bitterroot National Forest Seed Mix and Fertilizer Specifications (FSM 2070.3)		Disturbed sites project-wide			TRM-01 TRM-02 TRM-04
SL-17 Rehabilitation activities that cause temporary ground disturbance would cover exposed soil with readily available debris, application of organic fertilizer, and native plant seed. Use local seeding guidelines for detailed procedures and appropriate mixes. (Refer to the Bitterroot National Forest Seed Mix and Fertilizer Specifications (FSM 2070.3))		Disturbed sites project-wide			TRM-03 TRM-04 TRM-05 TRM-08

Design Element	Ensures Compliance with	Applicable Area/Timing	Applicable Activity Cards: Vegetation Management	Applicable Activity Cards: Fuels Management	Applicable Activity Cards: Travel Management
Watersheds					
WR-1 Equivalent Clearcut Area (ECA) (surrogate for water yield) should remain under the 20 percent threshold at the 6th code hydrologic unit or smaller. Research shows that below this level measurable increases in water yield are not observed (Stednick 1996, Hibbert 1979, Folliott and Brooks 1988, Bosch and Hewlett, 1992, MacDonald and Stednick 2003).	Clean Water Act. Bitterroot Forest Plan Standards. Forest Service Region 1 Guidelines. Forest Service Manual 2250.	Areas that involve vegetation management or removal of canopy cover prior to finalizing treatments to ensure threshold is not exceeded.	VM-03 VM-05 VM-09 VM-10	FM-01 FM-02 FM-03 FM-04	Not Applicable
WR-2 In moderate to high ECA watersheds, additional site visits and analysis should occur to evaluate risk of water yield increases against channel conditions, and would follow the direction in Neesvig, 2020. **Moderate ECA** = 13-18% **High ECA** = >18%		Proposed treatment areas prior to finalization of treatment units.	VM-03 VM-05 VM-06 VM-09 VM-10	FM-02 FM-06	
WR-3 Apply best management practices to all activities that involve ground disturbance.		Project-wide during planning and implementation.	VM-03 VM-05 VM-06 VM-07 VM-09 VM-10	FM-06 FM-09	TRM-01 TRM-02 TRM-03 TRM-04 TRM-05
WR-4 All haul routes would be brought up to best management practices standards prior to use.		Haul roads prior to hauling	VM-07	Not Applicable	TRM-03
WR-5 On streams with sediment total maximum daily loads (TMDLs) (McClain, Bass, Sweathouse, and Lick Crk), look for opportunities to reduce sediment from Forest roads and ensure no additional sediment contributing points are created.	Clean Water Act	Roads in the McClain, Bass, Sweathouse, and Lick drainages. Applies at all times.	VM-08	Not Applicable	Not Applicable

<table>
<tr><th>Design Element</th><th>Ensures Compliance with</th><th>Applicable Area/Timing</th><th>Applicable Activity Cards: Vegetation Management</th><th>Applicable Activity Cards: Fuels Management</th><th>Applicable Activity Cards: Travel Management</th></tr>
<tr><td>WR-6 On roads where existing water bars were bladed out during maintenance or reconditioning, install water bars when completing final maintenance or closing the road, following the Waterbar Spacing Guide on page II-27 of the Forest Plan:
<table>
<tr><th rowspan="2">Gradient Percent Characteristic</th><th colspan="2">Waterbar Spacing (feet) Soil</th></tr>
<tr><th>Loam Soils</th><th>Sandy Loam Soils</th></tr>
<tr><td>1 to 6%
300 ft</td><td>400 ft</td><td>350 ft</td></tr>
<tr><td>7 to 9%
200 ft</td><td>300 ft</td><td>250 ft</td></tr>
<tr><td>10 to 14%
150 ft</td><td>200 ft</td><td>175 ft</td></tr>
</table></td><td>Clean Water Act. Bitterroot Forest Plan Standards.</td><td>Project-wide during final maintenance or when closing a road</td><td>VM-07</td><td>FM-01
FM-02
FM-03
FM-04
FM-05
FM-06
FM-07
FM-08
FM-09
FM-10</td><td>TRM-05</td></tr>
<tr><td>WR-7 Block or otherwise eliminate access routes into mastication/chipping units following use. Smooth out any ruts and revegetate, as needed.</td><td>Travel Plan</td><td>Equipment trails Immediately following use</td><td>Not Applicable</td><td>FM-09
FM-10</td><td>Not Applicable</td></tr>
<tr><td>WR-8 All new specified roads would meet current best management practices standards.</td><td>Clean Water Act</td><td>New specified roads during road package development and implementation</td><td rowspan="2">Not Applicable</td><td rowspan="2">Not Applicable</td><td>TRM-01</td></tr>
<tr><td>WR-9 Design crossings that eliminate long road segments draining into streams, and utilize dips or cross drains to minimize contributing segments of roads to drainages.</td><td>Forest Plan Standards</td><td>Project-wide
during design and implementation</td><td>TRM-01</td></tr>
</table>

Design Element	Ensures Compliance with	Applicable Area/Timing	Applicable Activity Cards: Vegetation Management	Applicable Activity Cards: Fuels Management	Applicable Activity Cards: Travel Management
WR-10 On reconditioned or reconstructed roads, the grading that occurs at stream crossings will: • Leave as much of the existing vegetation on the travelway as possible. • Sidecasting is prohibited in RHCAs. • Install driveable dips on the uphill approach within 100-200 feet of the stream crossings to divert water and sediment from the travelway prior to the road entering the stream crossing area. The exact location of the dips will depend on individual site conditions such as: road slope, presence of ditch in the road design, rock outcrops, and channel location. Sediment traps may be an alternative treatment where driveable dips are not feasible. • Addition of surface rock on Maintenance Level 1 and 2 roads at stream crossings would be dependent upon site conditions and consultation with engineering, fisheries, or hydrology.	Clean Water Act Forest Plan Standards	Reconditioned or reconstructed roads during reconditioning or reconstruction	VM-07	Not Applicable	TRM-03
WR-11 Coordinate with fuels and timber prior to storage or decommission roads to ensure there would be no access conflicts.	Project Implementation	Determine need for access prior to storage or decommissioning.	Not Applicable		TRM-04 TRM-05
WR-12 Where culverts would be removed from live streams, obtain necessary permits from the State and Conservation District. Permits may	Clean Water Act Forest Plan Standards	Project-wide. Apply for permits 60 days prior to planned implementation.			TRM-04 TRM-05

Design Element	Ensures Compliance with	Applicable Area/Timing	Applicable Activity Cards: Vegetation Management	Applicable Activity Cards: Fuels Management	Applicable Activity Cards: Travel Management
include Montana Stream Protection Act (SPA 124 Permit), Short-term Water Quality Standard for Turbidity (318 Authorization), Federal Clean Water Act (404 Permit).					
WR-13 Mulch stream crossings as soon as possible following removal of culvert. Seeding and fertilizing on other areas of decommissioned roads could occur as decommission work on road is completed.	Clean Water Act	Culvert removals or near stream bank disturbed areas. As soon as practical.			TRM-04 TRM-05
WR-14 Where stream crossing design includes fords, harden using rock, gravel, or geotextiles to stabilize soils and reduce sediment input to streams.	Clean Water Act Forest Plan Standards	Stream or wetland crossings during trail construction.			TRM-05
WR-15 Seed and fertilize disturbed areas associated with road storage or decommission.	Clean Water Act Forest Plan Standards	Subsoiled roads after treatment.			TRM-04 TRM-05 TRM-08
WR-16 Seed, fertilize and mulch bare soils, and disturbed areas within 300 feet of streams or wetlands or other areas with disturbed soils.	Clean Water Act Forest Plan Standards	Disturbed soils in or near RHCA's or greater than 100 square feet after treatment.			TRM-01
Wildlife					
WL-1 Protect signed trees identified with "Wildlife Tree" signs from cutting or other damage. Exceptions include compliance with the silvicultural prescription and trees that pose a safety hazard.	Forest-wide Management Standard II.F.1.e(3) and II.F.1.e(16) WL-2 and WL-3 are consistent with the project specific amendments.	All management areas. No timing restrictions.	VM-03 VM-05 VM-06 VM-09 VM-10 VM-15	FM-01 FM-02 FM-03 FM-04 FM-05 FM-06 FM-07 FM-09	TRM-01 TRM-02 TRM-03 TRM-04 TRM-05 TRM-08
WL-2 Provide CWD for wildlife habitat. Within each representative Fire Group, retain or recruit ranges of CWD as specified by soils requirements. Refer to the Fire				FM-01 FM-02 FM-03 FM-04 FM-08	TRM-04

Design Element	Ensures Compliance with	Applicable Area/Timing	Applicable Activity Cards: Vegetation Management	Applicable Activity Cards: Fuels Management	Applicable Activity Cards: Travel Management
Group/CWD table located below. Do not remove pre-existing non-merchantable down logs from cutting units. **Fire Group Type** — **Coarse Woody Debris** 1,2,4 — 5-10 Tons/Acre 5,6 — 10-20 Tons/Acre 7,8,9,10 — 8-24 Tons/Acre 11 — 20-30 Tons/Acre				FM-09 FM-10	
WL-3 To maintain snags (standing dead trees) over the long-term for wildlife habitat and ecosystem processes, vegetation management projects should retain at least on average: • Across the Warm Dry snag analysis group, retain an average of at least 4-6 snags per acre greater than 15 inches dbh (warm dry snag analysis group= Fire group 1, 2, 4, 5) • Across the Warm Moist snag analysis group, retain an average of at least 4-6 snags per acre greater than 15 inches dbh (Warm/moist snag analysis group= Fire group 6, 11) • Across the remaining snag analysis groups, retain an average of at least 8-10 largest available snags per acre (Fire groups 7, 8, 9, 10) Vegetation management activities should retain snags greater than 20				FM-01 FM-02 FM-03 FM-04 FM-05 FM-06 FM-07 FM-08 FM-09 FM-10	TRM-01 TRM-02

Design Element	Ensures Compliance with	Applicable Area/Timing	Applicable Activity Cards: Vegetation Management	Applicable Activity Cards: Fuels Management	Applicable Activity Cards: Travel Management
inches DBH and at least the minimum number of snags and live trees (for future snags) that are displayed above. Where snag numbers for trees greater than 20 inches dbh do not exist to meet the recommended ranges, the difference would be made up with live replacement trees for future recruitment. Exceptions occur for issues such as human safety and instances where the minimum numbers are not present prior to the management activities. Snags felled for operational safety in harvest units shall be left onsite. Where vegetation management activities occur and snags (or live trees for future snags) are retained, the following direction should be followed: • Group snags where possible, such that in some areas the density of snags greater than 20 inches dbh may reach 5-10 snags/acre • Retain snags far enough away from roads or other areas open to public access to reduce the potential for removal (generally more than 150 feet); • Emphasize retention of the largest snags and live trees as well as those species that tend to be the most persistent, such as ponderosa pine, western larch, and Douglas-fir;					

Design Element	Ensures Compliance with	Applicable Area/Timing	Applicable Activity Cards: Vegetation Management	Applicable Activity Cards: Fuels Management	Applicable Activity Cards: Travel Management
• Favor snags or live trees with existing cavities or evidence of use by woodpeckers or other wildlife.					
WL-4 Minimize the chance of bear habituation. Food and garbage associated with project activities must be stored in a vehicle or other bear-proof container.	Forest Wide Management Goal II.B.7 Forest-wide Management Objective II.C.d(2)	All management areas. Applicable from February 15-December 1.	VM-03 VM-05 VM-06 VM-07 VM-08 VM-09 VM-10 VM-11 VM-12 VM-13 VM-14	FM-01 FM-02 FM-03 FM-04 FM-05 FM-06 FM-07 FM-08 FM-09 FM-10	TRM-01 TRM-02 TRM-03 TRM-04 TRM-05 TRM-08
WL-5 Vegetation management activities in old growth stands should only occur for one or both of the following purposes: Maintain or restore old growth habitat characteristics and ecosystem processes. Increase resistance and resilience to disturbances or stressors that may have negative impacts on old growth characteristics or abundance (such as drought, wildfire, and bark beetles). Exceptions to this guideline may be allowed, where needed, to mitigate hazards to: (1) public safety in campgrounds, other designated recreation sites, administrative sites, and permitted special use areas; or (2)	Forest-wide Management Standard II.F.1.e(1), II.F.1.e(2), and II.F.1.e (16)	All management areas. No timing restrictions.	VM-03 VM-05 VM-06 VM-15	FM-01 FM-02 FM-04 FM-06 FM-07 FM-08 FM-09 FM-10	TRM-01 TRM-02 TRM-03 TRM-04 TRM-05 TRM-08

Design Element	Ensures Compliance with	Applicable Area/Timing	Applicable Activity Cards: Vegetation Management	Applicable Activity Cards: Fuels Management	Applicable Activity Cards: Travel Management
infrastructure that is essential to community welfare (e.g., utilities and communications or wildland urban interface). To maintain habitat connectivity and minimize disturbance of old-growth associated wildlife, road construction (permanent or temporary), or other developments should be avoided in old growth unless access is needed to implement vegetation management activities and purposes as outlined above and there are no feasible alternative road locations. When identifying if proposed treatment areas include old growth, use a reasonable and accurate approach based on data collection or validation. Consider delineating old growth stands based on the FSH 2409.17 or other current direction.					
WL-6 In order to protect bald eagle nesting sites: Avoid the following activities within the specified buffers around active bald eagle nests during the nesting season (February 1 through August 15). Restrictions around individual nests may be rescinded if the wildlife biologist determines that the nest is not active due to nonoccupancy for the year, nest failure, successful fledging or nest location already has significant baseline disturbance (i.e., along a state highway).	Forest-wide Management Goal II.B.7 Forest-wide Management Objective II.C.d(2)	All management areas. Applicable from February 1-August 15.	VM-03 VM-05 VM-06 VM-07 VM-08 VM-09 VM-10 VM-11 VM-12 VM-13 VM-14 VM-15	FM-01 FM-02 FM-03 FM-04 FM-05 FM-06 FM-07 FM-08 FM-09 FM-10	TRM-01 TRM-02 TRM-03 TRM-04 TRM-05 TRM-08

Design Element	Ensures Compliance with	Applicable Area/Timing	Applicable Activity Cards: Vegetation Management	Applicable Activity Cards: Fuels Management	Applicable Activity Cards: Travel Management
• Forest management that includes harvest layout, prescribed fire, planting, thinning and road construction (1/4 mile buffer around active nests); • Forest management that includes timber harvesting and heavy truck traffic (1/2 mile buffer around active nests); • Blasting (1/2 mile buffer around active nests); • Helicopter use (1/4 mile horizontal distance or 1,000 feet above active nests).					
WL-7 In order to protect peregrine falcon nesting sites: restrict project activities within the viewshed of any active peregrine falcon nest site, as determined by the wildlife biologist, between March 15 and August 31. The wildlife biologist would determine occupancy.	Forest-wide Management Goal II.B.7; Forest-wide Management Objective II.C.d(2); Forest-wide Management Standard II.F.1.e(16)				
WL-8 Leave 1 to 2 hand piles per acre unburned in areas where hand piling is used for slash disposal to enhance habitat for small mammals and birds. Some retained piles may be consumed during prescribed fire operations.	Forest-wide Management Standard II.F.1.e(3) and II.F.1.e(16)	All management areas. No timing restrictions.	Not Applicable	FM-05	Not Applicable
WL-9 Minimize disturbance to wildlife. Temporary roads must be decommissioned no later than 3 years after the date the project would be completed.	Project-Specific Amendment – Elk Security Habitat Travel Management Rule	All temporary roads within 3 years of project completion.		Not Applicable	TRM-02

Design Element	Ensures Compliance with	Applicable Area/Timing	Applicable Activity Cards: Vegetation Management	Applicable Activity Cards: Fuels Management	Applicable Activity Cards: Travel Management
WL-10 Provide Year-round Quality Elk Habitat Travel management decisions should be designed to maintain elk residency on National Forest System lands during the archery and rifle big game hunting seasons by maintaining contiguous blocks of habitat in locations elk traditionally use at times when they are vulnerable to disturbance from hunting or other recreation that may cause displacement from public lands. No additional roads, trails, or areas should be designated for motor vehicle use if hunting district-specific elk trend data (5- or 10-year) suggests the population is below State objectives and declining or if elk use of National Forest System lands in the plan area has declined independent of population size. Vegetation management project activities on known elk winter and spring foraging areas should contain vegetation management treatments to increase elk forage to help alleviate elk conflicts with adjacent landowners. Vegetation management project activities and travel management decisions should be located and scheduled to minimize disturbance of elk on known winter range during the	Project specifiic amendments	All management areas. Seasonal guidance provided.	VM03 VM05 VM06 VW07 VM08 VM09 VM10 VM11 VM12 VM13 VM14	FM01 FM02 FM03 FM04 FM06 FM09	TRM01 TRM02 TRM04 TRM05

Design Element	Ensures Compliance with	Applicable Area/Timing	Applicable Activity Cards: Vegetation Management	Applicable Activity Cards: Fuels Management	Applicable Activity Cards: Travel Management
winter and in known calving areas during the reproductive season to avoid stressing elk when energy demands are high. Exceptions may occur when needed for protection of other resources as mandated by law, regulation, or policy. In such cases, concentrating management actions in time or space could be a method to minimize disturbance and reduce impacts to elk. To help maintain or restore habitat connectivity, vegetation management project activities and travel management decisions should not create movement barriers to elk in known migration corridors, except where necessary to provide for human health and safety. Elk forage, connectivity, winter range, and calving habitat conditions alleviate adjacent landowner conflicts and support State elk management objectives.					
WL-11 Follow all appropriate standards and guidelines to meet the Northern Rockies Lynx Management Direction, as required by Bitterroot National Forest Plan Amendment #26.	Bitterroot National Forest Plan Amendment #26- Northern Rockies Lynx Management Direction (NRLMD)	All management areas. See NRLMD for WUI exemption.	All	FM-01 FM-02 FM-03 FM-04 FM-06	All

Activity Cards – Contents

Vegetation Management

Card VM-03
Activity: Salvage Cut and Sanitation Cut

Description: Salvage treatments remove damaged or dying trees because of agents other than competition to recover the economic value that would otherwise be lost. Sanitation treatments remove trees to improve stand health by stopping or reducing the actual or anticipated spread of insects and disease. Sanitation and salvage treatments often occur simultaneously and in similar conditions.

- These treatments are used in stands experiencing current infestations of insects or disease.
- Treated stands generally remain stocked with a live overstory component, but stocking levels may vary depending on stand conditions. Openings may occur where damaged and diseased trees as well as dying trees would be removed.
- Canopy gaps may create conditions favorable for a future mosaic of age and size classes.
- In stands with high mortality, there may be a need to follow treatments with prescribed fire to promote sites favorable for natural or planted regeneration.

Objectives: The objective is the removal of trees to improve stand health by stopping or reducing the actual or anticipated spread of insects and disease. It is also to reduce future fuel levels by removing dead and damaged trees.

Related Actions: Stand Improvement-Thinning and Slashing (VM-06), Log Transport (VM-07), Tree Planting (VM-08), Herbicide Weed Control (VM-12), Native Plant Re-vegetation (VM-14), Prescribed Fire-Site Prep (FM-03), Prescribed Fire- Pile Burning (FM-05), Fuel Break Construction (Hand or Machine) (FM-06), Fireline (Hand or Machine) (FM-07), and Piling (Hand or Machine) (FM-08).

Methods: Mechanical ground-based yarding systems, aerial based logging systems, ground lead (winching), and hand cutting of trees.

Equipment Used: Chainsaw, feller buncher, skidder, forwarder, in-woods processer, skyline yarder (on or off-road), helicopter, de-limber, excavator, bulldozer, loader, and log truck.

Forest Plan Management Area Direction Constraining this Activity

This activity would occur in Management Areas 1, 2, and 3a. It also would meet all applicable requirements of the 1987 Bitterroot National Forest Plan (1987 Forest Plan).

Other Laws, Regulations, or Policies Constraining this Activity

Endangered Species Act 1973, Northern Rockies Lynx Management Direction (2007).
National Historic Preservation Act (NHPA)– (16 U.S.C. 470), American Indian Religious Freedom Act (AIRFA)– (42 U.S.C. 1996, 1996a), Native American Graves Protection and Repatriation Act (NAGPRA)– (25 U.S.C. 3001-3013), Executive Order 13007, Inadvertent Discovery Protocol (2015), 36 CFR Part 294- Special Areas; Roadless Area Conservation; and Final Rule. This rule was effective on March 13, 2001.

When would this activity be implemented?

Sanitation and salvage treatments are implemented in stands that are experiencing insects and disease activity and/or related mortality.

Examples include, but are not limited to, the following:

- mixed conifer stands with mountain pine beetle activity in lodgepole pine
- stands where Douglas-fir beetle is active in Douglas fir
- readily accessible stands of dead trees that could provide forest products through a commercial firewood sale

Integration Opportunities: Timber harvest would provide opportunities to perform road maintenance and implement best management practices to improve road conditions.

Card VM-05
Activity: Improvement Cut and Commercial Thin

Description: An intermediate harvest that improves stand conditions, such as: tree species composition, forest health, tree vigor, and fire hazard by removing mostly smaller suppressed trees, less desirable species, and/or unhealthy trees impacted by other stressors. It may be proposed to manage even-aged and uneven-aged stands.

- Used in warm and dry ponderosa pine/Douglas fir stands that would naturally experience low-intensity disturbances, such as low intensity fire or low levels of insect related mortality.
- The trees selected for removal within these areas would generally be smaller and often show signs of stress from high stand density, insects, or disease.
- The variable spacing of leaf trees would reduce stocking density and redistribute growing space to the best trees in the unit.
- Treatment would thin the canopy and break-up ladder fuels to reduce crown fire hazard. Following harvest, units would be treated with thinning or slashing and/or prescribed burning to reduce surface fuel loading and to return fire to the landscape.
- Units would remain stocked after treatment.

Objectives: Improvement cuts and commercial thinning are treatments designed to mimic nature's low-intensity disturbances, such as low intensity fire or low levels of insect-related mortality. These methods provide improved growing conditions for vigorous healthy stands, which reduce the risk of fire, insects, and disease by favoring the early seral, fire tolerant, and desired species.

- Maintain or improve stand health by favoring the best trees and reducing stand densities.
- Promote desired species composition and structure by removing competing less-desirable species; increasing tree growth and vigor; and improving stand resilience to disturbance.
- Reduce potential fire behavior by reducing canopy and ladder fuels as well as fuel continuity.
- Prepare stands for the reintroduction to fire (prescribed/wildfire).
- To have the stands remain stocked and regenerated are not the objectives of these treatments.

Related Actions: Stand Improvement-Thinning & Slashing (VM-06), Log Transport (VM-07), Tree Planting (VM-08), Herbicide Weed Control (VM-12), Native Plant Re-vegetation (VM-14), Prescribed Fire-Low Intensity (FM-01), Prescribed fire-Site prep (FM-03), Prescribed Fire- Pile Burning (FM-05), Fuel Break Construction (Hand or Machine) (FM-06), Fireline Construction (Hand or Machine) (FM-07), and Piling (Hand or Machine) (FM-08).

Methods: Ground-based yarding systems and aerial based logging systems.

Equipment Used: Chainsaw, Feller buncher, skidder, forwarder, in-woods processer, skyline yarder (on or off road), helicopter, de-limber, excavator, bulldozer, loader, and log truck.

Forest Plan Management Area Direction Constraining this Activity

This activity would occur in Management Areas 1, 2, and 3a. It also would meet all applicable requirements in the 1987 Forest Plan.

Other Laws, Regulations, or Policies Constraining this Activity

Endangered Species Act 1973 and Northern Rockies Lynx Management Direction (2007)

National Historic Preservation Act (NHPA)– (16 U.S.C. 470), American Indian Religious Freedom Act (AIRFA)– (42 U.S.C. 1996, 1996a), Native American Graves Protection and Repatriation Act (NAGPRA)– (25 U.S.C. 3001-3013), Executive Order 13007, Inadvertent Discovery Protocol (2015), 36 CFR Part 294- Special Areas; Roadless Area Conservation; and Final Rule. This rule was effective on March 13, 2001.

Card VM-05
Activity: Improvement Cut and Commercial Thin

When would this activity be implemented?

Improvement cuts and commercial thins are often proposed in stands where the existing tree densities and species composition are impacting stand health and tree growth as well as elevating the risk of insect and disease mortality or putting the stand at risk to undesirable effects from fire.

Examples include, but are not limited to, the following:

- Old growth units that are being treated to enhance the residual old and large diameter trees
- Ponderosa pine/mixed conifer stands with an undesirable stocking level of Douglas fir
- Mature plantations (including terraces) that have a high stand density affecting tree growth and stand health.

Integration Opportunities: Timber harvest would provide opportunities to perform road maintenance and implement best management practices to improve road conditions.

Card VM-06
Activity: Stand Improvement - Thinning and Slashing

Description: Small Tree Thinning (stand improvement) is an intermediate treatment designed to improve the species: composition, structure, condition, health, and growth of even or uneven-aged stands. The treatment reduces the number of saplings, cutting the undesirable live or dead trees. In two-aged or multi-storied stands, thinning and slashing is often used to reduce ladder fuels and to facilitate prescribed burning. In some stands, undesirable trees are cut and left on the ground to help implement a desired prescribed burning.

- Proposed in plantations and naturally regenerated stands.
- Reduce ladder fuels.
- Reduce the risk or spread of insects and disease.
- Trees would be cut by hand crews using chainsaws.
- Slash would be hand-piled and/or lopped and scattered.

Objectives: Small tree thinning, a stand improvement activity, is the selective cutting of young trees typically less than 35 years old, in naturally regenerated or planted stands, to: reduce the density of trees; improve growth and vigor; reduce insect and disease risk; and maintain desired species composition. The trees removed in these treatments are often: smaller, suppressed, unhealthy, and/or a fuels concern. Thinning and slashing reduces understory vegetation, effectively reducing ladder fuels and lowering the risk of fire reaching the crowns of the overstory.

- Favors early seral, fire tolerant, and desired species often mimicking a low-intensity wildfire.
- Improve stand health by favoring the genetically superior trees and species less susceptible to insects and disease.
- Improve growth and vigor by removing competition between trees.
- Promote desired species composition by using species preference in tree selection.
- Depending on the stand, thinning and slashing are used to prepare stands for the re-introduction of fire (prescribed or wildfire).

Related Actions: Clearcut with reserves (VM-01), Seed Tree and Shelterwood (VM-02), Salvage-Sanitation Cut (VM-03), Group Select/Single Tree (VM-04), Improvement Cut/Commercial Thin (VM-05), Prescribed fire-Low-Intensity (FM-01), Prescribed fire- Mixed Severity (FM-02), Prescribed Fire- Site Preparation (FM-03), Prescribed Fire- Pile Burning (FM-05), and Piling (Hand or Machine) (FM-08).

Methods: Hand crews.

Equipment Used: Chainsaw.

Card VM-06
Activity: Stand Improvement - Thinning and Slashing

Example of desired condition resulting from small tree thinning.

Forest Plan Management Area Direction Constraining this Activity

This activity would occur in Management Areas 1, 2, 3a. It also would meet all applicable requirements in the 1987 Forest Plan.

Other Laws, Regulations, or Policies Constraining this Activity

Endangered Species Act 1973 and Northern Rockies Lynx Management Direction (2007)

National Historic Preservation Act (NHPA)– (16 U.S.C. 470), American Indian Religious Freedom Act (AIRFA)– (42 U.S.C. 1996, 1996a), Native American Graves Protection and Repatriation Act (NAGPRA)– (25 U.S.C. 3001-3013), Executive Order 13007, Inadvertent Discovery Protocol (2015) 36 CFR Part 294- Special Areas; Roadless Area Conservation; and Final Rule. This rule was effective on March 13, 2001.

When would this activity be implemented?

Non-commercial hand thinning would occur in stands exhibiting crown-to-crown competition and/or high levels of competing ingrowth, which limit tree growth and increase the risk of insects and disease.

Examples include, but are not limited to, the following:

- A ponderosa pine plantation experiencing crown to crown competition and the natural ingrowth of competing Douglas fir
- A two-aged or multi-aged ponderosa pine and Douglas-fir mixed conifer stand with increasing stand density, competition in the understory, and ladder fuels increases the risk of stand replacing fire.
- Slashing of small trees or standing dead in a stand to create a fuel bed to meet a prescribed fire objective.

Card VM-06 Activity: Stand Improvement - Thinning and Slashing
Integration Opportunities: Coordinate implementation with adjacent treatments, such as prescribed burning or fuel reduction. Look for opportunities to integrate small tree thinning into stewardship contracts, when possible. Consider partnership opportunities with Forest Health Protection.

Card VM-07 **Activity: Commercial and Non-Commercial Log Transport**
Description: Loading of timber products onto log trucks or other equipment for transportation. Transportation takes place on designated haul routes as determined by the timber sale contract. **Objectives:** To remove commercial and non-commercial timber products from the sale area to mills and other processing facilities.
Related Actions: Clearcut with reserves (VM-01), Seed Tree and Shelterwood (VM-02), Salvage-Sanitation Cut (VM-03), Group Select/Single Tree (VM-04), Improvement Cut/Commercial Thin (VM-05), Specified Road Construction (TRM-01), Temporary Road Construction (TRM-02), Road Maintenance and Reconditioning (TRM-03), Road Decommissioning (TRM-04), Road Storage (TRM-05), and Sub-soiling (TRM-08).
Methods: Activity would be implemented through a timber sale contract. **Equipment Used:** Stinger steered off-load trailer, wagon steered trailer (mule train), single and tandem axle trucks with trailers, and self-loaders.
Forest Plan Management Area Direction Constraining this Activity
This activity would only occur in Management Areas 1, 2, 3a. It also would meet all applicable requirements in the 1987 Forest Plan.
Other Laws, Regulations, or Policies Constraining this Activity
Timber sale contract; hauling restrictions determined by wildlife; and hauling restrictions determined by weather and on the ground conditions. National Historic Preservation Act (NHPA)– (16 U.S.C. 470), American Indian Religious Freedom Act (AIRFA)– (42 U.S.C. 1996, 1996a), Native American Graves Protection and Repatriation Act (NAGPRA)– (25 U.S.C. 3001-3013), Executive Order 13007, Inadvertent Discovery and Protocol (2015).
When would this activity be implemented?
This activity would happen in timber sale areas and on designated haul routes.
Integration Opportunities: Noxious weed treatment; designated haul routes; dust abatement; collection of deposits to perform road maintenance and improve forest transportation systems.

Card VM-08
Activity: Tree Planting

Description: Tree planting artificially ensures the establishment or re-establishment of forest cover by planting seedlings in stands with or without site preparation. Conifer seedling hand planting in regeneration harvest units (clearcut, seed-tree, shelterwood, irregular selection, and group selection) would be implemented if sufficient natural regeneration of desired species composition could not be ensured. Planting also may be implemented after mixed to high severity prescribed fire treatments if natural regeneration would not be ensured to provide an appropriate species composition for the site or where opportunities for whitebark pine restoration would be available.

- Regeneration units would be examined following harvest to determine natural seedling density and species composition.If natural regeneration is insufficient, then the site would be planted with species determined by aspect and elevation.Seedlings that would be planted would be grown from local, genetically appropriate seed sources.Any prescribed fire in these units would occur prior to planting.

Objectives: Tree planting ensures desired stocking levels and species composition appropriate for the habitat type and the associated natural disturbance processes in areas where natural regeneration would not be expected to be successful**.** By planting species appropriate to local forest types, the Forest Service (Forest) could optimize hiding and thermal cover for wildlife, reduce soil erosion, and create forested conditions that would be more resilient to naturally occurring fires in the future.

Related Actions: Clearcut with Reserves (VM-01), Seed Tree/ Shelterwood (VM-02), Group Selection/Single Tree (VM-04), Stand Improvement- Thinning and Slashing (VM-06), Prescribed Fire- Mixed Severity (FM-02), Prescribed Fire- Site Prep (FM-03), Pile Burning (FM-05), Fuel break Construction (FM-06), Fireline Construction (FM-07), and Piling (Hand or Machine) (FM-08).

Methods: Planting would be done by hand by contract reforestation crews.

Equipment Used: Hoedads or planting spades.

Newly planted ponderosa pine seedling and contract planting crews.

Forest Plan Management Area Direction Constraining this Activity

This activity would occur in Management Areas 1, 2, and 3a. It also would meet all applicable requirements in the 1987 Forest Plan.

Other Laws, Regulations, or Policies Constraining this Activity

NFMA – (16 U.S.C. 1604(g)(3))

Card VM-08 **Activity: Tree Planting**
All forested lands in the Forest shall be maintained in appropriate forest cover with: species of trees, degree of stocking, rate of growth, and conditions of stand designed to secure maximum benefits of multiple use sustained yield management in accordance with land management plans. National Historic Preservation Act (NHPA)– (16 U.S.C. 470), American Indian Religious Freedom Act (AIRFA)– (42 U.S.C. 1996, 1996a), Native American Graves Protection and Repatriation Act (NAGPRA)– (25 U.S.C. 3001-3013), Executive Order 13007, and Inadvertent Discovery Protocol (2015).
When would this activity be implemented?
This activity would be implemented after timber harvest, if naturally regenerating seedlings would be found to be deficient based on stocking exams.
Integration Opportunities: Consider tree planting to help meet integrated goals in other program areas such as wildlife habitat restoration, whitebark pine restoration, and watershed restoration. Coordinate implementation timing with fuels to ensure any required prescribed fire- site preparation would be completed prior to planting.

Card VM-09
Activity: Aspen Restoration

Description: Aspen grows in clones and it reproduces by root suckers that sprout from a shared root system. With a lack of natural disturbance, conifers have encroached on existing aspen stands. Aspen restoration reduces conifer competition by removing shade that suppresses the growth and development of the aspen clone. Restoration activities may include:

- Monitoring (photo plots or field methods to record stand health)
- Removal and hand piling and/or burning of small conifers
- Girdling larger competing conifers
- Prescribed fire
- Harvest of competing conifers by mechanical methods
- Protection from browsing including, but not limited to, wildlife proof fencing
- Sub-soiling to enhance sprouting

Objectives: The aspen restoration objective would be to increase the aspen component across the Bitterroot National Forest. Where aspen would be present, treatments would focus on enhancing and restoring aspen clones.

- Increase aspen vigor to enhance sprouting, recruit multiple age classes, and improve resilience to natural disturbances.
- Maintain and promote healthy aspen stands to increase vegetation and habitat diversity.

Related Actions: Clearcut with Reserves (VM-01), Group Select/Single Tree Selection Harvest (VM-04), Improvement Cut/Commercial Thin (VM-05), Stand Improvement-Thinning and Slashing (VM-06), Prescribed Burning- Low-Intensity (FM-01), Prescribed Fire –Mixed Severity (FM-02), Prescribed Fire-Site Prep (FM-03), Prescribed Fire-Pile Burning (FM-05), Piling- Hand or Machine (FM-08), Mastication (FM-09), and Chipping (FM-10).

Methods: Ground-based yarding systems, aerial based logging systems, hand crews, hand ignition, or aerial ignition.

Equipment Used: Chainsaw, Feller buncher, skidder, forwarder, in-woods processer, skyline yarder (on or off-road), helicopter, de-limber, excavator, bulldozer, loader, log truck, drip torch, engine, and water pumps.

Card VM-09
Activity: Aspen Restoration

Example of conifers removed to increase sunlight and promote aspen suckers to sprout.

Forest Plan Management Area Direction Constraining this Activity

This activity would occur in Management Areas 1, 2, 3a, or 5. It also would meet all applicable requirements in the 1987 Forest Plan.

Other Laws, Regulations, or Policies Constraining this Activity

Endangered Species Act 1973 and Northern Rockies Lynx Management Direction (2007).

National Historic Preservation Act (NHPA)– (16 U.S.C. 470), American Indian Religious Freedom Act (AIRFA)– (42 U.S.C. 1996, 1996a), Native American Graves Protection and Repatriation Act (NAGPRA)– (25 U.S.C. 3001-3013), Executive Order 13007, Inadvertent Discovery Protocol (2015), 36 CFR Part 294- Special Areas; Roadless Area Conservation; and Final Rule. This rule was effective on March 13, 2001.

When would this activity be implemented?

This activity would be implemented where aspen is present and in decline.

Examples include, but are not limited to, the following:

- locations where clones are shaded and not receiving enough sunlight to promote sprouting
- where aspen trees are experiencing conifer encroachment
- where young aspen sprouts are experiencing high levels of wildlife browsing

Integration Opportunities: Wildlife habitat restoration.

Card VM-10
Activity: Whitebark Pine Daylighting

Description: Daylighting is defined as removing all competing trees around a target tree in a circular area of a predetermined size. Pruning of lower branches on whitebark pine also may be simultaneously implemented to reduce shading on the bole reducing blister rust.

- Competing trees (other than whitebark pine) would be removed in a predetermined radius from all healthy, desirable whitebark pine.

Objectives: The primary objective of this treatment would be to protect existing whitebark pine.

Whitebark pine was rapidly declining due to white pine blister rust infections, mountain pine beetle outbreaks, and fire exclusion. Whitebark pine populations are so low that future disturbances could cause local extinctions of this valuable keystone species that provides food to hundreds of wildlife species.

- Release whitebark pine saplings to encourage growth, survival, and development to cone-producing age
- Reduce basal area to reduce mountain pine beetle hazard
- Reduce stand density and fuels to decrease the risk of stand replacing wildfire
- Reduce the spread of white pine blister rust
- Reduce the risk of mealybugs
- Protect cone bearing trees

Related Actions: Stand Improvement- Thinning and Slashing (VM-06), Prescribed Burning- Pile Burning (FM-05), and Piling (Hand) (FM-08).

Methods: Trees would be removed and pruned by hand crews.

Equipment Used: Chainsaw, loppers, and handsaws.

Daylighting treatment to cut competing conifers within a radius of whitebark pine.

Card VM-10
Activity: Whitebark Pine Daylighting

Forest Plan Management Area Direction Constraining this Activity

This activity would only occur in areas that would meet all applicable requirements in the 1987 Forest Plan Management Areas 1, 2, 3A, 5. The 1987 Forest Plan specifies (p. II-21) that vascular plants identified as rare, pending study, or proposed as threatened or endangered would be identified and protected.

Other Laws, Regulations, or Policies Constraining this Activity

The Endangered Species Act (ESA) (1973)
The 4(d) Rule under the ESA includes exceptions to the proposed ESA protections to allow for optimal, flexible, and adaptive forest activities that could advance whitebark pine (WBP) conservation now and in the future. Federal forest management, restoration, and research related activities are explicitly excepted. Any additional management guidance from the U.S. Fish and Wildlife Service (Service) would be incorporated.

Northern Rockies Lynx Management Direction (2007)
National Historic Preservation Act (NHPA)– (16 U.S.C. 470), American Indian Religious Freedom Act (AIRFA)– (42 U.S.C. 1996, 1996a), Native American Graves Protection and Repatriation Act (NAGPRA)– (25 U.S.C. 3001-3013), Executive Order 13007, Inadvertent Discovery Protocol (2015), 36 CFR Part 294- Special Areas; Roadless Area Conservation; and Final Rule. This rule was effective on March 13, 2001.

When would this activity be implemented?

This activity would be implemented in areas where whitebark pine stands are: present, reasonably accessible, experiencing competition from other species, and at-risk from white pine blister rust and/or mountain pine beetle.

Integration Opportunities: Consider planning with adjacent thinning, slashing, and small tree removal treatments to reduce fuels and the risk of stand replacing fire. Consider pairing with adjacent whitebark pine planting activities to increase population size.

Card VM-11
Activity: Biological Weed Control

Description: The control of nonnative invasive weeds with natural enemies originating from the native range of the weed. All forms of macrobial and microbial organisms are considered as biological control agents.

- Biocontrols do not eliminate weed populations, but they control the abundance and minimize the monoculture characteristics of infestations.
- Weed populations would be inventoried prior to implementation of ground disturbing activities.
- Weed treatments may be prioritized by weed species of concern, including early invaders and State listed Priority 1A, 1B, 2A, 2B, and 3 noxious weed species.

Objectives: To reduce or prevent the spread of populations of noxious weed species. Biological weed control has proven a viable strategy for reducing weed populations in areas subjected to low-intensity management such as rangelands, preserved natural areas, and some waterways. It impacts the density and vigor of weeds, allowing native plants to re-establish and effectively compete.

Per FSM 2900 and the National Program Direction, at least 50 percent of the total acres treated must be monitored for treatment efficacy and the data recorded in NRM-FACTS through the TESP-IS integrated interface.

Related Actions: Clearcut with reserves (VM-01), Seed Tree and Shelterwood (VM-02), Salvage-Sanitation Cut (VM-03), Group Select/Single Tree (VM-04), Improvement Cut/Commercial Thin (VM-05), Meadow Restoration (VM-13), Native Plant Restoration (VM-14), Prescribed Fire-Pile Burning (FM-05), Specified Road Construction (TRM-01), Temporary Road Construction (TRM-02), Road Maintenance and Reconditioning (TRM-03), Road Decommissioning (TRM-04), Road Storage (TRM-05), Trail Construction (TRM-06), Dispersed Camp Site Rehabilitation (TRM-07), and Sub-soiling TRM-08).

Methods: Biocontrol agents would be released or applied by the Forest personnel or contractors.

Equipment Used: None.

Flea beetle (Apthona species) released on leafy spurge. Knapweed root weevils (Cyphocleonus achates) released on spotted knapweed.

Card VM-11
Activity: Biological Weed Control

Forest Plan Management Area Direction Constraining this Activity

This activity would only occur in Management Areas 1, 2, and 3a. It also would meet all applicable requirements in the 1987 Forest Plan.

- Complete an evaluation for the risk of noxious weeds spreading in vegetative communities and implementing control strategies.
- Emphasize the use of biological control to gain the upper hand in the control of spotted knapweed and leafy spurge.

Other Laws, Regulations, or Policies Constraining this Activity

National Historic Preservation Act (NHPA)– (16 U.S.C. 470), American Indian Religious Freedom Act (AIRFA)– (42 U.S.C. 1996, 1996a), Native American Graves Protection and Repatriation Act (NAGPRA)– (25 U.S.C. 3001-3013), Executive Order 13007, and Inadvertent Discovery Protocol (2015).

When would this activity be implemented?

Biological weed control is most effective in treating large, widely dispersed infestations or inaccessible populations of invasive plant populations.

Examples include, but are not limited to, the following:

- Release of knapweed root weevils (*Cyphocleonus achates*) or knapweed flower weevils (*Larinus minutus*) in areas of established, extensive knapweed populations.
- Release of Flea beetles (*Apthona* species) in areas of established leafy spurge.

Integration Opportunities: Weed control activities could be more effective when combined with seeding native grasses; consider planning in conjunction with native plant restoration activities.
The Resource Specific Guidelines and Design Features by Resource Area for Invasive Plants are located on page 39 for Vegetation Management; on page 82 for Fuels Management; and on page 113 for Transportation Management.

Card VM-12
Activity: Herbicide Weed Control

Description: The application of herbicides to eradicate, control, or contain selected nonnative, invasive plant populations. Methods vary by species infestation and size.

- Weed populations would be inventoried prior to implementation of ground disturbing activities.
- Weed treatment may occur before and/or after ground disturbing activities.
- Weed treatments may be prioritized by weed species of concern, including early invaders and State listed Priority 1A, 1B, 2A, 2B, and 3 noxious weed species.

Objectives: To reduce, eliminate, or prevent the spread of noxious weed species populations.

Noxious weeds impact native plant diversity, particularly in grassland areas where weeds are more prolific. Loss of native plant diversity impacts wildlife forage; causes soil erosion; increases sediment in watersheds; and reduces pollinator populations and species.

Per FSM 2900 and National Program Direction, at least 50 percent of the total acres treated must be monitored for treatment efficacy and the data recorded in NRM-FACTS through the TESP-IS integrated interface.

Related Actions: Clearcut with reserves (VM-01), Seed Tree and Shelterwood (VM-02), Salvage-Sanitation Cut (VM-03), Group Select/Single Tree (VM-04), Improvement Cut/Commercial Thin (VM-05), Log Transport (VM-07), Meadow Restoration (VM-13), Native Plant Restoration (VM-14), Prescribed Fire-Pile Burning (FM-05), Specified Road Construction (TRM-01), Temporary Road Construction (TRM-02), Road Maintenance and Reconditioning (TRM-03), Road Decommissioning (TRM-04), Road Storage (TRM-05), Trail Construction (TRM-06), Dispersed Camp Site Rehabilitation (TRM-07), and Sub-soiling TRM-08).

The Resource Specific Guidelines and Design Features by Resource Area for Invasive Plants are located on page 39 for Vegetation Management; on page 82 for Fuels Management; and on page 113 for Transportation Management.

Methods: Spraying would be performed by the Forest hand crews or contractors.

Equipment Used: Backpack sprayers, hand sprayers, stem injectors, utility task vehicles (UTV) and boom sprayer, and truck mounted boom sprayer.

Forest service personel treating weeds; example of truck rigged with spray equipment.

Card VM-12 **Activity: Herbicide Weed Control**
Forest Plan Management Area Direction Constraining this Activity
This activity would only occur in areas that would meet all applicable requirements in the 1987 Forest Plan.
Other Laws, Regulations, or Policies Constraining this Activity
Bitterroot National Forest Noxious Weed Treatment Project EIS, 2003 Treatments must be applied based on rates listed on the herbicide label. National Historic Preservation Act (NHPA)– (16 U.S.C. 470), American Indian Religious Freedom Act (AIRFA)– (42 U.S.C. 1996, 1996a), Native American Graves Protection and Repatriation Act (NAGPRA)– (25 U.S.C. 3001-3013), Executive Order 13007, and Inadvertent Discovery Protocol (2015).
When would this activity be implemented?
Most known nonnative, invasive plant infestations occur in developed areas, such as along roadsides and at administrative sites, gravel pits, and recreation areas. Herbicide application would be implemented when new disturbance occurs in these areas or new populations of weeds are documented. Examples include, but are not limited to, the following: • Treating existing Forest system roads prior to harvest activities to reduce weed spread by equipment/vehicles. • Treating existing Forest system roads after harvest is complete or after a fire to reduce weed spread of new infestations by equipment/vehicles. • Treating temporary roads, skid trails, and landings created by timber harvest activities. • Treating discrete new invader populations for containment and suppression.
Integration Opportunities: Weed control activities could be more effective when combined with seeding native grasses; consider planning in conjunction with native plant restoration activities.

Card VM-13
Activity: Meadow Restoration

Description: Meadow restoration is the removal of young trees growing in naturally occurring meadow areas.

- Trees would be cut, lopped, and scattered by handcrews.
- Stands may be treated with prescribed fire to remove encroaching conifers; stimulate new growth of native species; and promote forage for wildlife.
- Revegetation would use native plant seed common to each habitat type.

Objectives: The primary objective of meadow restoration would be to reduce conifer encroachment in meadow habitats to create plant diversity, promote rare plant habitat, and provide food for pollinator species. This increases forage and nutritional value for big game species and it provides songbird breeding and rearing habitat. By maintaining or reducing tree densities, more sunlight hits the forest floor and increases plant production.

Related Actions: Biological Weed Control (VM-11), Herbicide Weed Control (VM-12), Prescribed Fire- Low Intensity (FM-01), Prescribed Fire- Maintenance Burning (FM-04), Prescribed Fire- Mixed Severity (FM-02), and Native plant restoration (VM-14).

Methods: Handcrews

Equipment Used: Chainsaw

Example of naturally occurring meadow experiencing the creep or ingrowth of conifers.

Forest Plan Management Area Direction Constraining this Activity

This activity would occur in Management Areas 1, 2, 3a or 5. It also would meet all applicable requirements in the 1987 Forest Plan.

Card VM-13 **Activity: Meadow Restoration**
Other Laws, Regulations, or Policies Constraining this Activity
National Historic Preservation Act (NHPA)– (16 U.S.C. 470), American Indian Religious Freedom Act (AIRFA)– (42 U.S.C. 1996, 1996a), Native American Graves Protection and Repatriation Act (NAGPRA)– (25 U.S.C. 3001-3013), Executive Order 13007, Inadvertent Discovery Protocol (2015), 36 CFR Part 294- Special Areas; Roadless Area Conservation; and Final Rule. This rule was effective on March 13, 2001. Forest Service Manual (FSM 2670.22)
When would this activity be implemented?
Where naturally occurring meadows are present, accessible, and experiencing conifer encroachment or an increase in invasive plant populations, or where plant diversity is trending towards a monoculture.
Integration Opportunities: Cooperation with other Federal agencies/Rocky Mountain Elk Foundation/National Wild Turkey Federation/Mule Deer Foundation/Montana Native Plant Association. Consider planning with adjacent thinning, slashing, and prescribing fire activities. Consider coordinating treatment with weed control activities to reduce the levels of nonnative invasive species.

Card VM-14
Activity: Native Plant Re-vegetation

Description: Native plant re-vegetation is the planting or seeding of native plant species in disturbance areas.

- Seeds and seedlings are produced from genetically appropriate, locally sourced stock.
- Contact the Forest botanist/native plant coordinator for all seed and seedling needs.
- Request seedlings from the Forest botanist/native plant coordinator one growing season prior to the implementation date.
- The Forest botanist/native plant coordinator would provide the approved "blue tag" certified weed-free seed mix of native species for each specific seed zone.
- Seeded areas are often treated with organic fertilizer and weed free straw mulch.
- Seeding would occur in the spring and fall.

Objectives: The primary objective of native plant revegetation is to use native shrubs, forbs, and grasses to re-establish vegetation on bare ground. This would result from disturbance activities to reduce the spread of weeds and to increase species diversity. Native plant communities are key to ecosystem integrity and resilience, and they provide essential habitat and food sources for wildlife, including pollinators.

Related Actions: Clearcut with Reserves (VM-01), Seed Tree/Shelterwood (VM-02), Sanitation Salvage (VM-03), Group Selection/Single Tree (VM-04), Improvement Cut/Commercial Thin (VM-05), Stand Improvement- Thinning & Slashing (VM-06), Biological Weed Control (VM-11), Herbicide Weed Control (VM-12), Prescribed Fire- Pile Burning (FM-05), Fuel break Construction (FM-06), Fireline Construction (FM-07), Piling (Hand or Machine) (FM-08), Mastication (FM-09), Specified Road Construction (TRM-01), Temporary Road Construction (TRM-02), Road Maintenance and Reconditioning (TRM-03), Road Decommissioning (TRM-04), Road Storage (TRM-05), Trail Construction (TRM-06), Dispersed Camp Site Rehabilitation (TRM-07), and Sub-soiling TRM-08).

Methods: Planting and seeding would be implemented by handcrews.

Equipment Used: Hoedads, planting spades, and rotary seeders.

Picture of Forest employees planting native shrubs to stabilized streambanks.

Card VM-14
Activity: Native Plant Re-vegetation

Forest Plan Management Area Direction Constraining this Activity

This activity would occur in Management Areas 1, 2, 3a & 5. It also would meet all applicable requirements in the 1987 Forest Plan.

Other Laws, Regulations, or Policies Constraining this Activity

Forest Service Manual (FSM 2070) 2008; Native plant materials policy: A strategic Framework 2012; Norther Region Native Plant Handbook 1995; Region One use of Vegetative Materials on National Forests 1993; Region One native Plant Materials Program Strategy Plan 2012; Region One Do Not Use List 2014; and National Seed Strategy 2015.

National Historic Preservation Act (NHPA)– (16 U.S.C. 470), American Indian Religious Freedom Act (AIRFA)– (42 U.S.C. 1996, 1996a), Native American Graves Protection and Repatriation Act (NAGPRA)– (25 U.S.C. 3001-3013), Executive Order 13007, and Inadvertent Discovery Protocol (2015).

When would this activity be implemented?

This activity would be implemented in areas that have experienced disturbance resulting in a lack of native species diversity.

Examples include, but are not limited to, the following:

- A road decommissioning project where a culvert would be removed and shrubs would be planted to stabilize a stream crossing.
- A landing area for a timber unit where seeding native grasses could prevent establishment of invasive species.
- A temporary road for timber units where seeding native grasses could prevent establishment of invasive species.
- Any disturbed areas where soil disturbance would be void of any vegetation.

Integration Opportunities: Consider planning in conjunction with other restoration related activities such as meadow restoration, dispersed campsite re-habilitation, or installation/removal of stream crossing structures. Consider partnership opportunities with local conservation groups.

Fuels Management Activities

Card FM-01 **Activity: Prescribed Burning - Low-Intensity**
Description: A prescribed fire treatment of low-intensity covering the majority of the burn unit and consuming surface fuels with minimal overstory mortality. • Used in warm, dry forest types that would naturally experience a more frequent fire return interval. • Low-intensity fire would be prescribed to reduce levels of: grasses, brush, forest litter and concentrations of down wood. Anticipated overstory mortality may range from 0 percent to 25 percent depending on species composition, existing fuel loads, and scale. • Would commonly occur as a fuel reduction treatment in a wildland urban interface. • Prior slashing of ladder fuels and standing dead trees may occur to minimize fire intensity and limit resistance to control. **Objectives:** Prescribed burning: lowers surface fuel loading; increases canopy base heights; improves species composition and structure; and stimulates browse species for wildlife forage. Low-intensity burns are designed to mimic naturally occurring fires (often lightning caused) that frequently burned under conditions that produced minimal tree mortality. • Reduce potential for crown fire behavior within the wildland urban interface (WUI), community protection and in low/mixed severity fire regimes. • Reduce excess surface fuels; re-introduce fires to a fire dependent ecosystem; and move units closer to historical conditions. • Reduce risk from wildfire to firefighters, the public, and adjacent private lands within the project area. • Fire is restored as a natural process on the landscape necessary to maintain desired conditions.
Related Actions: Group Select- Single Tree (VM-04), Improvement Cut- Commercial Thin (VM-05), Stand Improvement- Thinning and Slashing (VM-06), Native Plant Re-vegetation (VM-14), Prescribed Fire- Pile Burning (FM-05), Fuel Break Construction (FM-06), Fireline Construction (FM-07), and Piling (Hand or Machine) (FM-08).
Methods: Force account-hand or aerial ignition. **Equipment Used:** Drip torch, helicopter, engine, and water pumps.

Card FM-01
Activity: Prescribed Burning - Low-Intensity

Photograph of a Ponderosa pine stand being treated with a low-intensity prescribed fire.

Forest Plan Management Area Direction Constraining this Activity

This activity would only occur in Management Areas 1, 2, 3a & 5. It also would meet all applicable requirements in the 1987 Forest Plan.

Other Laws, Regulations, or Policies Constraining this Activity

Compliance with the Clean Air Act and the Montana State Improvement Plan.
All prescribed burning would be implemented in full compliance with the Montana Department of Environmental Quality air quality program through coordination with the Montana/IDAHO Airshed Group.

Endangered Species Act 1973 and Northern Rockies Lynx Management Direction (2007).

National Historic Preservation Act (NHPA)– (16 U.S.C. 470), American Indian Religious Freedom Act (AIRFA)– (42 U.S.C. 1996, 1996a), Native American Graves Protection and Repatriation Act (NAGPRA)– (25 U.S.C. 3001-3013), Executive Order 13007, and Inadvertent Discovery Protocol (2015).

When would this activity be implemented?

Low-intensity prescribed fire may be prescribed in areas treated by other vegetation management activities or as a stand alone activity depending on existing vegetative conditions and surface fuels. Treatment primarily would be used in the warm and dry vegetation types. Locations are often steep, dry, and rocky, and they may have limited access.

Examples include, but are not limited to, the following:

- Warm, dry mixed conifer stands with encroaching shade tolerant Douglas fir that were historically dominated by ponderosa pine due to high frequency and low-intensity fire.
- Open grown stands with the desire to increase forage for big game species.

Card FM-01 **Activity: Prescribed Burning - Low-Intensity**
Integration Opportunities: Coordinate implementation with adjacent fuel reduction treatments. Consider low-intensity prescribed burning as a part of meadow restoration or wildlife habitat improvement activities.

Card FM-02
Activity: Prescribed Fire – Mixed Severity

Description: A prescribed fire treatment ranging from low to higher intensity designed to mimic mixed severity wildfire conditions that create a mosaic of stand conditions and reduce fuel continuity across the landscape.

- Used in cool forest types that would naturally experience mixed fire severity, insects, and disease.
- Stands are experiencing high mortality, having high fuel loading, and having little to no economic value. They also would otherwise be expensive to treat. Stands may be located in areas with no access for other forms of management.
- Moderate to high-intensity fire would be prescribed to generate overstory mortality and create openings. Anticipated overstory mortality may range from 25 percent to 100 percent depending on species composition, existing fuel loads, and scale.
- Prior slashing of live or dead trees to jackpot or windrow fuels may occur to aid in burn conditions to meet objectives, control fire intensity, and limit resistance to control.
- Existing conditions would lead to moderate to high surface fuel consumption.

Objectives: To mimic patches and patterns naturally found on the landscape within mixed severity fire regimes. Create openings for natural regeneration. Improve forage quality and quantity for: big horn sheep, mule deer, elk, and other species.

- Improve forest health by promoting natural processes under controlled conditions.
- Establish early successional conditions to create a variety of habitats, stand characteristics, and patterns across the project area.
- Reduce potential fire behavior and increase management options for future wildfires by reducing fuel continuity at both stand and landscape scales.
- Create suitable growing conditions to promote natural regeneration.

Related Actions: Stand Improvement-Thinning and Slashing (VM-06), Tree Planting (VM-08), Native Plant Re-vegetation (VM-14), Fuel Break Construction (FM-06), and Fireline Construction (FM-07).

Methods: Force account-hand or aerial ignition.

Equipment Used: Drip torch, helicopter, engine, and water pumps.

Forest Plan Management Area Direction Constraining this Activity

This activity would only occur in Management Areas 1, 2, 3a & 5. It also would meet all applicable requirements in the 1987 Forest Plan.

Card FM-02
Activity: Prescribed Fire – Mixed Severity

Other Laws, Regulations, or Policies Constraining this Activity

Compliance with the Clean Air Act and the Montana State Improvement Plan.
All prescribed burning would be implemented in full compliance with the Montana Department of Environmental Quality air quality program through coordination with the Montana/IDAHO Airshed Group.

The Endangered Species Act (ESA) (1973).
The 4(d) Rule under the ESA includes exceptions to the proposed ESA protections to allow for optimal, flexible, and adaptive forest activities that could advance WBP conservation now and in the future. Federal forest management, restoration, and research related activities are explicitly excepted. Any additional management guidance from the Service would be incorporated.

Northern Rockies Lynx Management Direction (2007).

National Historic Preservation Act (NHPA)– (16 U.S.C. 470), American Indian Religious Freedom Act (AIRFA)– (42 U.S.C. 1996, 1996a), Native American Graves Protection and Repatriation Act (NAGPRA)– (25 U.S.C. 3001-3013), Executive Order 13007, and Inadvertent Discovery Protocol (2015).

When would this activity be implemented?

Mixed severity prescribed fire is often prescribed in stands experiencing high mortality, loading high fuel, and having little to no economic value and would otherwise be expensive to treat. This treatment also may be used to maintain or restore the natural fire return interval at a landscape level. Treatments may be used in areas with no access for other forms of management such as inventoried roadless or wilderness study areas.

Examples include, but are not limited to, the following:

- Lodgepole pine stands with high levels of standing dead and down material with sub-alpine fir in growth where there is a high likelihood of stand replacing wildfire.
- A landscape comprised of cool moist mixed conifer forest with homogenous stand conditions that have missed two or more fire return intervals.

Integration Opportunities: Coordinate implementation with adjacent fuel reduction treatments. Consider mixed severity prescribed burning for wildlife habitat improvement.

Card FM-03
Activity: Prescribed Burning - Site Preparation

Description: A prescribed fire treatment of varying fire intensity based on site conditions designed to reduce vegetative competition to facilitate the success of artificial or natural regeneration. Site preparation also is used to reduce undesirable shade tolerant trees, existing surface fuels, and residual slash created during vegetative management activities.

- Exposure of bare mineral soil may be desired for seed germination.
- Maintain large, woody debris to provide root collar shade for young seedlings.
- Moderate to high-intensity fire would be prescribed to generate mortality of brush and remaining on-site trees to reduce competition during seedling establishment.
- Moderate to high consumption of surface fuels would be desired to reduce the current fire hazard and to protect regeneration during future wildfires.
- Prior slashing of ladder fuels and standing dead trees may occur to reduce competition, control fire intensity, and limit resistance to control.

Objectives: Prescribed burning for site preparation is designed to modify the soil, litter, and vegetation to create microclimate conditions conducive to the establishment and growth of desired seedlings. Burning for site preparation also is intended to reduce fuel loading and potential wildfire behavior.

Related Actions: Clearcut with Reserves (VM-01), Seed Tree- Shelterwood (VM-02), Sanitation Salvage (VM-03), Stand Improvement- Thinning and Slashing (VM-06), Native Plant Re-vegetation (VM-14), Prescribed Fire- Pile Burning (FM-05), Fuel break Construction (FM-06), Fireline Construction (VM-07), and Piling (Hand or Machine) (FM-08).

Methods: Force account-hand or aerial ignition.

Equipment Used: Drip torch, helicopter, engine, and water pumps.

Photo of recently completed site preparation burn.

Forest Plan Management Area Direction Constraining this Activity

This activity only would occur in Management Areas 1, 2, 3a. It also would meet all applicable requirements in the 1987 Forest Plan.

Card FM-03
Activity: Prescribed Burning - Site Preparation

Other Laws, Regulations, or Policies Constraining this Activity

Compliance with the Clean Air Act and the Montana State Improvement Plan.
All prescribed burning would be implemented in full compliance with the Montana Department of Environmental Quality air quality program through coordination with the Montana/IDAHO Airshed Group.

Endangered Species Act 1973 and Northern Rockies Lynx Management Direction (2007).

National Historic Preservation Act (NHPA)– (16 U.S.C. 470), American Indian Religious Freedom Act (AIRFA)– (42 U.S.C. 1996, 1996a), Native American Graves Protection and Repatriation Act (NAGPRA)– (25 U.S.C. 3001-3013), Executive Order 13007, Inadvertent Discovery Protocol (2015)
36 CFR Part 294- Special Areas; Roadless Area Conservation; and Final Rule. This rule was effective on March 13, 2001.

When would this activity be implemented?

Site prep burning most often occurs following a regeneration harvest and in preparation for natural or artificial regeneration.

Examples include, but are not limited to, the following:

- A brushy clearcut scheduled to be planted with ponderosa pine seedlings.
- A previously harvested stand with the objective to naturally regenerate lodgepole pine.

Integration Opportunities: Consider planning with adjacent prescribed burning or fuel reduction activities. Consider incorporating into brush disposal plans. For areas requiring artificial regeneration, coordinate and schedule site preparation activities with the Forest culturist in advance to ensure burning would be completed prior to planting.

Card FM-04
Activity: Prescribed Fire – Maintenance Burning

Description: A low-intensity prescribed fire treatment typically following previous prescribed fire treatments or wildfire designed to maintain a naturally occurring fire return interval and desired conditions.

- Used in warm, dry forest types that would naturally experience a more frequent fire return interval, often scheduled every 10 to 15 years.
- Low-intensity fire would be prescribed to reduce levels of: grasses, brush, forest litter, and concentrations of down wood. Anticipated overstory mortality may range from 0 percent to 10 percent depending on species composition, existing fuel loads, and scale.
- Would commonly occur to maintain conditions achieved through previous fuels reduction activities or wildfire.
- Prior slashing of ladder fuels and standing dead trees may occur to minimize fire intensity and limit resistance to control.

Objectives: Prescribed maintenance burning lowers surface fuel loading; increases canopy base heights; improves species composition and structure; and stimulates browse species for wildlife forage. Maintenance burns are designed to mimic naturally occurring low-intensity fires (often lightning caused) that burned at a frequent fire return interval.

- Maintain reduced potential for crown fire behavior within the WUI, community protection and in low/mixed severity fire regimes.
- Reduce excess surface fuels and move units closer to historical conditions.
- Reduce risk from wildfire to firefighters, the public, and adjacent private lands within the project area.
- Maintain fire as a natural process on the landscape.

Related Actions: Stand Improvement-Thinning and Slashing (VM-06), Native Plant Re-vegetation (VM-14), Fuel Break Construction (Hand or Machine) (FM-06), and Fireline Construction (Hand or Machine) (FM-07).

Methods: Force account-hand or aerial ignition.

Equipment Used: Drip torch, helicopter, engine, and water pumps.

Photograph of a Ponderosa pine stand being treated with a prescribed maintenance burn.

Forest Plan Management Area Direction Constraining this Activity

This activity would only occur in Management Areas 1, 2, 3a & 5. It also would meet all applicable requirements in the 1987 Forest Plan.

Card FM-04
Activity: Prescribed Fire – Maintenance Burning

Other Laws, Regulations, or Policies Constraining this Activity

Compliance with the Clean Air Act and the Montana State Improvement Plan.
All prescribed burning would be implemented in full compliance with the Montana Department of Environmental Quality air quality program through coordination with the Montana/IDAHO Airshed Group.

Endangered Species Act 1973 and Northern Rockies Lynx Management Direction (2007).

National Historic Preservation Act (NHPA)– (16 U.S.C. 470), American Indian Religious Freedom Act (AIRFA)– (42 U.S.C. 1996, 1996a), Native American Graves Protection and Repatriation Act (NAGPRA)– (25 U.S.C. 3001-3013), Executive Order 13007, and Inadvertent Discovery Protocol (2015).

When would this activity be implemented?

Prescribed maintenance burning would be implemented approximately 10 to 15 years following other prescribed fire treatments to maintain desired conditions in areas that historically had a frequent fire return interval.

Examples include, but are not limited to, the following:

- Warm, dry Ponderosa pine stands that historically burned on average every 10 years.
- Open grown stands where there is a desire to increase forage for big game species.

Integration Opportunities: Coordinate implementation with adjacent fuel reduction treatments. Consider low-intensity prescribed burning as a part of meadow restoration or wildlife habitat improvement activities.

Card FM-05
Activity: Prescribed Fire – Pile Burning

Description: Piles of nonmerchantable wood and slash are manually burned with a drip torch. Pile burning is guided by burn plans that specify the parameters of favorable conditions during which the risk of fire spread and air quality impacts are low, but they insure complete fuel consumption.

Pile burning is designed to meet the following results:

- Consume 70 percent-100 percent of each pile.
- Minimize crown scorch and bole damage to residual trees.
- Ground fire spread outside of each pile is considered acceptable.

Objectives: Pile burning is used to dispose of piles (hand/machine) of residual slash from vegetation management activities or existing surface fuels. Pile burning is intended to reduce excess fuel loadings, reduce fire intensity, and protect residual trees or values prior to the implementation of a prescribed fire or wildfire.

Related Actions: Clearcut with reserves (VM-01), Seed Tree and Shelterwood (VM-02), Salvage-Sanitation Cut (VM-03), Group Select/Single Tree (VM-04), Improvement Cut/Commercial Thin (VM-05), Stand Improvement- Thinning and Slashing (VM-06), Herbicide Weed Control (VM-12), Native Plant Re-vegetation (VM-14), Prescribed fire-Low Intensity (FM-01), Prescribed fire- Mixed Severity (FM-02), Prescribed Fire- Site Preparation (FM-03), Fuel break Construction (FM-06), and Piling (Hand or Machine) (FM-08).

Methods: Force account-hand ignition

Equipment Used: Handcrews and drip torches.

Photograph of a handpile burn unit during ignitions.

Forest Plan Management Area Direction Constraining this Activity

This activity would only occur in Management Areas 1, 2, 3a & 5. It also would meet all applicable requirements in the 1987 Forest Plan.

Card FM-05
Activity: Prescribed Fire – Pile Burning

Other Laws, Regulations, or Policies Constraining this Activity

Compliance with the Clean Air Act and the Montana State Improvement Plan.
All prescribed burning would be implemented in full compliance with the Montana Department of Environmental Quality air quality program through coordination with the Montana/IDAHO Airshed Group.

National Historic Preservation Act (NHPA)– (16 U.S.C. 470), American Indian Religious Freedom Act (AIRFA)– (42 U.S.C. 1996, 1996a), Native American Graves Protection and Repatriation Act (NAGPRA)– (25 U.S.C. 3001-3013), Executive Order 13007, and Inadvertent Discovery Protocol (2015).

When would this activity be implemented?

Pile burning would be implemented in areas where the piling activity occurred.

Examples include, but are not limited to, the following:

- Handpiles generated after thinning to remove Douglas fir ladder fuels on a warm, dry site adjacent to private property.
- Landing piles associated with vegetation management activities requiring whole tree yarding and landing processing.

Integration Opportunities: Consider planning in conjunction with other prescribed burning activities.

Card FM-06
Activity: Fuel Break Construction (Hand or Machine)

Description: Fuel break construction consists of cutting and removing standing vegetation of a certain diameter and/or species from the designated fuel break width as well as removing activity fuels and existing down wood.

- An area generally between 20 feet and 100 feet wide is cleared of the vegetation specified for removal. Generally, vegetation removal would be small diameter trees (larger than 8 inches diameter breast height [dbh]) and shrubs. Exceptions may occur during the construction of fuel breaks located along ridgetops, existing roads, and/or trails where larger trees may need to be removed depending on existing conditions and potential fire behavior.
- Low-hanging residual tree limbs would be pruned to limit the probability of torching and spotting from fire.
- All existing down woody fuels and activity slash within this area would be removed to limit fire intensities. Generally, fuels are scattered to prevent windrows, but they may be piled depending on conditions.
- Snags determined to be a safety hazard within the fuel break width would be removed.

Objectives: Fuel breaks would be used to limit the spread of prescribed burns and/or future wildfire by removing or reducing surface and ladder fuels adjacent to control lines. They are strategically placed along the perimeter of units, ridgetops, or along existing roads and trails. They decrease the resistance to control fire by reducing fire intensity and the potential for torching and spotting.

Related Actions: Prescribed fire low-Intensity (FM-01), Prescribed fire- Mixed Severity (FM-02), Prescribed Fire-Site Preparation (FM-03), Prescribed Fire-Maintenance (FM-04), Fireline Construction (FM-07), and Native Plant Re-Vegetation (VM-14).

Methods: Handcrews-force account, Service Contracts (Stand Improvement/Fuels IDIQ), Stewardship Contract, and Timber Sale Contract.

Machine- Service contract (Mechanical Fuels Indefinite Delivery Indefinite Quantity [IDIQ]), stewardship contract, and timber sale contract.

Equipment Used: Chainsaws, feller-buncher, skidder, and excavator.

Forest Plan Management Area Direction Constraining this Activity

This activity would only occur in Management Areas 1, 2, 3a. It also would meet all applicable requirements in the 1987 Forest Plan.

Other Laws, Regulations, or Policies Constraining this Activity

Endangered Species Act 1973 and Northern Rockies Lynx Management Direction (2007).

National Historic Preservation Act (NHPA)– (16 U.S.C. 470), American Indian Religious Freedom Act (AIRFA)– (42 U.S.C. 1996, 1996a), Native American Graves Protection and Repatriation Act (NAGPRA)– (25 U.S.C. 3001-3013), Executive Order 13007, Inadvertent Discovery Protocol (2015) 36 CFR Part 294- Special Areas; Roadless Area Conservation; and Final Rule. This rule was effective on March 13, 2001.

When would this activity be implemented?

Fuel break construction may be implemented under multiple conditions. Their primary use is associated with the implementation of prescribed fire activities. Fuel breaks would be placed along the perimeter of units or adjacent to existing roads and trails, when possible. The fireline construction activity would be used in conjunction with the fuel break for locations where roads, trails, or natural barriers were not available.

Card FM-06 Activity: Fuel Break Construction (Hand or Machine)
Examples include, but are not limited to, the following: • Fuel break construction may be implemented as a standalone activity in strategic locations identified for the future control of larger prescribed burns or wildfire. • Located along existing road networks prior to the implementation of large landscape prescribed burns.
Integration Opportunities: Consider incorporating into other vegetation management activities. Consider incorporating into stewardship activities or brush disposal plans, where appropriate. Consider utilizing fire crews or IDIQ contracts for implementation.

Card FM-07
Activity: Fireline Construction (Hand or Machine)

Description: A constructed barrier from which flammable materials were removed by scraping or digging to mineral soils. The fireline width is dependent on the existing fuels and anticipated fire behavior. A clearing, generally smaller than 10 feet wide would be completed prior to fireline construction. If a larger fuel break would be required for control, the Fuel break Construction (#) activity would be applied in addition to fireline construction. Construction may be completed by hand using hand tools or by machine.

- On the exterior edge of the clearing or fuel break, a continuous fireline of not less than 18 inches wide and not greater than 36 inches wide would be scraped or dug to mineral soil.
- Cut material and existing down wood removed from the fireline would be scattered within the cutting area and not windrowed or otherwise concentrated adjacent to the fuel break.
- All existing stumps and snags within the clearing limits would be cut flush at ground level and/or scraped around down to mineral soil to remove fuels and prevent ignition. Slash would not be mixed with side cast material. Side cast would be placed on the outside edge of the fireline to prevent smoldering and to remain available for use during rehabilitation.
- Shallow waterbars (4-5 inches) would be constructed across firelines using the following spacing guidelines.

Slope Gradient (percent)	Waterbar Spacing (feet)
< 20	370
21 – 30	270
31 – 40	200
41 – 50	150
51 – 60	110
> 61	100

- Where possible, natural barriers, such as rocks, streams, roads, or trails would be utilized.

Objectives: Fireline construction is used to provide a barrier to fire spread. It is primarily used to control prescribed fire within established boundaries.

Related Actions: Prescribed fire Low-Intensity (FM-01), Prescribed fire- Mixed Severity (FM-02), Prescribed Fire- Site Preparation (FM-03), Prescribed Fire- Maintenance (FM-04), Fuel break Construction (FM-06), and Native Plant Re-Vegetation (VM-14).

Methods: Handcrews-force account, service contracts (stand improvement/fuels IDIQ), stewardship contract, and timber sale contract.

Machine- Service contract (mechanical fuels IDIQ), stewardship contract, and timber sale contract.

Equipment Used: Hand tools and excavator.

Forest Plan Management Area Direction Constraining this Activity

This activity would only occur in Management Areas 1, 2, 3a. It also would meet all applicable requirements in the 1987 Forest Plan.

Other Laws, Regulations, or Policies Constraining this Activity

National Historic Preservation Act (NHPA)– (16 U.S.C. 470), American Indian Religious Freedom Act (AIRFA)– (42 U.S.C. 1996, 1996a), Native American Graves Protection and Repatriation Act (NAGPRA)– (25 U.S.C. 3001-3013), Executive Order 13007, and Inadvertent Discovery Protocol (2015).

Card FM-07 **Activity: Fireline Construction (Hand or Machine)**
When would this activity be implemented?
Fireline construction would be implemented in areas prior to prescribed fire activities. Firelines only would be constructed to control the fire spread when necessary. Existing roads, trails, streams, or natural barriers would be utilized when fire managers determine they would be effective at controlling fire spread based on potential fire behavior or time of year where possible.
Integration Opportunities: Consider incorporating into timber sale, stewardship activities, or brush disposal plans, where appropriate. Consider utilizing fire crews or IDIQ contract for implementation.

Card FM-08
Activity: Piling (Hand or Machine)

Description: Piling is the gathering and concentrating of residual slash (tops, limbs, branches, trunks, etc.) and existing dead and down woody material, generally larger than 1 inch in diameter, by hand or machine. Slash generated during vegetation management activities involving harvest operations would be generally whole tree yarded to landings and concentrated into roadside piles using equipment. Slash concentrations created during other vegetation management activities would be piled throughout units by hand or machine depending on material size and amounts. Typically, this material is disposed of by burning.

- Piles are carefully located outside of residual/leaf tree driplines, in openings or areas of low tree densities, to minimize scorch to trees when the piles would be burned.
- Piles are constructed to be compact and free of dirt and duff and to have a good base to prevent the pile from toppling and not made on down logs, rotten stumps, or rocks.
- Hand piles would be smaller than 10 feet in diameter with a minimum of 6 feet in height.
- Machine piles not associated with landings would be smaller than 15 feet in diameter and a minimum of 10 feet in height.
- Landing piles shall be of a size and location which would not impair road use or result in damage to residual trees. Size specifications and locations for landing piles would be determined based on-site specific conditions, harvest unit size, and volume.

Objectives: Piling is used to dispose of residual slash from vegetation management activities or existing surface fuels that have the potential to produce undesirable fire behavior or effects. Piling would be intended to reduce excess fuel loadings and fire intensity as well as to protect residual trees or values prior to the implementation of a prescribed fire or wildfire.

Related Actions: Clearcut with reserves (VM-01), Seed Tree and Shelterwood (VM-02), Salvage-Sanitation Cut (VM-03), Group Select/Single Tree (VM-04), Improvement Cut/Commercial Thin (VM-05), Stand Improvement- Thinning and Slashing (VM-06), Herbicide Weed Control (VM-12), Native Plant Re-vegetation (VM-14), Prescribed fire-Low Intensity (FM-01), Prescribed fire- Mixed Severity (FM-02), Prescribed Fire- Site Preparation (FM-03), Prescribed Fire-Pile Burning (FM-05), and Fuel Break Construction (FM-06).

Methods: Handcrews-force account, service contracts (stand improvement/fuels IDIQ), stewardship contract, and timber sale contract.

Machine- Service contract (mechanical fuels IDIQ), stewardship contract, and timber sale contract.

Equipment Used: Chainsaws, excavator, grapple, loader, brush rake, and skidder.

Forest Plan Management Area Direction Constraining this Activity

This activity would only occur in Management Areas 1, 2, 3a. It also would meet all applicable requirements in the 1987 Forest Plan.

Other Laws, Regulations, or Policies Constraining this Activity

National Historic Preservation Act (NHPA)– (16 U.S.C. 470), American Indian Religious Freedom Act (AIRFA)– (42 U.S.C. 1996, 1996a), Native American Graves Protection and Repatriation Act (NAGPRA)– (25 U.S.C. 3001-3013), Executive Order 13007, and Inadvertent Discovery Protocol (2015).

Card FM-08 Activity: Piling (Hand or Machine)
When would this activity be implemented?
Hand piling and machine piling would be implemented in areas treated by other vegetation management activities that produce slash or in areas where existing fuel loads have the potential for undesirable fire behavior that may cause negative effects to on-site (residual trees) or off-site values (private property). Generally, piling is used as an intermediate fuel reduction treatment prior to the use of prescribed fire activities. Examples include, but are not limited to, the following: • Machine piling associated with landings would be when a vegetation management activity requiring harvest would be prescribed. • Piling and pile burning may be prescribed as a standalone activity in areas not suitable for other prescribed fire activities, such as property boundaries, plantations, or stands dominated by fire intolerant species.
Integration Opportunities: Consider incorporating into timber sale, stewardship activities, or brush disposal plans, where appropriate. Consider utilizing fire crews or an IDIQ contract for implementation.

Card FM-09
Activity: Mastication of Fuels

Description: Mastication is a mechanical process to change the structure, arrangement, and size of horizontal and vertical fuels. Mastication involves shredding standing trees, shrubs, and downed woody materials leaving a mat of well distributed shredded wood on the forest floor. Mastication may be used in areas where other vegetation management or prescribed fire activities are not feasible and current fuel conditions are at risk to undesirable fire behavior.

- Mastication changes the size and orientation of fuels; it does not remove them from the site.
- Generally, masticated material would be within the following specifications: 75 percent of chips smaller than 3 feet in length and 25 percent of chips larger than 3 feet in length with a slash depth smaller than 1 feet in height.
- In addition to standing live and dead vegetation, mastication of existing down wood may occur to rearrange surface fuels and potential fire behavior.
- Primarily used in areas where opportunities to utilize other vegetation and fuel reduction activities would be limited.

Objectives: Mastication would be used to reduce the potential for crown fire behavior by modifying the arrangement of surface and canopy fuels. Mastication would be designed to raise canopy base heights and to reduce the potential for canopy ignition by removing ladder fuels. Mastication also is intended to reduce potential flame lengths by rearranging and compacting existing surface fuels.

Related Actions: Stand Improvement-Thinning and Slashing (VM-06), Fuel break Construction (FM-06), and Road Maintenance (TRM-03).

Methods: Mechanical- Service Contract (Mechanical Fuels IDIQ) and Stewardship Contract.

Equipment Used: Rotary drum masticator, horizontal drum masticator, excavator, feller-buncher, harvester, and backhoe.

Forest Plan Management Area Direction Constraining this Activity

This activity only would occur in Management Areas 1, 2, 3a. It also would meet all applicable requirements in the 1987 Forest Plan.

Other Laws, Regulations, or Policies Constraining this Activity

Endangered Species Act 1973 and Northern Rockies Lynx Management Direction (2007).

National Historic Preservation Act (NHPA)– (16 U.S.C. 470), American Indian Religious Freedom Act (AIRFA)– (42 U.S.C. 1996, 1996a), Native American Graves Protection and Repatriation Act (NAGPRA)– (25 U.S.C. 3001-3013), Executive Order 13007, and Inadvertent Discovery Protocol (2015).

When would this activity be implemented?

Mastication may be used in areas where other vegetative management or prescribed fire activities would not be feasible and current fuel conditions would be at risk to undesirable fire behavior.

Examples include, but are not limited to, the following:

- A ponderosa pine plantation with moderate to high mortality from previous mountain pine beetle activity that does not have a commercial product or where prescribed fire would not achieve the desired conditions.
- Stand improvement of a plantation where residual slash hazard would be unacceptable due to proximity to values.
- Roadside brushing to maintain road clearing widths.
- Fuel break construction along an existing road system.

Card FM-09 Activity: Mastication of Fuels
Integration Opportunities: Consider opportunities during stand improvement activities to minimize fuel hazards. Coordinate implementation with adjacent treatments, such as prescribed burning or fuel reduction. Coordinate with a transportation engineer to incorporate it into road maintenance plans, timber sale, or stewardship contracts.

Card FM-10
Activity: Chipping of Fuels

Description: Chipping is a mechanical process to change the structure, arrangement, and size of surface fuels. Chipping involves feeding slash generated from vegetation or fuels activities or existing surface fuels into a chipper leaving a mat of well distributed chips on the forest floor.

- Chips would be scattered and well distributed to an average depth of smaller than 2 inches.
- In certain locations, chips may be removed from the site.
- Chipping may be used as an alternative to pile and pile burning activities in certain locations.
- Chipping would likely occur in developed sites (campground and trailhead), adjacent to private property, or along roads and motorized trails.

Objectives: Chipping would be used to reduce potential fire behavior by reducing or modifying the arrangement of surface fuels.

Related Actions: Stand Improvement-Thinning and Slashing (VM-06) and Fuel break Construction (FM-06).

Methods: Handcrews-force account, service contract, and stewardship contract.

Equipment Used: Chipper and pick-up truck.

Forest Plan Management Area Direction Constraining this Activity

This activity only would occur in Management Areas 1, 2, 3a. It also would meet all applicable requirements in the 1987 Forest Plan.

Other Laws, Regulations, or Policies Constraining this Activity

National Historic Preservation Act (NHPA)– (16 U.S.C. 470), American Indian Religious Freedom Act (AIRFA)– (42 U.S.C. 1996, 1996a), Native American Graves Protection and Repatriation Act (NAGPRA)– (25 U.S.C. 3001-3013), Executive Order 13007, and Inadvertent Discovery Protocol (2015).

When would this activity be implemented?

Chipping would likely occur in areas where other vegetation management activities that leave residual slash occurred. Chipping may be used as an alternative to piling and pile burning in certain locations with existing road access.

Examples include, but are not limited to, the following:

- Chipping of slash created during fuel break construction along an existing road.
- Clean-up of branches or slash in a developed campground following hazard tree removal.
- Chipping of excess slash created during motorized trail construction.

Integration Opportunities: Consider opportunities during stand improvement or thinning/slashing activities to minimize roadside fuel hazards. Coordinate implementation with adjacent treatments, such as prescribed burning or fuel reduction.

Transportation Management

Card TRM-01
Activity: Specified Road Construction

Description: This activity designs and constructs new roads on National Forest System lands. These roads would be included in the National Forest System of Roads (NFSR), be maintained by Federal funds, and be available in the long-term for future forest management activities.

- Road construction activities may include, but are not limited to, using heavy equipment to clear timber to the clearing limits; excavate, as needed; and establish a pioneer road, grubbing of stumps, displacement of native soil, and other activities associated with construction.
- Culverts and bridges would be installed in specific locations to account for drainage and stream crossing requirements.
- Rock would be developed on an as needed basis from quarries and hauled in trucks to the construction site to strengthen weak subgrade materials.
- Most Forest roads are single lane with pull-outs, as needed, and constructed with local native material and designed for highway legal loads.
- Newly constructed Forest roads are mostly closed for public travel, but they may open for administrative use and closures may occur for public safety, wildlife protection, watershed concerns, or other reasons.
- Forest roads open to the public would be displayed on the Motor Vehicle Use Maps (MVUM).
- Traffic control measures would be utilized for public safety during project work, as needed.

Objectives: Design and implement a suitable transportation and trail system for long-term land management that would be responsive to public interests and reduces adverse environmental effects.

- Long-term specified roads would be constructed to access treatment areas and provide long-term access for future land management activities.
- Location, design, and construction of these roads would follow best management practice standards to minimize potential environmental impacts.
- Roads would be positioned at mid- to upper slope locations, but the final locations may depend upon future access needs.

Related Actions: Clearcut with Reserves (VM-01) ,Seed Tree /Shelterwood (VM-02), Salvage Sanitation Cut (VM-03), Group Selection/Single Tree (VM-04), Improvement Cut/Commercial Thin (VM-05), Log Transport (VM-07), Herbicidal Weed Control (VM-12), Temporary Road Construction (TRM-02), Road Maintenance and Reconditioning (TRM-03), Road Decommissioning (TRM-04), and Road Storage (TRM-05).

Methods: Activity would be implemented by Forest road crews or local contractors.

Equipment Used: Excavator, loaders, crawler tractors, rock drills, dump trucks, graders, roller compactors, rock crushers, cranes, and chainsaws for initial timber clearing.

Forest Plan Management Area Direction Constraining this Activity

This activity only would occur in areas that would meet all applicable requirements in the 1987 Forest Plan.

Card TRM-01
Activity: Specified Road Construction

Other Laws, Regulations, or Policies Constraining this Activity

36 CFR Part 294- Special Areas; Roadless Area Conservation; Final Rule:

> "The Department of Agriculture is adopting this final rule to establish prohibitions on road construction, road reconstruction, and timber harvesting in inventoried roadless areas on National Forest System lands. The intent of this final rule is to provide lasting protection for inventoried roadless areas within the National Forest System in the context of multiple-use management. This rule was effective on March 13, 2001."

Follow Montana best management practices during the road design process.

Endangered Species Act 1973 and Northern Rockies Lynx Management Direction (2007).

National Historic Preservation Act (NHPA)– (16 U.S.C. 470), American Indian Religious Freedom Act (AIRFA)– (42 U.S.C. 1996, 1996a), Native American Graves Protection and Repatriation Act (NAGPRA)– (25 U.S.C. 3001-3013), Executive Order 13007, and Inadvertent Discovery Protocol (2015).

When would this activity be implemented?

Forest road construction would be implemented when vehicular access would be needed for the protection, administration, and utilization of the Bitterroot National Forest.

Integration Opportunities: Provide motorized access for new areas. Timber management and recreation opportunities may be possible in areas not accessible before. Consider utilizing gates instead of other barriers where continued access would be necessary for implementation of additional vegetation and fuels management activities as well as critical locations for fire suppression.

Card TRM-02
Activity: Temporary Road Construction

Description: A road necessary for operations as authorized by a contract, permit, lease, or other written authorization that is not included in a Forest road system. Temporary roads would be constructed to a minimal standard to provide access for timber harvesting equipment and log trucks. Roads would be decommissioned for this project as described below.

- Typical construction methods use an excavator to clear to the clearing limits, excavate as needed, and establish a pioneer road.
- Temporary culverts and bridges may be installed in specific locations to account for drainage and stream crossing requirements.
- Road decommissioning would return the road footprint to its condition prior to use. If an existing road prism was used for temporary roads, it would be returned to conditions prior to use. If new temporary roads would be needed, they would be recontoured and fully rehabilitated.
- Road decommissioning may or may not include returning excavated soils back onto the road prism returning the ground to its natural contour, place woody debris on the disturbed area, and seed and fertilize the disturbed soil.

Objectives: These roads would be intended to provide short-term access for activities within National Forest System lands. These roads would be decommissioned after their designated use period is over.

Related Actions: Clearcut with reserves (VM-01), Seed Tree/ Shelterwood (VM-02), Sanitation Salvage Cut (VM-03), Group Selection/Single Tree (VM-04), Improvement Cut/ Commercial Thin (VM-05), Log Transport (VM-07), Herbicidal Weed Control (VM-12), Native Plant Re-Vegetation (VM-14), Specified Road Construction (TRM-01), Road Maintenance and Reconditioning (TRM-03), Road Decommissioning (TRM-04), and Sub-soiling (TRM-08).

Methods: Activity would be implemented through a timber sale contract.

Equipment Used: Excavator, loaders, bulldozer, dump trucks, and graders as well as along with timber harvester and chainsaws for initial timber clearing.

Forest Plan Management Area Direction Constraining this Activity

This activity only would occur in areas that would meet all applicable requirements of the 1987 Forest Plan.

Other Laws, Regulations, or Policies Constraining this Activity

36 CFR Part 294- Special Areas; Roadless Area Conservation; and Final Rule. This rule was effective on March 13, 2001.

Endangered Species Act 1973 and Northern Rockies Lynx Management Direction (2007).

National Historic Preservation Act (NHPA)– (16 U.S.C. 470), American Indian Religious Freedom Act (AIRFA)– (42 U.S.C. 1996, 1996a), Native American Graves Protection and Repatriation Act (NAGPRA)– (25 U.S.C. 3001-3013), Executive Order 13007, and Inadvertent Discovery Protocol (2015).

Card TRM-03
Activity: Road Maintenance and Reconditioning

Description: Road maintenance includes the repair or upkeep of a road necessary to perpetuate the road and to provide for its safe use. Maintenance and reconditioning of existing Forest roads would be an ongoing process that occurs on a periodic basis.

- Activities include: surface blading, earth work (e.g. cut and fill shaping), road surface shaping, ditch cleaning and reshaping, roadside clearing and/or brushing, seeding disturbed areas, drain dip and cross drain cleaning and construction, culvert cleaning, armoring, and/or replacement, dust abatement, slash filter windrow, and sediment trap construction near live water crossings.
- Traffic control measures would be utilized for public safety during project work, as needed.

Objectives: Road maintenance and reconditioning would be performed to maintain a safe travel way that minimizes the impacts of roads on water resources. Roads located in drainages, with segments close to streams, or high public use were prioritized for improved surfaces and best management practice upgrades. Appropriate maintenance could protect: road investment, soil, water quality, and riparian resources.

Related Actions: Log Transport (VM-07)

Methods: Road maintenance requires the use of heavy equipment to perform: excavation, embankment, compaction, area grading, removal and disposal of roadside vegetation, material haul, material placement, and other incidental work activities.

Equipment Used: Excavators, dozers, compactors, dump trucks, water trucks, brushers, front end loaders, and other items on an as needed basis.

Forest Plan Management Area Direction Constraining this Activity

This activity only would occur in areas that would meet all applicable requirements in the 1987 Forest Plan.

Other Laws, Regulations, or Policies Constraining this Activity

Clean Water Act 33 U.S.C. §1251 et seq. (1972).
The Clean Water Act (CWA) establishes the basic structure for regulating discharges of pollutants into the waters of the United States and regulating quality standards for surface waters.

National Historic Preservation Act (NHPA)– (16 U.S.C. 470), American Indian Religious Freedom Act (AIRFA)– (42 U.S.C. 1996, 1996a), Native American Graves Protection and Repatriation Act (NAGPRA)– (25 U.S.C. 3001-3013), Executive Order 13007, Inadvertent Discovery Protocol (2015) 36 CFR Part 294- Special Areas; Roadless Area Conservation; and Final Rule. This rule was effective on March 13, 2001.

When would this activity be implemented?

Roads and drainage systems normally deteriorate because of traffic, weather, and age. Many such conditions could be avoided and corrected by timely maintenance. Maintenance and reconditioning would be implemented on an annual and cyclic basis depending on need. Road maintenance and reconditioning activities could be accomplished by Forest crews, public works contracts, service contracts, and commercial timber sales. Emergency repairs may be required due to storms or other catastrophic events.

Integration Opportunities: Combining road maintenance activities with other work that requires the use of the road maintenance equipment could provide cost savings in mobilization and implementation.

Card TRM-04
Activity: Road Decommissioning

Description: Activities that result in the stabilization and restoration of unneeded roads to a more natural state. One or more treatments would be used to decommission the road depending on resource objectives and cost.

- Roads causing resource impacts may be physically blocked, decompacted, or recontoured to restore surface drainage as well as have drainage ways re-established, have unstable road embankments removed, and recontour surfaces to restore natural slopes.
- Roads or road sections that would be recontoured would be typically seeded and mulched to prevent soil erosion.
- Road fill and culverts may be removed from streams, floodplains, and wetlands to restore natural flow patterns and ecological function.
- Roads not causing resource impacts could be administratively decommissioned by removing these roads from the National Forest System of Roads and noting the decision in Natural Resource Manager (NRM).

Objectives: Eliminate roads from the system, which are not needed for future use, and perform decommissioning treatments where roads would be causing adverse environmental effects.

Related Actions: Herbicidal Weed Control (VM-12), Native Plant Revegetation (VM-14), Temporary road Construction (TRM-02), Road Maintenance and Reconditioning (TRM-03), Trail construction (TRM-06), and Sub-soiling (TRM-08).

Methods: Natural recovery, and heavy equipment. Completed by Forest crews, stewardship sale, timber sale, and/or service contracts.

Equipment Used: Excavator and subsoiler.

Forest Plan Management Area Direction Constraining this Activity

This activity only would occur in areas that would meet all applicable requirements in the 1987 Forest Plan.

Other Laws, Regulations, or Policies Constraining this Activity

National Historic Preservation Act (NHPA)– (16 U.S.C. 470), American Indian Religious Freedom Act (AIRFA)– (42 U.S.C. 1996, 1996a), Native American Graves Protection and Repatriation Act (NAGPRA)– (25 U.S.C. 3001-3013), Executive Order 13007, and Inadvertent Discovery Protocol (2015).

When would this activity be implemented?

Roads identified through analysis as not needed would be candidates for road decommissioning. It is advantageous to implement several decommissioning activities within a small geographic area to make it financially viable.

Integration Opportunities: Opportunity for watershed rehabilitation within the same area as road decommissioning; similar equipment would be used. Hiking access or off-highway vehicle access through trails development on decommissioned roads could provide access for subsistence and recreation uses. Road decommissioning may be performed as a timber sale contract requirement when the road would be used as a haul route by the purchaser. This should not be required if the road would be needed to accomplish post-harvest activities, such as slashing, burning, or planting. Consider delaying road decommissioning on segments needed for vegetation and fuels management implementation until after those activities would be completed. Coordinate with fuels and silviculture on future needs during implementation planning.

Card TRM-05
Activity: Road Storage

Description: Storage treatments would occur on roads that would be needed for long-term access, but not in the short-term. Treatments would leave the road prism intact, but in a stabilized condition until needed for future use.

- Storage activities could vary from no treatment (administrative closure) to those that include road surface ripping; placement of woody debris on roads; removal of drainage structures (such as culverts) at risk of failure; and reshaping any stream crossing to natural contours. Disturbed soils would be seeded, fertilized, and mulched; road entrances may be fully re-contoured.
- Water bars or other drainage features may be constructed in locations that present an unacceptable risk of failure or mass wasting.
- Road prism would remain partially intact after storage treatments, but it would not be useable without reconstruction.
- Traffic control measures would be utilized for public safety during project work, as needed.
- Proposed road storage in this project would not affect legal public motorized access as authorized in the Bitterroot National Forest Travel Plan.

Objectives: To avoid, minimize, or mitigate adverse effects to soil, water quality, and riparian resources by storing closed roads not needed for long periods.

- Stabilize prism to preserve the road structure and/or to reduce erosion and then stored between use cycles.
- Where road segments would not be needed for future management, there would be a need to decommission road segments to reduce road densities and improve elk security.
- There would be a need to address discrepancies (such as gated roads designated as open) between on-the-ground road conditions and travel status in the Bitterroot Travel Management Plan.

Related Actions: Specified Road Construction (TRM-01), Road Maintenance and Reconditioning (TRM-03), Trail Construction (TRM-06), Sub-soiling (TRM-08), and Native Plant Revegetation (VM-14).

Methods: Work would be performed by Forest personnel or local contractors.

Equipment Used: Excavators, pickup trucks, service trucks, all-terrain vehicles, utility task vehicles, and miscellaneous small tools.

Forest Plan Management Area Direction Constraining this Activity

This activity only would occur in areas that would meet all applicable requirements in the 1987 Forest Plan.

Other Laws, Regulations, or Policies Constraining this Activity

National Historic Preservation Act (NHPA)– (16 U.S.C. 470), American Indian Religious Freedom Act (AIRFA)– (42 U.S.C. 1996, 1996a), Native American Graves Protection and Repatriation Act (NAGPRA)– (25 U.S.C. 3001-3013), Executive Order 13007, and Inadvertent Discovery Protocol (2015).

When would this activity be implemented?

Roads identified through analysis as not needed for long periods would be candidates for storage activities. Funding would be required to implement road storage through public works contracts. It is advantageous to implement several storage activities within a small geographic area to make it financially viable.

Card TRM-05
Activity: Road Storage

Integration Opportunities: Opportunity for watershed rehabilitation within the same area as road storage, as similar equipment is used. Off-highway vehicle access through development of motorized trails on stored roads would provide access for subsistence and recreation uses.

Consider delaying road storage on segments needed for vegetation and fuels management implementation until after those activities would be completed. Coordinate with fuels and silviculture on future needs during implementation planning.

Card TRM-08
Activity: Sub-Soiling

Description: Sub-soiling is the physical shattering of the soils with heavy equipment, and it is the preferred treatment for severely compacted soils.

- Sub-soiling is done with an excavator and a specialized sub-soiling attachment called a sub-soiling grapple rake featuring a curved shank and a winged tooth.
- Soils would be decompacted to an approximate depth of 18-30 inches.
- Soil horizons would not be mixed and there is minimal disturbance to soil organic matter and existing vegetation.

Objectives: Soil compaction is the compression of soil macro and micro pores, which: reduce infiltration, soil porosity, water and nutrient holding capacity, and biological activity. Sub-soiling treats soil compaction to initiate soil restoration, improves soil aeration, and increase hydrologic function. Sub-soiling is an important tool in road decommissioning, which would be needed to reduce road densities and improve elk security.

- Improves infiltration of groundwater and reduces erosion and sedimentation associated with runoff.
- Allows plant roots and microscopic fungus to penetrate the soil more deeply, stabilizing soils and restoring soil nutrient balances.
- Enhances revegetation as seed germination and seedling survival is greater and seedlings receive increased moisture in decompacted soils.

Related Actions: Biological Weed Control (VM-11), Herbicide Weed Control (VM-12), and Native Plant Restoration (VM-14).

Methods: Sub-soiling would be implemented using Forest employees or contractors.

Equipment Used: Excavator with a sub-soiling grapple rake attachment.

Photo of the sub-soil grapple rake attachment in use.

Forest Plan Management Area Direction Constraining this Activity

This activity only would occur in Management Areas 1, 2, and 3A. It also would meet all applicable requirements in the 1987 Forest Plan.

Card TRM-08
Activity: Sub-Soiling

Other Laws, Regulations, or Policies Constraining this Activity

National Historic Preservation Act (NHPA)– (16 U.S.C. 470), American Indian Religious Freedom Act (AIRFA)– (42 U.S.C. 1996, 1996a), Native American Graves Protection and Repatriation Act (NAGPRA)– (25 U.S.C. 3001-3013), Executive Order 13007, and Inadvertent Discovery Protocol (2015).

When would this activity be implemented?

Generally, sub-soiling is proposed to treat compacted soils associated with roads and skid trails. It also may be used to treat terraced benches that have suitable access for ground-based equipment. Soils with coarse fragment (rock) content greater than 50 percent should not be sub-soiled due to the potential to create more disturbance and bring rocks to the soil surface.

Examples include, but are not limited to, the following:

- Treating skid trails used for yarding in units where timber is harvested in summer.
- Decompacting soil in roads that would be selected for decommissioning in the project area.
- Rehabilitating burn pile sites.

Integration Opportunities: Opportunities for watershed restoration and native plant restoration often coincide with road decommissioning. Opportunities may exist for treating historic skid trails within the project area.

Appendix B
Implementation Process

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Appendix B – Implementation Process

1. Introduction

This appendix describes the process for implementation of the Bitterroot Front project. This implementation process and the checklists included were developed with the design features in appendix A to provide a link from the environmental assessment (EA) to the project-specific work. The design features provide activity-specific design criteria and best management practices. The implementation process and checklists include: site conditions, triggers, mitigation measures, and other requirements for each type of activity. The purpose is to guide future data needs and field visits to develop treatment scenarios that are consistent with the National Environmental Policy Act documentation for the project.

This appendix outlines the process each activity would follow during implementation to ensure the: effects are within the scope of the analysis in the EA; activity would be allowed under the decision; and all resource-specific guidelines and protection measures would be incorporated into the activity design. The implementation process steps would be essential for: project accountability, tracking, decision-making, and documentation. The checklists, treatment unit tables and maps, and other products in this implementation process must be considered alongside the decision document, effects analyses, and design features for the success of the project as a whole.

The purpose of this document is to describe the implementation process for the Bitterroot Front project. The primary goals are to:

- Field-verify proposed treatment units and activities in the project area to ensure that treatments would move the landscape towards desired conditions.
- Demonstrate that the effects of implementation would be within the scope of activities and the range of effects described in the EA and authorized in the Decision Notice.
- Conduct a transparent implementation process that keeps the public, Indian Tribes, and other partners informed of and involved in the activity location, timing, and design.
- Ensure that the Forest Service (Forest) continues to consult and collaborate with interested federally recognized Indian Tribal Governments.
- Ensure implementation of activities would be responsive to dynamic on-the-ground conditions, new scientific information, and public/tribal input.

The implementation process is designed to be consistent with the 1987 Bitterroot National Forest Plan (1987 Forest Plan) as well as to be a living document, which may need to be adjusted during the implementation of each activity. As activities become verified, the process may be refined and use new technology or expertise. However, the major steps of this implementation process would be required components for the project decision.

The implementation plan is intended to be flexible. The order in which treatments are prioritized would be changed to meet the purpose and need of the Bitterroot Front project. Opportunities for public and tribal participation in: activity identification and review, field work, line officer approval, contracting, and monitoring are all required under the Bitterroot Front Decision Notice.

2. Tribal Consultation

Federally recognized Tribal Governments have a unique government-to-government relationship with the United States Government. Consultation with Indian Tribes requires a continuous process throughout a project including initiation, planning, design, and implementation. Forest guidance encourages staff not only to meet the requirements of Federal law, but to seek a partnership with Tribal Governments wherever possible.

To improve consultation and coordination with federally recognized Tribal Governments, the implementation process would include the following measures:

1. The staff of the Bitterroot National Forest would meet annually with the Confederated Salish and Kootenai Tribes (CSKT) and Nez Perce Tribe.
   a. The meeting would cover both the planned activities for the upcoming implementation activities and review of prior implementation efforts.
   b. The line officer responsible for implementation of the project would be present at the meeting.

3. Implementation Process

This section describes the 5-step process to move an implementation activity through: identification and prioritization, field review, contracting and documentation, and monitoring and adaptive management. In brief, the steps are:

1. Field survey and consultation
2. Project compliance check
3. Line officer approval
4. Implementation
5. Documentation and assessment

The Bitterroot Front project area is divided into 4 implementation phase areas (figure 1). The estimated acres of proposed activities for each phase appear in chapter 2 of the EA. The implementation process would be completed once for each of the phases. Activities under the Bitterroot Front project may take several months to undergo all steps of the implementation process. At any given time, several planned activities may be in different steps of the process and overlap between phases.

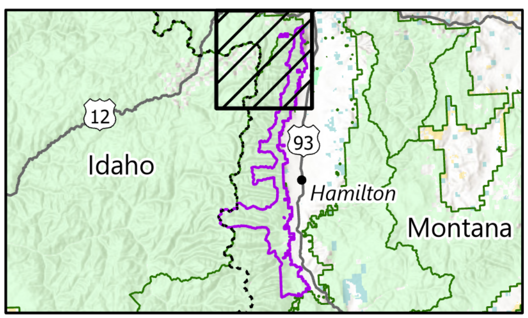
Bitterroot Front Environmental Assessment

Figure 1a
Project Implementation Phase

- Implementation phase 1
- Implementation phase 2
- Implementation phase 3
- Implementation phase 4

- Priority area
- Project boundary
- Forest boundary

- U.S. Forest Service
- U.S. Fish and Wildlife Service
- State
- Private



This map is intended to depict physical features as they generally appear on the ground and may not be used to determine title, ownership, legal boundaries, legal jurisdiction, including jurisdiction over roads or trails, or access restrictions that may be in place on either public or private land. Obtain permission before entering private lands, and check with appropriate government offices for restrictions that may apply to public lands. Lands, roads and trails within the boundaries of the National Forest may be subject to restrictions on motor vehicle use. Obtain a Motor Vehicle Use Map, or inquire at the local Forest Service Office for motor vehicle access information. Natural hazards may or may not be depicted on the map, and land users should exercise due caution. This map is not suitable for navigational use.

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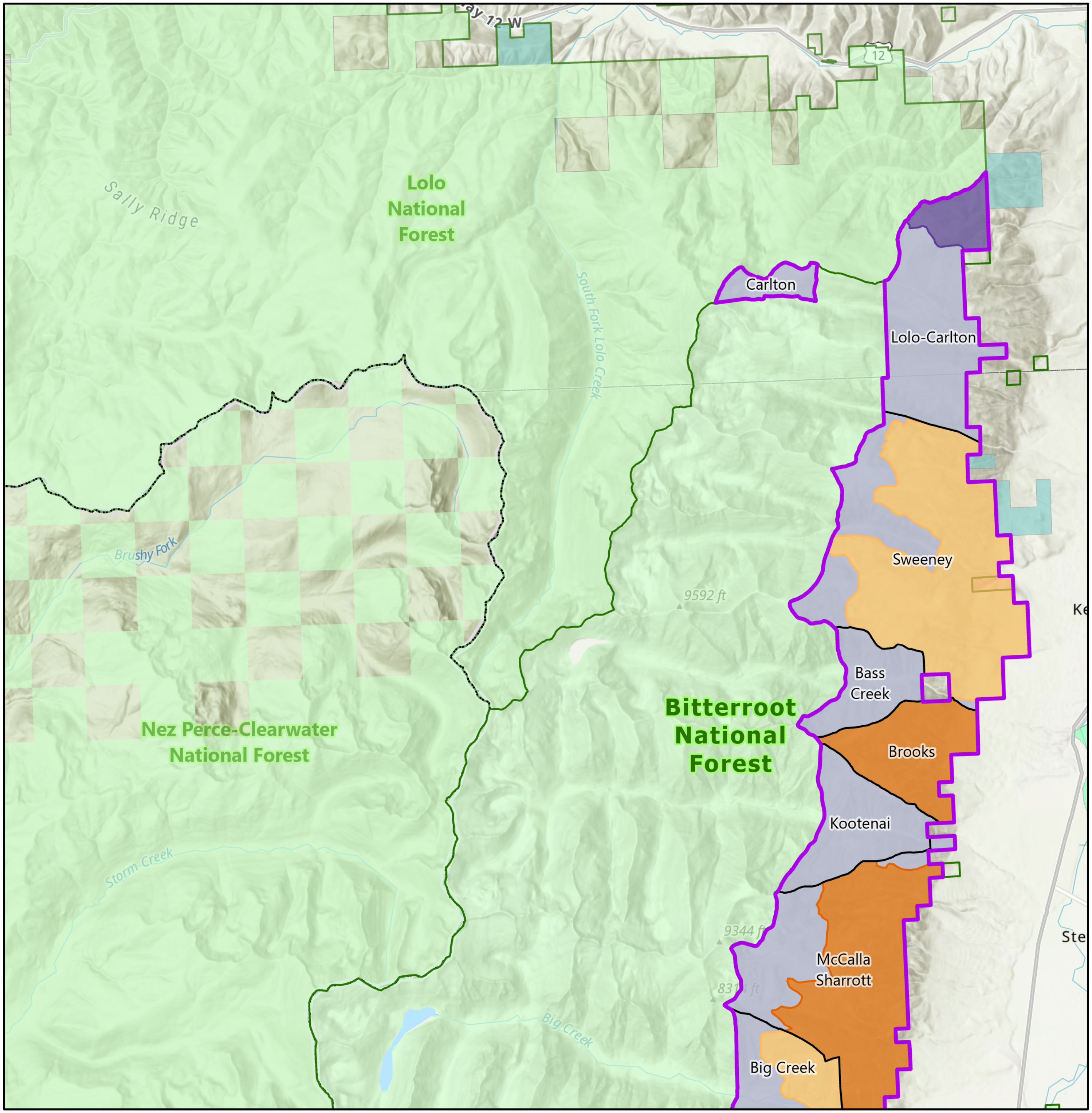


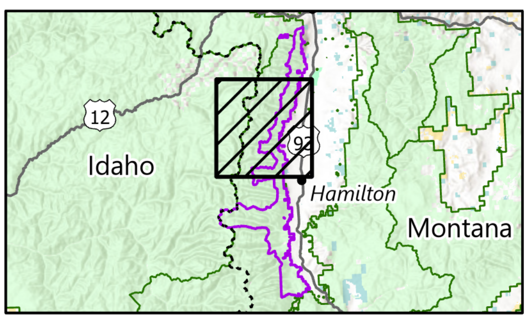
Bitterroot Front Environmental Assessment

Figure 1b
Project Implementation Phase

- Implementation phase 1
- Implementation phase 2
- Implementation phase 3
- Implementation phase 4

- Priority area
- Project boundary
- Forest boundary

- U.S. Forest Service
- U.S. Fish and Wildlife Service
- State
- Private



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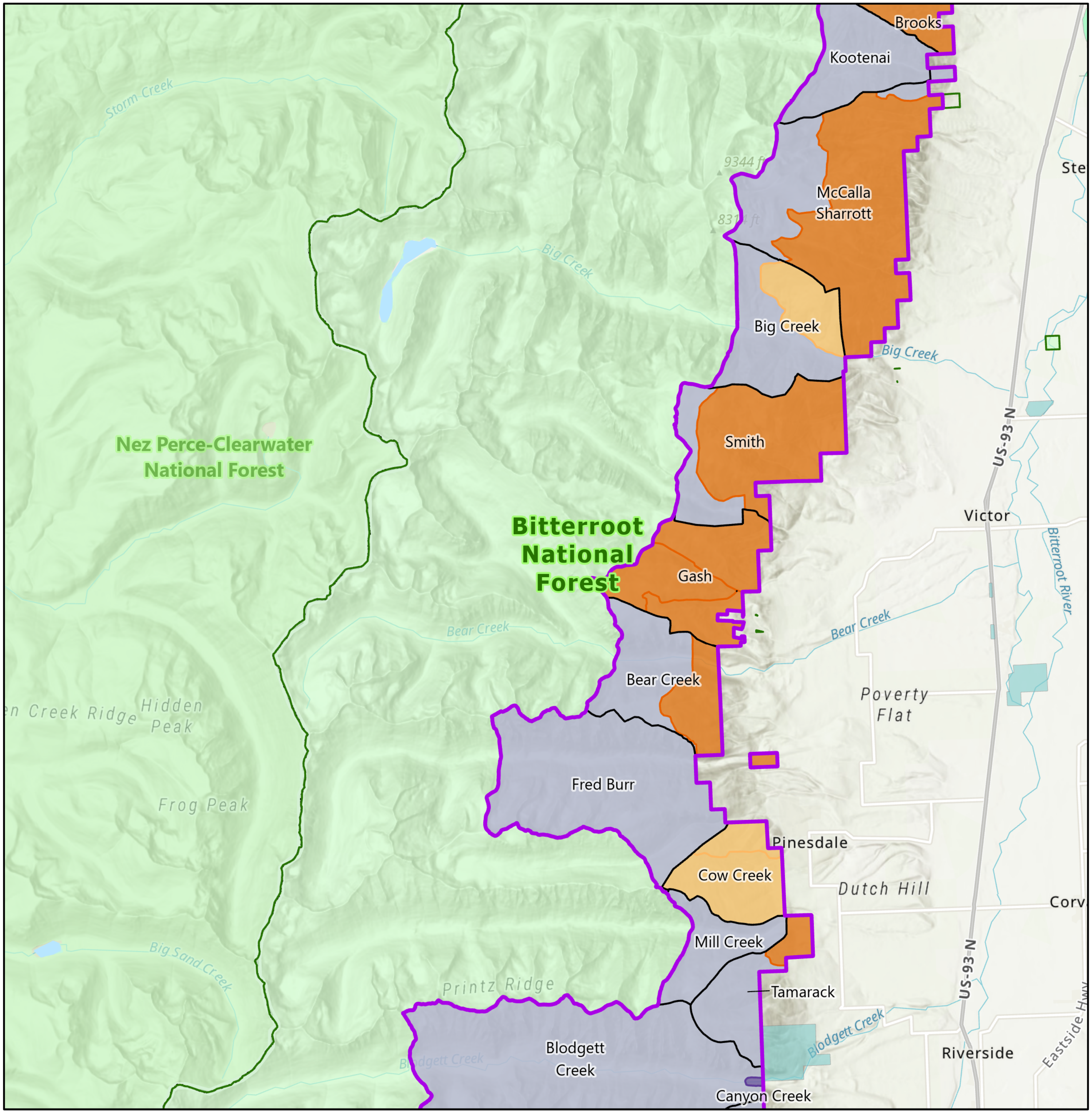


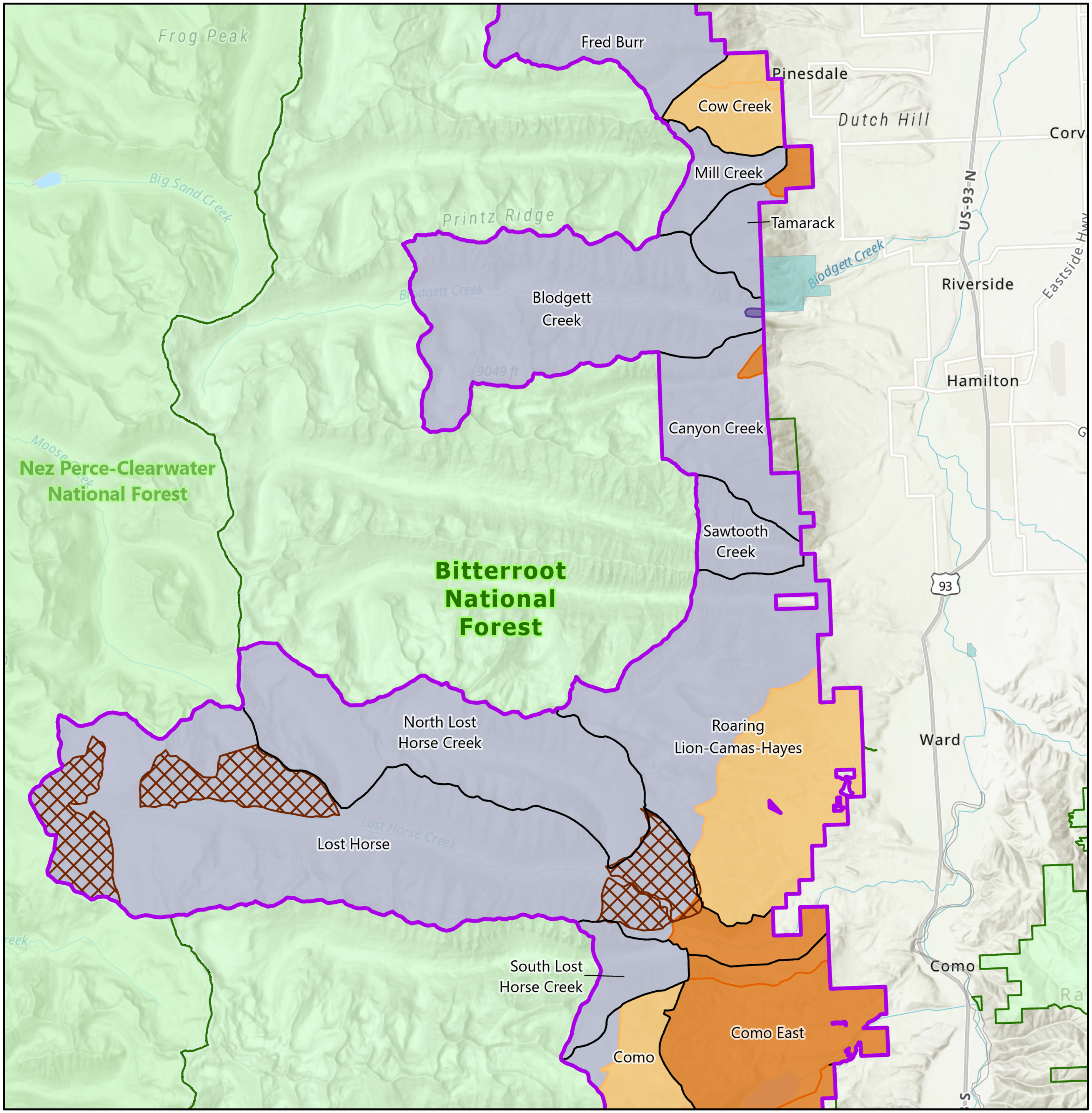
Bitterroot Front Environmental Assessment

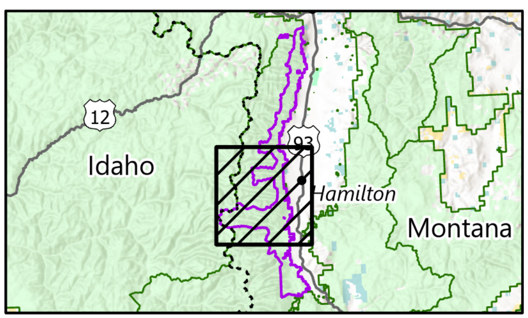
Figure 1c
Project Implementation Phase

- Implementation phase 1
- Implementation phase 2
- Implementation phase 3
- Implementation phase 4

- Priority area
- Project boundary
- Forest boundary
- Research natural area

- U.S. Forest Service
- State
- Private





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0 3 6 Miles

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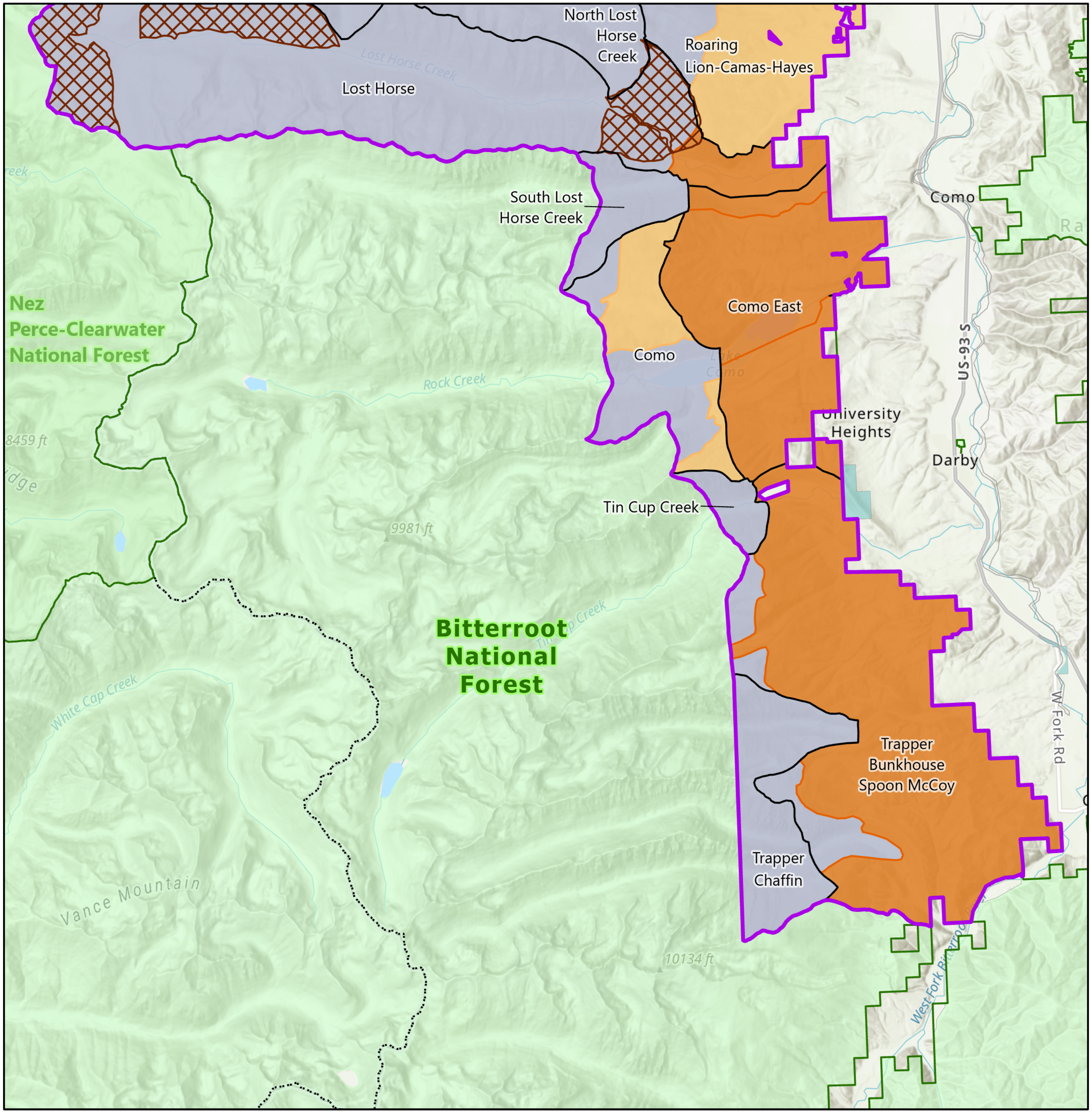
Bitterroot Front Environmental Assessment

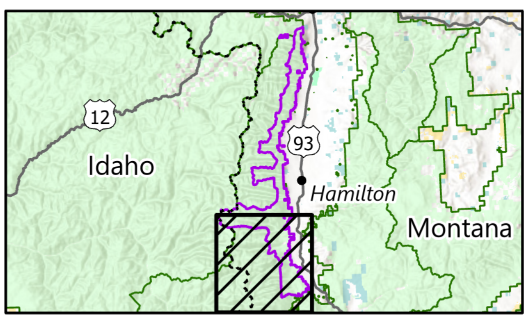
Figure 1d
Project Implementation Phase

- Implementation phase 1
- Implementation phase 2
- Implementation phase 3
- Implementation phase 4

- Priority area
- Project boundary
- Forest boundary
- Research natural area

- U.S. Forest Service
- State
- Private





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USDA

Step 1) Field survey and consultation

In each phase, resource specialists would conduct field surveys and stand walkthrough exams to verify proposed activities would move the area or unit toward the desired conditions. Surveys would confirm location specific conditions and determine if and how the activities would be implemented. Survey data would identify areas that should be avoided or where effects should be minimized, such as cultural sites or sensitive wildlife areas. Also, survey data would help establish treatment-specific objectives and desired outcomes.

Forest fuels' specialists and silviculturists would plan and prescribe the complete range of treatments that would meet the desired future conditions. Field surveys and consultation results would be used to refine activity design elements; identify the need for additional mitigation measures; and result in a modification of the activity location or timing.

Mitigation measures are identified when it is evident that proposed actions will have unintended or greater effects than anticipated to the applicable resource or because the analysis indicates a particular forest plan component, law, or regulation will not be met. Mitigation measures differ from design features in that they are identified during or post-effects analysis (reactive), while design features are identified prior to effects analysis (proactive). However, they can both serve the purposes of ensuring compliance with law, regulation, and policy; reducing or eliminating effects; and responding to issues and concerns. The line officer will review and approve mitigation measures prior to their adoption.

Step 2) Project compliance check

After field surveys were completed the Forest specialist would cross reference proposed activities in treatment areas with the EA, decision, and design features as well as other applicable laws, regulations, and policies. The EA must be checked to verify that the proposed activities would be within the range of activities analyzed under the selected alternative. The decision would document the rationale for the selected alternative and include any constraints for activities.

The design features in appendix A describe: what is usually accomplished; how it is typically implemented; what constraints and resource-specific guidelines apply; and when it would be implemented. Design features, Forest plan consistency, and best management practices would generally mitigate resource concerns.

The staff of the Bitterroot National Forest would document the design features that would be used for implementing the proposed activities recommended by the line officer in implementation area unit tables (step 3). A proposed activity must adhere to the design features to stay within the effects analyzed in the Bitterroot Front project EA. If the activity would not meet all the constraints in the design features, then the activity would not be considered.

The proposed activity would be added to the implementation checklist (step 4). A portion of the checklists would track the amount of implemented activity (for example, acres of vegetation treatment, miles of road, trail building, or decommissioning) against the upper limits of the selected alternative.

The implementation process involves the creation of an implementation packet to demonstrate field review and compliance with the decision and laws. The packet, checklists, tables, and other templates and forms appear below in the Site Verification and Consultation and Proposed Activities by Resource.

The implementation packet would be available to the public on the project website prior to and during implementation, and it would facilitate review and future prioritization of activities, as described in step 1.

All other documents associated with implementation, including all non-sensitive field notes, spatial data, and formal consultation documentation, would be stored in the implementation record.

Step 3) Line officer approval

The line officer reviews the checklists and associated documents from steps 1 and 2 to ensure the proposed activity met all requirements under the: decision document, Forest Plan, Forest directives, and other applicable laws and regulations. Once it is determined that the activity met all requirements, the line officer would give approval to implement by signing the implementation packet. The signature would be placed in the implementation record.

Step 4) Implementation

Activities would be implemented through a variety of methods. Forest personnel would either perform the activity or solicit the activity or survey out for contract work. Moreover, the Bitterroot National Forest staff may enter into a cooperative agreement with partners to complete the activities; however, they would not be limited to the above options. If other methods to help implement planned activities become available during the project, they will be explored.

Step 5) Documentation and assessment

There are a variety of documentation methods that would be performed to capture the completed work. The documentation method would be dependent upon who is completing the work and includes sight inspections, photographs of the implementation and completed activity, and other relevant documentation that would accurately depict the work being performed. The Bitterroot National Forest staff would determine when the work would be completed.

It is crucial to document the effectiveness of mitigations that were developed under step 2. This is essential for informing the next phase of implementation, or the next project, where changes to design features would be needed to address effectiveness in minimizing or avoiding resource impacts.

Project monitoring and documentation would take place during and following implementation and they would serve three purposes:

1. To ensure compliance with the project design features in appendix A of the EA.
2. To inform the adaptive management process when changes would need to be made to design features or mitigations to achieve intended protections.
3. To inform design feature development for future projects and to provide evidence for design feature effectiveness.

To sustain desired stand conditions, post monitoring assessments and adaptive management practices are necessary procedures to determine future tactics. The Forest Plan monitoring requires resource specialists to document their monitoring results in a summary format that would be included as part of the project record. Post monitoring provides expert opinions needed to adapt treatment choice and methods, design features, and mitigations to improve the ability of the project to meet specific objectives. Adaptive management allows for flexibility in a system of management practices based on clearly identified intended outcomes to determine if management actions would be meeting those outcomes, and, if not, to facilitate management changes that would best ensure those outcomes would be met or re-evaluated.

Site Verification and Consultation of Proposed Activities by Resource

The sections below contain templates to facilitate documentation of the field review, legal consistency review, and activity verification. Field verification would allow specialists to consider additional needed mitigations to the effects analysis of the project area. Site verification allows for mitigating flaws within the geographic information systems (GIS) analysis exercise to identify treatments. These checklists and worksheets should be completed once for each of the priority areas within each of the four implementation phases.

Resource specific pre-implementation checklists

Instructions: These resource specific checklists must be completed prior to approval for implementation of an activity under the Bitterroot Front project. For many resources, surveys may be required prior to certifying completion of necessary compliance and consultation actions. In some instances, existing data would be used for implementation. It is the responsibility of the resource specialists to:

- Ensure that the necessary compliance and consultation actions were completed.
- Ensure that the compliance and consultation record would be placed in the project implementation record.
- Certify that the necessary compliance and consultation would be complete for the specified implementation area.

Resource specific instructions appear in *italics* in the checklist sections below. Each checklist includes a table and space for supporting documentation and rationale related to the: range of effects analyzed in the EA; any needed adjustments or mitigations for the proposed activity; any surveys conducted; any contacts made with the public; and compliance with applicable laws and regulations.

Conclusion Documentation of Field Verification and Consultation.

Specialist Signature	Determination within scope of EA	Notes
Botany:	Yes No Date:	
Heritage:	Yes No Date	
Fire & Fuels:	Yes No Date	
Invasive Plants:	Yes No Date	
Transportation:	Yes No Date	
Recreation & Scenic Resources:	Yes No Date	

Specialist Signature	Determination within scope of EA	Notes
Soil, Water, & Fisheries:	Yes No Date	
Vegetation Management:	Yes No Date	
Wildlife:	Yes No Date	

Additional Mitigation Measures Needed

The following mitigation measures identified for the Bitterroot Front project would be informed by pre-implementation surveys and consultation. The first table below lists mitigation measures and specifies what issue or cause of effects the measure responds to; if there are any anticipated effectiveness of the mitigation; and where the mitigation would be applicable (by unit, sale area, habitat, resource condition, etc.). The interdisciplinary team was made aware of the proposed mitigations. They were reviewed by the different resource specialists to ensure that mitigations for one resource did not create unintentional impacts to another resource, as well as to ensure the proposed mitigation was feasible (mitigation measure review table below). If specialists did not find that application of the mitigation changed the anticipated effects for their resource, no further documentation was needed. If the mitigation would change anticipated effects, it is stated below what that difference is and why.

The line officer responsible for implementation reviewed and approved the mitigations, along with any associated monitoring needs as described. These mitigations would be included as part of the implementation of the proposed action.

Instructions: *Specialists should* ***indicate whether the proposed mitigation is required to maintain the decision's finding regarding environmental impacts or if it is necessary for compliance with the Forest Plan, law, and regulation.***

Guidance for completing the form is as follows:

- ***Responds to*** *should describe the law/regulation or land management plan standard or guideline, the issue/concern or level of effects that are prompting the need for the mitigation. This would help the line officer and interdisciplinary team members better understand the need and how it might be accommodated.*
- ***Anticipated effectiveness*** *describes how successful the mitigation measure should be in preventing or lessening effects to the applicable resource, habitat component, or feature/condition of concern. This effectiveness should be evaluated with monitoring post-implementation, but it should be supported by professional experience or best available science when being proposed.*
- ***Applicable area/activity*** *specifies where the mitigation measure needs to be applied within the project area. Because mitigation measures are responding to more focused issues/concerns or effects, they are typically less applicable to the entire project and more applicable to certain: areas, units, features, conditions, or types of activities being implemented.*

Mitigation measures and associated monitoring by resource area

Mitigation measure	Responds to (issue/concern, cause of effects)	Anticipated effectiveness	Applicable area/activity
Botany			
Heritage resources			
Fire and fuels			
Invasive plants			
Transportation			
Recreation & scenic resources			
Soil, water, and fisheries			
Vegetation management			
Wildlife			

Fire/Fuel Surveys

- ☐ A Prescribe Fire Burn Plan must be completed for prescribed treatment. All units planned for prescribed fire within the upcoming year (pile or underburn) would be entered into the Montana/Idaho Airshed Group database prior to August 31st (https://mi.airshedgroup.org/). The required information consists of: latitude/longitude, location description, airshed, unit size, elevation, burn category and type, and fuel loading.
- ☐ Obtain current year, Forest major open burning permit from the Montana Department of Environmental Quality (DEQ). Other surveys (specify):

Supporting Documentation	**Date**	**Project File Doc Number**

______________________________ ______________________

Name, Title (print and sign) Date

Fisheries Surveys

Resource specific instructions*: Fisheries consultations with the United States Fish and Wildlife Service (Service) under Section 7 of the Endangered Species Act (ESA) would be completed prior to signing the decision for the Bitterroot Front project. After that, if any future activities would be proposed for implementation that were not covered in the original Letter of Concurrence or Biological Opinion, then the Section 7 consultation would have to be re-initiated and completed before those activities would occur.*

Fisheries staff would complete all surveys required by law, regulation, or policy within the implementation area. The list below is not exhaustive, nor does it apply to every treatment. The fisheries biologist would determine which surveys would need to be conducted. While completing ground reconnaissance, look for opportunities to achieve multiple resource management objectives.

After the line officer approves the activity for implementation and prior to implementation, the line officer ensures the riparian habitat conservation area (RHCA) boundaries are correctly delineated, flagged, and avoided in coordination with the project hydrologist. Ensure roadside erosion control structures (e.g., straw bale check dams, waddles, and slash filter windrows) are correctly located and installed, as specified in the project design features. Ensure hazard trees within RHCAs that are proposed for felling and retention on-site are identified, field checked, and flagged.

- ☐ Applicable State (State of Montana 124 permit) and Federal (U.S. Army Corps of Engineers 404 permit) permits would be obtained for activities affecting culverts and stream channels.
- ☐ Consultation for bull trout and bull trout critical habitat was completed by the Service.
- ☐ In cooperation with the project range specialist, and prior to any application, ensure that all proposed applications of herbicides would be consistent with the project design features.
- ☐ Other surveys (specify):

Supporting Documentation	Date	Project File Doc Number

Standard inclusions above (if documentation is attached) or in this space (if only a few lines need to be written about it) would include: confirmation that the activity fits within the range of effects analyzed in the EA and rationale for any adjustments or mitigations that need to be applied to the original proposal; surveys or other forms of data collection (or reasoning why not needed); contacts made with the public pertaining to this resource for this activity; compliance with laws and regulations; biological assessments or evaluations and other records of threatened and endangered species; consultations with State and Federal agencies; U.S. Army Corps of Engineers or Montana Fish, Wildlife and Parks permits; peak flow calculations; if the activity is within a flood plain, municipal watershed, or principal drinking *watersource; if it requires placing fill in stream beds, constructing/replacing a bridge/culvert in stream beds, cutting of trees near streams, or diverting or pumping water; if it requires discharge of waste water; if the Watershed Condition Classification Framework score for affected watersheds would change; if any timing restrictions would be required; and any other required documentation.*

____ _________________________

Name, Title (print and sign) Date

Heritage

Resource specific instructions: *Under the National Historic Preservation Act (NHPA), consultation with all interested parties would be required prior to implementation. This includes Indian Tribes and Tribal Governments, the applicable State Historic Preservation Officer (SHPO), a Tribal Historic Preservation Officer, and interested members of the public. Implementation activities by the Forest would seek to minimize or avoid adverse effects to historic properties, wherever possible. Some activities may have little or no potential to adversely affect historic properties and may proceed after the heritage program manager reviews the proposed activity and the responsible line officer approves it.*

The staff of the Bitterroot National Forest initiated consultation under the National Phasing Programmatic Agreement (NPA), an agreement which allows for a phased identification process for large-scale, multi-year undertakings. The NPA allows the development of a Heritage Implementation Plan (HIP) in lieu of an individual programmatic agreement to document how the phased Section 106 process would be completed. A draft version of the HIP is included in the draft EA project file (PF-CULTURAL-002), the final EA would include the final draft of the HIP.

If the proposed activity causes the Heritage Program Manager to reach a finding of adverse effect to historic properties, a separate agreement document (Memorandum of Agreement or Programmatic Agreement [MOA/PA]) would be required. That document would outline mitigations to be completed by the agency and those mitigations would be completed no later than 5 years after completion of the implementation area's activities.

Provisions under the U.S. Forest Service Region One Programmatic Agreement outline the process to follow if newly discovered heritage resources are encountered during implementation. They are referred to as "post-review discoveries" under NHPA and "inadvertent discoveries" under the Native American Graves Protection and Repatriation Act. Those same procedures would apply to this project. Activities located within 50 meters (164 feet) of a newly discovered heritage resource would cease until a heritage resource specialist completes the review process.

Consultation required under the NHPA would be completed prior to conducting any activity within the implementation area. The heritage program specialist would utilize all applicable, existing programmatic agreements during the consultation process. Consultation may require the heritage program specialist to conduct background literature research, field inventory or survey, or oral history interviews to meet the "reasonable and good faith effort" requirement to identify historic properties within the implementation area. If historic properties are identified within the Area of Potential Effect (APE), mitigation measures may result in modification of treatment unit boundaries, activity timing, or intensity of activity type.

- ☐ Consultation with the Idaho or Montana SHPO was completed through measures outlined in the Region One Programmatic Agreement or
- ☐ Consultation with the Idaho or Montana SHPO was completed through measures outlined in the NHPA Phasing Programmatic Agreement.

Additionally,

- ☐ Consultation was completed with all tribes who expressed an interested in historic properties within the project APE

Supporting Documentation	Date	Project File Doc Number

The above list provides supporting documentation that the Forest met its Section 106 responsibilities under the NHPA prior to implementation. Documents would include inventory reports or other project review documentation; efforts to obtain public input and comments on heritage resources; SHPO consultation documentation (letters, emails, etc.); Tribal Government consultation documentation (letters, emails, etc.); and any agreement documents (MOA/PA) that were completed to mitigate adverse effects to historic properties. Sensitive information, including site location information, may be withheld from the public record to protect historic properties, as allowed under Federal law.

Name, Title (print and sign) Date

Hydrology

Resource specific instructions: *After the line officer approves the activity for implementation and prior to implementation, ensure the RHCA boundaries are correctly delineated, flagged, and avoided in coordination with the project fisheries biologist. Ensure that necessary best management practices were designed and would be applied on haul routes before hauling commences.*

- ☐ Create map products of RHCA buffers and sensitive soils (if needed) for use in the timber sale contract package.
- ☐ Treatment areas adhere to the Bitterroot National Forest equivalent clearcut area (BNF ECA) threshold method in the project record (PF-AQUATICS-002). Field reconnaissance, stream surveys, and subsequent analysis would occur at varying levels as outlined in the table below based on the equivalent clearcut area threshold (ECAT) within the treatment area watersheds.

ECA Threshold	Pre-Implementation Practices
Low	**Definition:** Where the post-project cumulative ECA is between 0 percent and 13 percent, watersheds are classified as Low (Green). The risk of channel instability from project related water yield increases is low. **Actions:** Proposed project activities are subject to the standard range of design features contained in appendix B. No further ECA analysis or stream surveys would be needed for the implementation of the project in these watersheds.
Moderate	**Definition:** Where the post-project cumulative ECA is between 13 percent and 18 percent, there is a Moderate (Yellow) risk of channel instability from project related water yield increases. **Actions:** Should stable channel conditions be found during initial field reconnaissance, no further ECA analysis or stream surveys would be needed for the implementation of the project in these watersheds. Should persisting channel instability from past management activities or recent catastrophic fire (potential for debris flows/gully formation) be found during initial field reconnaissance, stream surveys and subsequent sediment entrainment analysis would follow guidance outlined in the BNF ECAT method (PF-AQUATICS-002). From the initial visual walkthrough survey stream channels would be categorized into two broad categories: W1 - Those with channel substrate having median particle sizes (d_{50}) less than 256 mm (cobble/gravel/sand/silt). W2 - Those with channel substrate having median particle sizes (d_{50}) 256 mm or greater (small boulder/large boulder/bedrock) or channels with abundant in-stream large wood at or above reference levels. If they are determined to be a W1 stream, establish a representative response reach that is below all anticipated upstream effects and follow guidance outlined in the BNF ECAT method (PF-AQUATICS-002). W2 streams are considered inherently stable and would not be analyzed further. Should W1 response reaches be deemed unstable after analysis, proposed project activities may need to be modified (that is less percentage of treatment on high energy slopes (mid to high elevation north slopes)) or potential restoration opportunities, such as in-stream large wood placement/riparian revegetation to facilitate more channel roughness and added bank stability. Proposed project activities would be subject to the standard range of design features contained in appendix B.

ECA Threshold	Pre-Implementation Practices
High	**Definition:** Where the post-project cumulative ECA would be greater than 18 percent, proposals are at high (Red) risk of raising ECA above the 20 percent threshold, increases in water yield are likely to be measurable, and depending on the dominant substrate size they could lead to added channel instability. **Actions:** Stream surveys and subsequent sediment entrainment analysis would be completed. Follow the guidance outlined in the BNF ECAT method (PF- AQUATICS-002), which may be required within these project watersheds depending on dominant channel substrate. From the initial visual walkthrough survey stream channels would be categorized into two broad categories: W1 - Those with channel substrate having median particle sizes (d_{50}) less than 256 mm (cobble/gravel/sand/silt). W2 - Those with channel substrate having median particle sizes (d_{50}) 256 mm or greater (small boulder/large boulder/bedrock) or channels with abundant in-stream large wood at or above reference levels. If they would be determined to be a W1 stream, establish a representative response reach that would be below all anticipated upstream effects and follow the guidance outlined in the BNF ECAT method (PF-AQUATICS-002). W2 streams are considered inherently stable and they would not be analyzed further. Should response reach thresholds be approached or exceeded, a reduction of commercial harvest in these areas also may be considered as well as exploration of potential restoration opportunities, such as in-stream large wood placement/riparian revegetation to facilitate more channel roughness and added bank stability. Design features in addition to the standard range of design features contained in appendix B may be warranted.

In cooperation with the project silviculturist, proposed changes to crown cover from proposed vegetation management activities would be reviewed with respect to changes in ECA coefficients. These coefficients are used to calculate proposed ECA to ensure that when combined with existing conditions, ECATs are not exceeded.

- ☐ Review new specified road designs and construction plans to ensure compliance with project design features concerning RHCAs and stream crossings.
- ☐ Review proposed locations for temporary roads and tracked line machine trails to ensure compliance with project design features concerning RHCAs and stream crossings. Where stream crossings (on non- fish bearing streams) are unavoidable, crossing locations were field verified by the project fisheries biologist or hydrologist prior to construction.
- ☐ Review all proposed road management activities for consistency with the project-level travel analysis.
- ☐ Necessary permits were obtained for road decommissioning or storage proposals that involve removal of culverts or other work in the stream channels.
- ☐ Consultation for Clean Water Act and total maximum daily load (TMDL) compliance with the Montana DEQ was completed.
- ☐ Other surveys (specify):

Supporting Documentation	Date	Project File Doc Number

Standard inclusions above (if documentation is attached) or in this space (if only a few lines need to be written about it) would include: confirmation that the activity fits within the range of effects analyzed in the EA and rationale for any adjustments or mitigations that were applied to the original proposal; surveys or other forms of data collection (or reasoning why not needed); contacts made with the public pertaining to this resource for this activity; compliance with laws and regulations; consultation with State and Federal Agencies; U.S. Army Corps of Engineers or Montana Fish, Wildlife and Parks permits; peak flow calculations; if the activity is within a flood plain, municipal watershed, or principal drinking water source; if it requires placement of fill in stream beds, constructing/replacing bridge/culvert in stream beds, cutting of trees near streams, or diverting or pumping water; if it requires discharge of waste water; if the Watershed Condition Classification Framework score for affected watersheds would change; if any timing restrictions are required; and any other required documentation.

Name, Title (print and sign) Date

Invasive Plant Surveys

Resource specific instructions: *Based on a survey of invasive weeds in the treatment area, prioritize weed infestations for treatment in high-risk sites, including treatment operating areas and along access routes. Control weeds prior to treatment implementation, as necessary. Modify treatment to reduce expansion of invasive weeds, as necessary.*

After the line officer has approved the activity for implementation and prior to implementation, treat populations of Priority 1A, 1B, and 2A Montana listed noxious weeds on haul routes.

- ☐ Pre-treatment invasive plant species surveys: Within high-risk areas for invasive plant species, complete inventories to identify invasive plant populations.
- ☐ In cooperation with the project fisheries biologist and prior to any application, ensure that all proposed applications of herbicides would be consistent with the project design features.
- ☐ Proposed activities avoid populations of Priority 1A, 1B, and 2A weeds.

Supporting Documentation	Date	Project File Doc Number

Standard inclusions above (if documentation is attached) or in this space (if only a few lines need to be written about it) would include: confirmation that the activity fits within the range of effects analyzed in the EA and rationale for any adjustments or mitigations that were applied to the original proposal due to this resource; surveys or other forms of data collection (or reasoning why not needed); contacts made with the public pertaining to this resource for this activity; compliance with laws and regulations; if there are invasive plants located in the project area; previous treatment plans or reports; timing restrictions; and any other required documentation.

Name, Title (print and sign) Date

Land Survey

Resource specific instructions: *Prior to commencing any ground- or vegetation-disturbing activities, evidence of the Public Land Survey System (PLSS) would be marked for protection. The Forest land surveyor shall be consulted to assist with providing data, searching for and evaluating evidence, and locating and protecting monuments of the PLSS from destruction.*

- ☐ Forest engineer was contacted and the survey was completed.
- ☐ Other surveys (specify):

Supporting Documentation	Date	Project File Doc Number

Forest engineer signature that identified surveys were completed: _______

Date of completion: ______________________________

Recreation

Resource specific instructions: *The recreation specialist would work with the team and the proposed treatments to inventory the recreation attributes that may be affected by treatments. The type of treatment and the location could affect recreation activities and the quality of the recreation experience in the near-term and over the long-term. Evaluate how the treatment would affect the recreation facilities and settings in the area. Use the design features to ensure that the recreation opportunities would be appropriately managed for the period of treatment implementation and for the long-term. Design implementation to minimize the impact on recreation users to the extent feasible and include having good communication with partners and the public about the impacts of the activities.*

Developed Recreation Sites

- ☐ Identify priority developed recreation sites for treatment (including hazard tree removal) and any other developed sites affected by treatment activities.

Dispersed Recreation Activities

- ☐ Identify dispersed recreation impacts that would need to be treated or those that would need to have a higher degree of clean-up than other general forest areas.

Designated Areas

- ☐ Review proposed treatments in Inventoried Roadless Areas for consistency with 36 CFR Part 294-Special Areas; Roadless Area Conservation; Final Rule. This rule was effective on March 13, 2001.
- ☐ Review proposed treatments within recommended wilderness areas for consistency with wilderness attributes and characteristics.
- ☐ Review proposed treatment activities around eligible wild and scenic streams for consistency with outstandingly remarkable values (ORV).

Trails

- ☐ Identify the location of any National Forest System Trail that would be impacted by treatment activities.
- ☐ Identify designated National Scenic, Historic or Recreation Trails, including existing routes and areas, where potential re-routes may be implemented.
- ☐ Identify managed snow trails.

Recreation Rental Facilities

- ☐ Identify recreation rental facilities and the reservation season that might be impacted by treatment activities.

Recreation Special Uses

- ☐ Identify the location of any authorized recreation special uses that would be impacted by treatment activities. Identify the types of uses that would be affected.

Unique Special Areas

- ☐ Identify the location of any unique area within the treatment area, such as disabled hunting areas, rock collecting areas, etc.

Partnerships/Volunteers

- ☐ Identify any scheduled project work by partners or volunteer groups in areas that may be impacted by treatment activities.

Public Health and Safety

- ☐ Identify any closures that may need to be in place for the safety of the public.
- ☐ Other surveys (specify):

Supporting Documentation	Date	Project File Doc Number

Standard inclusions above (if documentation is attached) or in this space (if only a few lines need to be written about it) would include: confirmation that the activity fits within the range of effects analyzed in the EA and rationale for any adjustments or mitigations that were applied to the original proposal due to this resource; surveys or other forms of data collection (or reasoning why not needed); contacts made with the public pertaining to this resource for this activity; compliance with laws and regulations; if any developed recreation sites or dispersed recreation activities are within or near the project area; if there are any timing restrictions; public notifications made/posted; and any other required documentation.

Name, Title (print and sign) Date

Scenic Resource Surveys

Instructions*: Evaluate and select the applicable design features for visual resources such that the treatment area's identified visual quality objectives would be achieved consistent with the Forest Plan.*

- ☐ Identify valued scenic resources.
- ☐ Identify the sensitivity level of scenery.
- ☐ *Identify the treatment area's visual quality objectives, per Forest Plan guidance, in accordance with the scenic resource design features in appendix A of the environmental analysis.
- ☐ Other surveys (specify):

Supporting Documentation	Date	Project File Doc Number

Standard inclusions above (if documentation is attached) or in this space (if only a few lines need to be written about it) would include: confirmation that the activity fits within the range of effects analyzed in the EA and rationale for any adjustments or mitigations that were applied to the original proposal due to this resource; surveys or other forms of data collection (or reasoning why not needed); contacts made with the public pertaining to this resource for this activity; compliance with laws and regulations; modeling used to evaluate effects; which, if any, visually sensitive areas affect the project area; what visual quality objective(s) would be applicable and if they are met; and any other required documentation.

Name, Title (print and sign) Date

Sensitive Plant Surveys

Resource specific instructions: *Surveys would be conducted following laws, regulations, and policies for rare plant species (refer to the EA and the biological evaluation for a list of all of the laws, regulations, and policies). The forest botanist would determine which areas would be surveyed following the Region One Botany Survey and Analysis Protocol.*

Habitat Type	Species Potentially Present

- ☐ A pre-field review would be used to determine if surveys would be required based on the type and intensity of proposed management actions, and whether at-risk plants would be known to occur in the analysis area, or they are suspected to occur based on the presence of suitable habitat. If the pre-field review determines direct or indirect effects from proposed activities would be possible, and plants are known or suspected to occur, conduct a risk analysis and plan field surveys where needed.
- ☐ If a rare plant population were located during surveys, the population would be mapped and recommended exclusions for the proposed activities would be documented and provided to the line officer and implementation team. Final exclusions would be documented in the mitigation section.
- ☐ Other surveys (specify):

Supporting Documentation	Date	Project File Doc Number

Standard inclusions above (if documentation is attached) or in this space (if only a few lines are needed) would include: confirmation that the activity fits within the range of effects analyzed in the EA and rationale for any adjustments or mitigations that were applied to the original proposal due to this resource; surveys or other forms of data collection (or reasoning why not needed); contacts made with the public pertaining to this resource for this activity; compliance with laws and regulations; biological assessments and evaluations and other records of: threatened, endangered, candidate, rare, and sensitive species; consultation with State and Federal Agencies; if there are any timing restriction for the activity; and any other required documentation.

____ ______________________

Name, Title (print and sign) Date

Silviculture Surveys

Resource specific instructions: *The stand diagnosis and exams as well as insect and disease surveys would be used to determine the existing conditions within each proposed treatment area and across the project area.*

Existing conditions should be compared to the desired condition (example found in the Treatment Diagnosis Crosswalk [PF-VEGETATION-002]) to determine the departure from desired conditions and to develop a range of treatment options. Once a treatment alternative would be chosen, silvicultural prescriptions would be prepared, reviewed, and signed by a certified silviculturist.

- ☐ Conduct stand diagnosis for each proposed treatment unit. (This may include R1 Common Stand Exam or R1 Walk-through Exam.)
- ☐ Conduct insect and disease survey. (This may include Aerial Detection Survey, Forest Health and Protection site visit, and/or Stand Diagnosis.)
- ☐ Conduct old growth exams to meet Forest Plan Standards and the Site-Specific Forest Plan Amendment (appendix C), where appropriate. (This may include R1 Common Stand Exam, R1 Walk-through Exams, or old growth specific criterion.)
- ☐ Prepare a silvicultural prescription and marking guides for all vegetation management activities. The prescription must be reviewed and signed by a certified silviculturist. (This would be completed for all treatment units within the chosen alternative.)

Supporting Documentation	Date	Project File Doc Number

Standard inclusions above (if documentation is attached) or in this space (if only a few lines need to be written about it) would include: confirmation that the activity fits within the range of effects analyzed in the EA and rationale for any adjustments or mitigations that were applied to the original proposal due to this resource; surveys or other forms of data collection (or reasoning why it would not be needed); regional forester approval for even-aged harvest larger than 40 acres; contacts made with the public pertaining to this resource for this activity; compliance with laws and regulations; approved prescriptions; if there would be regeneration needs or intermediate treatments for the stand(s) associated with the activity; and any other required documentation.

Name, Title (print and sign) Date

Soil Surveys

- ☐ Sensitive soil types, i.e., severe erosion hazard rating, slopes greater than 40 percent, and landslide prone areas identified and avoided.
- ☐ Treatment areas would be overlaid with the Soil Risk Evaluation Framework map products located in the project record. Field reconnaissance would occur at varying levels, as outlined in the table below based on the mapped soil risk category within the treatment area boundaries.

<table>
<tr><th>Soil Risk Category (SRC)</th><th>Pre-Implementation Practices</th></tr>
<tr><td>A, B</td><td>Actions: Proposed project activities would be subject to the standard range of design features contained in appendix A in the EA.</td></tr>
<tr><td>C, D</td><td>Actions: Soil inventory of persisting detrimental soil disturbance (DSD) <u>may be</u> required within these project areas. Proposed project activities would be subject to the standard range of design features contained in appendix A in the EA. Should persisting DSD from past management activities be found during field reconnaissance, proposed project activities may need to be modified to avoid adverse soil resource effects.

Pre-project DSD and coarse woody debris (CWD) soil surveys would be needed once unit boundaries would be established if the following proposed treatments/conditions are met:

• ground-based yarding would be proposed on slopes less than 40 percent;
• mechanized clipping would be proposed on slopes greater than 40 percent; and/or
• temporary road construction.

Combined with:
• past vegetation management that occurred within the last 35 years; and/or
• recent (less than 10 years) high severity fire covers greater than 15 percent of the unit; and/or
• lack of CWD.

<u>*If the layout crew or other resource specialist survey does not identify a lack of CWD and/or evidence of past management (such as excavated skid trails, tree stumps or persistent fire </u>consumed CWD, and high severity fire effects), no soil inventory in units would be needed.</td></tr>
<tr><td>E, F</td><td>Actions: Soil inventory of persisting DSD <u>would be</u> required within these project areas. Avoidance of commercial harvest or prescribed burning in these areas also may be considered as well as exploration of potential restoration opportunities. Design features in addition to the standard range of design features contained in appendix A in the EA may be warranted.

Pre-project DSD and CWD soil surveys would be needed once unit boundaries would be established, if the following treatments are proposed:

• ground-based yarding on slopes less than 40 percent; or
• mechanized clipping on slopes greater than 40 percent would be proposed; or
• unit-wide prescribed fire operations; and/or
• temporary road construction.

Should pre-project soil inventory identify units approaching 15 percent DSD and/or CWD limitations, soil mitigations and/or a soil restoration plan would be developed and implemented with proposed vegetation/fuels treatments to ensure long-term soil productivity would be maintained.</td></tr>
</table>

***Timber layout crew and other resource specialist surveys would provide valuable insight to general unit conditions and help guide the need for soil inventory of disturbance and CWD surveys in these Soil Risk Categories. These observations would be documented for each unit and included as supporting documentation.**

CWD requirements by Fire Group

Fire Group	**CWD (Tons per Acre)**
Scree, Rock, Meadows, Grasslands	0-5
1, 2, 4 =Warm, Dry Ponderosa Pine; Warm Dry Douglas-fir	5-10
5, 6 = Cool, Dry Douglas-fir; Moist Douglas-fir	10-20
7, 8, 9, 10 =Cool lodgepole; Dry Lower Subalpine Fir; Moist Lower Subalpine Fir; Cold, Moist Upper Subalpine and Timberline	8-24
11=Warm Moist Grand Fir, Western Redcedar, and Western Hemlock	20-30

Supporting Documentation	**Date**	**Project File Doc Number**

Standard inclusions above (if documentation is attached) or in this space (if only a few lines need to be written about it) would include: confirmation that the activity fits within the range of effects analyzed in the EA and rationale for any adjustments or mitigations that were applied to the original proposal due to this resource; surveys or other forms of data collection (or reasoning why not needed); contacts made with the public pertaining to this resource for this activity; compliance with laws and regulations; if there are: steep slopes, highly erosive soils, landslides, wetlands, or alluvial fans located in the project area; and any other required documentation.

Name, Title (print and sign) Date

Timber Surveys

Resource specific instructions: *Coordinate with specialists to modify cutting unit boundaries.*

- ☐ Complete Residual Value appraisal.

Supporting Documentation	Date	Project File Doc Number

Standard inclusions above (if documentation is attached) or in this space (if only a few lines need to be written about it) would include: confirmation that the activity fits within the range of effects analyzed in the EA and rationale for any adjustments or mitigations that were applied to the original proposal due to this resource; surveys or other forms of data collection (reasoning why not needed); contacts made with the public pertaining to this resource for this activity; compliance with laws and regulations; documentation associated with completion of gates 1, 2, and 3, if applicable; economics analyses, marking guidelines, cruising data, and layout information; recording of stands designated for small sale strategy, if applicable; and any other required documentation.

____ ________________________

Name, Title (print and sign) Date

Transportation Planning Surveys

Resource specific instructions: *Apply the appropriate design features for transportation systems and haul routes to keep effects to existing routes and effects from new routes within the bounds disclosed within the EA that supports the decision for this project. Required surveys and design would be completed prior to road package preparation. The construction survey and design would be in accordance with timber sale contract provisions.*

- ☐ Existing conditions of the potential haul routes within the implementation area would be documented with road logs.

Supporting Documentation	Date	Project File Doc Number

Standard inclusions above (if documentation is attached) or in this space (if only a few lines need to be written about it) would include: confirmation that the activity fits within the range of effects analyzed in the EA and rationale for any adjustments or mitigations that were applied to the original proposal due to this resource; surveys or other forms of data collection (reasoning why not needed); contacts made with the public pertaining to this resource for this activity; compliance with laws and regulations; Travel Analysis or Access & Travel Management documentation; road activity information associated with the activity; if roads would be added to or removed from the Forest Transportation System; if revisions would be needed for the Motor Vehicle Use Maps; easement or surfacing agreements; applicable Schedule A maintenance agreements, and any other required documentation. Document road storage and decommissioning requirements in compliance with immediate needs for storage or decommissioning.

Name, Title (print and sign) Date

Wildlife Surveys

Resource specific instructions: *Wildlife consultations with the Service under Section 7 of the ESA would be completed prior to signing the decision for the Bitterroot Front project. After that, if any future activities would be proposed for implementation that were not covered in the original Letter of Concurrence or Biological Opinion, then a Section 7 consultation would have to be re-initiated and completed before those activities could occur.*

Complete surveys required by law, regulation, or policy. The list below is not exhaustive, nor does it apply to every treatment. The wildlife biologist would determine which surveys would need to be conducted. While completing ground reconnaissance, look for opportunities to achieve multiple resource management objectives.

- ☐ Field verification surveys of GIS mapped Canada lynx habitat, if needed (Canada lynx).
- ☐ Consistency with all Northern Rockies Lynx Management Direction Standards and Guidelines, as described in Design Features.
- ☐ Field verification surveys documenting presence of known American peregrine falcon and bald eagle nest sites. Appropriately marked wildlife trees for avoidance of protected nest areas, as described in Design Features.
- ☐ If needed, coordinate with Montana Fish, Wildlife, and Parks to identify areas important to various wildlife species (elk calving areas, security areas, etc.) for avoidance and/or application of special management considerations. Typically, special management considerations would be in the form of design features.
- ☐ Document and appropriately mark wildlife trees for avoidance of nest sites/trees/dens for management indicator species and sensitive primary and secondary cavity nesters, if needed.
- ☐ Consultation for threatened and endangered species completed with the Service, if needed.
- ☐ Verify with the Service the grizzly bear status. If the grizzly bear status changed to “may be present”, re-initiate a Section 7 consultation with the Service for an effects determination.
- ☐ Verify with the Service any other newly listed ESA species requiring consultation.
- ☐ Complete a supplemental wildlife report for an implementation phase to document and analyze an agreement with the Northern Rockies Lynx Management Direction and other sensitive species/management indicator species detections and protection measures.
- ☐ Other surveys (specify):

Supporting Documentation	**Date**	**Project File Doc Number**

Standard inclusions above (if documentation is attached) or in this space (if only a few lines need to be written about it) would include: confirmation that the activity fits within the range of effects analyzed in the EA and rationale for any adjustments or mitigations that were applied to the original proposal due to this resource; surveys or other forms of data collection (or reasoning why it would not be needed); contacts made with the public pertaining to this resource for this activity; compliance with laws and regulations; biological assessments and evaluations, and other records of threatened and endangered, rare, and sensitive species; consultation with State and Federal Agencies; if there are any timing restrictions for the activity; and any other required documentation.

______________________________________ ____________________

Name, Title (print and sign) Date

Implementation packet coversheet

Instructions: *An implementation packet coversheet would be prepared using the template on the following pages. This template should be used to verify that all implementation process steps were followed and documented. The instructions below refer to this template.*

A. *Ensure steps 1 through 3 of the implementation process and the resource specific pre-implementation checklists were completed.*

B. *Keep the implementation record current with all documentation related to implementation. Include a record number in all file names for indexing and long-term record keeping and include the record number on the following pages to show all pertinent files would be a part of that record and they would be easily obtained.*

C. *"Activity information": This section is general activity information and a list of implementation documents associated with the activity. The list of documents should refer to: maps, resource specific pre-implementation checklists, activity tracking tables, unit tables, design features, and any other relevant documents.*

D. *"Process documents": This section should document all the steps leading up to implementation of the activity and show that the staff of the Bitterroot National Forest followed the process within this implementation plan. The list should include all records disclosing the staff of the Bitterroot National Forest's process leading up to implementation. Listed documents would include:*

- *Applicable workshop meeting notes;*
- *Out-year plan;*
- *Comments received and summary of comments;*
- *Letters sent or email communications with the public;*
- *Government-to-government consultation documentation with local tribes (including meeting notes, letters sent, etc.);*
- *Notifications printed in the newspaper of record; and*
- *Any letters or memos associated with the activity that authorizes it or that the line officer has signed off on.*

E. *"Signatures": The implementation packet preparer and the line officer responsible for implementation should sign the coversheet. The line officer must verify that all resource specialists completed the compliance and consultation actions required and signed their respective checklists and the necessary: maps, activity tracking tables, unit tables, and mitigation measures tables would be completed.*

Activity information

<table>
<tr><td>Project:</td><td colspan="2"></td><td>District:</td><td></td></tr>
<tr><td colspan="2">Implementation Area:</td><td colspan="3"></td></tr>
<tr><td colspan="2">Contact Person and Title:</td><td colspan="3"></td></tr>
<tr><td colspan="2">Legal Description or Location:</td><td colspan="3"></td></tr>
<tr><td colspan="2">Project File Location:</td><td colspan="3"></td></tr>
</table>

List all maps and activity documents	Date	Project File Doc Name

Decision implementation tracking form

Instructions: *This form would be used to track activity types for which upper limits would be specified in the decision document. The form would track remaining acres or miles per activity after activities would be proposed for each implementation area. Area-specific limitations may be tracked using the second table.*

Bitterroot Front project activity tracking table

Activity (units)	Maximum acres/miles	Remaining acres/miles

Area specific limitations tracking table

Area specific limitations (units, sites, drainage, etc.)	Type of limitation (avoidance, timing, duration, etc.)	Applicable activities

Implementation area unit and summary tables

Instructions: *The following three tables would be used to track activities by road and treatment unit for each implementation area. These tables would be released to the public to provide details about activities after the line officer approval occurred (step 5).*

Implementation area summary

Year	Road #	Unit	Harvest activity	Acres	Non-commercial activity	Acres	Prescribed fire activity	Acres	Transportation activity	Miles

Implementation area activity totals

Activity	Activity Total
Intermediate harvest	
Non-commercial activities	
Prescribed fire – site preparation	
Prescribed fire – low severity	
Prescribed fire – mixed severity	
Prescribed fire – wildlife habitat	
Specified road construction	
Temporary road construction	
Road decommissioning	
Road storage	

Year	Unit Number	Acres	Sale Name	Logging System	Vegetation Management Activity Card	Fuels Management Activity Card	Transportation Management Activity Card	Road Maintenance (FSR #)	Road Reconditioning (FSR #)	Road Storage (FSR #)	Road Decommissioning (FSR #)	Temporary Road Construction (Feet)	Specified Road Construction (Feet)

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Appendix C

Maps

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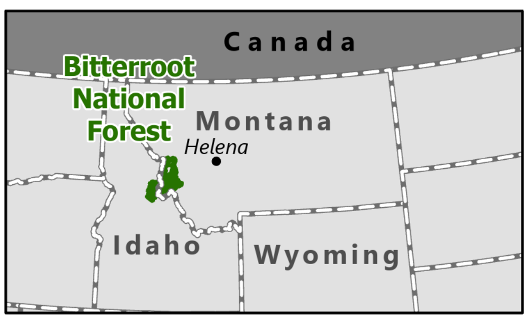
Bitterroot Front Environmental Assessment

Figure 1-1
Project Overview

Project boundary
Forest boundary
Research natural area

U.S. Forest Service
Bureau of Land Management
U.S. Fish and Wildlife Service
State
Private



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0 9 18 Miles

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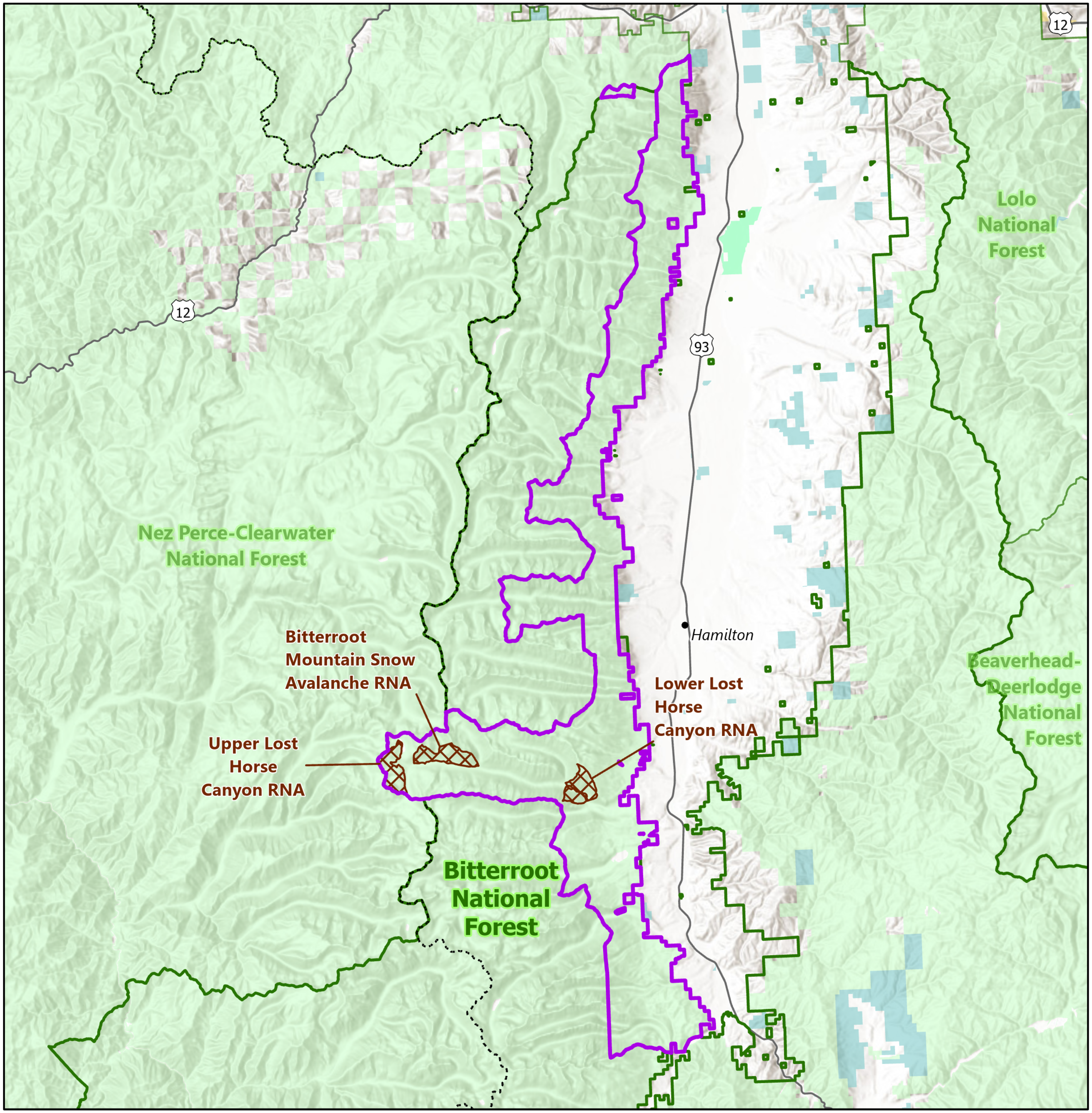


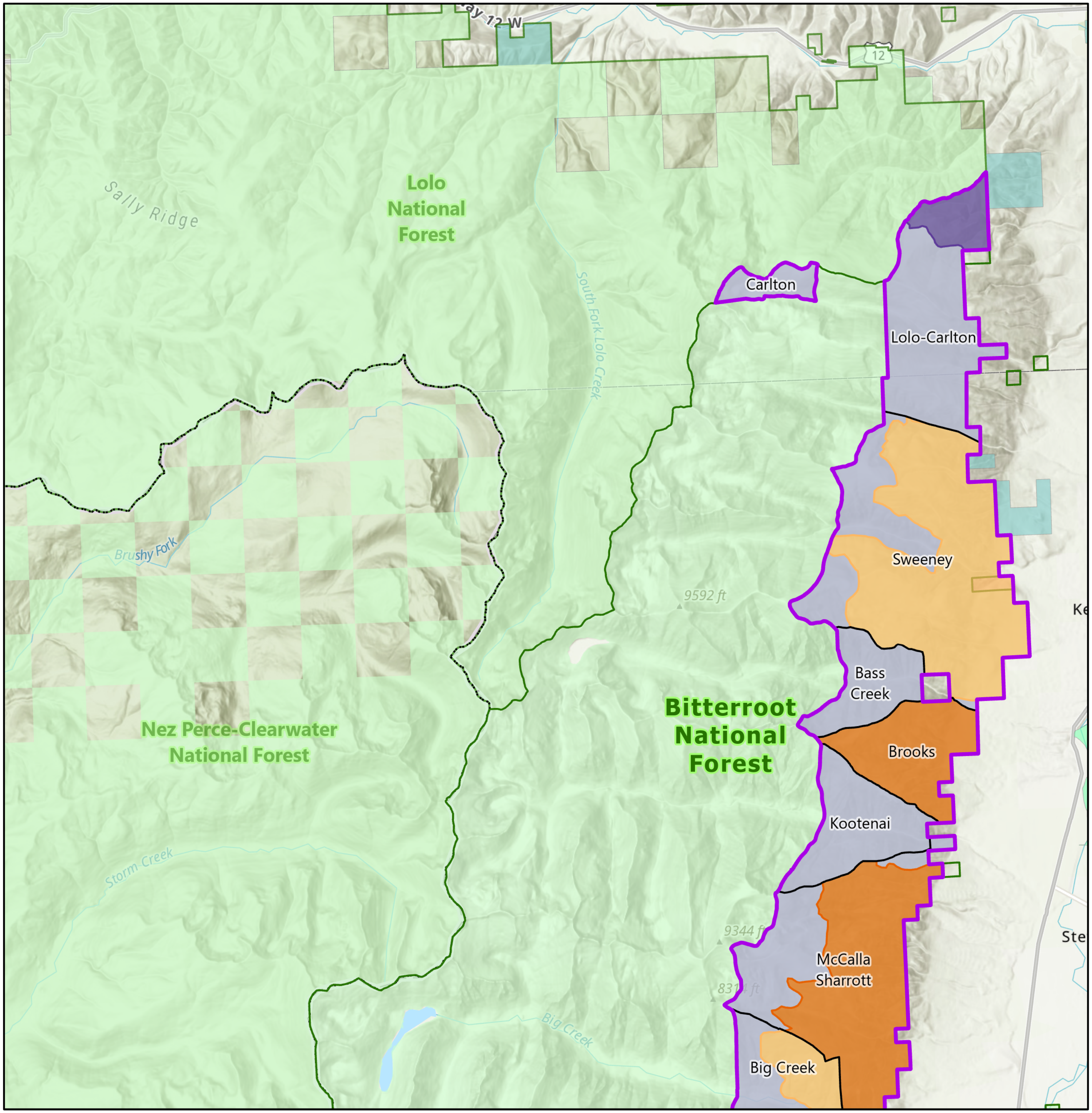
Bitterroot Front Environmental Assessment

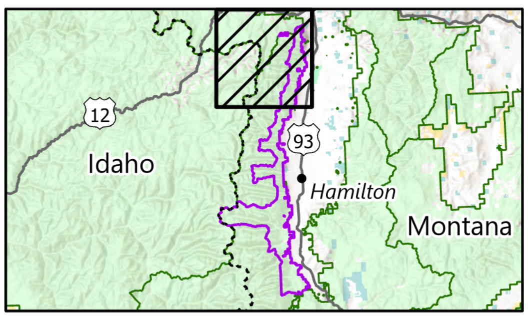
Figure 1-2a
Project Implementation Phase

- Implementation phase 1
- Implementation phase 2
- Implementation phase 3
- Implementation phase 4

- Priority area
- Project boundary
- Forest boundary

- U.S. Forest Service
- U.S. Fish and Wildlife Service
- State
- Private





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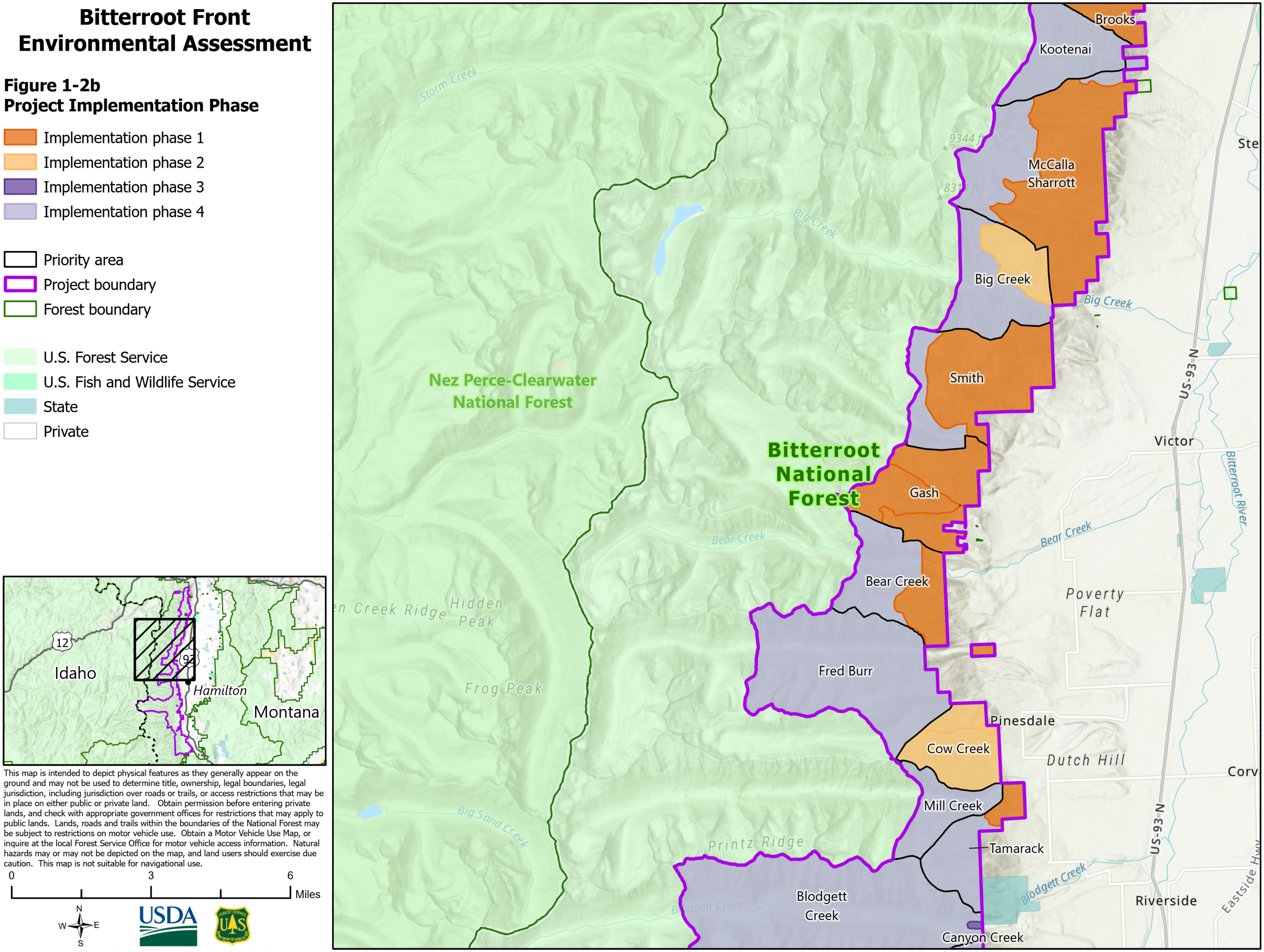
Bitterroot Front Environmental Assessment

Figure 1-2b
Project Implementation Phase



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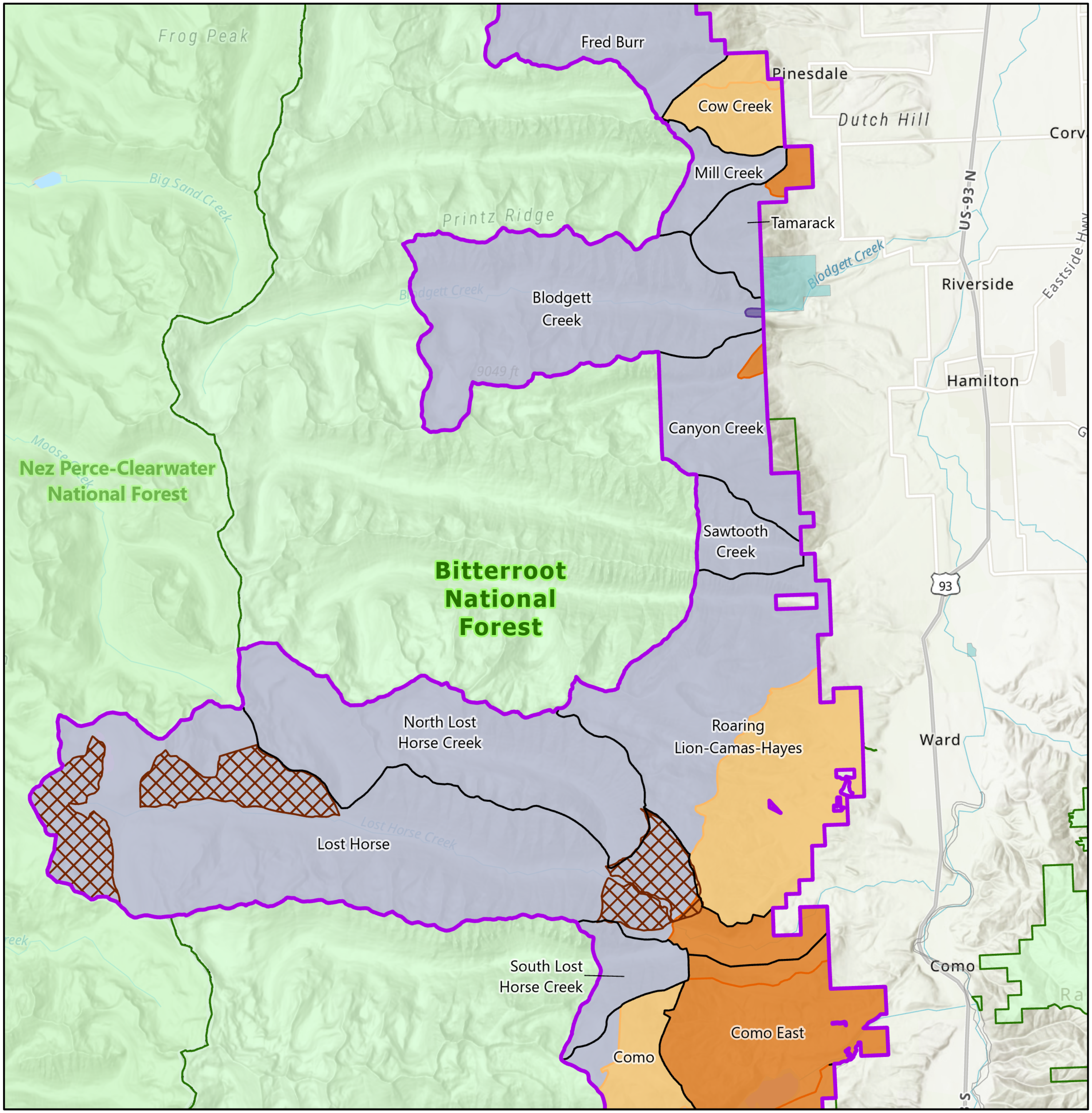
Bitterroot Front Environmental Assessment

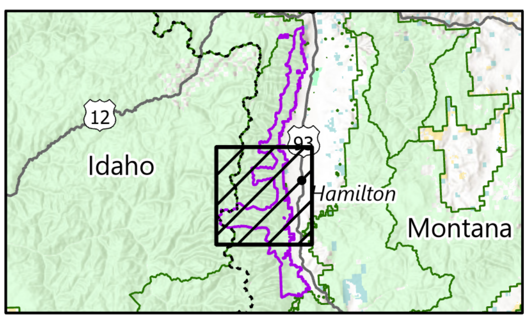
Figure 1-2c
Project Implementation Phase

- Implementation phase 1
- Implementation phase 2
- Implementation phase 3
- Implementation phase 4

- Priority area
- Project boundary
- Forest boundary
- Research natural area

- U.S. Forest Service
- State
- Private





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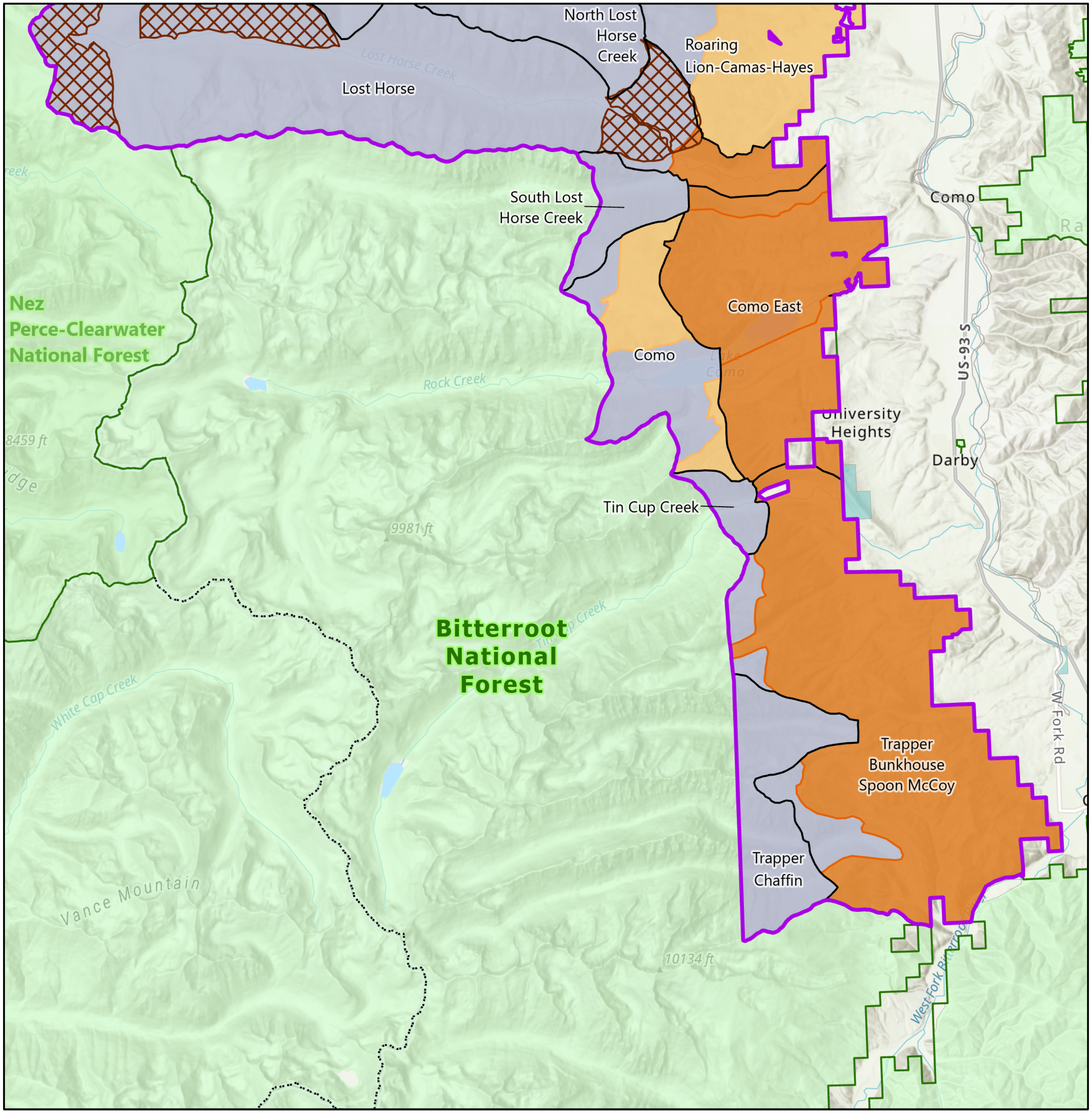
Bitterroot Front Environmental Assessment

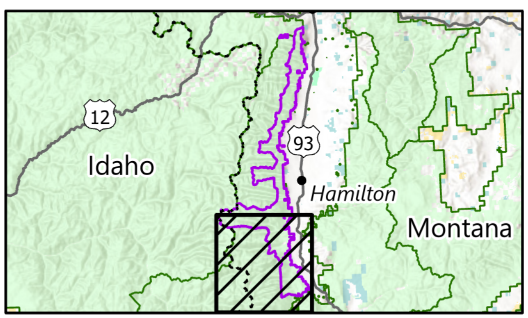
Figure 1-2d
Project Implementation Phase

Implementation phase 1
Implementation phase 2
Implementation phase 3
Implementation phase 4

Priority area
Project boundary
Forest boundary
Research natural area

U.S. Forest Service
State
Private





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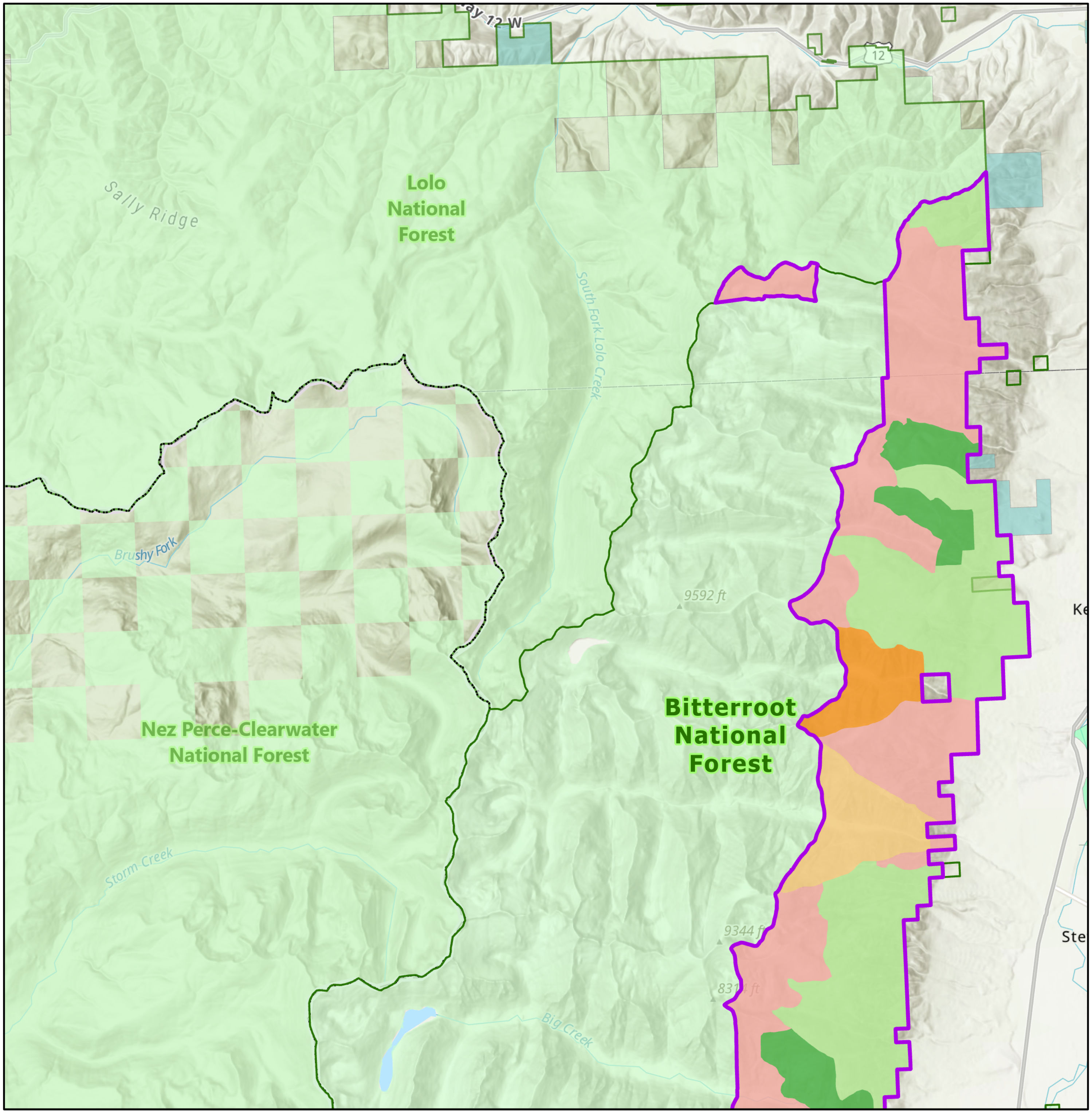
Bitterroot Front Environmental Assessment

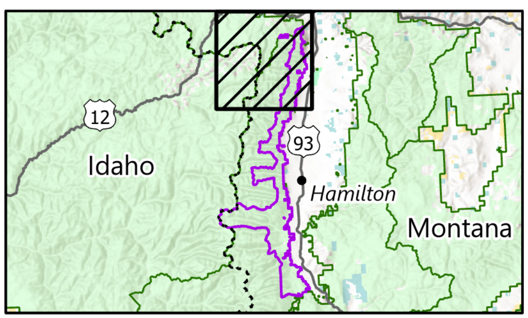
Figure 1-3a
Management Areas

- 3a, Partial retention
- 3c, Retention emphasis
- 5, Semiprimitive recreation
- 6, Proposed wilderness
- 6 & 9,Proposed wilderness & RNA

- Project boundary
- Forest boundary

- U.S. Forest Service
- U.S. Fish and Wildlife Service
- State
- Private





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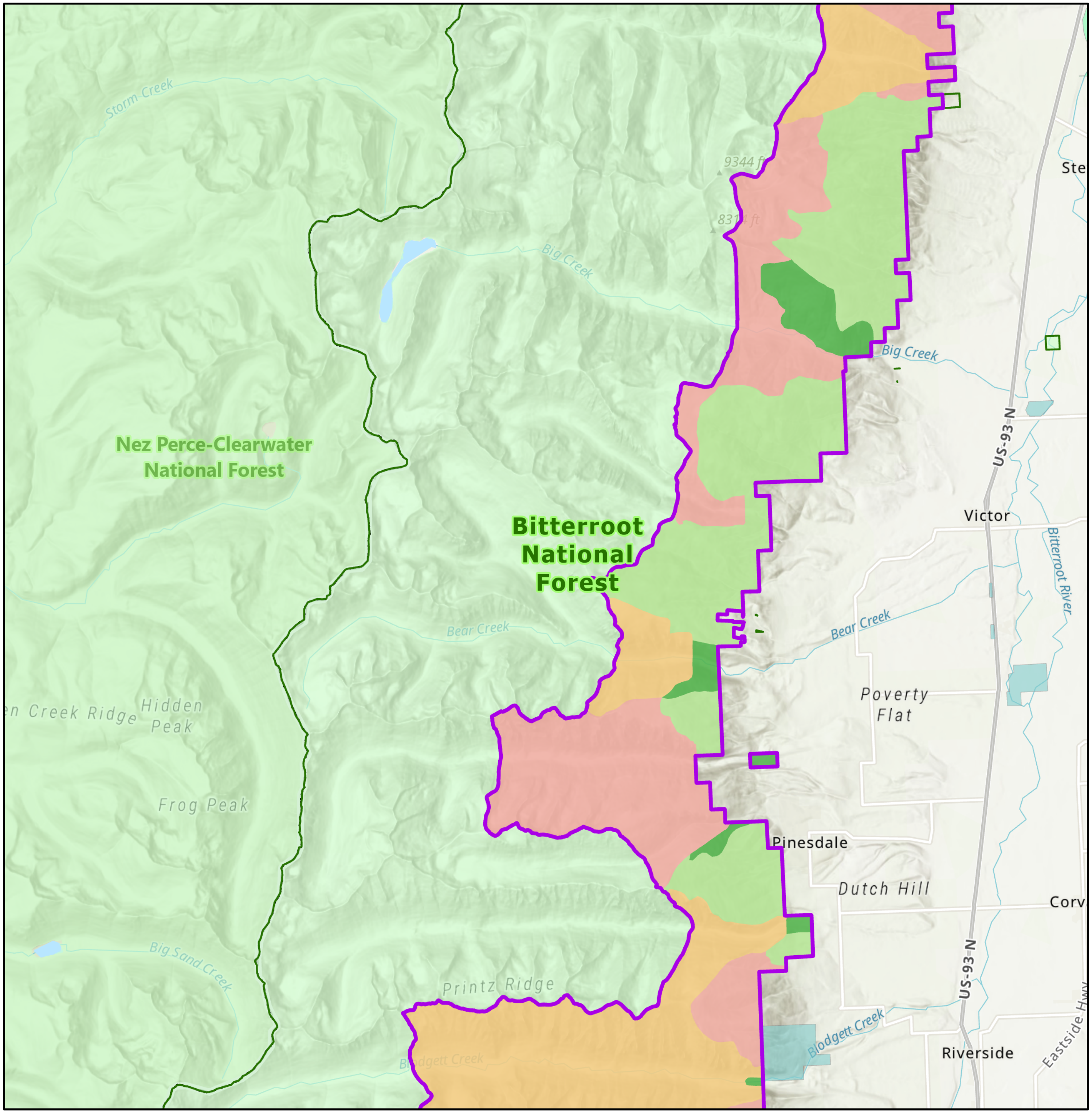
Bitterroot Front Environmental Assessment

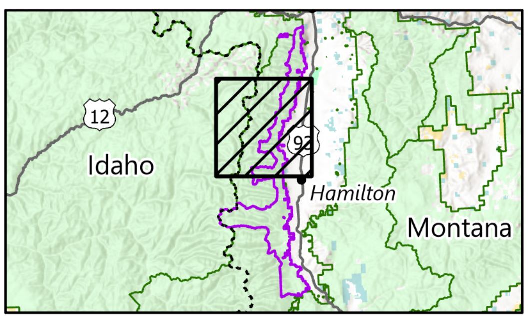
Figure 1-3b
Management Areas

- 3a, Partial retention
- 3c, Retention emphasis
- 5, Semiprimitive recreation
- 6, Proposed wilderness

- Project boundary
- Forest boundary

- U.S. Forest Service
- U.S. Fish and Wildlife Service
- State
- Private





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0 3 6 Miles

N W E S

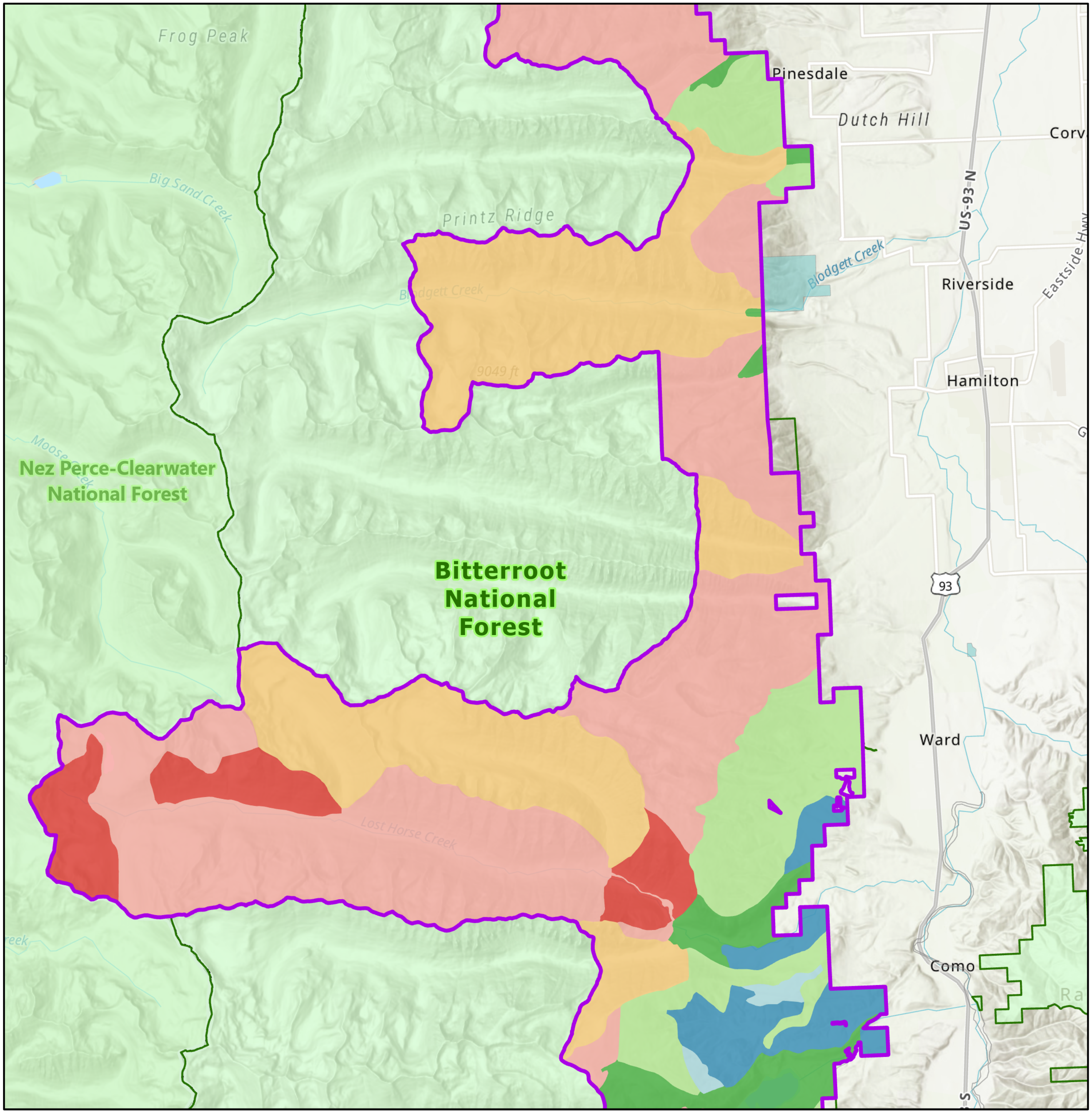
Bitterroot Front Environmental Assessment

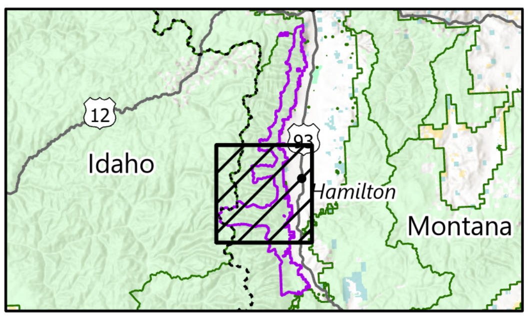
Figure 1-3c
Management Areas

- 1, Timber emphasis
- 2, Winter range
- 3a, Partial retention
- 3c, Retention emphasis
- 5, Semiprimitive recreation
- 5 & 9, Semiprimitive recreation & RNA
- 6, Proposed wilderness
- 7, Wilderness

- Project boundary
- Forest boundary

- U.S. Forest Service
- State
- Private





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0 3 6 Miles

N S W E

USDA

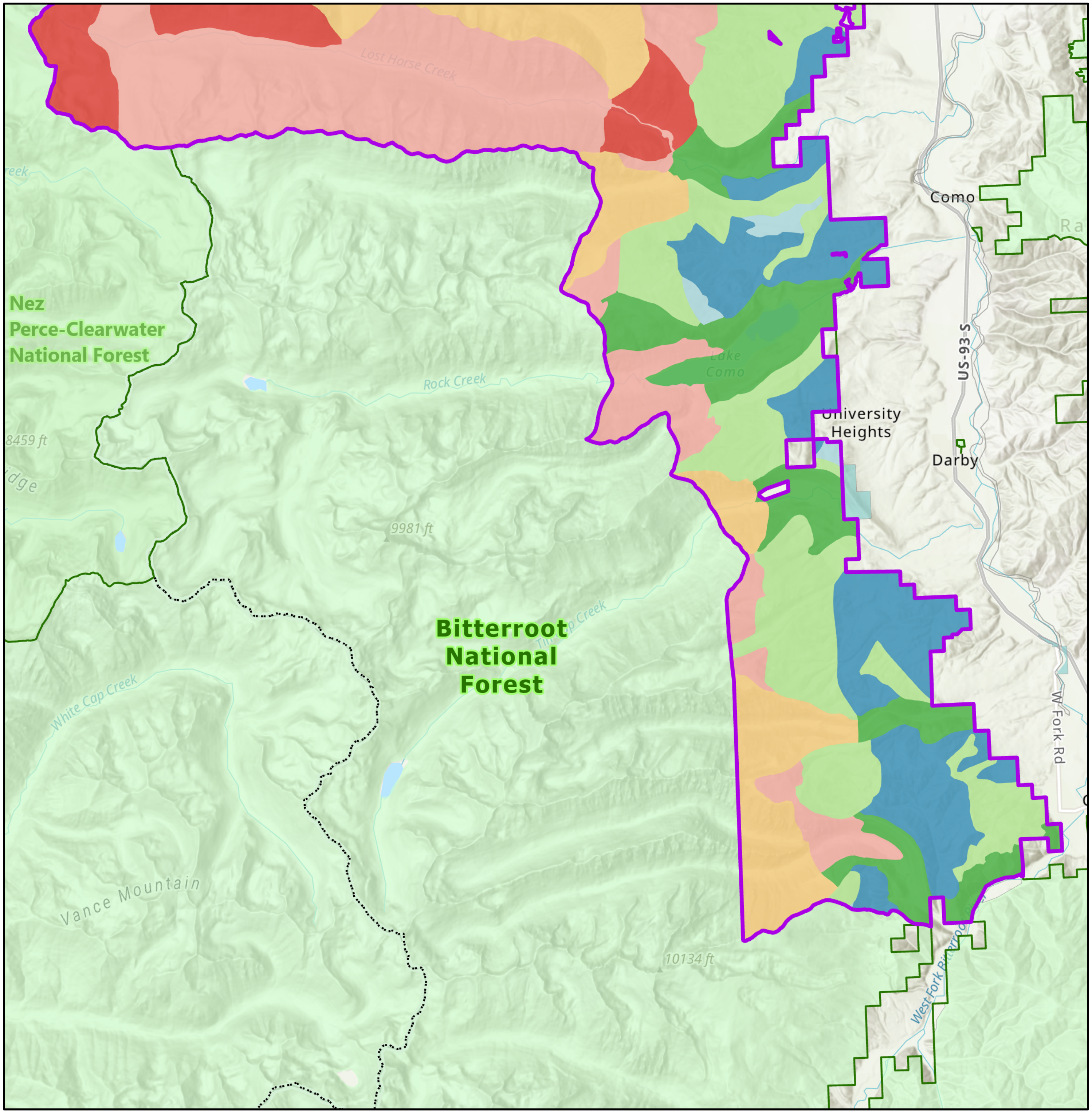
Bitterroot Front Environmental Assessment

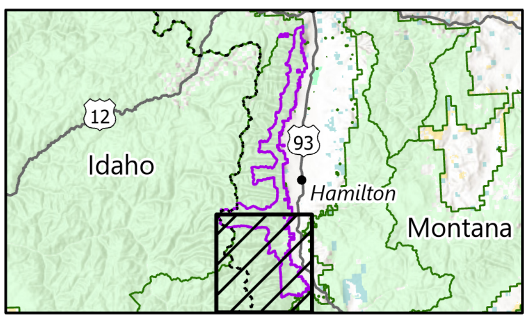
Figure 1-3d
Management Areas

- 1, Timber emphasis
- 2, Winter range
- 3a, Partial retention
- 3c, Retention emphasis
- 5, Semiprimitive recreation
- 5 & 9, Semiprimitive recreation & RNA
- 6, Proposed wilderness

- Project boundary
- Forest boundary

- U.S. Forest Service
- State
- Private





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0 3 6 Miles

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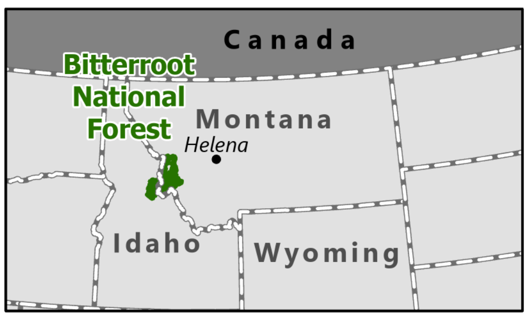
Bitterroot Front Environmental Assessment

Figure 1-4
Fire Regime Groups

- Fire Regime Group I
- Fire Regime Group II
- Fire Regime Group III
- Fire Regime Group IV
- Fire Regime Group V
- Water
- Snow / Ice
- Barren
- Sparsely Vegetated

- Project boundary
- Forest boundary

- U.S. Forest Service
- Bureau of Land Management
- U.S. Fish and Wildlife Service
- State
- Private



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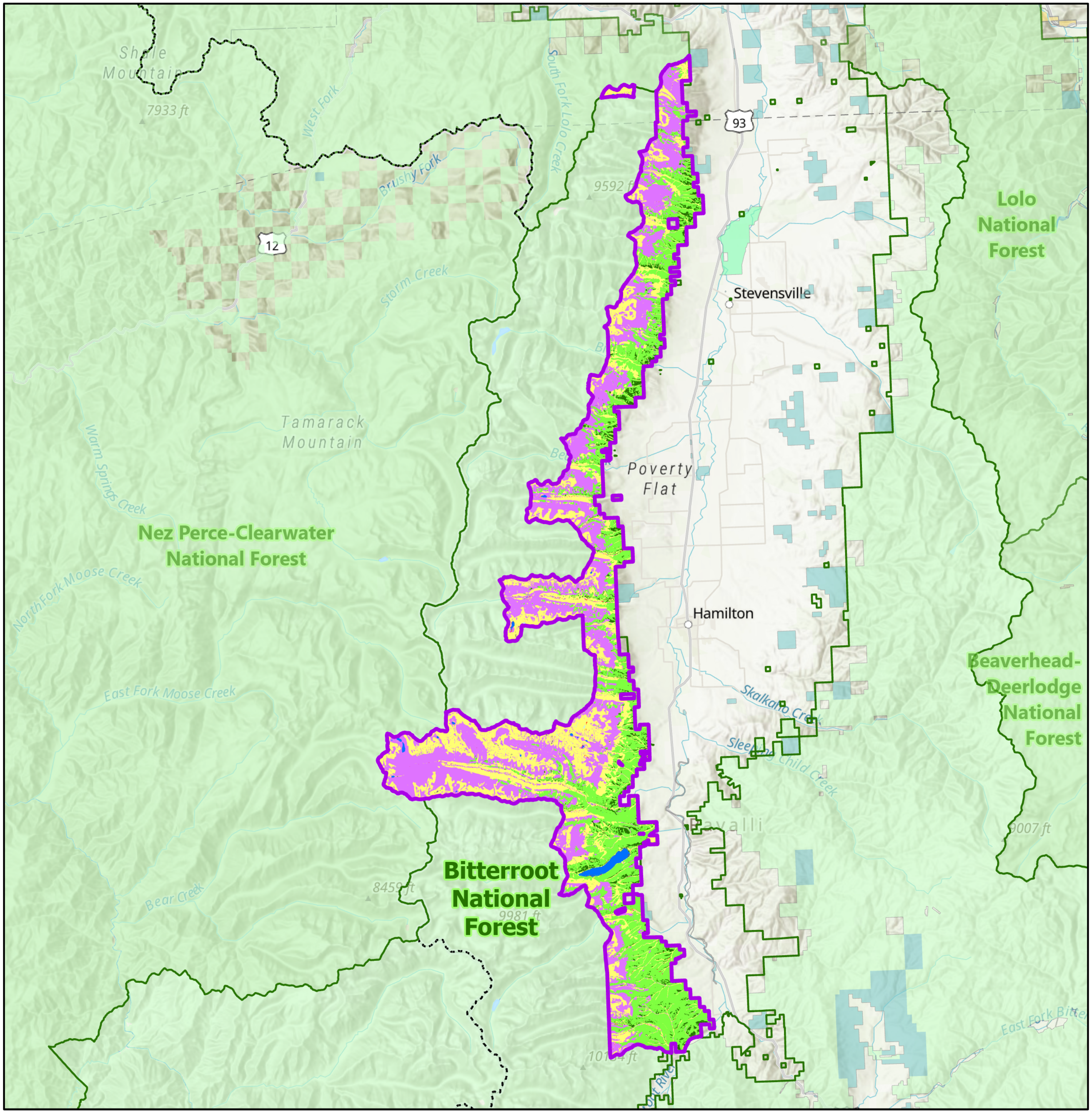
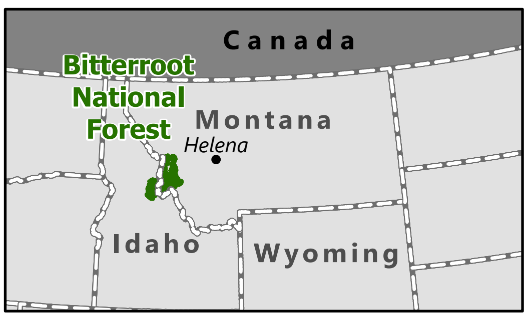


Bitterroot Front Environmental Assessment

Figure 1-5
Vegetation Condition Class

- Vegetation Condition Class I.A
- Vegetation Condition Class I.B
- Vegetation Condition Class II.A
- Vegetation Condition Class II.B
- Vegetation Condition Class III.A
- Water
- Snow/Ice
- Developed
- Barren or Sparse
- Agriculture

- Project boundary
- Forest boundary
- U.S. Forest Service
- Bureau of Land Management
- U.S. Fish and Wildlife Service
- State
- Private



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0 9 18 Miles

N S E W

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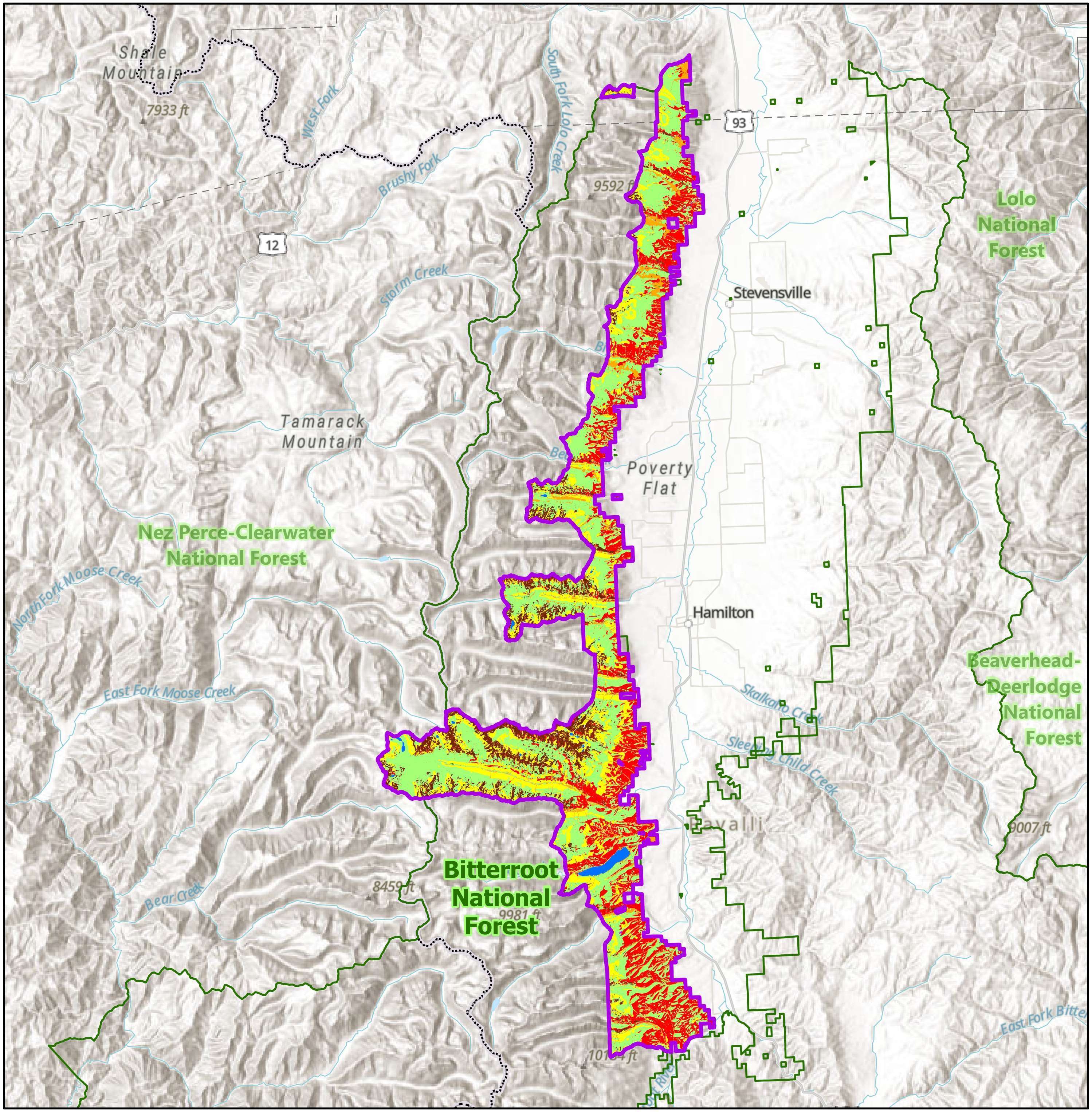


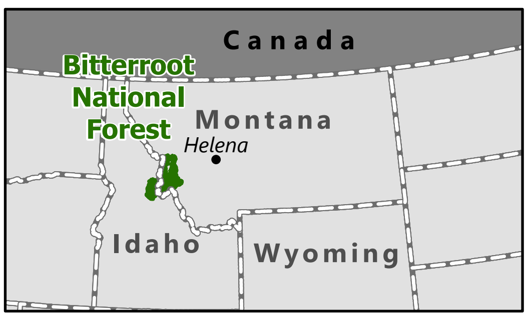
Bitterroot Front Environmental Assessment

Figure 1-6
Flame Length: Existing Conditions

- Non-burnable
- 1-4 ft
- 5-8 ft
- 9-11 ft
- >11 ft

- Project boundary
- Forest boundary

- U.S. Forest Service
- Bureau of Land Management
- U.S. Fish and Wildlife Service
- State
- Private



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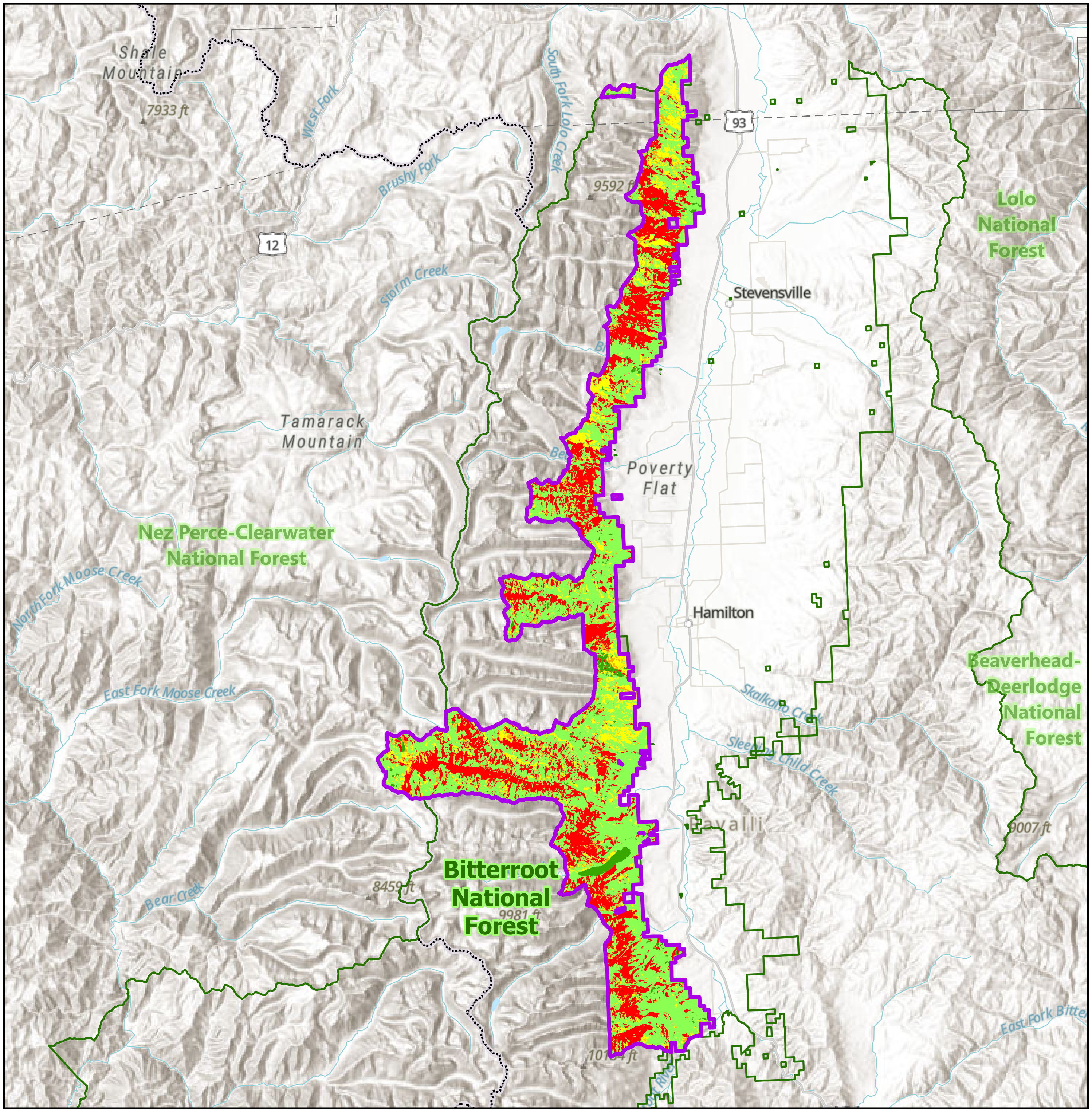


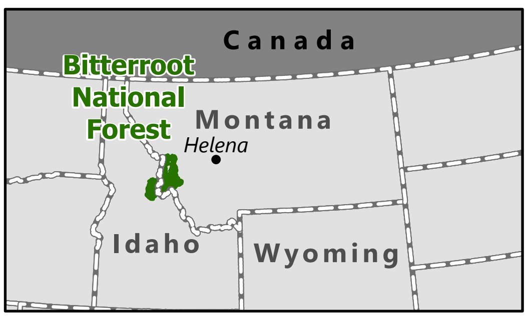
Bitterroot Front Environmental Assessment

Figure 1-7
Crown Fire Activity: Existing Conditions

- Crown fire
- Surface fire
- Non-burnable

- Project boundary
- Forest boundary

- U.S. Forest Service
- Bureau of Land Management
- U.S. Fish and Wildlife Service
- State
- Private



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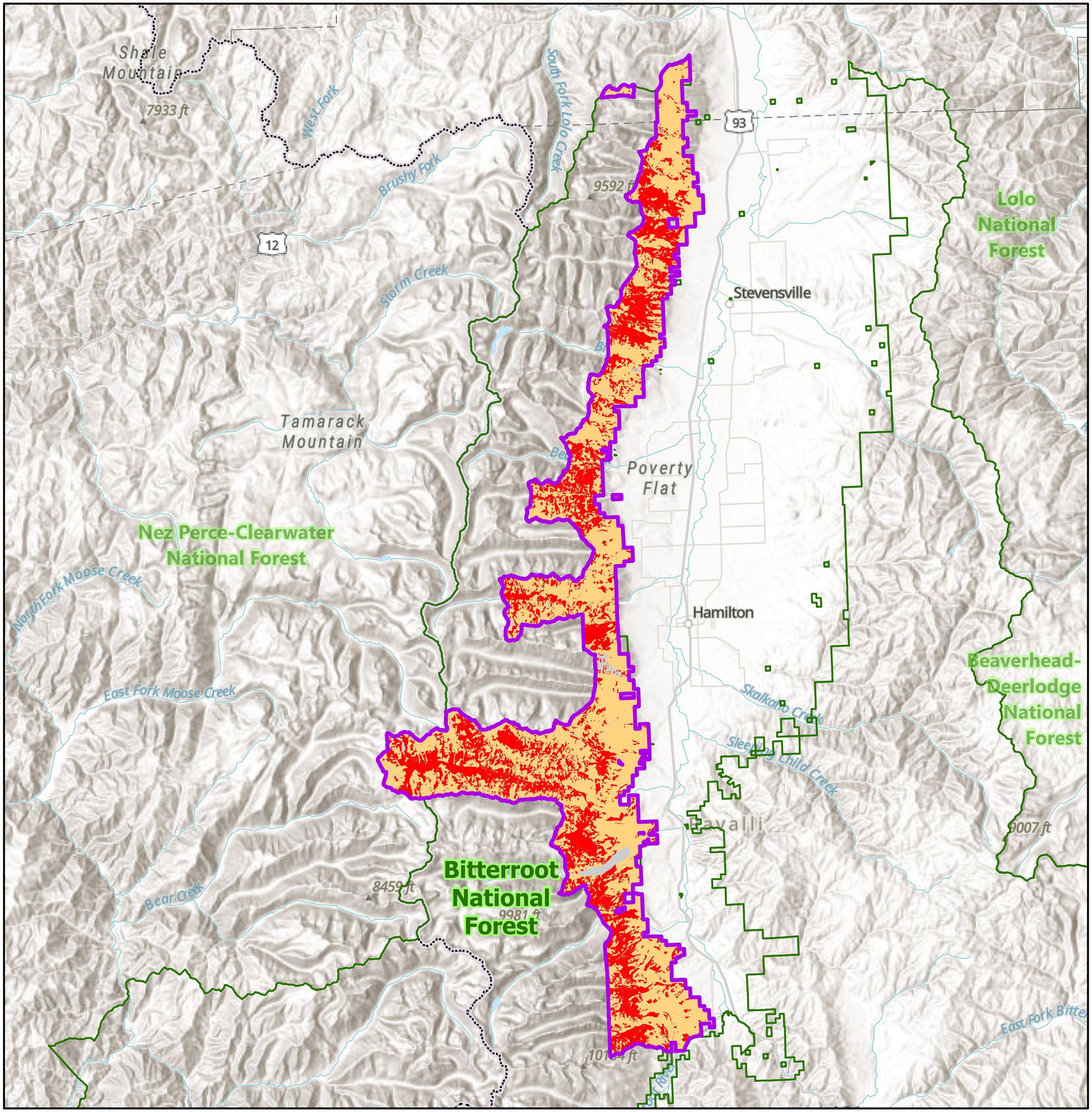


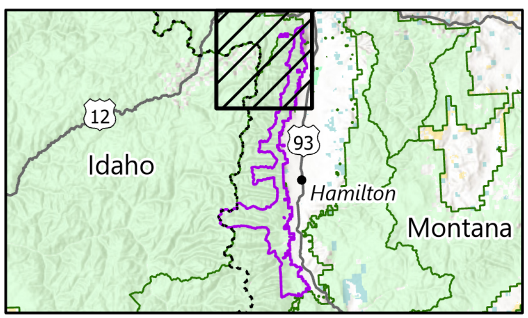
Bitterroot Front Environmental Assessment

Figure 2-1a
Proposed Vegetation Treatment Types

- Commercial intermediate harvest and prescribed burn
- Noncommercial stand improvement and prescribed burn
- Noncommercial whitebark pine restoration and prescribed burn
- Prescribed burn
- Slash and prescribed burn

- Priority area
- Project boundary
- Forest boundary
- Inventoried roadless area

- U.S. Forest Service
- U.S. Fish and Wildlife Service
- State
- Private



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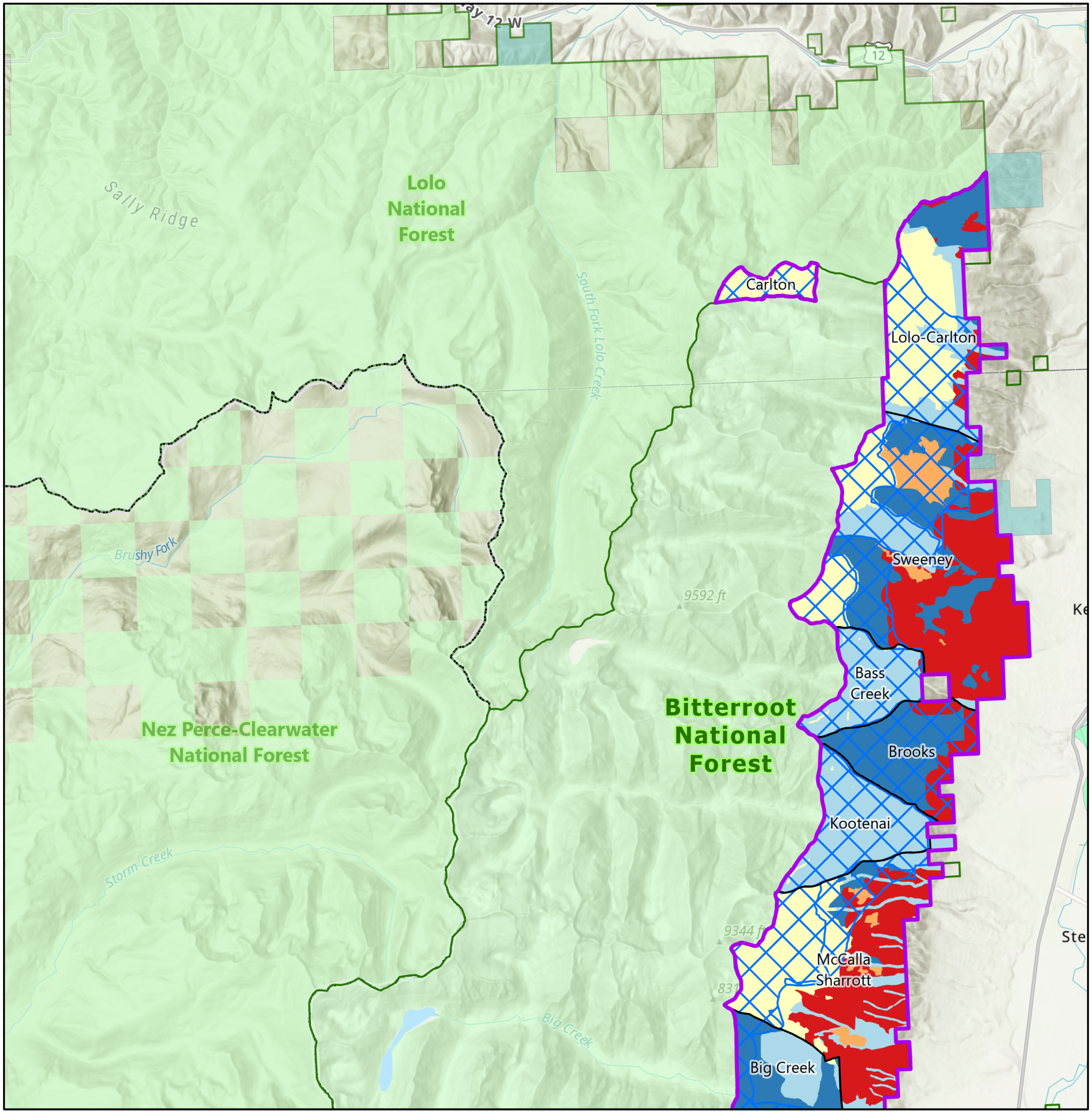


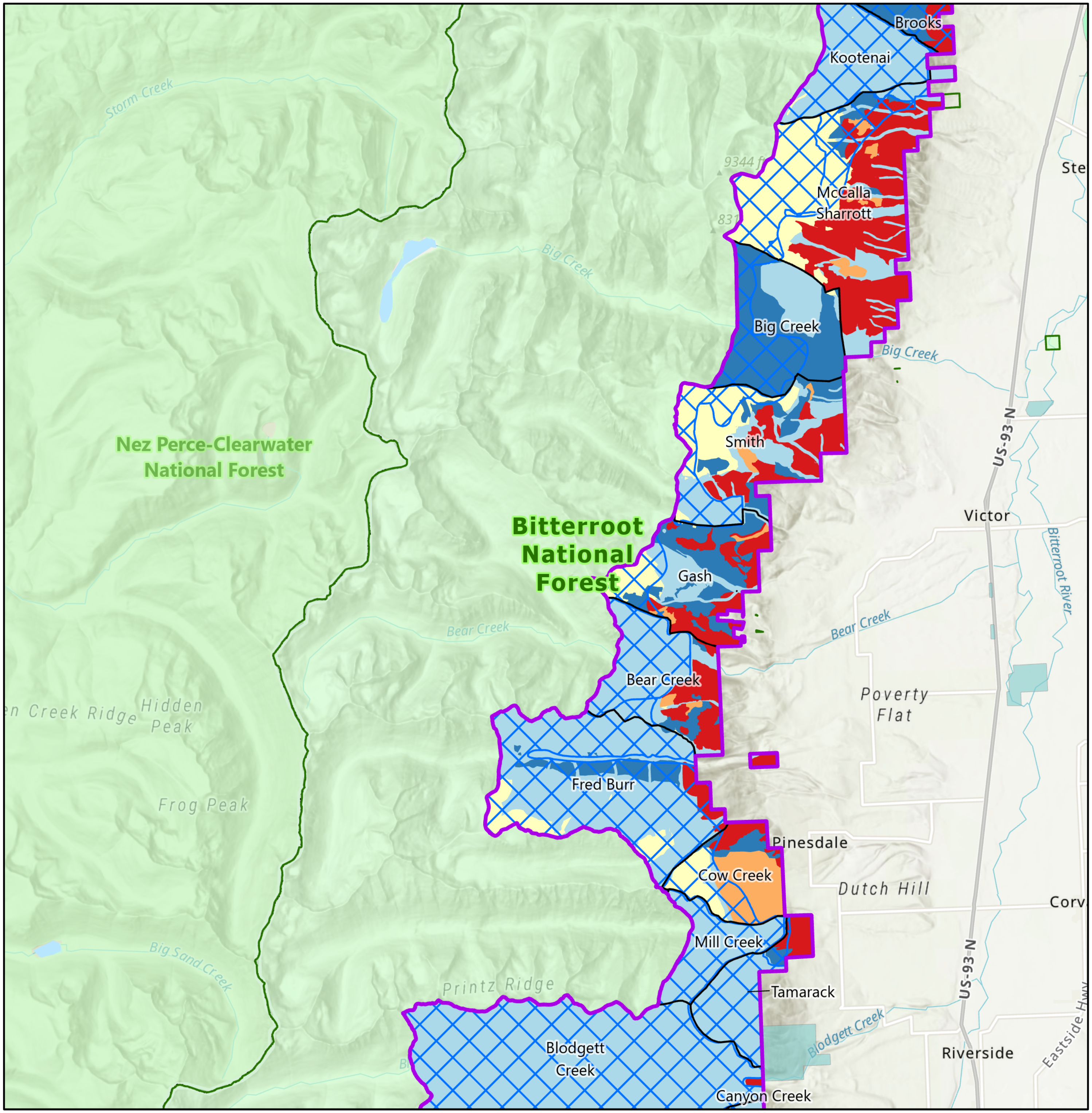
Bitterroot Front Environmental Assessment

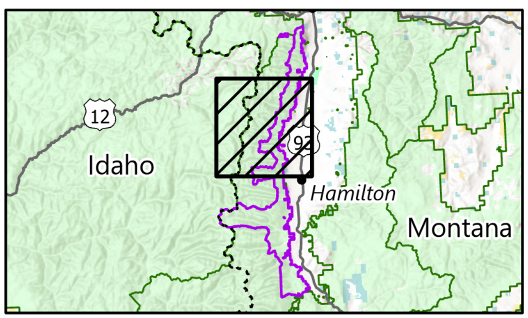
Figure 2-1b
Proposed Vegetation Treatment Types

- Commercial intermediate harvest and prescribed burn
- Noncommercial stand improvement and prescribed burn
- Noncommercial whitebark pine restoration and prescribed burn
- Prescribed burn
- Slash and prescribed burn

- Priority area
- Project boundary
- Forest boundary
- Inventoried roadless area

- U.S. Forest Service
- U.S. Fish and Wildlife Service
- State
- Private





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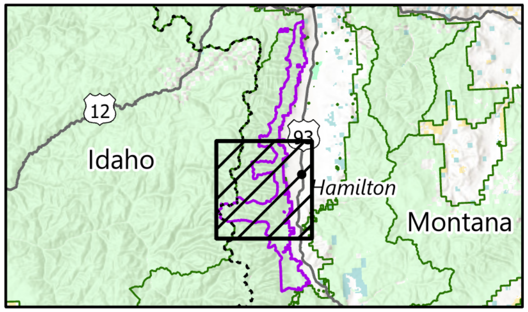
Bitterroot Front Environmental Assessment

Figure 2-1c
Proposed Vegetation Treatment Types

- Commercial intermediate harvest and prescribed burn
- Noncommercial stand improvement and prescribed burn
- Noncommercial whitebark pine restoration and prescribed burn
- Prescribed burn
- Slash and prescribed burn

- Priority area
- Project boundary
- Forest boundary
- Research natural area (no treatments proposed)
- Inventoried roadless area

- U.S. Forest Service
- State
- Private



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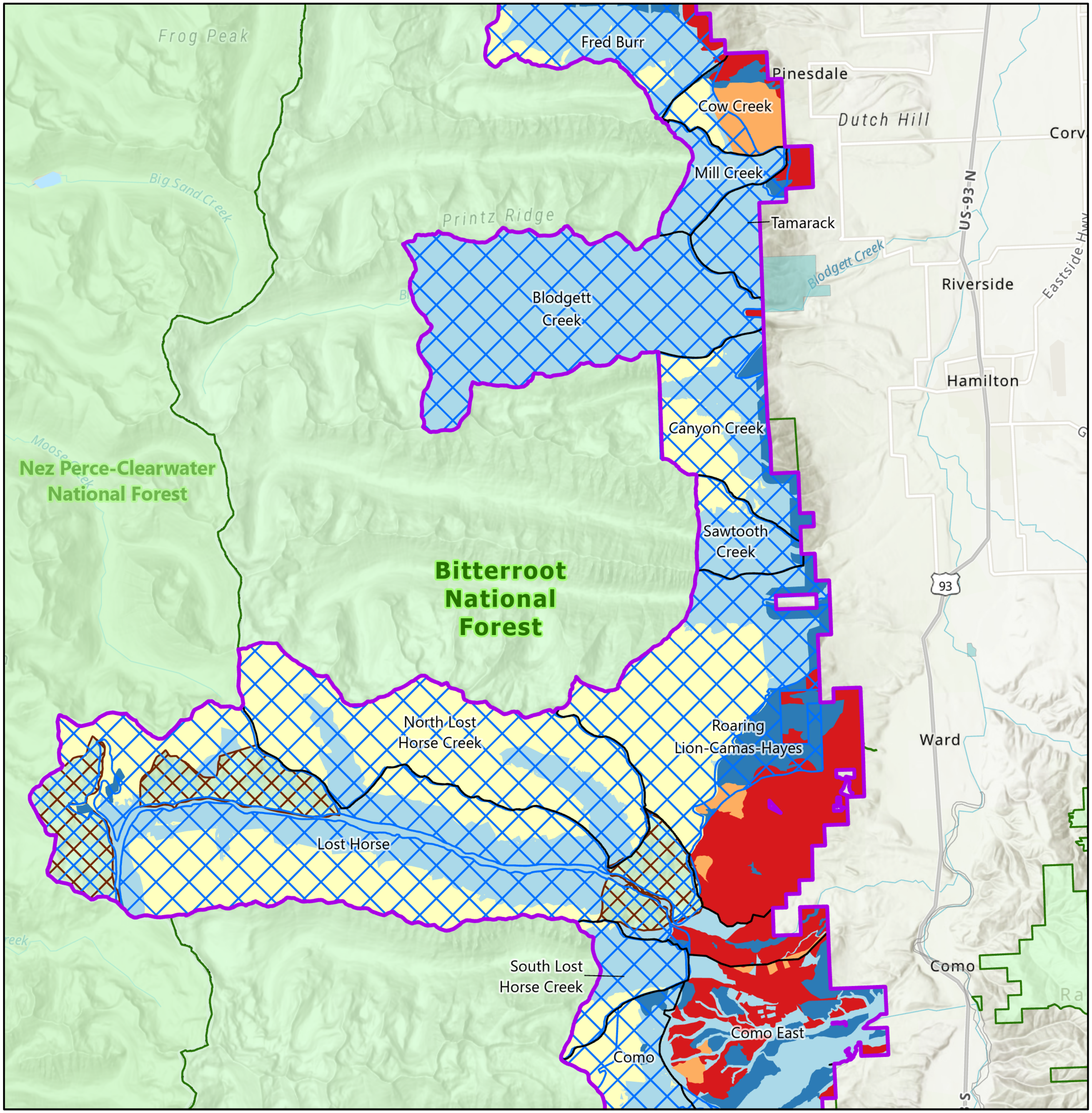


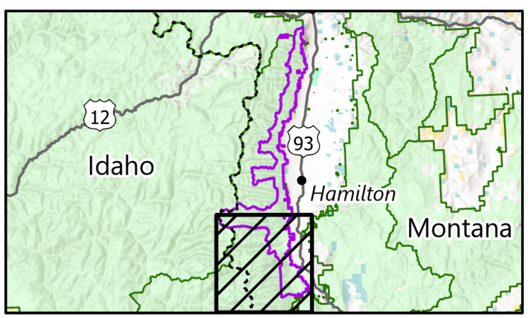
Bitterroot Front Environmental Assessment

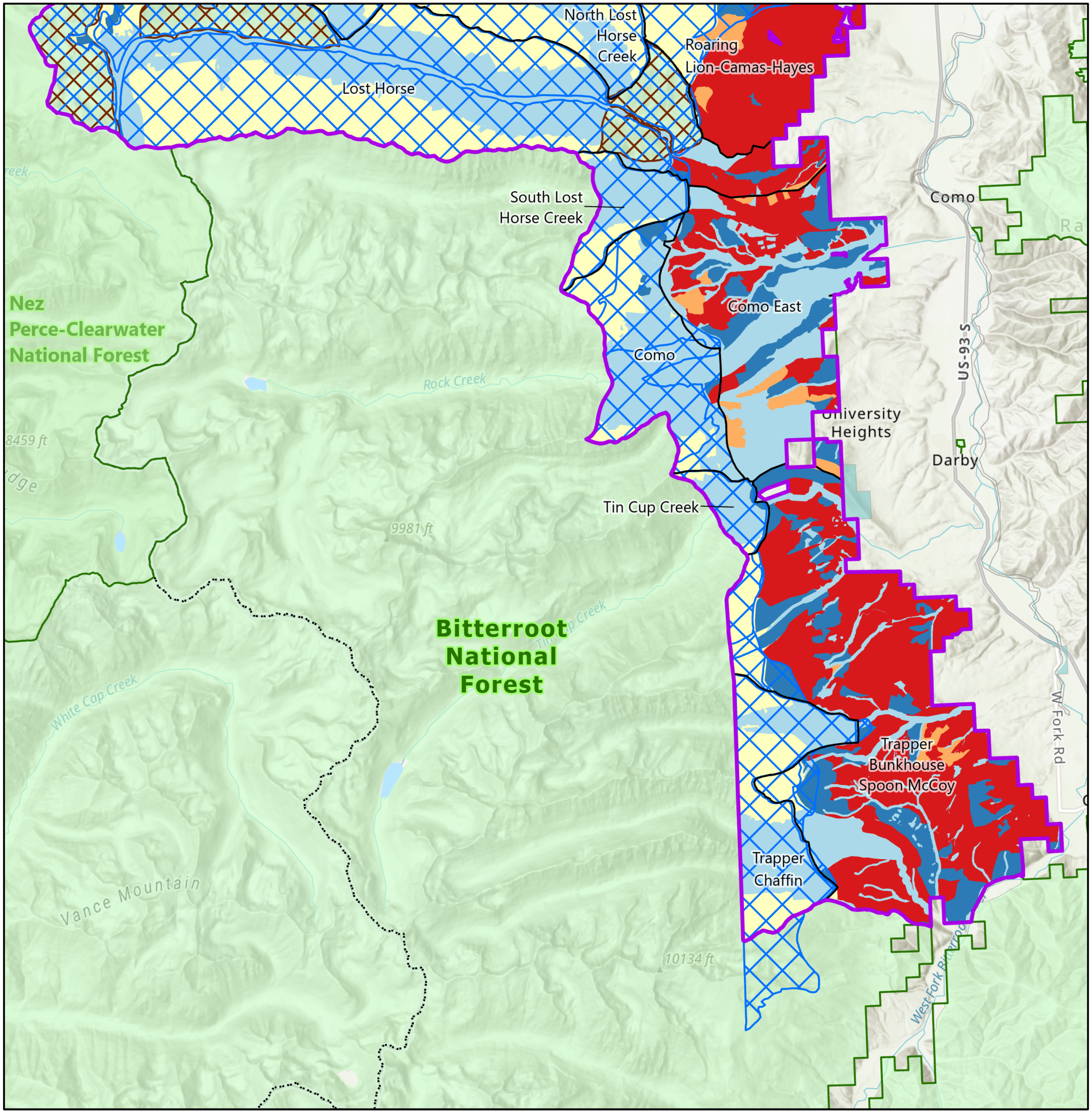
Figure 2-1d
Proposed Vegetation Treatment Types

- Commercial intermediate harvest and prescribed burn
- Noncommercial stand improvement and prescribed burn
- Noncommercial whitebark pine restoration and prescribed burn
- Prescribed burn
- Slash and prescribed burn

- Priority area
- Project boundary
- Forest boundary
- Research natural area (no treatments proposed)
- Inventoried roadless area

- U.S. Forest Service
- State
- Private





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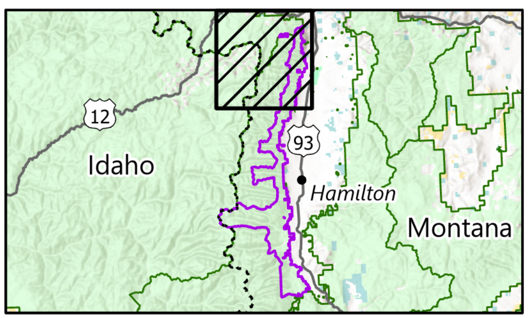
Bitterroot Front Environmental Assessment

Figure 2-2a
Inventoried Roadless Area and Private Proximity Treatments

- Commercial intermediate harvest and prescribed burn within a quarter mile of private lands or existing roads
- Implementation phase 1
- Implementation phase 2
- Implementation phase 3
- Implementation phase 4
- Existing road

- Priority area
- Inventoried roadless area
- Project boundary
- Forest boundary

- U.S. Forest Service
- U.S. Fish and Wildlife Service
- State
- Private



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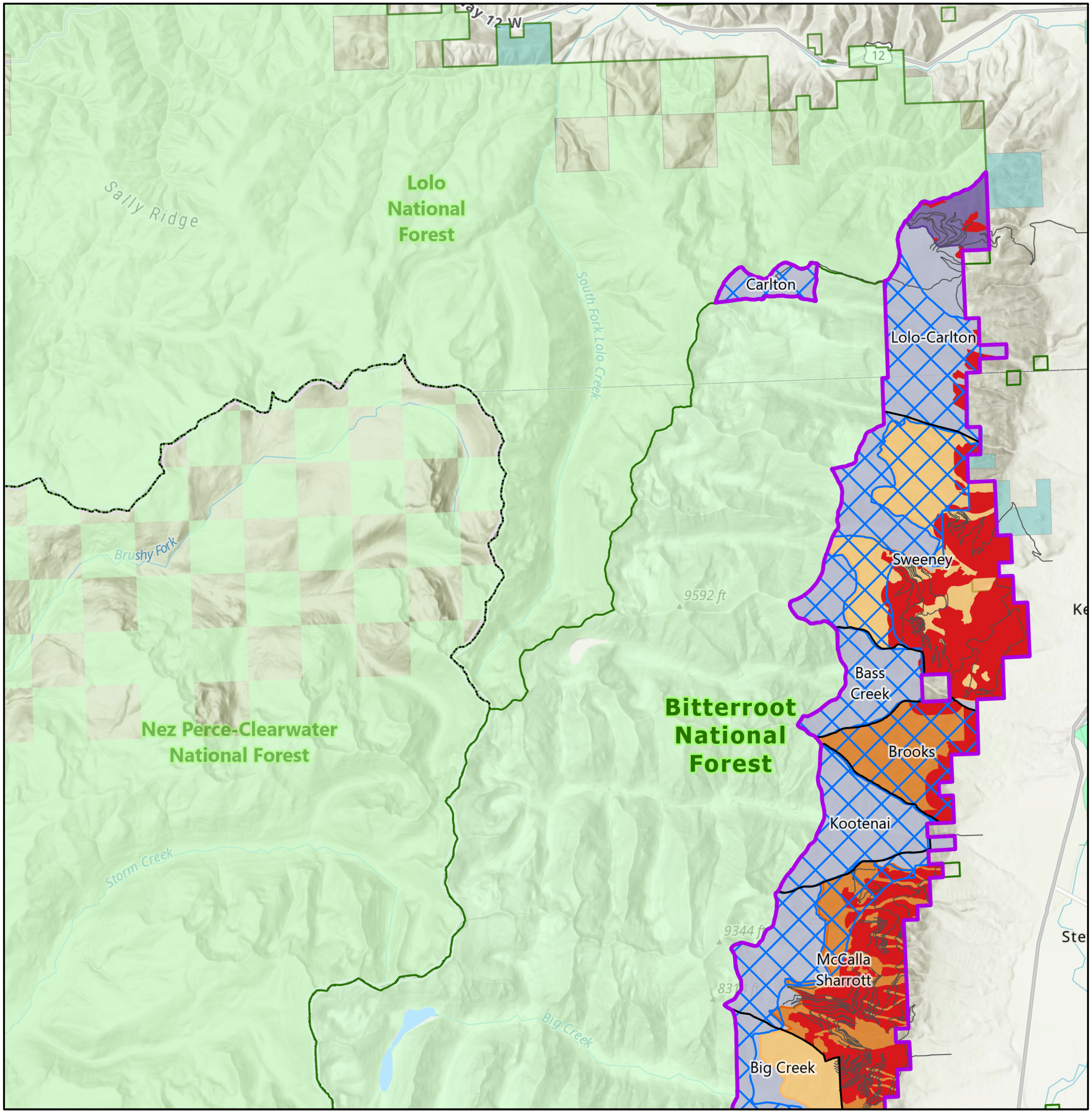
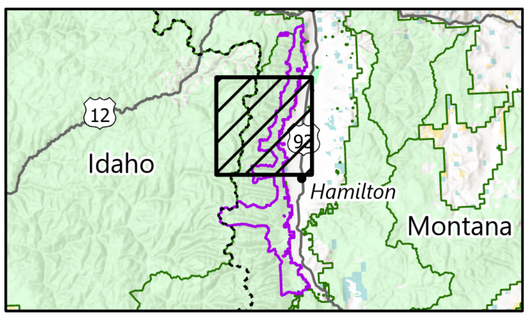


Bitterroot Front Environmental Assessment

Figure 2-2b Inventoried Roadless Area and Private Proximity Treatments

- Commercial intermediate harvest and prescribed burn within a quarter mile of private lands or existing roads
- Implementation phase 1
- Implementation phase 2
- Implementation phase 3
- Implementation phase 4
- Existing road
- Priority area
- Inventoried roadless area
- Project boundary
- Forest boundary
- U.S. Forest Service
- U.S. Fish and Wildlife Service
- State
- Private



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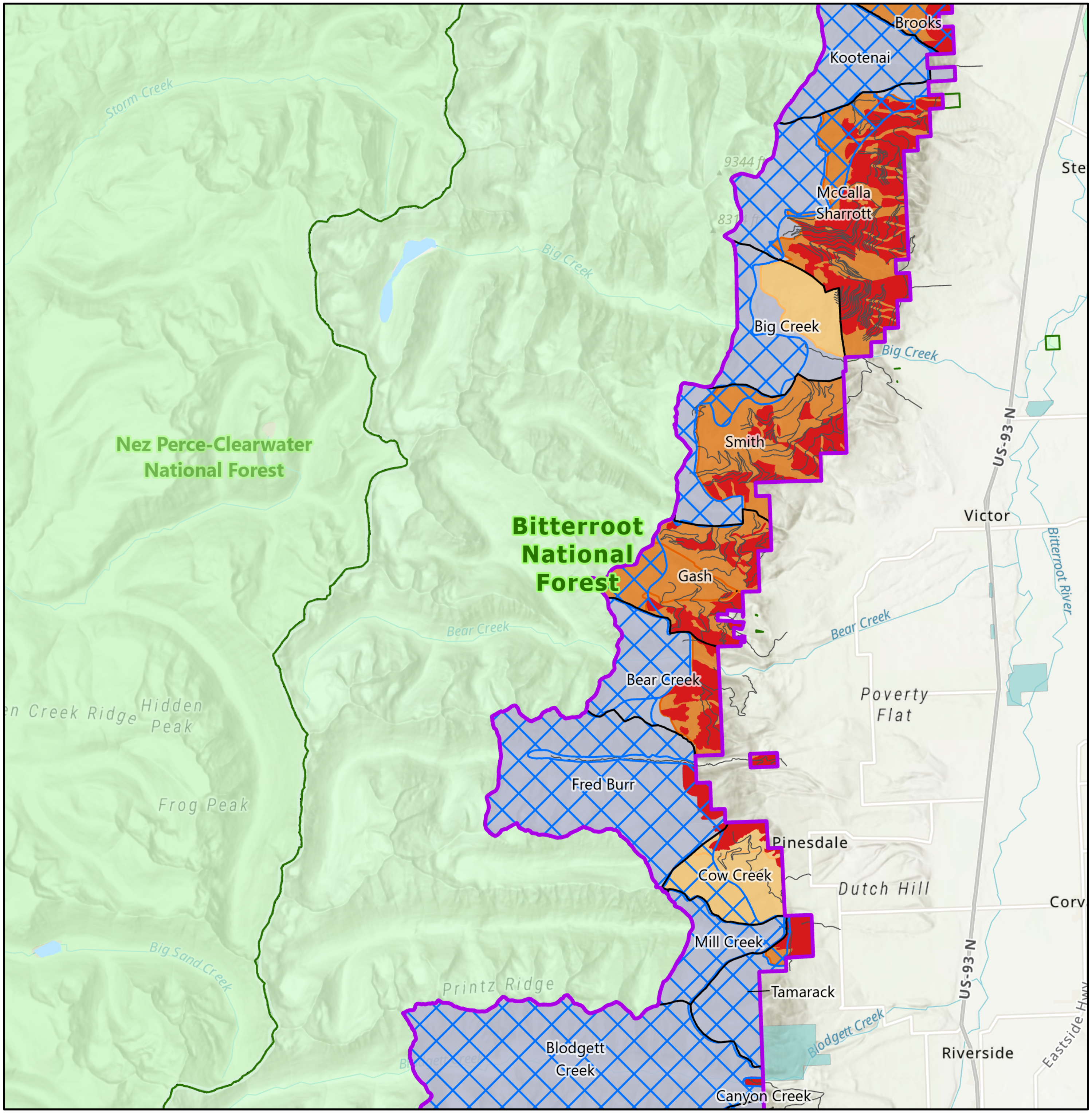


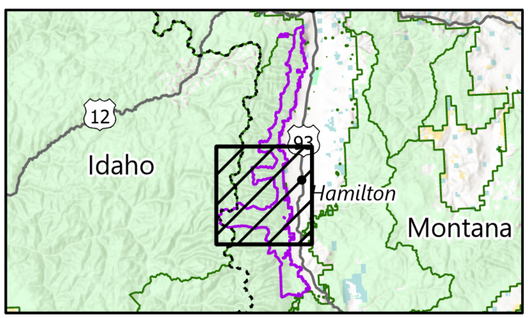
Bitterroot Front Environmental Assessment

Figure 2-2c Inventoried Roadless Area and Private Proximity Treatments

- Commercial intermediate harvest and prescribed burn within a quarter mile of private lands or existing roads
- Implementation phase 1
- Implementation phase 2
- Implementation phase 3
- Implementation phase 4
- Existing road

- Priority area
- Inventoried roadless area
- Project boundary
- Forest boundary

- U.S. Forest Service
- State
- Private



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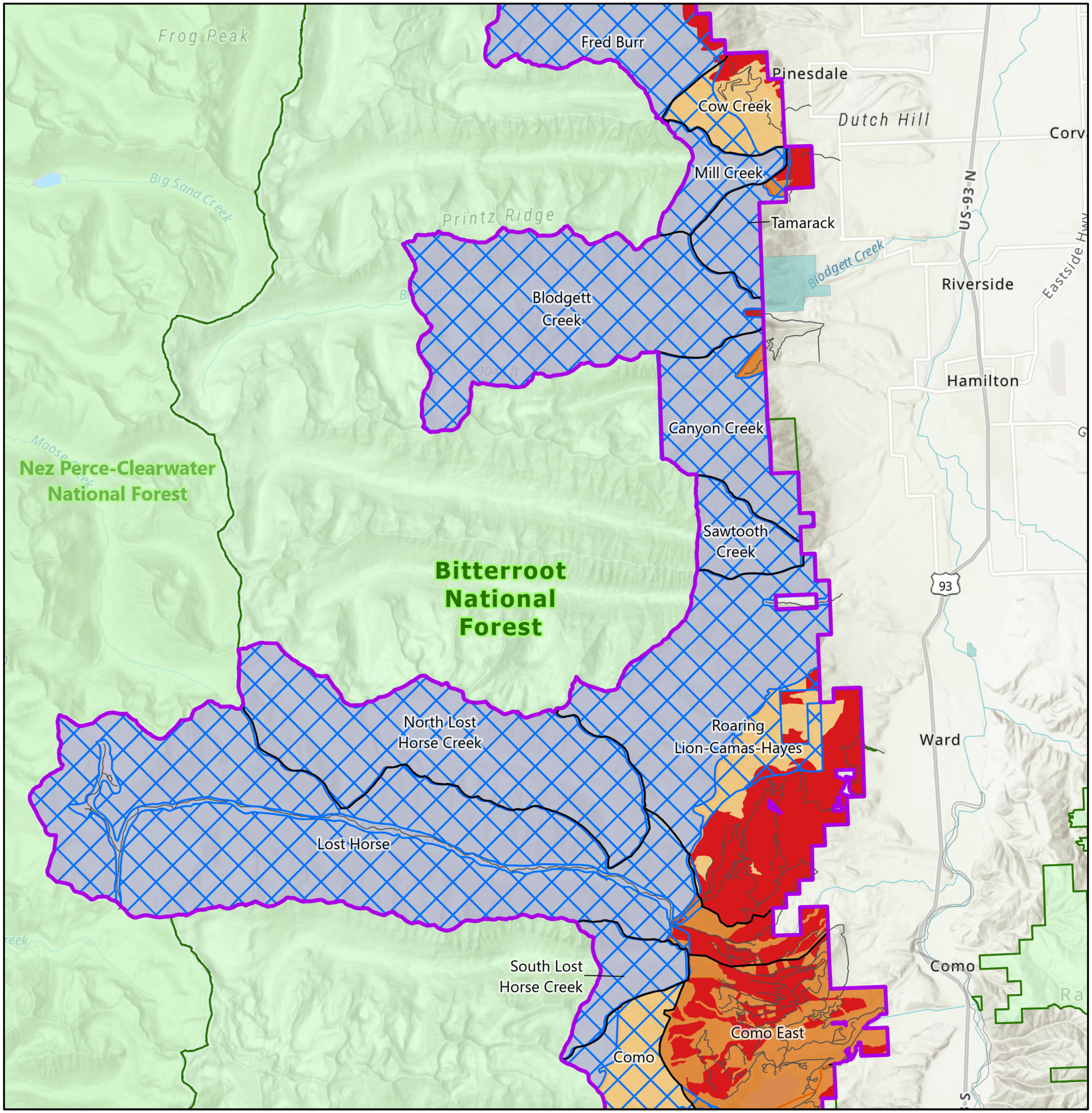


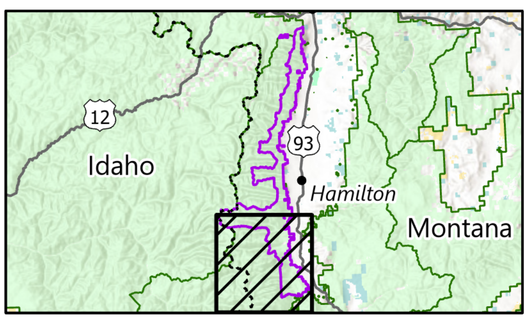
Bitterroot Front Environmental Assessment

Figure 2-2d
Inventoried Roadless Area and Private Proximity Treatments

- Commercial intermediate harvest and prescribed burn within a quarter mile of private lands or existing roads
- Implementation phase 1
- Implementation phase 2
- Implementation phase 4
- Existing road

- Priority area
- Inventoried roadless area
- Project boundary
- Forest boundary

- U.S. Forest Service
- State
- Private



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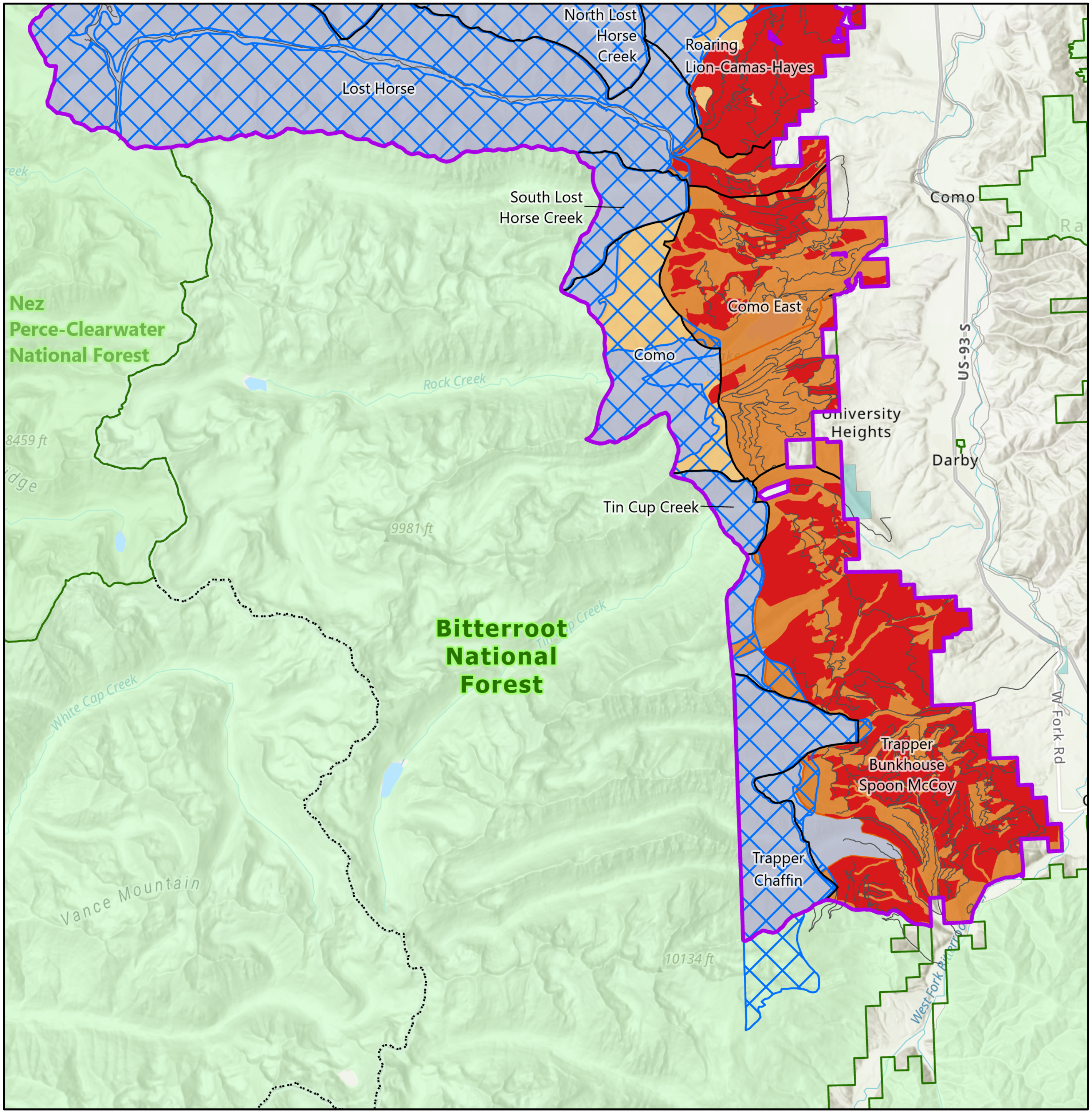


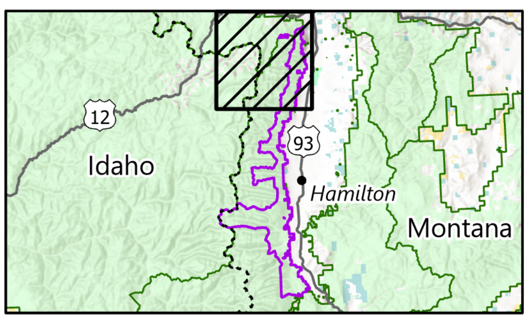
Bitterroot Front Environmental Assessment

Figure 2-3a
Proposed Transportation Changes

- Decommission NFSRs
- Store NFSRs
- Store NSFRs after use
- Maintain current status as NSFRs
- Undetermined road, obliterate
- Undetermined road, obliterate after use

- Priority area
- Project boundary
- Forest boundary

- U.S. Forest Service
- U.S. Fish and Wildlife Service
- State
- Private



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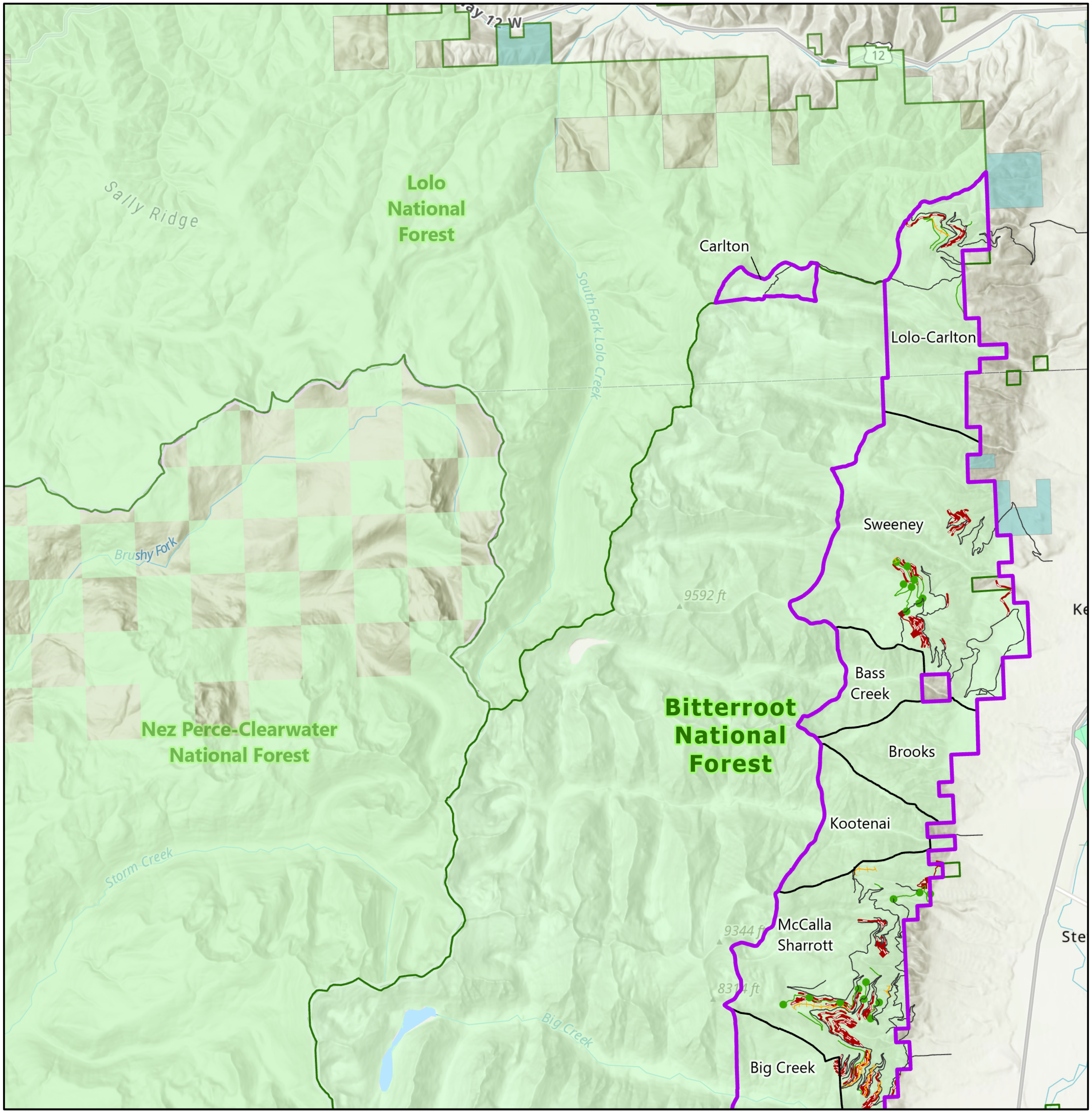


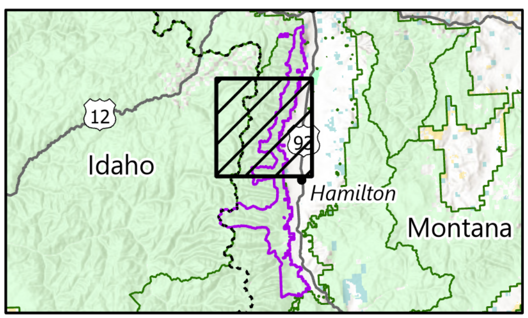
Bitterroot Front Environmental Assessment

Figure 2-3b
Proposed Transportation Changes

- Decommission NFSRs
- Store NFSRs
- Store NSFRs after use
- Maintain current status as NSFRs
- Undetermined road, obliterate
- Undetermined road, obliterate after use
- Previously decommissioned NFSR
- Private road, maintain status

- Priority area
- Project boundary
- Forest boundary

- U.S. Forest Service
- U.S. Fish and Wildlife Service
- State
- Private



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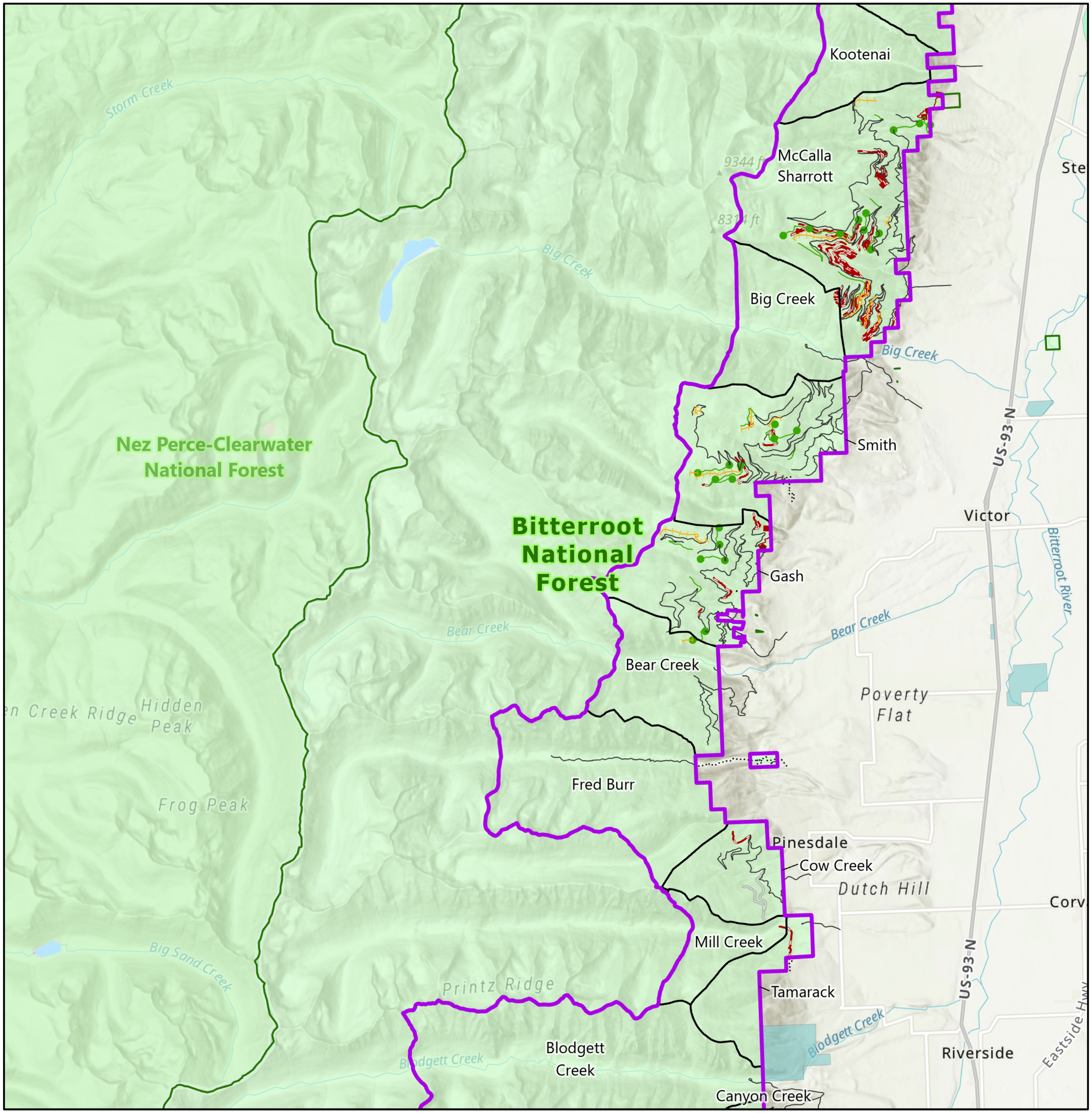


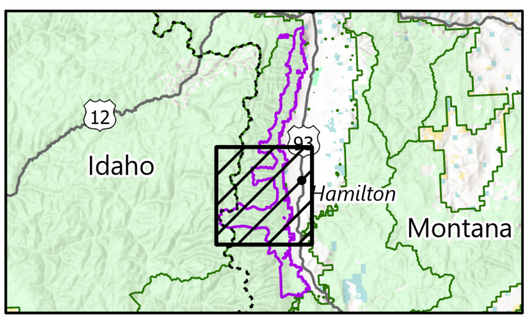
Bitterroot Front Environmental Assessment

Figure 2-3c
Proposed Transportation Changes

- Maintain current status as NSFRs
- Undetermined road added as NFSRs
- Undetermined road, obliterate
- Undetermined road, obliterate after use
- Previously decommissioned NFSR
- Private road, maintain status

- Priority area
- Project boundary
- Forest boundary
- Research natural area

- U.S. Forest Service
- State
- Private



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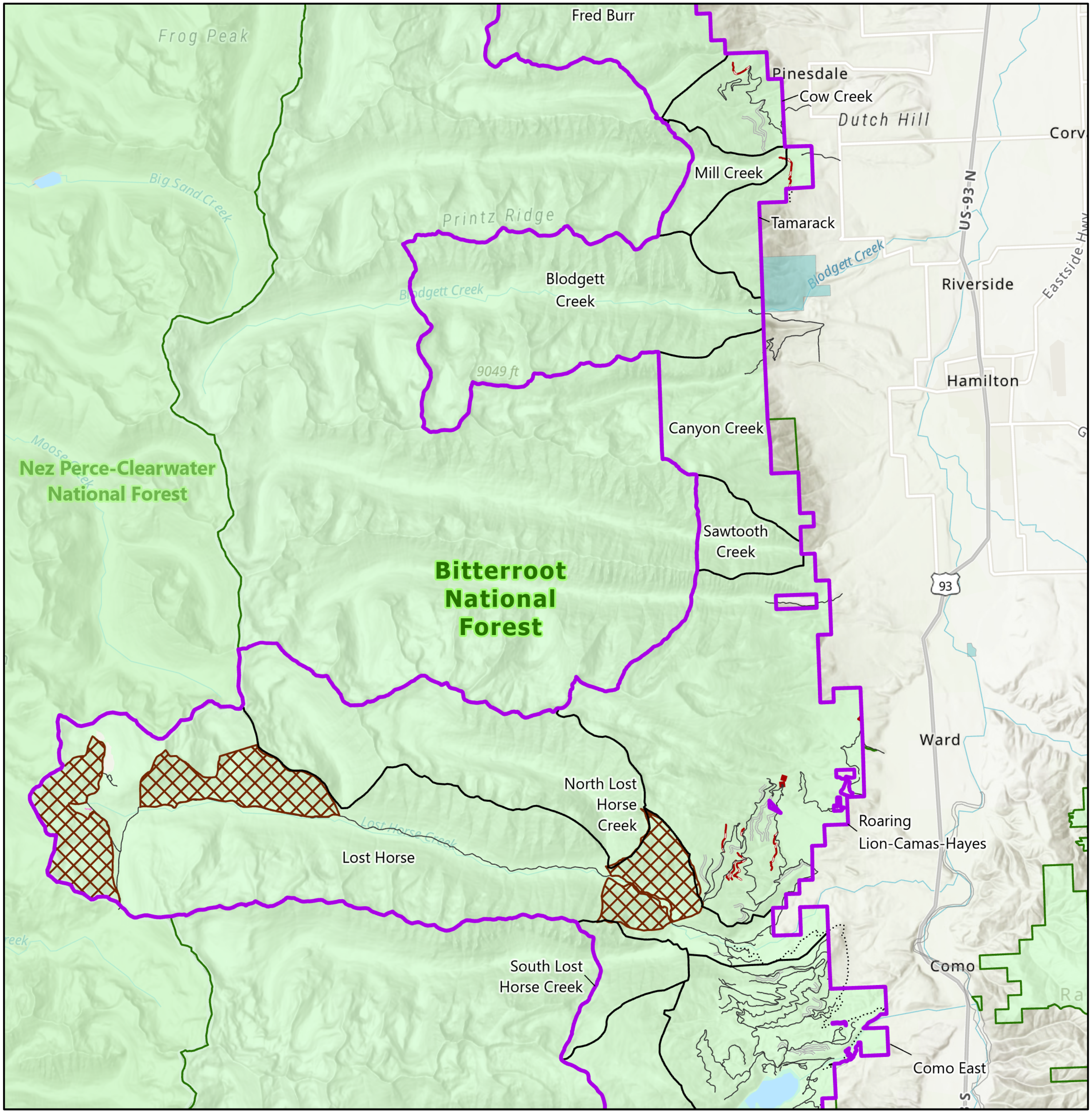


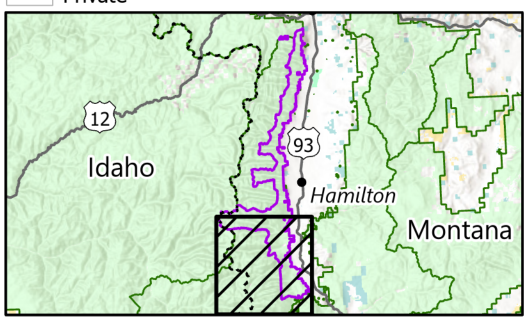
Bitterroot Front Environmental Assessment

Figure 2-3d
Proposed Transportation Changes

- New construction NFSRs
- Decommission NFSRs
- Decommission NFSRs, maintain as National Forest System trail
- Maintain current status as NFSRs
- Undetermined road added as NFSRs
- Undetermined road, maintain as National Forest System trail
- Undetermined road, obliterate
- Undetermined road, obliterate after use
- Previously decommissioned NFSR
- Private road, maintain status

- Priority area
- Project boundary
- Forest boundary
- Research natural area

- U.S. Forest Service
- State
- Private



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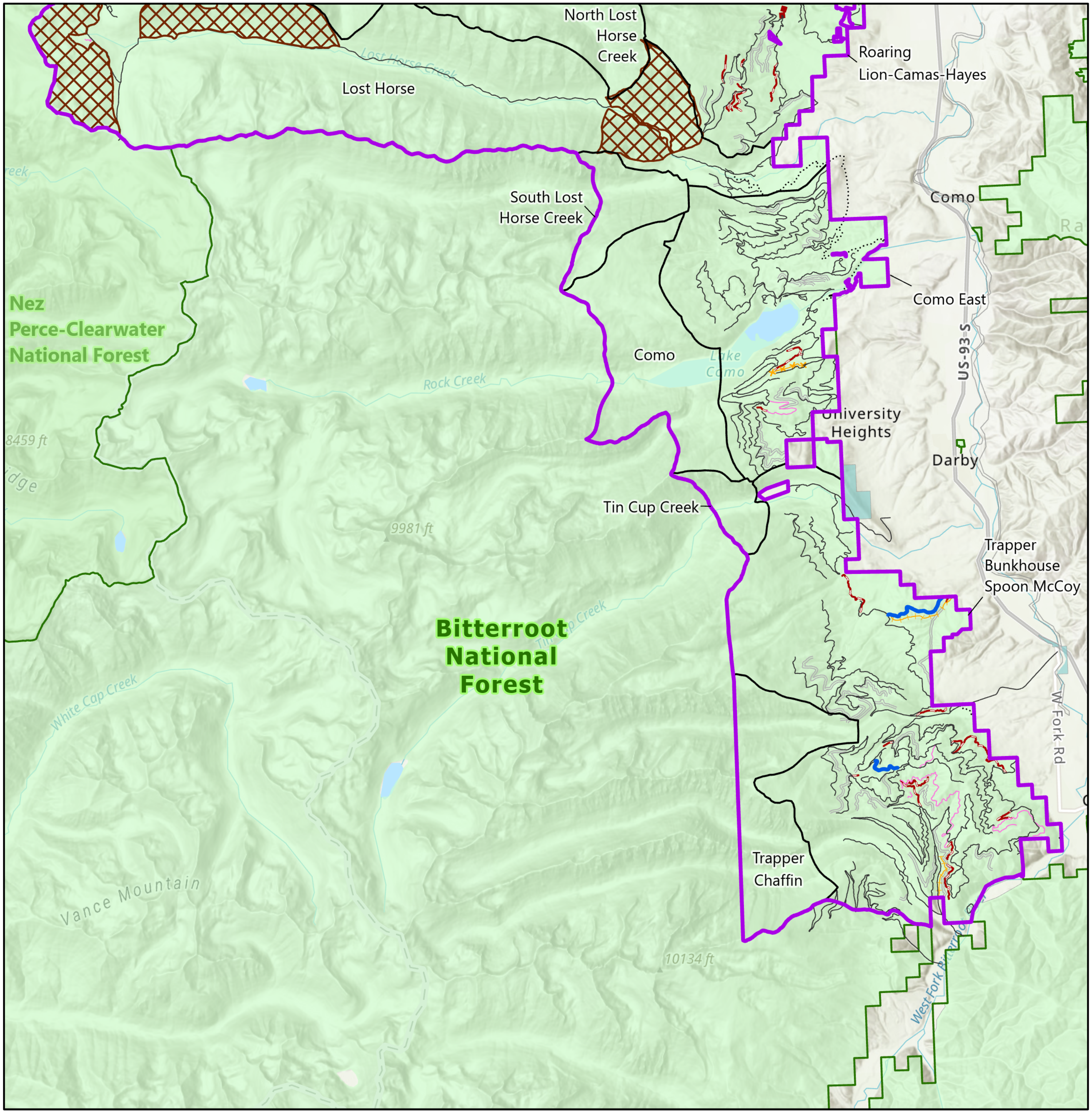


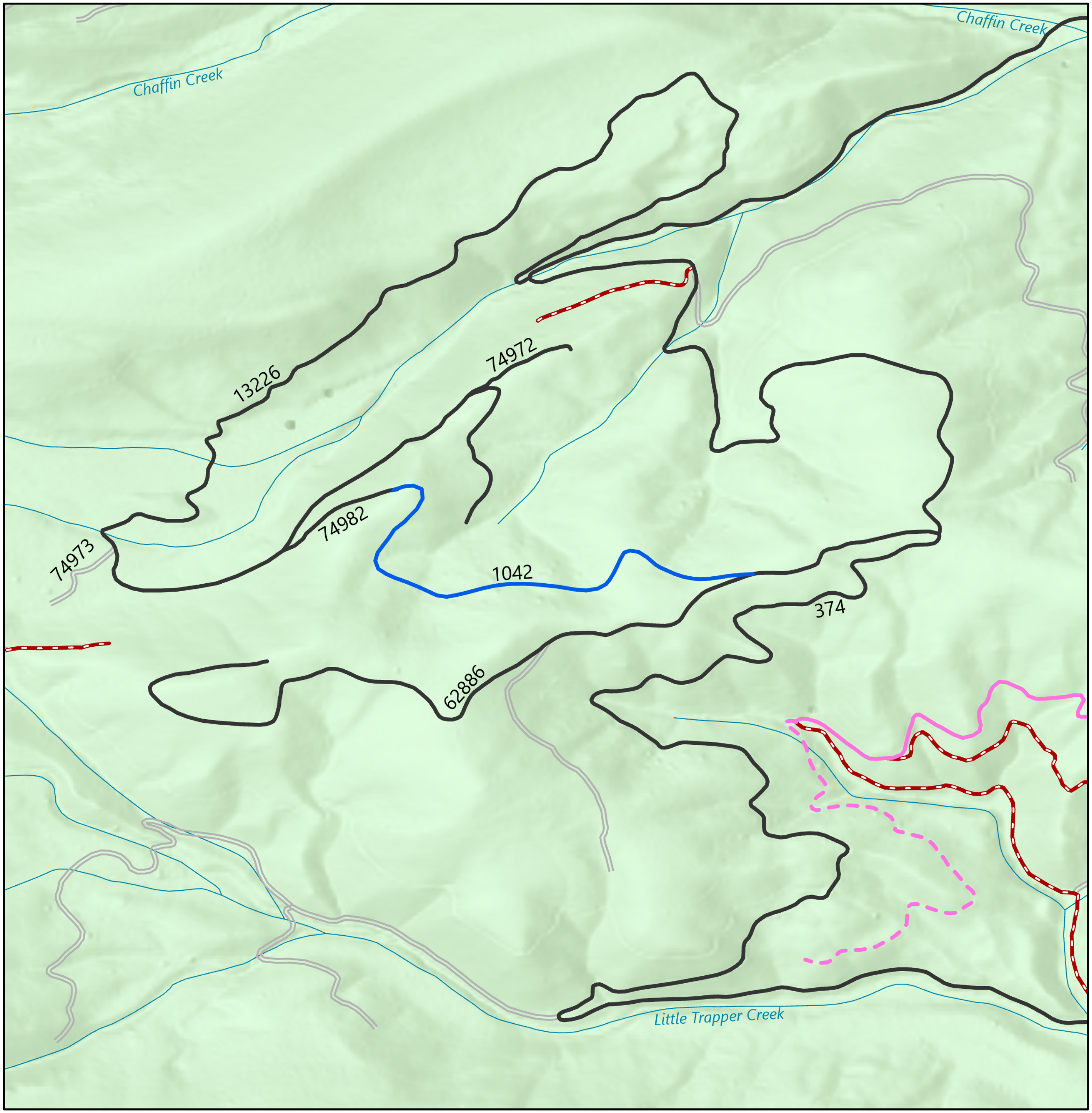
Bitterroot Front Environmental Assessment

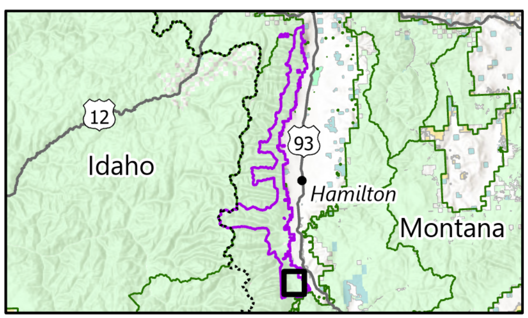
Figure 2-4
Chaffin Creek Road Construction

- New construction NFSRs
- Maintain current status as NSFRs
- Undetermined road added as NFSRs
- Undetermined road, maintain as National Forest System trail
- Undetermined road, obliterate
- Previously decommissioned NFSR

- Project boundary
- Forest boundary

- U.S. Forest Service





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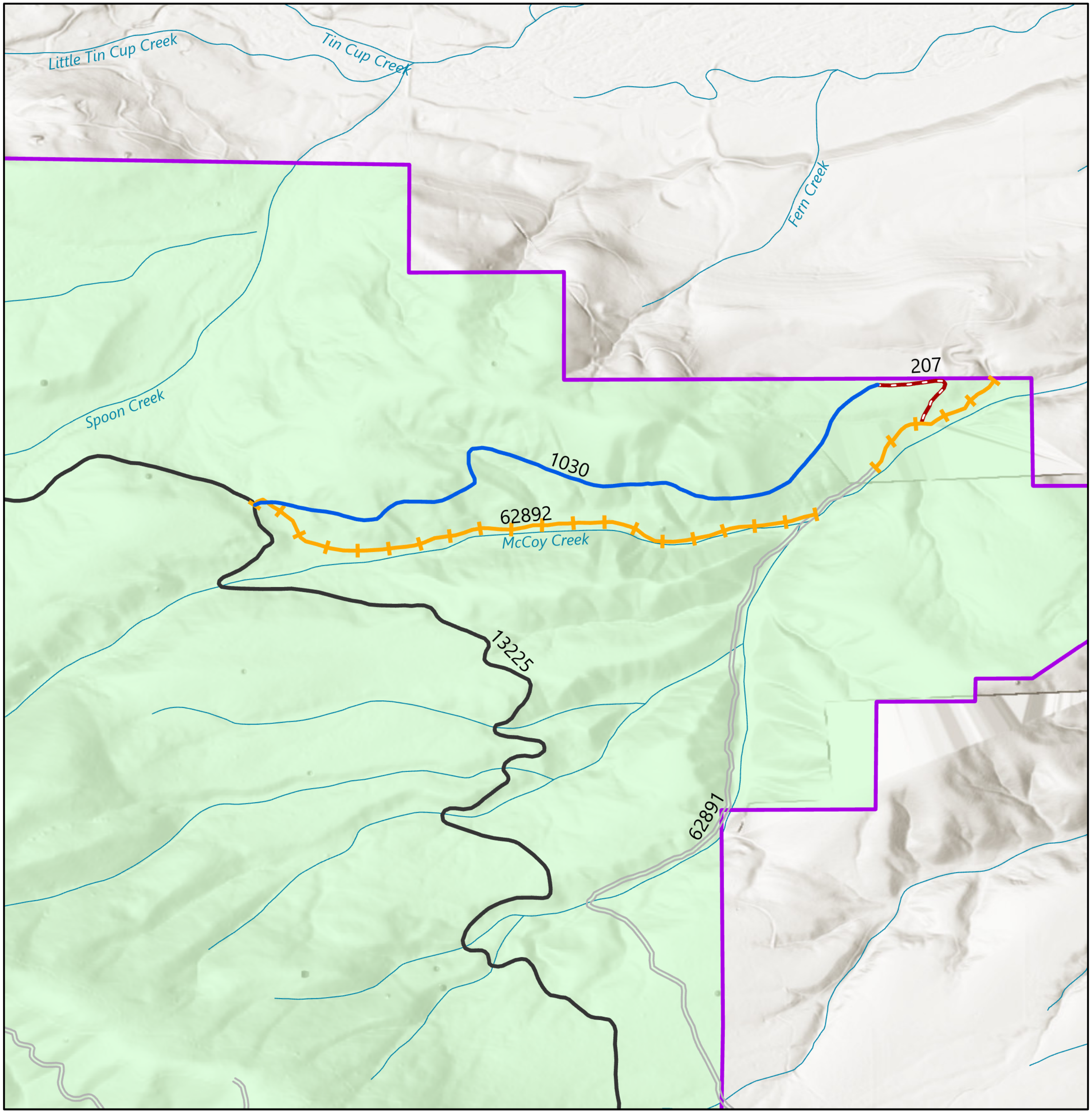
Bitterroot Front Environmental Assessment

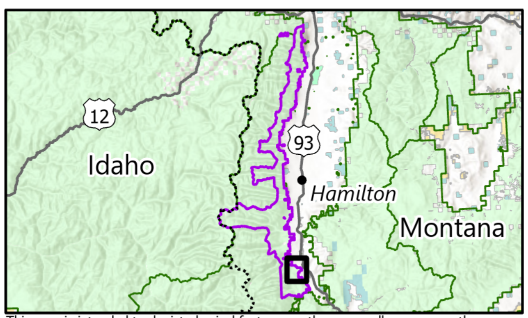
Figure 2-5
McCoy Creek Road Construction

- New construction NFSRs
- Decommission NFSRs
- Maintain current status as NSFRs
- Undetermined road, obliterate
- Previously decommissioned NFSR

- Project boundary
- Forest boundary

- U.S. Forest Service
- Private





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Appendix D

Forest Plan Amendment Discussion

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Appendix D – Forest Plan Amendment Discussion

The Bitterroot Front project would require a project-specific amendment to the 1987 Bitterroot Forest Plan (1987 Forest Plan or "plan"). Project-specific amendments arise from a need to take specific action to meet a forest plan goal or desired condition in such a way that would be inconsistent with plan standards. The plan is amended simultaneously with the approval of the project or activity so that the project or activity is consistent with the plan as amended and the amendment only applies to that project or activity (§ 219.15(c)).

When a plan amendment is made together with, and only applies to, a project or activity decision, the analysis prepared for the project or activity may serve as the documentation of the preliminary identification of the need to change the plan (§ 219.13(b)(1)).

The Forest Service (Forest) is required to identify which substantive requirements of the 2012 Planning Rule are likely to be directly related to the amendment. Scoping notifications acknowledged that a project-specific amendment is needed for: winter range thermal cover, elk habitat effectiveness, old growth, snags, and coarse-woody debris standards in the plan. This document serves as the initial notice regarding which substantive requirements are likely directly related to the: winter range thermal cover elk habitat effectiveness, old growth, snags, and coarse-woody debris amendments. Concurrently, the Bitterroot National Forest is working on amending outdated or conflicting forest plan components for all future projects. Currently, the Bitterroot National Forest is finalizing programmatic amendments for these same plan components.

The Bitterroot Front project is being proposed, in part, to address vegetative changes in the project area due to departures from historic disturbance regimes. There is also a need to improve habitat and forage quality and quantity for: bighorn sheep, mule deer, elk, and other regionally sensitive species. Vegetation and fuel management activities are being proposed to help meet those project purposes. The provision of the 2012 Planning Rule that is likely directly related to elk habitat effectiveness and thermal cover is § Code of Federal Regulations (CFR) 219.10(a)(5) consideration of habitat conditions for wildlife commonly used and enjoyed by the public. The purpose of the amendment related to elk habitat effectiveness is to ensure there is sufficient access for management of the Bitterroot National Forest and public use. The purpose of the thermal cover amendment is to allow vegetation management activities to occur that would move the project area towards desired conditions described in the proposed action. Amending the plan to set aside plan standards related to elk habitat effectiveness and thermal cover would allow proposed activities to occur that would improve habitat conditions for elk and other big game species found in the project area.

One of the purposes of the Bitterroot Front project is to improve landscape resilience to disturbances (such as insects, diseases, and fire) by modifying fuels, forest structure, and composition. The current Forest Plan definition is general, and it does not account for differing old growth attributes by forest type. The purpose of the old growth amendment was to update the Forest Plan definition of old growth to align with old growth classifications identified for Western Montana in "Old Growth Forest Types of the Northern Region", commonly referred to as Green et al. 2011. This paper better defines and classifies old growth based on location and habitat type. Amending the Forest Plan to update the definition of old growth would help to ensure the project maintains old growth based on habitat types found on the Bitterroot National Forest. For the old growth standard, the provision that is likely directly related is § 219.9(a)(2)(i), which requires plan components to maintain or restore the diversity of ecosystems and habitat types throughout the plan area including "key characteristics associated with terrestrial and aquatic ecosystem types". This provision was identified due to old growth being a key characteristic associated with vegetation on the Bitterroot National Forest and the project's purpose of improving landscape resilience to disturbance.

Part of the purpose of the Bitterroot Front project is to reduce crown fire hazard potential within low severity fire regimes. The purpose of the coarse woody debris and snag amendments is to ensure the amount of snags and coarse woody debris that would be left on the ground and standing aligns with the historical ranges identified for the fire groups present within the project area. For both snags and coarse woody debris standard, the provision that would be likely directly related is § 219.8 (a)(1)(iv) and (v), which requires plan components to maintain or restore ecological integrity of terrestrial and aquatic ecosystems and watersheds in the plan area, including plan components to maintain or restore structure, function, composition, and connectivity, taking into account: (iv) system drivers, including wildland fire and (v) wildland fire and opportunities to restore fire adapted ecosystems. These provisions were identified due to the departure from historic fire regimes within the project area. Modifying the amount of coarse woody debris that would be necessary to be left on site would provide a better opportunity to restore fire adapted ecosystems.

Elk Habitat Objectives

During scoping for the Bitterroot Front project, the public was notified of the Forest's intent to undertake project-specific amendments for elk habitat objectives in the 1987 Forest Plan. The Forest is currently finalizing an environmental assessment (EA) of programmatic amendments for elk habitat. For the Bitterroot Front project, the plan standards regarding elk habitat effectiveness, thermal cover, and hiding cover would be set aside. Amending the plan to set aside plan standards related to elk habitat effectiveness and thermal cover would allow proposed activities to occur that would improve habitat conditions for elk and other big game species found in the project area. The purpose of the amendments related to elk habitat effectiveness is to ensure there is sufficient access for management of the Bitterroot National Forest and public use. The purpose of the thermal cover amendment would be to allow vegetation management activities to occur that would move the project area toward desired conditions.

The proposed action would modify or remove:

- two forest-wide standards (Forest Plan pp. II-21, F.1.e(12), pp. II-21 F.1.e.(14)),
- one Forest Plan Record of Decision (ROD) Direction (Forest Plan ROD, page 8), and
- five management area standards (Forest Plan pp. III-4 B.3.c(4), pp. III-10 C.3.c(4)), pp. III-10 C.3.e(1), pp. III-17 D.3.c(4), and pp. III-31 F.3.c(4)).

1987 Forest Plan Components-Elk Habitat Effectiveness

The current components that would be **modified or removed** read:

Forest-wide Standard for Elk Habitat Effectiveness (Forest Plan pp. II-21, F.1.e(14)): Manage roads through the travel plan process to attain or maintain 50 percent or higher of elk habitat effectiveness (Lyon 1983) in currently roaded, third order drainages. Drainages where more than 25 percent of the roads are in place are considered roaded. Maintain 60 percent or higher of elk habitat effectiveness in drainages where less than 25 percent of the roads were built.

Management Area 1 Standard for Elk Habitat Effectiveness (Forest Plan pp. III-4, B.3.c(4)): Maintain elk habitat effectiveness through road closures as specified in the Forest-wide standards in Chapter II (Lyon 1983).

Management Area 2 Standard for Elk Habitat Effectiveness (Forest Plan pp. III-10, C.3.c(4)): Maintain elk habitat effectiveness through road closures as specified in the Forest-wide standards in Chapter II (Lyon 1983).

Management Area 3a Standards for Elk Habitat Effectiveness (Forest Plan pp. III-17, D.3.c(4)): Maintain elk habitat effectiveness through road closures as specified in the Forest-wide standards in Chapter II (Lyon 1983)

Management Area 3c Standard for Elk Habitat Effectiveness (Forest Plan pp. III-31, F.3.c(4)): Maintain elk habitat effectiveness through road closures as specified in the Forest-wide standards in Chapter II (Lyon 1983).

Glossary: Elk Habitat Effectiveness - An index of the capability of an area to provide security for elk. It is based on hiding and thermal cover present and roads open to public motorized use.

Intent of the 1987 Forest Plan Standards: The 1987 Forest Plan standards for elk habitat effectiveness cite Lyon et al. (1983) as a standard for road density that should be used to evaluate elk habitat effectiveness. The intent of the standards was to provide better security for animals.

1987 Forest Plan Components-Thermal and Hiding Cover

The current components to be **modified or removed** read:

Forest-wide Standard for Thermal and Hiding Cover (Forest Plan pp. II-21, F.1.e(12)): Big-game cover/forage relationships, as described in Guides for Elk Habitat Objectives (USDA Forest Service 1978), would be a consideration in planning timber management activities.

Management Area 2 Standard for Thermal Cover (Forest Plan pp. III-10, C.3.e(1)): Guides for Elk Habitat Objectives (USDA Forest Service 1978) would be followed in prescribing any timber harvest in this management area. The following timber management standards are desirable on winter range:

a. Even-aged management.

b. Precommercial and commercial thinning.

c. Establish or maintain a mixture of ponderosa pine and Douglas-fir.

d. Rotations would be greater than the culmination of mean annual increment to provide for 20 percent to 30 percent of the rotation length in thermal cover and 55 percent to 65 percent of the rotation length in forested or open forage. The rest of the rotation would be in hiding cover.

Timber harvest on land unsuitable for timber production is appropriate for meeting cover/forage objectives, if other resource objectives including soil and water could be met.

Management Area 3a Standard for Thermal and Hiding Cover (Forest Plan ROD, pp. 8): Winter range would be managed to provide forage diversity and hiding cover with at least 25 percent of the area in thermal cover at all times.

Intent of the 1987 Forest Plan Standards: The purpose of the thermal and hiding cover requirement was to provide optimal habitat on elk winter range and to maintain the current level of big game hunting opportunities (USDA Forest Service 1987, p. II-5).

Project-specific Amendment Components for Elk

The modified components to be **added and amended** would read:

Forest-wide Desired Condition: The Forest supports a diversity of elk habitats that provide for ecological conditions that supplement diverse recreational opportunities including wildlife enjoyment, viewing, and hunting.

Project-specific Guidelines: Travel management decisions should be designed to maintain elk residency on National Forest System lands during the archery and rifle big game hunting seasons by maintaining contiguous blocks of habitat in locations elk traditionally use at times when they are vulnerable to disturbance from hunting or other recreation that may cause displacement from public lands. No additional roads, trails, or areas should be designated for motor vehicle use if hunting district-specific elk trend data (5- or 10-year) suggests the population would be below State objectives and declining, or if elk use of National Forest System lands in the plan area would decline independent of population size.

Vegetation management project activities on known elk winter and spring foraging areas should contain vegetation management treatments to increase elk forage to help alleviate elk conflicts with adjacent landowners.

Vegetation management project activities and travel management decisions should be located and scheduled to minimize disturbance of elk on known winter range during the winter and in known calving areas during the reproductive season to avoid stressing elk when energy demands are high. Exceptions may occur, when needed, for protection of other resources as mandated by law, regulation, or policy. In such cases, concentrating management actions in time or space could be a method to minimize disturbance and reduce impacts to elk.

To help maintain or restore habitat connectivity, vegetation management project activities and travel management decisions should not create movement barriers to elk in known migration corridors, except where necessary to provide for human health and safety.

Geographic Area Guideline HD 250 West Fork Bitterroot: Vegetation management project activities should contain vegetation management treatments to reduce conifer encroachment on open grassland slopes, where applicable, to increase spring elk forage.

Forest-wide Goals: The Forest engages in cooperation and collaboration with other partners in the development of management strategies to maintain suitable habitat conditions and big game populations in numbers and distribution that allow for sustainable, high-quality viewing and hunting experiences on National Forest System lands.

Elk forage, connectivity, winter range, and calving habitat conditions alleviate adjacent landowner conflicts and support State elk management objectives.

Glossary: Elk Security - Adequate forage and hiding cover where disturbance to elk on winter range during the winter and in calving areas during the reproductive season would be minimized and impeding migration corridors would be avoided.

Purpose of Plan Amendments: The proposed project-specific amendments for the elk habitat effectiveness standard are intended to allow 22 of the 65 third order drainages in the analysis area to not meet elk habitat effectiveness standards. The small size of the third order watersheds in this project area limits the amount of roads that could be present on the ground. To meet the standards, road mileage that would need to be closed would limit forest management access to proposed treatment areas and reduce public use.

For elk thermal cover, the proposed project-specific amendments are intended to apply the best available science to the Bitterroot Front project's thermal cover design and adapt to changes that occurred on the landscape in support of the 1987 Forest Plan as well as the project goals and objectives. The proposed amendments would allow for treatment that supports continued enhancement of the diversity of ecological conditions utilized by elk, as described by the current best available scientific information.

Discussion of Elk Habitat Effectiveness

The 1987 Forest Plan says Lyon et al. (1983) should be applied to third order drainages. There are 398 third order drainages in the Bitterroot National Forest with a range of 3 – 9,625 acres in size. Only 75 drainages (19 percent) are larger than 3,000 acres, although Lyon et al. (1983) says these standards should be applied to an area larger than 3,000 acres.

Furthermore, the plan standard does not state what roads would be considered (all roads, all publicly open roads, or only roads open during hunting season). Most recently, the Bitterroot National Forest was using all roads open at any point during the year, maximizing the number of drainages that do not meet the standard. The elk population in the Bitterroot National Forest increased dramatically since the 1987 Forest Plan was written, despite numerous project plan amendments to this standard in 110 drainages (out of 398 drainages across the Bitterroot National Forest). Elk habitat "effectiveness" is related more to forage abundance and quality than road density (Ranglack et al. 2016, Crane et al. 2016).

Discussion of Thermal Cover

Generally, winter range is limited to project area lower elevations. Most of the project area is too high to be classified as winter range, and it does not meet either the 20 percent optimal thermal cover percentage referenced in the Guides for Elk Habitat Objectives (USDA Forest Service 1978), nor the 25 percent minimum standard for thermal cover in winter range set in the Bitterroot Forest Plan ROD. Thermal cover is difficult to accurately measure on the landscape. Procedures outlined in the Guides for Elk Habitat Objectives (USDA Forest Service, 1978) are no longer used because these standards are expressed in crown closure not canopy cover.

The purpose of the 1987 Forest Plan thermal cover requirement was to provide habitat that, at that time, was believed to be necessary to meet the 1987 Forest Plan goals and objectives of maintaining the State's population goals for elk. However, recent research questioned the necessity of thermal cover for wintering elk survival (Cook et al. 1998, Cook et al. 2004). The researchers found "no significant, positive effect of thermal cover on the condition of elk during any of their six experiments. In contrast, dense cover provided a costly energetic environment, resulting in significantly greater over-winter mass loss, fat catabolism, and (in one winter) mortality." Whether thermal cover is necessary for individual elk survival or elk population viability is unclear. As discussed in PF-WILDLIFE-001 (wildlife specialist report), large amounts of winter range thermal cover do not seem necessary to support the State's elk population goals in the Bitterroot National Forest.

Effects of Elk Habitat Amendments

The 1987 Forest Plan contains over-arching applicable plan components related to these project-specific amendments including: (1) a forest-wide goal to provide habitat to support viable populations of native and desirable nonnative wildlife and fish; (2) management objectives to provide optimal habitat on elk winter range along with maintaining habitat to support viable populations of wildlife species; and (3) standards regarding elk population status as an indicator of commonly hunted ungulates and the status of their habitat.

An analysis calculated across the Bitterroot National Forest found noncompliance with the elk habitat effectiveness standard in 230 drainages (out of 398 drainages across the Bitterroot National Forest). Despite this, elk are ubiquitous across the Bitterroot National Forest and Bitterroot Valley. They have continued to increase both in population and range since the 1987 Forest Plan. Though some herds in the project area (i.e., HD 250) are still below the State objective set by the Montana Fish, Wildlife, and Parks, populations have been steadily increasing.

With these plan-specific amendments, the project would continue to provide and improve habitat in the project area for elk and other ungulates. While the effects of the amendments would provide a variance for the amount of thermal cover maintained in the project area and provide a variance for some third order drainages to meet the elk habitat effectiveness standard, these effects would be minimal. The amendments to thermal cover would allow for treatments that would enhance elk forage across the project area. Although the elk habitat effectiveness standard would not be met, elk secure habitat would be increased. It is likely that there would be little discernable change in elk viability as a result of implementing elk habitat amendments.

Cumulative Impact of Elk Habitat Effectiveness and Habitat Objectives Amendment

There were 14 project-specific amendments related to elk habitat effectiveness since the approved 1987 Forest Plan. There were 10 project-specific amendments related to thermal and hiding cover. Despite these amendments, elk populations remain stable and the 1987 Forest Plan objective of maintaining the 1987 level of big-game hunting opportunities continues to be achieved. Current best available science for managing elk populations and collaboration with the Montana Department of Fish, Wildlife, and Parks to maintain elk populations across the Bitterroot National Forest proved to be better than the 1987 elk habitat standards. Furthermore, the proposed activities, in combination with past and reasonably foreseeable future actions in the analysis area, would not be expected to cumulatively degrade elk populations.

The anticipated effects of the plan amendments associated with Gold Butterfly and Mud Creek would be similar to those analyzed and disclosed in this document. Therefore, the cumulative effects of applying the proposed amendment to this project would have the benefit of providing a consistent, nonsubjective method of identifying elk habitat and population numbers.

Old Growth

The proposed amendment is based on the purpose of the project, which is to improve landscape resilience to disturbances such as insects, diseases, and fire by modifying forest structure and composition as well as fuels. There is a need to amend the 1987 Forest Plan old growth definition to ensure the project maintains old growth as a key characteristic of terrestrial integrity. During the analysis of the EA, it was determined that the amendment would apply to the 1987 Forest Plan components listed below.

Discussion

The Planning Rule at 36 CFR 219.(a)(2)(i) requires plan components, including standards and guidelines, to maintain or restore diversity of ecosystems and habitat types throughout the plan area. In doing so, the plan must include plan components to maintain or restore: (i) key characteristics associated with terrestrial and aquatic ecosystem types. Application of this planning rule requirement would be achieved through Forest Plan goals, objectives, and standards for old growth. All plan standards to maintain old growth would still apply, but the amendment improves the method for measuring the amount of old growth in the project area and evaluating project effects by modifying the criteria used to identify old growth based on better scientific information than was used in 1987 when the Bitterroot Forest Plan was developed. This plan amendment also applies the requirements through the project design, which supports achieving forest-wide objectives for old growth as a key characteristic of the plan area's terrestrial ecosystems.

Intent of Forest Plan Standards

The intent of old growth management in the 1987 Forest Plan is stated in the Forest-wide resource standard on page II-19 of this 1987 Forest Plan:

"The amount and distribution of old growth will be used to ensure sufficient habitat for the maintenance of viable populations of existing native and desirable vertebrate species, including two indicator species, the pine marten and pileated woodpecker."

Current Standards and Purpose of Amendment

Forest-wide standard for old growth (stand conditions) (Forest Plan pp. II-19, F.2.e.(2)): that qualify as old growth would vary by habitat type and landform. Criteria to consider for identifying old growth include: Large trees, generally 15 per acre greater than 20 inches diameter at breast height (dbh) for species other than lodgepole pine and 6 inches dbh for lodgepole pine; canopy closure at 75 percent of site potential; stand structure usually uneven-aged or multi-storied; snags, generally 1.5 per acre greater than 6 inches dbh and 0.5 per acre greater than 20 inches; more than 25 tons of per acre of downed material greater than 6 inches diameter; heart rot and broken tops in large trees are common; and mosses and lichens are present.

Amendment: The amendment proposes a project-specific modification of this standard and 1987 Forest Plan glossary definition to update the project's identification criteria for old growth using the quantitative and qualitative factors of Green et al. 1992, errata corrected 2011. Green et al. represents the Forest's best available scientific information to define old growth. This work contains measurable criteria to consistently define old growth based on a regional definition that old growth forests are distinguished by old trees and related structural attributes (Green et al. 2011). The old growth definitions are specific to forest type and habitat type group. Key attributes include age, numbers, and diameter of the old tree component within the stand and stand density. Minimum thresholds were established for these attributes. Associated characteristics are also defined such as probabilities of coarse woody debris, number of canopy layers, and number of snags over 9 inches diameter at breast height. Therefore, it is a better measure to evaluate whether the project maintains and promotes old growth. The recommended amendment on old growth criteria would identify more old growth stands in a wider variety of vegetation types. These old growth designated stands would be managed for old growth with the objective to maintain them into the future by improving stands' conditions to make them more resilient to disturbance. In summary, more stands would be managed for old growth in the project and at the Bitterroot National Forest scale with the amendment.

Modification of standards in Management Areas 1, 2, 3a, and 3c is also needed to delineate old growth by stand as identified in the Forest Service Handbook 2409.17. Old growth would be delineated at the stand level based on forest composition and structure as defined by Green et al. (2011) during project area planning. Stands smaller than 40 acres, if meeting criteria, would be maintained or promoted as old growth during project implementation. Five acres is considered the minimum size practical for stand delineation and even stands of this size are valuable as a key characteristic of ecosystem diversity. Due to the dynamic nature of stand progression, stands are best identified at the project-specific scale. Thus, a forest-wide static map of old growth would not be provided. Old growth is not a static state; natural disturbances, such as windstorms, wildfire, insects, and diseases can move a stand from one successional stage to another (Oliver and Larson 1996).

This amendment would allow for consistent and reliable project-level identification and a statistically valid Bitterroot National Forest-wide inventory of old growth acres by applying Green et al. (2011) as the standard and the definition of old growth in the glossary of the 1987 Forest Plan. Replacing the standard that states "Old-growth stands may be logged and regenerated when other stands have achieved old-growth status" (USDA 1987a, p. II-20) with a guideline that conserves old growth, but it allows for management actions to increase resilience, particularly when stands are heavily impacted by insects and/or disease, would provide flexibility until a national policy is developed. Executive Order (E.O.) 14072 (Biden 2022) implores the Forest to conserve mature and old growth forests on Federal lands while deploying climate-smart forestry practices to improve the resilience of these lands. In this context, the numerical percentages of old growth for third-order drainages would be removed and replaced with the Bitterroot National Forest-wide desired condition to increase the amount of old growth forest in the Bitterroot National Forest and not retain a target of a low percentage.

Management Area 1 standard for old growth Objectives (Forest Plan pp. III-4, 3(c)(2)): Old growth stands should be 40 acres and larger, distributed over the management area. About 3 percent of Management Area 1 is suitable timberland, in each third order drainage, would be maintained in old growth. Provide 40 acre stands of old growth by coordinating management activities in this area with activities in adjacent management areas and with intermingled riparian and unsuitable management areas (USDA 1979).

Amendment: This project-specific modification from this standard would be intended to delineate old growth within this management area by stand as identified in the Forest Service Handbook 2409.17. Old growth would be delineated at the stand level based on vegetation composition and structure as defined by Green et al. 1992 errata 2011 (see preceding standard modification description). The 40-acre stand size requirement would be set aside and stands less than 40 acres meeting old growth criteria would be included as they are valuable as a key characteristic of ecosystem diversity.

Management Area 2 standard for old growth Objectives (Forest Plan pp. III-10, 3(c)(2)): Old growth stands should be 40 acres and larger and distributed over the management area. About 8 percent of Management Area 2 is suitable timberland, in each third order drainage, would be maintained in old growth. Provide 40 acre stands of old growth by coordinating management activities in this area with activities in adjacent management areas and with intermingled riparian and unsuitable management areas (USDA 1979).

Amendment: This project-specific modification from this standard is intended to delineate old growth within this management area by stand as identified in the Forest Service Handbook 2409.17. Old growth would be delineated at the stand level based on vegetation composition and structure as defined by Green et al. 1992 errata 2011 (see preceding standard modification description). The 40-acre stand size requirement would be set aside and stands less than 40 acres meeting old growth criteria would be included as they are valuable as a key characteristic of ecosystem diversity.

Management Area 3A standard for old growth Objectives (Forest Plan pp. III-16, 3(c)(2)): Old growth stands should be 40 acres and larger and distributed over the management area. About 8 percent of Management Area 3A would be suitable timberland, in each third order drainage, would be maintained in old growth. Provide 40 acre stands of old growth by coordinating management activities in this area with activities in adjacent management areas, especially management Area 3B, riparian areas (USDA 1979).

Amendment: This project-specific modification from this standard is intended to delineate old growth within this management area by stand, as identified in the Forest Service Handbook 2409.17. Old growth would be delineated at the stand level based on vegetation composition and structure, as defined by Green et al. 1992 errata 2011 (see preceding standard modification description). The 40-acre stand size requirement would be set aside and stands less than 40 acres meeting old growth criteria would be included as they are valuable as a key characteristic of ecosystem diversity.

Glossary

OLD GROWTH- Old forest with qualitative and quantitative characteristics varying by habitat type, as defined for Western Montana in Green et al. 1992 errata 2011 and as updated over time.

STAND- A community of naturally or artificially established trees of any age sufficiently uniform in: composition, constitution, age, site productivity, spatial arrangement, or condition to be distinguishable from adjacent communities thereby forming a silvicultural or management entity. FSH 2409.17 SILVICULTURAL PRACTICES HANDBOOK. Five acres is the smallest practical area to manage as a stand.

Effects of Old Growth Amendment

Wildlife

The project interdisciplinary team designed the proposed action to retain old growth status for any stands being treated that meet the Green et al. (1992, errata corrected 2011) criteria. This would allow the Forest the flexibility to treat conditions related to the purpose and need of this project while retaining the old growth status of stands (as well as enhancing stands that may soon meet the old growth criteria) within the project area. With the project-specific amendment, the plan standards to maintain old growth would still apply, but the amendment would improve the method for measuring the amount of old growth in the project area and evaluating project effects by modifying the criteria used to identify old growth based on better scientific information than was used in 1987 when the Bitterroot National Forest Plan was developed. No change to effects on wildlife species associated with or dependent on old growth would be expected from this amendment**.**

Forest Vegetation

As discussed in greater detail in the Forest Vegetation section of the EA, with the new habitat type-based definitions, more stands and a greater variety of stands, would meet the old growth minimum standards in the Bitterroot Front project area than would have with the original generic 1987 Forest Plan definition. This amendment provides a better foundation to: meet the purpose and need of the project, meet the Forest Plan goals and objects, meet the 2012 Planning Rule requirements, and maintain and manage old growth in the Bitterroot Front project area. (Note: old growth status would continue to be validated through walk-through exams during the implementation phase of the project.)

The proposed project-specific Forest Plan amendment would allow treatments to be carried out that would specifically improve the resilience of old growth stands. Treatments including commercial harvest utilizing improvement cuts, group tree, and single-tree selection cuts, or non-commercial stand improvement thinning would be used to reduce competition and improve species composition while retaining the old growth characteristics as defined by Green et al (1992, errata corrected 2011) for each site-specific habitat type. Treatments would reduce competition by removing competing in-growth, improving species composition, and reducing fuels in old growth stands, especially in the drier forest types such as those most commonly found within the Bitterroot Front project area. To maintain or restore old growth character within existing old growth, site-specific treatments would be implemented to increase resiliency and resistance to disturbances such as insects, disease, and fire. Indirectly, the removal of competing in-growth would improve the old growth stands resilience to future fire and insect disturbances compared to existing conditions.

Specifically, to promote the retention of old growth and contribute to biodiversity, vegetation management activities in old growth should retain all minimum old growth characteristics as defined in Green et al. (2011) (Vegetation Specialist Report [PF-VEGETATION-001] table 9) and as updated over time.

Vegetation management activities in old growth stands only should occur for one or both of the following purposes:

- Maintain or restore old growth habitat characteristics and ecosystem processes.
- Increase resistance and resilience to disturbances or stressors that may have negative impacts on old growth characteristics or abundance such as drought, wildfire, and bark beetles.

Exceptions to this guideline may be allowed, where needed, to mitigate hazards to: (1) public safety in campgrounds, other designated recreation sites, administrative sites, and permitted special use areas or (2) infrastructure that would be essential to community welfare (e.g., utilities and communications or wildland urban interface).

To maintain habitat connectivity and minimize disturbance of old-growth associated wildlife, road construction (permanent or temporary), or other developments should be avoided in old growth unless access would be needed to implement vegetation management activities and purposes as outlined above and there are no feasible alternative road locations. When identifying if proposed treatment areas include old growth, use a reasonable and accurate approach based on data collection or validation. Consider delineating old growth stands based on the FSH 2409.17, or other current direction.

Cumulative Impact of Old Growth Amendment

There are two other projects currently being planned on the Bitterroot National Forest that also include project-specific plan amendments related to old growth, Gold Butterfly and Mud Creek. These project-specific amendments propose to make the same changes to the definition of old growth (consistency with Green et al. 1992 errata 2011). This would align all three projects in regard to old growth classification.

The intent of the Forest Plan old growth direction would be to ensure sufficient habitat for wildlife, including two indicator species, pine marten and pileated woodpecker. Pileated woodpeckers and marten are not old growth dependent species. They are associated with mature and over-mature forests that contain habitat components such as large trees, large snags, and down woody material that are often found in old growth forests, but they also make use of younger forests that contain some of those habitat components and forage in a variety of forest types (Mellen et al. 1992). Therefore, forests that do not meet the old growth definitions can and do provide habitat that contributes to the viability of these species at several scales.

The anticipated effects of the plan amendments associated with Gold Butterfly and Mud Creek would be similar to those analyzed and disclosed in this document. When taking these projects into account with the amendment proposed here, the cumulative impact of all three amendments would have the benefit of providing a consistent, nonsubjective method of identifying old growth in these areas. Updating the definition of old growth would not affect the amount of habitat available for species, such as pileated woodpeckers or marten.

Coarse Woody Debris

This proposed project-specific amendment is intended to modify coarse woody debris requirements for the Bitterroot Front project to support achieving goals and objectives in the Forest Plan for soil productivity while achieving the project purpose and need to improve landscape resilience to disturbances such as insects, diseases, and fire. This amendment would help ensure the amount of coarse woody debris to be left on the ground aligns with the historical ranges identified for the fire groups present within the project area. For this project, the proposed, modified standard would replace the management area standard in the 1987 Forest Plan (USDA Forest Service 1987, pp. III-19, f(4)).

Discussion

The purpose of the 1987 Forest Plan coarse woody debris requirements was to maintain soil productivity; design fire management programs consistent with other resource goals; and provide for nongame habitat. Current management area direction for coarse woody debris retention does not recognize the differences in the natural variation of coarse woody debris among different forest and habitat types, as supported by the best available scientific information. Additionally, Management Area 2 includes two contradictory standards requiring both 10 to 15 tons per acre and 25 tons per acre of coarse woody debris to be left after harvest activities. Lastly, the tons/acre amounts of coarse woody debris prescribed in the 1987 Forest Plan exceed what current scientific information recommends would be needed to maintain soil productivity and manage fuel loadings. Proposed components also consider the needs of nongame habitat.

Intent of Forest Plan Standard

Pertinent Forest Plan goals (USDA Forest Service 1987, pp. II-3, II-4)

- Maintain soil productivity.
- Design fire management programs that would be consistent with other resource goals (Appendices K and M) Pertinent Forest Plan Objectives (USDA Forest Service 1987, pp. II-6, II-7).
- Design management activities to maintain soil productivity.

Since the 1987 Forest Plan was developed, scientific information became available regarding the amount of coarse woody debris present in different habitat type groups (Fischer and Bradley 1987, Graham et al. 1994, Brown and Smith 2000, Brown et al. 2003). This information provides more refined measures to guide project implementation to contribute to achieving Forest Plan goals and objectives. The components for coarse woody debris integrate managing the risk of wildfire, the habitat requirements of species requiring high densities of logs and soil function as well as the ecological processes resulting from fire (Bull et al. 1997, Bull 2002).

Amending Project Specific Components regarding Coarse Woody Debris

There is a need to amend coarse woody debris requirements in Management Areas 1, 2, 3a, 3b, and 3c (USDA 1987a, pp. III-6, III-12, III-13, III-19, III-28, III-33) within the Bitterroot Front project area to resolve the contradictory direction within the existing standards and to ensure the amount of coarse woody debris to be left on the ground aligns with the current scientific information regarding soil health and fuel loading (Graham et al. 1994, 2003). This project specific change would replace amounts of coarse woody debris from the 1987 Forest Plan standards with amounts suitable to the biophysical setting according to the best available scientific information in Graham et al. (1999) and Brown et al. (2003), allowing the Forest to manage for fuel reduction while providing small mammal habitat and soil function.

Table D-1 – Recommended ranges of tons/acre of Coarse Woody Debris to Retain after Vegetation Management Activities for each Fire Group*

Fire Groups	Recommended Coarse Woody Debris Ranges (tons/acre)
Scree, Rock, Meadows, Grasslands	0-5
1, 2, 4 =Warm, Dry Ponderosa Pine; Warm Dry Douglas-fir	5-10
5, 6 = Cool, Dry Douglas-fir; Moist Douglas-fir	10-20
7, 8, 9, 10 =Cool lodgepole; Dry Lower Subalpine Fir; Moist Lower Subalpine Fir; Cold, Moist Upper Subalpine and Timberline	8-24
11=Warm Moist Grand Fir, Western Redcedar, and Western Hemlock	20-30

*Source: Based on Brown and Smith 2000, Graham et al. 1994, and Fischer and Bradley 1987.

Effects of the Project Specific Coarse Woody Debris Amendment

Amending the plan site specifically to modify direction related to coarse woody debris would achieve the Forest Plan goals of maintaining soil productivity and fire management. Modifying plan direction would allow for better fuels management as the amount of coarse woody debris to be left on-site wood would better align with the levels that would have been historically present within Fire Groups 2 and 4. Maintaining coarse woody debris within historic ranges would reduce fire severity and impacts to soils from long-duration burning of large wood.

The modified plan direction would allow proposed project activities to occur that would maintain or restore ecological integrity by moving stand conditions towards their historical composition and function. There would be an increased opportunity to return fire to the landscape and move the project area towards having historic fire return intervals.

The proposed fuel treatments would leave slash on the ground through the winter and into late summer/fall before prescribed burning would be completed. This would provide an opportunity for the nutrients in the slash to be leached into the soil.

Cumulative Impact of Coarse Woody Debris Amendment

The coarse-woody debris requirements are based on current science, which varies from the amounts shown in the 1987 Forest Plan. The amended coarse-woody debris requirements for this project would encompass less than 0.1 percent of the Bitterroot National Forest because very little of the project area is in Fire Groups 2 or 4. Since the 1987 Forest Plan, forest plan amendments were made to adjust coarse-woody debris levels. Site-specific forest plan amendments were needed to ensure coarse-woody debris retention in fuel reduction treatments were based on current science. Previous Forest Plan amendments in combination with Alternative 2 of this project cumulatively amount to 1.5 percent of the overall acreage for the Bitterroot National Forest. The modifications of the coarse-woody debris requirements for this project would not have appreciable cumulative effects at the site or forest scale.

Cumulatively, by implementing this project-specific standard for coarse-woody debris, the Bitterroot Front project area would be expected to have appropriate levels of coarse-woody debris by fire group, over time, fully supporting the Bitterroot National Forest goals and objectives.

Snags

The proposed amendment is intended to modify snag requirements for the Bitterroot Front project to support achieving goals and objectives in the 1987 Forest Plan for wildlife (USDA Forest Service 1987, pp. II-20). This amendment would remove the forest-wide standard (e)(3) in section F.1 of Chapter II of the 1987 Forest Plan that states "All snags that do not present an unacceptable safety risk will be retained" (USDA Forest Service 1987, p. II-20). Snag retention in treated stands would be based on findings from Harris (1999), Bollenbacher et al. (2009), Bush and Reyes (2023), and numerous scientific papers by Evelyn Bull and others. Stands targeted for treatment should retain a suitable number of snags in a variety of size classes, depending on habitat type groups. This also would resolve the discrepancy in the existing 1987 Forest Plan that allows for salvage and sanitation harvest and firewood gathering while also stating that snags shall be retained if they do not present an unacceptable safety risk. The proposed change would provide sufficient snag habitat for wildlife while also allowing for the removal of excess snags, where necessary, to address fuel loading or to meet restoration objectives through sanitation and salvage treatments (Harris 1999, Spiering and Knight 2005). With the recent listing of whitebark pine as a threatened species, a standard is proposed to prevent the felling of whitebark pine by firewood cutters. During the EA analysis, it was determined the amendment would apply to the 1987 Forest Plan standard listed below.

Forest-wide standard (USFS 1987, pp. II-20, (e)(3): All snags that do not present an unacceptable safety risk would be retained.

Discussion

Since the 1987 Forest Plan was signed, additional science is available regarding the number of snags that would be expected in different habitat type groups (Harris 1999; Bollenbacher et al 2009; Bush and Reyes 2023), which provides more refined guidelines for meeting the Forest Plan goals and objectives. Concurrently, the Bitterroot National Forest is working on amending outdated or conflicting Forest Plan components for all future projects, including snag retention management.

The project-specific amendment would incorporate and be consistent with relevant new planning components for snag management, as proposed in the Forest Plan Amendment EA. These include:

Forest-wide Desired Condition

The Bitterroot National Forest conditions support natural quantities and distributions of snags. Snags are unevenly distributed and dynamic over time, with a range of decay classes represented. The highest densities of snags occur in burned areas and in areas infested by insects. The lowest densities occur along roads; in areas where the concern for human safety is elevated; in areas where there is concern for fire hazard, such as the wildland-urban interface, and in stands where active management is occurring. Individual stands may have no snags, or many, depending upon site-specific conditions. Table D-2 displays the mean number of snags per acre by diameter threshold by snag analysis group found in areas of the Bitterroot National Forest that have not had proactive vegetation management.

Specific for the Bitterroot Front project the following desired snag conditions would be applied:

To maintain snags (standing dead trees) over the long-term for wildlife habitat and ecosystem processes, vegetation management projects should retain at least on average:

- across the Warm Dry snag analysis group, retain an average of at least 4-6 snags per acre greater than 15 inches dbh;
- across the Warm Moist snag analysis group, retain an average of at least 4-6 snags per acre greater than 15 inches dbh; and
- across the remaining snag analysis groups, retain an average of at least 8-10 largest available snags per acre.

Table D-2 – Forest wide existing condition and desired minimum snags across the Forest

Snag Analysis Group[1]	Medium (>10"dbh[4])		Large (>15"dbh[4])		Very large(>20"dbh[4])	
	Existing Condition[2]	Desired minimum[3]	Existing Condition[2]	Desired minimum[3]	Existing Condition[2]	Desired minimum[3]
Lodgepole Pine	24.7 (16-33)	11	3.4 (1-5)	2	1.1 (0.3-2)	2
Warm/Dry	16.1 (11-20)	2	7.4 (4-10)	4	3.6 (2-5)	2
Warm/Moist	19.7 (4-39)	4	12.4 (2-24)	3	6.8 (0-13)	3
Cold, Cool/Moist	26.1 (21-31)	14	7.3 (5-9)	5	1.8 (0.9-2)	1

[1] Snag analysis groups are from Bollenbacher (2009).
[2] Existing condition is the mean snags per acre, with the 90 percent confidence intervals shown in parenthesis. Source is R1 Summary Database, FIA data, Hybrid 2015. (Bush and Reyes 2023).
[3] Desired is derived from Bollenbacher (2009), supplemental data Harris (1999) represented by the mean number of snags found in the wilderness and roadless areas on the Bitterroot National Forest, Bull et al. 1997, and Brown et al. 2003.
[4] Diameter at breast height (4.5 feet above the ground). The classes are not mutually exclusive; e.g. the numbers for the larger than 10 inches medium class include the large/very large classes and the larger than 15 inches large class includes the very large class.

Vegetation management activities should retain snags greater than 20 inches dbh and at least the minimum number of snags and live trees (for future snags) that are displayed above. Where snag numbers for trees greater than 20 inches dbh do not exist to meet the recommended ranges, the difference would be made up with live replacement trees for future recruitment. Exceptions occur for issues, such as human safety, and instances where the minimum numbers are not present prior to the management activities. Snags felled for operational safety in harvest units shall be left on site.

Where vegetation management activities occur and snags, or live trees for future snags, are retained, the following direction should be followed:

- Group snags, where possible, such that in some areas the density of snags larger than 20 inches dbh may reach 5-10 snags/acre;
- Retain snags far enough away from roads or other areas open to public access to reduce the potential for removal, generally more than 150 feet;
- Emphasize retention of the largest snags and live trees as well as those species that tend to be the most persistent, such as ponderosa pine, western larch, and Douglas-fir; and
- Favor snags or live trees with existing cavities or evidence of use by woodpeckers or other wildlife.

Intent of Forest Plan Standard

The desired condition is to have adequate snags numbers in various size classes and species across the landscape to support viable populations of wildlife species dependent on snags.

Effects of Snags Amendment

Due to changed conditions, including wildfire and insects and disease increasing tree mortality since the creation of the 1987 Forest Plan, snags are no longer a limiting habitat element for wildlife species and the abundance of snags contributes to increased fire severity. Currently, high-severity fires and more frequent fires were determined to be a primary threat to wildlife, including special status species, and their habitats. Concentrations of snag areas are also apparent on the east and west-facing slopes of the Bitterroot Front and Sapphire Range from wildfires in recent decades. The snag amendment applies to the desired amount of snags across the landscape and a minimum number of snags to be left as residuals after vegetative treatment to provide for structural diversity, wildlife habitat, and future coarse woody debris.

Snags may be clustered or scattered across the landscape, as long as the number of snags retained on average meet habitat needs (Bull et al. 1997).

The project-specific snag amendments would still provide for appropriate distribution, size classes, and amount of snags across the project area and the Bitterroot National Forest to support snag-associated wildlife species, such as pileated woodpeckers. Snag retention is based on the best available scientific information, and it would retain snags that are most beneficial to wildlife and forest desired conditions. The amendments would be consistent with the Forest Plan desired conditions for snags and intentions to protect wildlife while being able to meet the purpose and need to reduce fire severity.

Cumulative Impact of Snag Amendment

Snag density desired conditions are based on Forest Inventory and Analysis (FIA) data representing current conditions (Bush and Reyes 2023) in wilderness and roadless areas, which only provide a snapshot in time in areas generally undisturbed by vegetation management, but include recent fire disturbance and or/beetle-caused mortality. While these data accurately represent the existing number of snags on the landscape, they also demonstrate how the number of snags on the landscape was increasing due to increasing rates of bark beetle epidemics and wildfire (Bollenbacher et al. 2009). A more appropriate basis for snag density desired conditions is a combination of: historical conditions, landscape averages, inventory and monitoring data, and wildlife needs. While dead trees, particularly larger diameter ones, play a crucial ecological role, they also have the capacity to significantly increase wildfire risk when present and concentrated at densities above historical averages. This has highlighted the need to cluster large snags in such a way to provide adequate resting, denning, and nesting habitat for multiple species.

Since the number of snags on the Bitterroot National Forest is not a limiting factor for snag-associated wildlife, the project-specific plan amendment, in combination with other vegetation modification projects, would not result in a loss of viability for wildlife. The ability for projects to remove excess snags to move vegetation and fire regimes toward desired conditions would better support wildlife and wildlife habitat by reducing the primary threat of high severity fires across the landscape.

References

Biden. 2022. Executive Order 14072: Strengthening the Nation's Forests, Communities, and Local Economies. 87 FR 24851, Pages 24851-24855.

Bollenbacher, B., R. Bush, and R. Lundberg. 2009. Estimates of snag densities for western Montana forests in the northern region, Report 09-05 v1.3. Region One Vegetation Classification, Mapping, Inventory and Analysis Report, U.S. Department of Agriculture, Forest Service, Region One, Missoula, MT.

Brown, J. K., E. D. Reinhardt, and K. A. Kramer. 2003. Coarse woody debris: Managing benefits and fire hazard in the recovering forest. Gen. Tech. Rpt. RMRS-GTR-105. Ogden, UT: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station.

Brown, J. K., and J. K. Smith. 2000. Wildland fire in ecosystems: Effects of fire on flora. Gen. Tech. Rep. RMRS-GTR-42-vol. 2, U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Ogden, UT.

Bull, E. L., C. G. Parks, and T. R. Torgersen. 1997. Trees and logs important to wildlife in the interior Columbia River basin. Gen. Tech. Rep. PNW-GTR-391, U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station, Portland, OR.

Bull, E.L. 2002. The value of coarse woody debris to vertebrates in the Pacific northwest. Pages 171-178 *in* W. F. Laudenslayer, Jr., P. J. Shea, B. E. Valentine, C. P. Weatherspoon, and T. E. Lisle, editors. Proceedings of the symposium on the ecology and management of dead wood in western forests; 1999 November 2-4; Reno, NV. Gen. Tech. Rep. PSW-GTR-181. U.S. Department of Agriculture, Forest Service, Pacific Southwest Research Station, Albany, CA.

Bush, R. and B. Reyes. 2023. Estimates of snag and live tree densities for western Montana forests in the northern region based on FIA hybrid 2015 analysis dataset. 3 April 2023 edition. 22-20 V 3.0.

Cook, J. G., L. L. Irwin, L. D. Bryant, R. A. Riggs, and J. W. Thomas. 1998. Relations of forest cover and condition of elk: A test of the thermal cover hypothesis in summer and winter. Wildlife Monographs. No. 14 1 : 14 1.

Cook, J. G., L. L. Irwin, L. D. Bryant, R. A. Riggs, and J. W. Thomas. 2004. Thermal cover needs of large ungulates: A review of hypothesis tests. *In:* Transactions of the 69th North American Wildlife and Natural Resources Conference. Pp. 708–726. Internet website: https://www.fs.usda.gov/research/treesearch/24695.

Crane, K.K., Mosley, J.C., Mosley, T.K., Frost, R.A., Smith, M.A., Fuller, W.L., Tess, M.W. 2016. Elk Foraging Site Selection on Foothill and Mountain Rangeland in Spring. Rangeland Ecology & Management, Volume 69, Issue 4, July 2016, Pages 319-325.

Fischer, W. C., and A. F. Bradley. 1987. Fire ecology of western Montana forest habitat types. Gen. Tech. Rep. INT-GTR-223, U.S. Department of Agriculture, Forest Service, Intermountain Research Station, Ogden, UT.

Graham, R. T., A. E. Harvey, M. F. Jurgensen, T. B. Jain, J. R. Tonn, and D. S. Page-Dumroese. 1994. Managing coarse woody debris in forests of the Rocky Mountains. Report INT-RP-477. Department of Agriculture, Forest Service, Intermountain Research Station.

Graham, R. T., A. E. Harvey, T. B. Jain, J. R. Tonn. 1999. The Effects of Thinning and Similar Stand Treatments on Fire Behavior in Western Forests. U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. Portland, Oregon.

Green, P., J. Joy, D. Sirucek, W. Hann, A. Zack, and B. Naumann. 2011. Old-growth forest types of the Northern Region (1992, with errata through 2011).

Harris, R.B. 1999. Abundance and characteristics of snags in western Montana forests. Gen. Tech. Rep. RMRS-GTR-31, U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Ogden, UT.

Lyon, J.L. 1983. Road Density Models Describing Habitat Effectiveness for Elk. Journal of Forestry, Volume 81, Issue 9, September 1983, Pages 592–613, https://doi.org/10.1093/jof/81.9.592

Mellen, T.K , Meslow, E.C., Mannan, R.W. 1992. Summertime Home Range and Habitat Use of Pileated Woodpeckers in Western Oregon. The Journal of Wildlife Management, Volume 56, Issue 1, January 1992, Pagees 96-103. https://doi.org/10.2307/3808796

Oliver and Larson, 1996. Forest Stand Dynamics, Update Edition. C.D. Oliver & B.C. Larson. New York, New York.

Ranglack, D., B. Garrott, J. Rotella, K. Proffitt, J. Gude, and J. Canfield. 2016. Evaluating elk summer resource selection and applications to summer range habitat management.

Spiering, D.J., Knight, R.L., 2005. Snag density and use by cavity-nesting birds in managed stands of the Black Hills National Forest. Forest Ecology and Management, Volume 214, Issues 1-3, August 2005, Pages 40-52. https://doi.org/10.1016/j.foreco.2005.03.054

USDA Forest Service. 1979. Wildlife Habitats in Managed Forests: the Blue Mountains of Oregon and Washington. Agriculture Handbook 53.

USDA Forest Service. 1978. Guides for Elk Habitat Objectives. Hamilton, MT: Bitterroot Forest, Forest Service.

USDA Forest Service. 1987a. Bitterroot National Forest Land and Resource Management Plan. U.S. Department of Agriculture, Forest Service, Northern Region, Bitterroot National Forest, Hamilton, Montana.

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Appendix E

Road and Trail Management

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Appendix E – Road and Trail Management

1. Introduction

The proposed action includes several different types of road management activities. System roads within the project area would be evaluated for best management practices and applied to haul routes, as necessary. Roads not needed for future management would be decommissioned, removed from the system, treated, and returned to the natural land base. Other roads that are not needed for management in the short term would be placed into storage in an environmentally benign state, but they would remain within the National Forest System of Roads (NFSR) under basic custodial care for potential future use. Some identified roads are also designated in the National Forest System of Trails, and they would maintain trail status despite changes in road status. There would be no net gain of NFSRs or change in public access due to the proposed action.

Action would be taken on undetermined roads, or roads that have been located, but that are not identified in the NFSRs. Most undetermined roads are redundant and they would be obliterated, or treated and returned to the natural land base, while others may be used as temporary haul routes or permanently added to the NFSRs. Road building would take place to support proposed vegetation management and reduce sedimentation effects. Temporary roads would facilitate log removal from stands treated using commercial harvest. After use, temporary roads would be treated and returned to the natural land base. (Potential temporary roads are described in the environmental assessment and depicted in Appendix C, but they are not listed in this appendix.)

2. Road Changes Tables

The following tables display the routes affected by the proposed action for roads, trails, and access management for the Bitterroot Front Project (July 2023):

Table E-1 – Proposed New NFSRs Construction

Route #	Name	Beginning Milepost	Ending Milepost	Proposed Motor Vehicle Use Map (MVUM) Code[1]	Segment Length (Miles)	Notes
1030	McCoy Creek	-	-	0	1.31	Construct to replace NFSR 62892
1042	Chaffin Creek	5.704	7.162	0	0.67	Construct to provide an alternative haul route to NFSR 374
				Total	**1.98**	

[1] MVUM code 0 is a designation for a highway that is closed year round to public use.

Table E-2 – Proposed NFSR to Store

Route #	Route Name	Length of Segment (miles)
13101	Gash Creek	0.57
62019	Maccalla Cr-Big Cr Face	0.11
62028	Maccalla Cr-Big Cr Face	1.00
62031	Mccalla Creek	1.04
62053	Smith Creek	0.64
62191	Mcclain Creek	0.66
62194	Mcclain Creek	0.93
62199	Smith Creek	0.30
62214	Mcclain Creek	0.12
62220	Mcclain Creek	0.11
62285	Mcclain Creek	0.84
73888	South Gash Creek	0.44
74795	Larson Creek	0.17
74798	Silverthorn	0.24
	Total	**7.21**

Table E-3 – Proposed NFSR to Store after use to complete proposed treatments

Route #	Route Name	Length of Segment (miles)
62009	Sweeney Creek	0.77
62029	Maccalla Creek	1.81
62061	Sweathouse	1.38
62063	Sweathouse	0.63
62071	Gash Creek	0.48
62198	Smith Creek	1.31
62203	Sweathouse	0.35
62233	Larson Creek	1.33
62250	Mccalla-Silverthorn	0.35
62254	Mccalla-Silverthorn	0.43
73890	Bear Creek	0.42
1136A	Pine	1.31
1136B	Lost Cabin	0.98
	Total	**11.55**

Table E-4 – Proposed NFSRs to Decommission

Route #	Route Name	Length of Segment (miles)
62014	Mccalla Cr – Big Cr Face	0.27
62017	Mccalla Cr – Big Cr Face	0.66
62026	Maccalla Cr – Big Cr Face	0.66
62027	Maccalla Cr – Big Cr Face	0.54
62032	Mccalla Creek	1.13
62054	Smith Creek	0.59
62055	Smith Creek	0.29
62062	Sweathouse	0.84

Route #	Route Name	Length of Segment (miles)
62063	Sweathouse	0.15
62064	Smith Creek	0.12
62065	Smith Creek	0.12
62192	Mcclain Creek	0.45
62256	Silverthorn	0.25
62867	Little Trapper	0.87
62891	Mccoy Creek-Cooper Draw	0.30
62892	Mccoy	1.01
73886	Gash Creek	1.12
73890	Bear Creek	0.19
74796	Larson Creek	0.46
1136B	Lost Cabin	0.06
	Total	**10.08**

Table E-5 – NFSRs Proposed to be Decommissioned as Roads, but Maintain the National Forest System of Trail Status

Route #	Route Name	Length of Segment (miles)
62923	Shannon Gulch	0.62
	Total	**0.62**

Table E-6 – Undetermined Roads Proposed to add to the NFSRs

Route #	Route Name	Length of Segment (miles)
62872	Little Trapper	0.21
62873	Little Trapper	0.27
62877	W. Fork/Hart Bench	0.56
62878	Leavens Gulch	1.71
62882	Little Trapper	3.45
62913	Bunkhouse	1.52
62959	Head Of Lost Horse	0.20
74950	Chaffin Creek	0.60
	Total	**8.54**

Table E-7 – Undetermined Roads Proposed to maintain the National Forest System of Trails Status

Route #	Route Name	Length of Segment (miles)
62884	Little Trapper	0.70
	Total	**0.70**

Table E-8 – Undetermined Roads Proposed to obliterate after use to complete proposed treatments

Route #	Route Name	Length of Segment (miles)
116	St Mary	0.220
165	Sweathouse Creek	0.611
183	Larson Creek	0.788
191	Larry Creek	0.515
201	Camas Creek	0.149
	Total	**2.28**

Table E-9 – Undetermined Roads Proposed to obliterate

Route #	Route Name	Length of Segment (miles)
167	Bear Creek	0.10
180	Big Creek	0.10
62913	Bunkhouse	0.21
74976	Burnt Ridge	0.30
74975	Chaffin Creek	0.12
74971	Chaffin Creek	0.21
62629	Chaffin Creek	0.63
13104	Cow Creek	0.54
206	Coyotee Coulee	0.28
62068	Gash Creek	0.67
62889	Hart Gulch	1.71
199	Hayes Creek	0.17
184	Larry Creek	0.69
185	Larry Creek	0.24
186	Larry Creek	0.10
187	Larry Creek	0.25
188	Larry Creek	0.48
189	Larry Creek	0.31
190	Larry Creek	0.43
192	Larry Creek	0.17
193	Larry Creek	0.30
204	Larry Creek	0.60
155	Larry Creek	0.26
156	Larry Creek	0.19
62415	Leavens Gulch	0.60
177	Little Smith Creek	0.12
178	Little Smith Creek	0.07
179	Little Smith Creek	0.14
62882	Little Trapper	0.73
62414	Little Trapper	0.83
62873	Little Trapper	0.50
62883	Little Trapper	0.68
105	Mccalla-Silverthorn	0.61
106	Mccalla-Silverthorn	0.30
107	Mccalla-Silverthorn	0.41
108	Mccalla-Silverthorn	0.23
115	Mccalla-Silverthorn	0.25
62018	Mccalla Cr-Big Cr Face	0.35

Route #	Route Name	Length of Segment (miles)
124	Mccalla Cr-Big Cr Face	0.46
125	Mccalla Cr-Big Cr Face	0.35
126	Mccalla Cr-Big Cr Face	0.47
127	Mccalla Cr-Big Cr Face	0.18
128	Mccalla Cr-Big Cr Face	0.44
129	Mccalla Cr-Big Cr Face	0.16
130	Mccalla Cr-Big Cr Face	0.12
131	Mccalla Cr-Big Cr Face	0.40
132	Mccalla Cr-Big Cr Face	0.25
133	Mccalla Cr-Big Cr Face	0.14
134	Mccalla Cr-Big Cr Face	0.45
135	Mccalla Cr-Big Cr Face	0.21
136	Mccalla Cr-Big Cr Face	0.42
137	Mccalla Cr-Big Cr Face	0.20
138	Mccalla Cr-Big Cr Face	0.42
139	Mccalla Cr-Big Cr Face	0.37
140	Mccalla Cr-Big Cr Face	0.06
141	Mccalla Cr-Big Cr Face	0.26
159	Mccalla Cr-Big Cr Face	0.57
160	Mccalla Cr-Big Cr Face	0.14
161	Mccalla Cr-Big Cr Face	0.29
162	Mccalla Cr-Big Cr Face	0.10
181	Mccalla Cr-Big Cr Face	0.55
62038	Mccalla Creek	1.05
100	Mccalla Creek	0.79
101	Mccalla Creek	0.34
102	Mccalla Creek	0.90
103	Mccalla Creek	1.05
104	Mccalla Creek	0.67
109	Mccalla Creek	0.51
110	Mccalla Creek	0.37
111	Mccalla Creek	0.64
112	Mccalla Creek	0.37
113	Mccalla Creek	1.04
114	Mccalla Creek	0.28
157	Mccalla Creek	0.53
158	Mccalla Creek	0.23
182	Mccalla Creek	0.16
62190	Mcclain Creek	0.77
62195	Mcclain Creek	1.00
62189	Mcclain Creek	0.59
207	Mccoy Creek	0.60
194	Moose Creek	0.53
195	Moose Creek	0.18
196	Moose Creek	0.42
197	Moose Creek	0.64
198	Moose Creek	0.20
200	Moose Creek	0.85
202	Shannon Gulch	1.00
205	Shannon Gulch	0.38
164	Smith Creek	0.61

Route #	Route Name	Length of Segment (miles)
170	Smith Creek	0.01
172	Smith Creek	0.04
174	Smith Creek	0.21
175	Smith Creek	0.29
176	Smith Creek	0.15
166	South Gash Creek	0.17
203	Spoon Tin Cup	1.03
117	St Mary	0.32
118	St Mary	0.36
119	St Mary	0.18
120	St Mary	0.11
121	St Mary	0.33
122	St Mary	0.13
123	St Mary	0.45
62201	Sweathouse	0.12
163	Sweathouse Creek	0.08
168	Sweathouse Creek	0.33
169	Sweathouse Creek	0.20
171	Sweathouse Creek	0.06
173	Sweathouse Creek	0.04
62007	Sweeney Creek	0.53
142	Sweeney Creek	0.66
143	Sweeney Creek	0.53
144	Sweeney Creek	0.36
145	Sweeney Creek	0.24
146	Sweeney Creek	0.43
147	Sweeney Creek	0.26
148	Sweeney Creek	0.23
149	Sweeney Creek	0.24
150	Sweeney Creek	0.47
151	Sweeney Creek	0.25
152	Sweeney Creek	0.33
153	Sweeney Creek	0.41
154	Sweeney Creek	0.32
62075	Tag Alder Creek	0.82
	Total	**49.32**

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Appendix F

Forest Plan Consistency

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Appendix F – Forest Plan Consistency

Standard	Standard Description	Does the Proposed Action Meet the Standard?	If "No" or "N/A", provide an explanation
Recreation			
1	The Bitterroot National Forest Travel Plan (Forest Travel Plan) would be annually reviewed and revisions made to meet Bitterroot National Forest Plan (Forest Plan) management direction. Off-road vehicle use decisions would be incorporated into the Forest Plan as amendments. The Montana Fish and Game Commission Road Management Policy would be considered in the annual travel planning process.		N/A - The project does not propose actions regarding the Forest Travel Plan.
2	Road end facilities and trails would be built to provide access to wilderness and roadless area trail systems.		N/A - Outside the scope of this project.
3	Trails in areas proposed for development or paralleled by new roads would be evaluated for retention during project environmental analysis.	Yes, all existing trails within the project area would be retained.	
4	The priority for trail reconstruction and relocation would be based on public safety, resource damage, and type of use.		N/A - Outside the scope of this project.
5	Off-road vehicle use would be controlled to prevent soil degradation.	Yes, project design features outline control measures to prevent off-road vehicle use.	
6	Information and education would be provided to meet visitor needs and encourage appropriate visitor behavior.		N/A - Outside the scope of this project.
Wilderness			
1	Subject to existing private rights and pending final action by Congress, wilderness recommendations and Montana Wilderness Study Act areas should be managed to maintain their existing wilderness character.	Yes, prescribed fire is the only proposed treatment for the recommended wilderness areas, which would not degrade the wilderness character.	
Cultural Resources			
1	The Forest Service (Forest) would undertake a systematic program of cultural resource inventory, evaluation, and preservation aimed at the enhancement and protection of significant cultural resource values.	Yes, a cultural resource inventory was completed in 2017.	

Standard	Standard Description	Does the Proposed Action Meet the Standard?	If "No" or "N/A", provide an explanation
2	Significant cultural resource sites that were evaluated would be preserved in place whenever possible.	Yes, all eligible properties within the project area of potential effect (APE) would be avoided.	
3	An inventory survey for cultural resources would be made for most surface-disturbing activities.	Yes, a cultural resource inventory was completed utilizing the Forest's Site Inventory Strategy (SIS).	
4	Cultural resources that were discovered would be evaluated in relation to the published Advisory Council on Historical Preservation criteria for eligibility to the National Register of Historic Places.	Yes, all sites were evaluated for the National Register of Historic Places.	
5	The Forest would enhance and interpret significant cultural sites for the education and enjoyment of the public when such development would not degrade the cultural property.	Yes, interpretation would be completed, as needed.	
6	The Forest would consult with Native American traditional religious leaders to identify sites to protect in accordance with the American Indian Religious Freedom Act.	Yes, Native American tribes were consulted with prior to project approval.	
Scenery (Visual Quality)			
1	The time required for openings to visually recover before adjacent stands could be harvested would vary by visual quality and other management objectives as determined through application of the visual management system and project interdisciplinary team process. As a general guide, recovery in retention and partial retention areas, from middle ground viewing distances, occurs when the site is stocked with about 300 trees per acre with the dominant trees 20 feet tall. This condition is reached in 26 to 34 years from the time of harvest. Generally, habitat types not capable of supporting 300 trees per acre recover in 30 years. The minimum recovery period, generally associated with maximum modification visual quality objective (VQO) areas, occurs when a new forest stand is established and certified as stocked.	Yes, the proposed action meets this standard with application of design criteria for those units noted in the scenery specialist report.	
2	Timber harvest that created openings should be designed to blend with natural openings to the extent practical.	Yes, the proposed action meets this standard with application of design criteria.	
3	The size, shape, and location of the area between openings would be consistent with water, wildlife, and visual resource consideration. Documentation of rationale and tradeoffs would be required, if the proposed openings are larger than the intervening leave areas.	Yes, the proposed action meets this standard with application of design criteria.	

Standard	Standard Description	Does the Proposed Action Meet the Standard?	If "No" or "N/A", provide an explanation
Wildlife and Fish			
1	The amount and distribution of old growth would be used to ensure sufficient habitat for the maintenance of viable populations of existing native and desirable nonnative vertebrate species, including two indicator species, pine marten and pileated woodpecker.	Yes, the indicator was evaluated under the effects analysis. (See the Wildlife specialist report.)	
2	Stand conditions that qualify as old growth would vary by habitat type and landform. Criteria to consider for identifying old growth include those listed in the Forest Plan on page II-20.	Generally yes, although old growth criteria used were the more current R1 definitions (See the Wildlife specialist report. [PF-WILDLIFE-001])	This standard was amended for this project. (See Appendix D.)
3	All snags that do not present an unacceptable safety risk would be retained.		This standard was amended for this project. (See Appendix D.)
4	Long rotations would be prescribed to meet old growth requirements on suitable timberland in Management Areas 1, 2, 3a, 3b, and 3c.	Yes, the project design features comply with this standard.	
5	Old growth stands may be logged and regenerated when other stands have achieved old-growth status.		This standard was amended for this project. (See Appendix D.)
6	Sanitation and salvage harvests may occur in stands classified as old growth if old growth characteristics are retained after logging.	Yes, project design features comply with this standard.	
7	Cutthroat trout populations would be used as an indicator of fisheries habitat changes.	Yes, the distribution and current status of westslope cutthroat trout is discussed in detail in the Aquatics report (PF-AQUATICS-001). Likewise, the effects analysis focuses on potential effects to cutthroat trout. Cutthroat trout is analyzed as a sensitive species in the biological evaluation presented in the Aquatics report (PF-AQUATICS-001).	
8	Watershed project analysis would estimate the effects of sediment on fish habitat.	Yes, the fisheries and hydrology analysis include extensive analysis of potential sediment inputs and their likely effects on fish habitat.	

Standard	Standard Description	Does the Proposed Action Meet the Standard?	If "No" or "N/A", provide an explanation
9	In cooperation with the Idaho Department of Fish and Game, the need for additional salmon hatching channel capacity on the Selway River would be assessed by 1990. The facility would be expanded, if additional capacity would be required. The existing facility would be maintained.		N/A - Outside the scope of the project. This standard only applies to the Selway River, which is not in the analysis area.
10	Beaver would be introduced into suitable riparian habitat.		N/A - Outside the scope of the project.
11	Elk population status would be used as an indicator of commonly hunted ungulate species and the status of their habitat.	Yes, the indicator was evaluated under the effects analysis (See the Wildlife specialist report.)	
12	Big game cover/forage relationships, as described in Guides for Elk Habitat objectives, would be a consideration in planning timber management activities.		This standard was amended for this project. (See Appendix D.)
13	The recommendations in the Coordinating Elk and Timber Management Report would be considered during timber management and transportation planning.	Yes, the indicator was evaluated under the effects analysis. (See the Wildlife specialist report.)	
14	Manage roads through the Forest Travel Plan process to attain or maintain 50 percent or higher elk habitat effectiveness in currently roaded third order drainages. Drainages where more than 25 percent of roads are in place are considered roaded. Maintain 60 percent or higher elk habitat effectiveness in drainages where less than 25 percent of the roads were built.	No.	This standard was amended for this project. (See Appendix D.)
15	If, for three years running, the bull elk harvest during the first week of the hunting season exceeds 40 percent of the total bull harvest, additional fall road closures would be considered.		N/A – Montana Department of Fish, Wildlife, and Parks (MDFWP) no longer provides this data.
16	The habitat needs of sensitive species, as listed by the regional forester, would be considered in all project planning.	Yes, the indicator was evaluated under the effects analysis. (See Wildlife, Aquatics, and Rare Plant specialist reports.)	
17	Wildlife use would have a priority over livestock use on elk winter range.	Yes, the project does not alter rangeland allotments.	

Standard	Standard Description	Does the Proposed Action Meet the Standard?	If "No" or "N/A", provide an explanation
Threatened and Endangered Species			
1	No formal recovery plan was established for threatened and endangered species on the Bitterroot National Forest. Specific population objectives would be established when sufficient biological information would be available to do so. Cooperate and involve the public in any interagency recovery effort.		N/A - The Recovery Plan for bull trout was developed. The proposed action is located in the Columbia Headwaters Recovery Unit-Bitterroot River Sub-Unit. Recovery Plans for grizzly bears were developed, but the project area is not within any recovery zone. No formal recovery plan was developed for Canada lynx.
2	Participate in the identification and protection of threatened and endangered species as well as vascular plants identified as rare, pending a study and proposal as threatened or endangered.	Yes, the indicator was evaluated under the effects analysis. (See Wildlife, Watershed, and Aquatics specialist reports.)	
Timber			
1	All timber sales would be designed, as well as possible, to be affordable to purchasers under average market conditions at the time of sale.	Yes, economic feasibility would influence cutting unit prioritization to ensure the sale would be designed to be affordable to purchasers.	

Standard	Standard Description	Does the Proposed Action Meet the Standard?	If "No" or "N/A", provide an explanation
2	The allowable sale quantity, 33.4 million board feet (MMBF), includes components which may not be available for the annual timber sale program due to the lack of demand or because legislative action would be required. These components include the 2.3 MMBF of small size material not merchantable under current timber sale contract utilization standards. Montana Wilderness Study Act areas, Blue Joint and Sapphire, contribute 1.9 MMBF to the allowable sale quantity. Helicopter yarding is required to harvest 4.3 MMBF of the allowable sale quantity. Approximately 1.4 MMBF is located on lands that support high value ponderosa pine in major travel corridors and 2.9 MMBF is located in small scattered acreages on steep slopes and/or sensitive soils that support less valuable: Douglas-fir, lodgepole pine, spruce, and subalpine fir. Sandy, decomposed granite land types, which are difficult to develop and maintain fish habitat, contribute 5.7 MMBF to the allowable sale quantity. Salvageable material portions of the allowable sale quantity would be 2.2 MMBF. The components are based on the total allowable sale quantities (ASQ) and, therefore, could not be added. For example, portions of the helicopter yarding volume are included in all the other components. If one or more components would not be available or saleable, the annual timber sale program would be reduced accordingly. For sawtimber sales, the program would be reduced when the volume of a component offered, but unsold, exceeds 10 MMBF.	Yes, when determining sale areas, timber sale volume would not exceed 33.4 MMBF. This standard would not be exceeded, as there would be multiple sales within this project area.	
3	A variety of tree species would be planted, where habitat conditions permit, to prevent creation of monocultures that would be susceptible to insect and disease epidemics.	Yes, this indicator was evaluated under the effects analysis.	
4	By the end of the first decade, all of the reforestation backlog would be eliminated.		N/A – Proposed activities would not create a reforestation backlog. Reforestation would only be necessary for burned area recovery.
5	Approved site preparation methods on land suitable for timber production include mechanical preparation, burning, and spot scarification. The ground application of herbicides may be utilized to prepare planting spots in an environmental analysis that indicates other silvicultural alternatives would not meet management objectives or they are significantly more costly.	Yes, site preparation is covered under the effects analysis.	

Standard	Standard Description	Does the Proposed Action Meet the Standard?	If "No" or "N/A", provide an explanation
6	Establish vegetative cover on temporary roads and skid trails within 2 years.	Yes, these standards are met through project design criteria.	
7	Generally, stand size would be larger than five acres.	Yes, these standards are met through project design criteria.	
8	Train personnel currently involved in timber sale preparation, tree marking, and timber sale administration to ensure the application of genetic principles in on-the-ground timber management activities.	Yes, these standards are met through project design criteria.	
9	Implement scientifically based, efficient, and effective methods of selecting seed collection stands and procuring seeds.	Yes, the Bitterroot National Forest has an active tree improvement program covering ponderosa pine, Douglas-fir, and lodgepole pine. Engleman spruce is not a regional or Bitterroot National Forest priority.	
10	Participate in ongoing selective breeding projects for: ponderosa pine, Douglas-fir, Engelmann spruce, and lodgepole pine.		N/A - The tree improvement program is managed at the Bitterroot National Forest and regional scale, not at the project scale.
11	An economic analysis would be completed for all alternatives presented in detail on timber sales over 1 million board feet in size, and on capital investment transportation systems. Project alternatives would be designed to show the economic tradeoffs of different ways to implement Forest Plan standards. Project net public benefit and/or probable marketability would be analyzed and a decision made whether to continue at each of the following stages of planning.	Yes, a feasibility form would be completed – during project planning and design –and a Timber Sale Report would be completed (Residual Value)– before advertisement of the project. The Transaction Evidence Appraisal would be completed.	
12	Timber harvests to meet timber production objectives and related site preparation and regeneration practices would be designed so that there would be reasonable assurance that stands could be restocked within 5 years after final harvest.	Yes, this was evaluated under the effects analysis in the Silviculturist specialist report. No regeneration harvest is proposed.	

<table>
<tr><th>Standard</th><th>Standard Description</th><th>Does the Proposed Action Meet the Standard?</th><th>If “No” or “N/A”, provide an explanation</th></tr>
<tr><td colspan="4">Water, Air, and Soil</td></tr>
<tr><td>1</td><td>Utilize an equivalent road area or a similar concept to evaluate cumulative effects of a project involving significant vegetation removal, prior to including them on implementation schedules.</td><td>Yes, an equivalent clearcut area was used by resource specialists during the project cumulative effects analysis. Additional analysis would take place once treatment units would be established prior to implementation.</td><td></td></tr>
<tr><td>2</td><td>Hydrologic recovery following land-disturbing activities would normally take 20 years from time of harvest. The maximum area allowed to be hydrologically unrecovered, by habitat and land type, is shown below in the table (also see Forest Plan (FP) page II-24 for further definitions):
<table>
<tr><th>Land Types</th><th>HT123</th><th>HT4</th><th>HT567</th><th>RIP</th></tr>
<tr><td>-40</td><td>40</td><td>40</td><td>35</td><td>30</td></tr>
<tr><td>MN=40</td><td>40</td><td>40</td><td>30</td><td>NA</td></tr>
<tr><td>S40M60</td><td>25</td><td>30</td><td>25</td><td>25</td></tr>
<tr><td>SS+60</td><td>25</td><td>30</td><td>25</td><td>NA</td></tr>
</table></td><td></td><td>N/A - The project would not create any hydrologically unrecovered areas.</td></tr>
<tr><td>3</td><td>As part of project planning, site-specific water quality effects would be evaluated and control measures designed to ensure that the project would meet Bitterroot National Forest water quality goals; projects that would not meet State water quality standards would be redesigned, rescheduled, or dropped.</td><td>Yes, site-specific water quality effects were analyzed in the Watershed and Aquatics specialist report(PF-AQUATICS-001), and they were incorporated into the project design criteria</td><td></td></tr>
<tr><td>4</td><td>Water for nonconsumptive uses (instream flows) necessary for maintaining: fishery habitat, recreational uses, channel maintenance, and aesthetics would be protected by negotiation (compacts), adjudication, special use permits, or state reservation. Consumptive water uses to meet the Bitterroot National Forest needs would be pursued through appropriate Federal and state systems.</td><td></td><td>N/A - The project proposed no changes to existing instream flows.</td></tr>
<tr><td>5</td><td>The soil survey and interpretations would be provided at an order III, the forest land planning level of detail, for the Bitterroot National Forest outside the wilderness, except for high use recreation areas and rangeland, which would be inventoried as indicated in Table II-3.</td><td>Yes, see the Soils specialist report for detailed analysis.</td><td></td></tr>
</table>

Standard	Standard Description	Does the Proposed Action Meet the Standard?	If "No" or "N/A", provide an explanation
6	Soil and water conservation practices would be a part of project design and implementation to ensure soil and water resource protection.	Yes, these practices were incorporated into project design criteria.	
7	Plan and conduct land management activities so reductions of soil productivity potential caused by: detrimental compaction, displacement, puddling, and severe burning are minimized.	Yes, project design criteria were developed to minimize detrimental soil disturbance and to protect land productivity and stability.	
8	Plan and conduct land management activities so soil loss, accelerated surface erosion, and mass wasting, caused by these activities, would not result in an unacceptable reduction in soil productivity and water quality.	Yes, project design criteria were developed to minimize detrimental soil loss and mass wasting.	
9	Design or modify management practices to protect land productivity and to maintain land stability, as necessary.	Yes, project design criteria were developed to minimize detrimental soil disturbance and protect land productivity and stability.	
10	Actively reduce sediment from existing roads. Sediment reduction measures to be considered include: cross-drains into vegetative filter strips away from streams; grass seed, fertilized, mulch, and netting on cuts; fills slash filter windrows or straw bales at the toe of fill in contributing areas; and gravel ditches and road surface.	Yes, site-specific road maintenance improvements were identified and they would be implemented to address chronic sediment sources.	
11	The Forest would cooperate with the Montana and Idaho Air Quality Bureaus state implementation plans. The Bitterroot National Forest is an active member of the Montana State Airshed Group and it adheres to practices and policies of the State of Montana Cooperative Smoke Management Plan.	Yes, appropriate state implementation plans would be followed prior to and during prescribed burn activities.	
12	Upon receipt of a Notice of Prevention of Significant Deterioration action that may impact the wilderness air quality, the air quality values and the standards for predicting them would be identified.	Yes, appropriate state implementation plans would be followed prior to and during prescribed burn activities.	
13	Protect and preserve the integrity of and maintain access to the snow survey sites and electronic snow telemetry (SNOTEL) sites shown in Table II-6.		N/A - This project does not propose any actions that would impact the snow survey or SNOTEL sites.
14	Road plans and environmental analysis reports for activities in the Cow and Burnt Fork municipal watersheds would be submitted to the Montana Water Quality Bureau for review and approval.	Yes, the Montana Department of Environmental Quality would be consulted on proposed actions within the Cow Creek Municipal Watershed.	

Standard	Standard Description	Does the Proposed Action Meet the Standard?	If "No" or "N/A", provide an explanation
Minerals and Energy Resources			
1	Case by case surface management restrictions would be developed for locatable, leasable, and common variety minerals.		N/A - No actions are proposed to surface management restrictions of minerals or lease applications.
2	Before recommendations are made on any lease application, analysis of environmental effects would be made in compliance with the National Environmental Policy Act. Stipulations, which are displayed in Appendix N, and, which are based upon the "Oil and Gas Leasing of Nonwilderness National Forest Lands, 1981," (Appendix K), would be recommended in accordance with management area direction in Chapter III.		N/A - No actions are proposed to surface management restrictions of minerals or lease applications.
3	Identify common variety mineral sites that are suitable for construction aggregate and compatible with management area goals and standards.	Yes, identified materials' source sites are compatible with a respective management area.	
4	Areas currently withdrawn from mineral entry would be evaluated in accordance with the provisions of Section 204 of the Federal Land Policy and Management Act of 1976 (Appendix I).		N/A - Treatment units do not include areas currently withdrawn from mineral entry.
5	Coordinate the transportation system with mineral development.		N/A - Proposed actions do not include mineral development.
6	Consider outstanding and reserved mineral rights during project analysis.	Yes, proposed actions would not impact outstanding or reserved mineral rights.	
Road System			
1	Case roads would be maintained to design standards.		N/A - Project area does not include case roads.
2	Roads would be closed to public use, if adequate road maintenance funds are not available.	No	The Forest's policy is to close roads to public travel that present a driving hazard until mitigations could be implemented.
3	All roads would be designed to facilitate reestablishment of vegetative cover on disturbed areas within a reasonable time, not to exceed 3 years, after termination of a contract. If the road is necessary as a permanent addition to the Bitterroot National Forest transportation systems, then the roadbed may not be revegetated.	Yes, timber sale contract provisions and design criteria address this standard.	

Standard	Standard Description	Does the Proposed Action Meet the Standard?	If "No" or "N/A", provide an explanation
4	Temporary roads, tractor roads, skid trails, and firelines would be waterbarred and revegetated to control erosion. Table II-7 is a guide to waterbar spacing depending on the disturbed surface gradient and erodibility of the soil.	Yes, measures are among the best management practices included in the project design criteria.	
Protection			
1	Fire management standards, including the expected average annual acreage burned by the management area, are contained in the Bitterroot National Forest "Fire Management Action Plan". (See Appendix M of the 1987 Bitterroot Forest Plan.) The Bitterroot Forest Plan was developed after completion of the Level II fire management analysis as outlined in Forest Service Manual 5109.19. The Fire Management Action Plan would be annually revised to identify the differences between the most cost efficient fire management program determined by the Level II analysis and the fire management program funded in the current fiscal year.		N/A - Revisions to the Fire Management Action Plan is outside the purpose of this project.
2	The time and number of planned ignition prescribed burns to meet air quality requirements would be scheduled in cooperation with the State of Montana.	Yes, prescribed burn activities would be coordinated with the Montana/Idaho Airshed Group.	
3	The fuels treatment backlog would be eliminated by the end of the first decade. Priority for treatment would be given to high-risk stands with fuels exceeding 70 tons per acre.		N/A – The standard refers to the fuels backlog that existed when the Bitterroot Forest Plan was established.
Insect and Disease			
1	Silvicultural prescriptions would utilize integrated pest management strategies and treatments that reduce long-term losses due to insects and diseases.	Yes, this indicator is evaluated under the effects analysis.	
2	Pesticides, biological agents, preventive chemicals, and insecticide implants may be utilized on insects and diseases to provide short-term protection on specific sites after an appropriate environmental analysis.		N/A – Preventive chemicals or insecticides for insects and disease are not being proposed for use.

Standard	Standard Description	Does the Proposed Action Meet the Standard?	If "No" or "N/A", provide an explanation
3	Mountain pine beetle in lodgepole pine: utilize the mortality prediction model to identify the susceptibility of lodgepole pine stands to mountain pine beetle losses and to schedule silvicultural treatments. Prescribe even-aged silvicultural systems, including clearcutting where it is optimal, to create mosaics in extensive lodgepole pine stands. Prescribe thinning in young lodgepole pine stands to maintain stand vigor and control tree size and rotation age. Preventive chemicals may be utilized to reduce losses or protect high-value sites, such as campgrounds and seed orchards, after an environmental analysis is completed.		N/A – Preventive chemicals or insecticides for insects and disease are not being proposed for use.
4	Mountain pine beetle in ponderosa pine: prescribe thinning in young ponderosa pine stands to reduce stand density to a level that minimizes mortality. Chemical strategies, like lethal trap trees utilizing bait and Sevimol-4®, may be applied to protect high-value sites after an environmental analysis is completed.	Yes, this indicator is evaluated under the effects analysis. However, preventive chemicals are not being proposed for use.	
5	Dwarf mistletoe control in lodgepole and Douglas-fir (Gibson and Dooling 1982): Prescribe silvicultural treatments in managed stands to reduce losses to dwarf mistletoe. Treatments include: clearcutting; overstory removal; controlling species composition through thinning; and planting and removing infected trees from logged or burned stands.	Yes, this indicator is evaluated under the effects analysis.	
6	Western spruce budworm in Douglas-fir (Gibson and Dooling 1982): Silvicultural strategies and treatments of host stands would be utilized to reduce and prevent long-term damage in timber production areas. Strategies would include: presalvaging of susceptible trees and managing species, genetic composition, density, vigor, age, and structure. Biological strategies, such as the use of Bacillus thuringiensis (Bt), may be utilized to reduce or prevent damage in timber production and high-value areas, such as campgrounds. Chemical strategies, like implants, may be utilized where both risk of unacceptable damage and value are high, such as seed production areas, administrative sites, and campgrounds, after an environmental analysis.	Yes, this indicator is evaluated under the effects analysis. However, biological or preventive chemicals for Western spruce budworm are not being proposed for use.	

Standard	Standard Description	Does the Proposed Action Meet the Standard?	If "No" or "N/A", provide an explanation
Noxious Weeds			
1	The primary means of preventing, containing, or controlling noxious weeds would be through vegetative management practices and by using biological agents, such as: insects, rusts, molds, and other parasites on host plants. However, herbicides may be utilized to provide short-term protection on specific sites after an appropriate environmental analysis.	Yes, noxious weed prevention and control measures have been included in the project design criteria.	
Special Uses			
1	New outfitter and guide permits for traditional uses would be considered only when the services offered by existing outfitters would be fully utilized. Proposed transfer, termination, or relinquishment of permits operating at less than 100 service days would be considered for phasing out or reallocating service days to other current permit holders to provide for more economic operations.		N/A - Proposed actions do not include new outfitter or guide permits for the project area.
2	Permits for new uses or uses not currently under permit would be considered.		N/A - Proposed actions do not include any new uses.
Range			
1	Allotments may be closed if: the permittee stops his or her cattle; the transitory range is eliminated by tree regeneration; it is not cost effective; or environmental quality could not be protected.		N/A - Proposed actions do not include any changes to range allotments.
Wild and Scenic Rivers			
1	Eligible river wild, scenic, or recreational values would be protected until suitability studies provide the basis for future disposition.	Yes, Lost Horse and Blodgett Wild and Scenic Streams are within the project area. This indicator is evaluated under the effects analysis.	

Standard	Standard Description	Does the Proposed Action Meet the Standard?	If “No” or “N/A”, provide an explanation
Road Construction Standards The objectives of these standards are to construct roads that meet the needs for intended uses yet lay lightly on the land (minimum cuts and fills); manage traffic in lieu of high road standards; and control sediment deposition in streams. As technology improves, some of the numerical constraints may change to meet state-of-the-art environmental protection measures.			
Minor Collector and Local Roads			
1	Machine marks left on cut slopes catch seed and fertilizer and should be left. Cut slope seeding and fertilizing should be completed during the first season of construction and fill slopes immediately after final blading. Native vegetation would be encouraged on permanently or temporarily closed roads and where it would not be a safety hazard or maintenance problem on open roads. Apply practices that encourage revegetation including ripping the road surfaces of closed roads, allowing native plant encroachment, and blading only when necessary.	Yes, cut and fill slopes on constructed roads would be stabilized during the first season. Roads identified for decommissioning would be evaluated to determine which segments require ripping to facilitate native plant re-establishment.	
2	Design and maintain roads with sufficient width to accommodate planned use.	Yes, route design would include appropriate lane widths.	
3	Channel water away from the road surface to minimize loss of material from the roadway. Utilize outsloping, rolling grades, culverts, or other appropriate measures and structures. Culverts would be used for drainage crossings that carry water during any part of the year, and where there is a need to relieve ditch water.	Yes, road maintenance best management practices and improvement measures would include these design features.	
4	In addition, provide drive through dips or other type cross drains where culverts and grade rolling are too widely spaced to adequately divert water. As a minimum, roads with gradients less than 4 percent should provide cross drains equal to natural drainage spacing. Cross drains on steeper gradient roads should be spaced at sufficient intervals to control rills on the road surface and rilling or gullying of fill slopes. Divert runoff onto areas of vegetative cover to provide a filter for sediment and to avoid diversions onto fill slopes at natural drainages.	Yes, road maintenance best management practices and improvement measures would include these design features.	

Standard	Standard Description	Does the Proposed Action Meet the Standard?	If "No" or "N/A", provide an explanation
5	Maximum permissible sustained grades would not exceed 8 percent where the native soil has a moderate or low erodible rating and would not exceed 6 percent where the soil erodible rating is high. Pitches from 8 percent to a maximum of 15 percent would be allowed when special erosion control measures are designed into the road. Pitches from 8 percent to 10 percent are limited to a maximum of 1,000 feet and over 10 percent are limited to a maximum of 500 feet in length. Deviations to the above may be approved by the Forest supervisor after consideration for: log haul costs, maintenance costs, erosion control, graveling, additional ditches, and improved technology.	Yes, these standards would be applied during road design.	
6	Road maintenance operations and practices should protect the road investment; minimize loss of material from the roadway; and minimize erosion. Practices that would be avoided include undercutting the backslopes and leaving berms on the road surface.	Yes, road maintenance best management practices and improvement measures are designed to address these factors.	
7	Sections of roads with soils that may become rutted during wet weather should be surfaced, traffic restricted, or otherwise managed to prevent damage.	Yes, haul route conditions would be monitored by the timber sale administrator and prevention measures would be implemented where/when appropriate.	
Roads in Riparian Areas			
1	Plan transportation systems to minimize roads crossing or running parallel to streams.	Proposed route locations were determined following discussions to relocate a proposed route away from a perennial stream reach. The Hydrology analysis estimates negligible amounts of sediment that would be generated from road construction activities.	
2	Avoid beaver habitat and elk wallows.	Yes, road placement would avoid these habitats.	

Standard	Standard Description	Does the Proposed Action Meet the Standard?	If "No" or "N/A", provide an explanation
3	Except at stream crossings, vegetative buffer strips should be maintained between the toe of the road fill and the stream on soils that are likely to produce sediment above natural levels. In sandy soils, the minimum buffer strip should be 100 feet with an added 5 feet for each percent of land slope between the road and stream. In other soils, the width of the strip would vary by geomorphology, but as a guideline, the buffer strip should be a minimum of 25 feet wide with an added 2 feet for each percent of land slope between the road and stream (Trimble and Sartz 1957).	Newly constructed roads proposed in this project would be outside the riparian habitat conservation area.	
4	Windrows of baled straw, slash, or other effective material should be placed at the toe of the fill slope as sediment filters, where needed. They should be constructed during clearing operations and prior to culvert installation (Forest Plan Note No. 212).	Yes, these best management practices are routinely implemented during clearing and culvert installations on the Bitterroot National Forest.	
5	Revegetation of cut and fill slopes should be insured through adequate measures such as grass seeding, mulch application, or special slope treatments depending on the nature of native soil.	Yes, cut and fill slopes of newly constructed roads would be stabilized to minimize soil movement.	
6	Road gradients should be 5 percent or less within 400 feet of streams or stream crossings. Where gradients exceed 5 percent, the road surface would be stabilized, unless the native material resists erosion.	Yes, these standards would be applied during road design layout.	
7	Road surface runoff should be channeled off the road outside of riparian areas. Drive through dips, in or out slopes or cross drains with ditches may be appropriate. Some cross drainage and/or surfacing would normally be provided within 200 feet of all stream channel crossings, unless native material resists erosion.	Yes, these road improvement measures were proposed along haul routes through the project area.	
8	Closed roads should be revegetated to prevent surface erosion.	Yes, decommissioned routes would be decompacted, reseeded, and mulched where natural revegetation would be determined to be inadequate.	
9	Fish passage should be provided where roads cross fisheries' streams.	Yes, the project proposed replacement of several culverts that are fish passage barriers.	
10	Prevent material from entering streams by utilizing measures noted above; removing material to appropriate disposal areas; or other effective measures.	Yes, the project proposes site-specific road improvement measures.	

Standard	Standard Description	Does the Proposed Action Meet the Standard?	If "No" or "N/A", provide an explanation
11	If construction cannot be avoided during periods when the soils are saturated, special measures would be taken, such as installing debris basins, filters, or other methods to trap sediment.	Yes, haul route conditions would be monitored by the timber sale administrator and prevention measures would be implemented where/when appropriate.	
12	Dewater live stream channels during culvert installation in soil types, which are likely to increase stream sedimentation.		NA - No new live steam crossings are proposed in this project.
13	Permanent culverts should be installed during the initial crossing of live streams.		NA - No new live steam crossings are proposed in this project.
Road Density Standards			
1	Plan transportation systems to minimize roads crossing or running parallel to streams.	Yes, new road construction, as proposed in the project, was designed for placement that would minimize proximity to and crossing of streams to the extent possible.	
2	Transportation system densities would be subject to the interdisciplinary team process. As a general guide, average road densities in third order and larger drainages would not exceed the densities by land type and visual quality objective displayed in Table II-8 (FP II-33).The densities shown for maximum modification, modification visual quality objectives, and the land type are designed to protect soil and water resources. The other densities are designed to meet more restrictive visual quality objectives as well as soil and water constraints. No roads would be built to access SS+60 lands, however, it may be environmentally acceptable to cross them to access suitable timberland or to meet other resource objectives on adjacent lands.	Yes, road densities within the project boundary would be calculated in accordance with parameters outlined in the 1987 Forest Plan. The results of the road density analysis would be reviewed and referenced when new road construction would be proposed for future forest management.	

Standard	Standard Description	Does the Proposed Action Meet the Standard?	If “No” or “N/A”, provide an explanation
INFISH – Timber Management			
TM-1	Prohibit timber harvest, including fuelwood cutting, in Riparian Habitat Conservation Areas (RHCA), except as described below. a) Where catastrophic events such as: fire, flooding, volcanic, wind, or insect damage results in degraded riparian conditions, allow salvage and fuelwood cutting in RHCA only where present and future woody debris needs are met. Also, this would occur where cutting would not retard or prevent attainment of other Riparian Management Objectives (RMO) and where adverse effects could be avoided to inland native fish. For priority watersheds, complete a watershed analysis prior to salvage cutting in RHCAs. b) Apply silvicultural practices for RHCAs to acquire desired vegetation characteristics, where needed, to attain RMOs. Apply practices in a manner that does not retard attainment of RMOs and that avoids adverse effect in Inland native fish.	Yes, no timber harvest is proposed in INFISH RHCAs.	NA - No new live steam crossings are proposed in this project.
INFISH – Roads Management			
RF-1	Coordinate with Federal, tribal, state, and county agencies as well as cost-share partners to achieve consistency in road design, operation, and maintenance necessary to attain RMOs.	Yes, the proposed action would be designed to improve the condition of project area roads to reduce future sediment inputs into fish bearing streams.	

Standard	Standard Description	Does the Proposed Action Meet the Standard?	If "No" or "N/A", provide an explanation
RF-2	For each existing or planned road, meet RMOs and avoid adverse effect to inland native fish by: a. Completing a watershed analysis prior to construction of new roads or landings in RHCAs within priority watersheds. b. Minimizing road and landing location in RHCAs. c. Initiating development and implementation of a road management plan or a transportation management plan. At a minimum, address the following items in the plan: 1. Road design criteria, elements, and standards that govern construction and reconstruction. 2. Road management objectives for each road. 3. Criteria that govern road operation, maintenance, and management. 4. Requirements for pre-, during, and post- storm inspection and maintenance. 5. Regulation of traffic during wet periods to minimize erosion and sediment delivery and accomplish other objectives. 6. Implementation and effectiveness monitoring plans for road stability, drainage, and erosion control. d. Avoiding sediment delivery to streams from the road surface. 1. Roadway surface outsloping is preferred, except in cases where outsloping would increase sediment delivery to streams or where outsloping is infeasible or unsafe. 2. Route road drainage away from potentially unstable stream channels, fills, and hillslopes. e. Avoiding disruption of natural hydrologic flow paths. f. Avoiding sidecasting of soils or snow. Sidecasting of road material is prohibited on road segments within or abutting RHCAs in priority watersheds.	a. Yes, no new roads or landings are proposed in priority watersheds. b. Yes, roads and landings would be minimized in RHCAs. c. Yes, the project included an analysis that considered the current condition of each road and its potential effects on resources, including aquatics. d. Yes, road best management practices and project design features incorporated these designs. e. Yes, road design would avoid disruptions of natural hydrologic flow. f. Yes, sidecasting would not be used.	

Standard	Standard Description	Does the Proposed Action Meet the Standard?	If "No" or "N/A", provide an explanation
RF-3	Determine the influence of each road on RMOs. Meet RMOs and avoid adverse effects on inland native fish by: a. Reconstructing road and drainage features that do not meet design criteria standards; operation and maintenance standards; shown to be less effective than ones that were designed for controlling sediment delivery; ones that retard attainment of RMOs; or ones that do not protect priority watersheds from increased sedimentation. b. Prioritizing reconstruction based on the current and potential damage to inland native fish and their priority watersheds; ecological value of the riparian resources affected; and feasibility of options, such as helicopter logging and road relocation out of RHCAs. c. Closing and stabilizing or obliterating as well as stabilizing roads not needed for future management activities. Prioritize these actions based on the current and potential damage to inland native fish in priority watersheds and the ecological value of the riparian resources affected.	Yes, the project included an analysis that considered the current condition of each road and their potential effects on resources, including aquatics.	
RF-4	Construct new and improve existing culverts, bridges, and other stream crossings to accommodate a 100-year flood, including associated bedload and debris, where those improvements would/do pose a substantial risk to riparian conditions. Substantial risk improvements include those that: do not meet design and operation maintenance criteria; have been shown to be less effective than designed for controlling erosion; retard attainment of RMOs; or that do not protect priority watersheds and the ecological value of the riparian resources affected. Construct and maintain crossings to prevent diversion of stream flow out of the channel and down the road in the event of crossing failure.		N/A - No culvert replacements on live streams are planned for this project.
RF-5	Provide and maintain fish passage at all road crossings of existing and potential fish-bearing streams.		N/A - No culvert replacements on live streams are planned for this project.

Standard	Standard Description	Does the Proposed Action Meet the Standard?	If "No" or "N/A", provide an explanation
INFISH – Grazing Management			
GM-1	Modify grazing practices, such as accessibility of riparian area to livestock, length of grazing season, stocking levels, timing of grazing, etc., that retard or prevent attainment of RMOs or are likely to adversely affect inland native fish. Suspend grazing if adjusting practices would not be effective in meeting RMOs.		N/A - No grazing management actions are proposed.
GM-2	Locate new livestock handling and/or management facilities outside of RHCAs. For existing livestock handling facilities inside RHCAs, assure that facilities do not prevent attainment of RMOs. Relocate or close facilities where these objectives cannot be met.		N/A - No grazing management actions are proposed.
GM-3	Limit livestock: trailing, bedding, watering, salting, loading, and other handling efforts to those areas and times that would not retard or prevent attainment of RMOs or adversely affect inland native fish.		N/A, No new live steam crossings are proposed in this project.
GM-4	Adjust wild horse and burro management to avoid impacts that prevent attainment of RMOs or adversely affect inland native fish.		N/A - This is outside the scope of the project.
INFISH – Recreation Management			
RM-1	Design, construct, and operate recreation facilities, including rails and dispersed sites, in a manner that does not retard or prevent attainment of RMOs and avoids adverse effects on inland native fish. Complete watershed analysis prior to construction of new recreation facilities in RHCAs within priority watersheds. For existing recreation facilities inside RHCAs, assure that the facilities or use of the facilities would not prevent attainment of RMOs or adversely affect inland native fish. Relocate or close recreation facilities where RMOs cannot be met or adverse effects on inland native fish cannot be avoided.		N/A - This is outside the scope of the project.
RM-2	Adjust dispersed and developed recreation practices that retard or prevent attainment of RMOs or adversely affect inland native fish. Where adjustment measures such as: education, use limitations, traffic control devices, increased maintenance, relocation of facilities, and/or specific site closures are not effective in meeting RMOs and avoiding adverse effects on inland native fish, eliminate the practice or occupancy.		N/A - This is outside the scope of the project.
RM-3	Address attainment of RMOs and their potential effects on inland native fish in wild and scenic rivers, wilderness, and other recreation management plans.		N/A - This is outside the scope of the project.

Standard	Standard Description	Does the Proposed Action Meet the Standard?	If "No" or "N/A", provide an explanation
INFISH – Minerals Management			
MM-1	Minimize adverse effects to inland native fish species from mineral operations. If a Notice of Intent indicates that a mineral operation would be located in a RHCA, consider the effects of the activity on inland native fish in the determination of significant surface disturbance pursuant to 36 CFR 228.4. For operations in a RHCA, ensure operators take all practicable measures to maintain, protect, and rehabilitate fish and wildlife habitat, which may be affected by the operations. When bonding is required, consider (in the estimation of bond amount) the cost of stabilizing, rehabilitating, and reclaiming the area of operations.		N/A - This is outside the scope of the project.
MM-2	Locate structures support facilities and roads outside RHCAs. Where no alternative to siting facilities in RHCAs exists, locate and construct the facilities in ways that avoid impacts to RHCAs and streams as well as adverse effects on inland native fish. Where no alternative to road construction exists, keep roads to the minimum necessary for the approved mineral activity. Close, obliterate, and revegetate roads no longer required for mineral or land management activities.		N/A - This is outside the scope of the project.

Standard	Standard Description	Does the Proposed Action Meet the Standard?	If “No” or “N/A”, provide an explanation
MM-3	Prohibit solid and sanitary waste facilities in RHCAs. If no alternative to locating mine waste (waste rock, spent ore, and tailings) facilities in RHCAs exists, and releases can be prevented and stability could be ensured, then: a. analyze the waste material using the best conventional sampling methods and analytic techniques to determine its chemical and physical stability characteristics and b. locate and design the waste facilities using the best conventional techniques to ensure mass stability and to prevent the release of acid or toxic materials. If the best conventional technology is not sufficient to prevent such releases and ensure stability over the long-term, prohibit such facilities in RHCAs, then: c. monitor waste at arid waste facilities to confirm predictions of chemical and physical stability and make adjustments to operations to avoid adverse effects to inland native fish and to attain RMOs, as needed. d. reclaim and monitor waste facilities to assure chemical and physical stability; revegetate to avoid adverse effects to inland native fish; and attain RMOs. e. require reclamation bonds adequate to ensure long-term chemical and physical stability as well as successful revegetation of mine waste facilities.		N/A - This is outside the scope of the project.
MM-4	For leasable minerals, prohibit surface occupancy within RHCAs for oil, gas, and geothermal exploration and development activities where contracts and leases do not already exist, unless there are no other options for location of RMOs that could be attained and adverse effects to inland native fish could be avoided. Adjust the operating plans of existing contracts to (1) eliminate impacts that prevent attainment of RMOs and (2) avoid adverse effects to inland native fish.		N/A - This is outside the scope of the project.

Standard	Standard Description	Does the Proposed Action Meet the Standard?	If "No" or "N/A", provide an explanation
MM-5	Permit sand and gravel mining arid extraction within RHCAs only if no alternatives exist; if the action(s) would not retard or prevent attainment of RMOs; and if the adverse effects to inland native fish could be avoided.		N/A - This is outside the scope of the project.
MM-6	Develop inspection, monitoring, and reporting requirements for mineral activities. Evaluate and apply the results of inspecting and monitoring to modify mineral plans, leases, or permits, as needed, to eliminate impacts that prevent attainment of RMOs and avoid adverse effects on inland native fish.		N/A - This is outside the scope of the project.
INFISH – Fire / Fuels Management			
FM-1	Design fuel treatment and fire suppression strategies, practices, and actions so as not to prevent attainment of RMOs, and to minimize disturbance of riparian ground cover and vegetation. Strategies should recognize the role of fire in ecosystem function and identify those instances where fire suppression or fuel management action could perpetuate or be damaging to long-term ecosystem function or inland native fish.	Yes, minimal burning would occur in RHCAs with no effect to RMOs. Potential effects are described in detail in the RHCA.	
FM-2	Design prescribed burn projects and prescriptions to contribute to the attainment of RMOs.	Yes, minimal burning would occur in RHCAs with no effect to RMOs. Potential effects are described in detail in the RHCA.	
FM-3	Immediately establish an emergency team to develop a rehabilitation treatment plan to attain RMOs and to avoid adverse effects on inland native fish whenever RHCAs are significantly damaged by a wildfire or a prescribed fire burning out of prescription.		N/A - This is outside the scope of the project.
FM-4	Design prescribed burn projects and prescriptions to contribute to the attainment of RMOs.	Yes, minimal burning would occur in RHCAs with no effect to RMOs. Potential effects are described in detail in the RHCA.	
FM-5	Immediately establish an emergency team to develop a rehabilitation treatment plan to attain RMOs and to avoid adverse effects on inland native fish whenever RHCAs are significantly damaged by a wildfire or a prescribed fire burning out of prescription.		N/A - This is outside the scope of the project.

Standard	Standard Description	Does the Proposed Action Meet the Standard?	If "No" or "N/A", provide an explanation
INFISH – Lands Management			
LH-1	Require instream flows and habitat conditions for hydroelectric and other surface water development proposals that: maintain or restore riparian resources and favorable channel conditions as well as fish passage, reproduction, and growth. Coordinate this process with the appropriate state agencies. During relicensing of hydroelectric projects, provide written and timely license conditions to the Federal Energy Regulatory Commission (FERC) that require fish passage, flows, and habitat conditions that maintain/restore riparian resources and channel integrity. Coordinate relicensing projects with the appropriate state agencies.		N/A - This is outside the scope of the project.
LH-2	Locate new hydroelectric ancillary facilities outside RHCAs. For existing ancillary facilities inside the RHCA that are essential to proper management, provide recommendations to the FERC to assure that the facilities would not prevent attainment of RMOs and that adverse effects on inland native fish would be avoided. Where these objectives cannot be met, provide recommendations to the FERC that such ancillary facilities should be relocated. Locate, operate, and maintain hydroelectric facilities that must be located in RHCAs to avoid effects that would retard or prevent attainment of RMOs and to avoid adverse effects on inland native fish.		N/A - This is outside the scope of the project.
LH-3	Issue leases, permits, rights-of-way, and easements to avoid effects that would retard or prevent attainment of RMOs and to avoid adverse effects on inland native fish. Where the authority to do so was retained, adjust existing leases, permits, rights-of-way, and easements to eliminate effects that would retard or prevent attainment of RMOs or adversely affect inland native fish. If adjustments are not effective, eliminate the activity. Where the authority to adjust them was not retained, negotiate to make changes in: existing leases, permits, rights-of-way, and easements to eliminate effects that would prevent attainment of RMOs or adversely affect inland native fish. Priority for modifying: existing leases, permits, rights-of-way, and easements would be based on the current and potential adverse effects on inland native fish and the ecological value of the riparian resources affected.		N/A This is outside the scope of the project.
LH-4	Use land acquisition, exchange, and conservation easements to meet RMOs and to facilitate restoration of fish stocks and other species-at-risk of extinction.		N/A - This is outside the scope of the project.

Standard	Standard Description	Does the Proposed Action Meet the Standard?	If "No" or "N/A", provide an explanation
INFISH – General Riparian Area Management			
RA-1	Identify and cooperate with Federal, tribal, state, and local governments to secure instream flows needed to maintain riparian resources, channel conditions, and aquatic habitat.		N/A - This is outside the scope of the project.
RA-2	Trees may be felled in RHCAs when they pose a safety risk. Keep felled trees on-site when needed to meet woody debris objectives.	Yes, no trees are proposed for felling in RHCAs.	
RA-3	Apply herbicides, pesticides, other toxicants, and other chemicals in a manner that would not retard or prevent attainment of RMOs and that avoids adverse effects on inland native fish.	Yes, this is covered in design features.	
RA-4	Prohibit fuels storage and other toxicants within RHCAs. Prohibit refueling within RHAs, unless there are no other alternatives. Refueling sites within an RHCA must be approved by the Forest and have an approved spill containment plan.	Yes, this is covered in design features.	
RA-5	Locate water drafting sites to avoid adverse effects to inland native fish and instream flows in a manner that does not retard or prevent attainment of RMOs.	Yes, this is covered in design features.	
INFISH – Watershed and Habitat Restoration			
WR-1	Design and implement watershed restoration projects in a manner that promotes the long-term ecological integrity of ecosystems; conserves the genetic integrity of native species; and contributes to attainment of RMOs.	Yes, restoration actions included in the project fully support attainment of RMOs.	
WR-2	Cooperate with Federal, state, local, and tribal agencies as well as private landowners to develop watershed-based coordinated resource management plans or other cooperative agreements to meet RMOs.		N/A - This is outside the scope of the project.
INFISH – Fish and Wildlife Restoration			
FW-1	Design and implement fish and wildlife habitat restoration and enhancement actions in a manner that contributes to attainment of RMOs.	Yes, restoration actions included in the project fully support attainment of RMOs.	
FW-2	Design, construct, and operate fish and wildlife interpretive and other user-enhancement facilities in a manner that does not retard or prevent attainment of RMOs or adversely affects inland native fish. For existing fish and wildlife interpretive and other user-enhancement facilities inside RHCAs, assure that RMOs are met and adverse effect on inland native fish are avoided. Where RMOs cannot be met or adverse effect on inland native fish avoided, relocate or close such facilities.		N/A - This is outside the scope of the project.

Standard	Standard Description	Does the Proposed Action Meet the Standard?	If "No" or "N/A", provide an explanation
FW-3	Cooperate with Federal, tribal, and state wildlife management agencies to identify and eliminate wild ungulate impacts that prevent attainment of RMOs or adversely affect inland native fish.		N/A - This is outside the scope of the project.
FW-4	Cooperate with Federal, tribal, and state fish management agencies to identify and eliminate adverse effects on native fish associated with: habitat manipulation, fish stocking, fish harvest, and poaching.		N/A - This is outside the scope of the project.

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