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Middle Fork Weiser River Landscape Restoration Project

FINAL ENVIRONMENTAL IMPACT STATEMENT

Volume 1–Chapters 1 to 4
Payette National Forest

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Chapter 1 — Purpose and Need

1.1. Introduction

This Final Environmental Impact Statement (FEIS) discloses the temporary, short- and long-term, direct, indirect, irretrievable, irreversible, and cumulative environmental impacts of a Proposed Action and alternative actions for the Middle Fork Weiser River Landscape Restoration Project (Project) on the Council Ranger District of the Payette National Forest (Forest or PNF) in Adams County, Idaho. Proposed restoration activities include timber harvest, biomass harvest, road reconstruction, road realignment, temporary road construction, road decommissioning, culvert removal, thinning of submerchantable trees, prescribed fire, and other actions as described in detail in Chapter 2. Proposed recreation improvements include designated and dispersed recreation site improvements, motorized and non-motorized trail development and realignment, trailhead improvements, and replacement of a vault toilet. This document has been prepared pursuant to the requirements of the National Environmental Policy Act (NEPA, 40 CFR 1500–1508); National Forest Management Act (NFMA) implementing regulations of 2005, including transition language (36 CFR 219.14); and 2003 Payette National Forest Land and Resource Management Plan, as amended (Forest Plan) (United States Department of Agriculture [USDA] Forest Service 2003a).

The Forest's 800,000 acre Weiser-Little Salmon Headwaters Project (WLSH) was accepted in the Collaborative Forest Landscape Restoration (CFLR) Program[1] in 2012, and the Project is within the WLSH area. The purpose of the CFLRP is to encourage the collaborative, science-based ecosystem restoration of priority forest landscapes. Planning for this Project was initiated in summer 2013 in collaboration with the Payette Forest Coalition (PFC). The PFC, formed in June 2009, is a collaborative group comprised of stakeholders from a broad range of outside interests, including the environmental community, timber industry, recreational groups, and State and County government. The goal of the PFC is to work to sustain the ecologic function of landscapes and the economic health of rural communities.

In 2009 the Forest deferred the Middle Fork Weiser River area from analysis due to ongoing analysis of the Mill Creek-Council Mountain Landscape Restoration Project (also a collaborative project), a large-scale project located north of and adjacent to this Project area currently in the implementation phase. A second project collaborated on with the PFC, and currently in the implementation phase, is the Lost Creek-Boulder Creek (LCBC) Landscape Restoration Project.

As part of the planning process, a Project Travel Analysis Process (TAP) was completed in June 2013 and updated in November 2013. The Interdisciplinary Team (IDT) identified a Minimum Road System (MRS) recommendation (USDA Forest Service 2013a). The MRS identified National Forest System (NFS) roads needed for the protection, administration, and utilization of the NFS lands within the Project area. The MRS is the minimum that will serve Forest health, emergency access, and public access needs while complying with resource objectives, reflecting likely funding, and minimizing adverse effects associated with road construction, reconstruction, and maintenance. The Middle Fork Weiser River Landscape Assessment (Assessment) (USDA Forest Service 2014) was also completed for this Project to assess the existing conditions compared with historical conditions within the Project area. This EIS uses information from the

[1] Established with the Omnibus Public Land Management Act of 2009, PL 111-11

TAP and Assessment as a basis for assessing existing versus desired conditions and the formulation of the Proposed Action.

1.1.1. Project Area

The Project area is located approximately 6 miles southeast of Council, Idaho, in Adams County. Land ownership within and adjacent to the Project area includes NFS lands, Idaho State lands, and private ownership. Access to the area is via the Middle Fork Weiser River Road (National Forest System [NFS] road 50186), accessed by U.S. Highway 95, south of Council, Idaho, or via State Highway 55 and West Mountain Road (NFS road 50195) west of Donnelly, Idaho.

The Project area encompasses approximately 49,276 acres within the Weiser River drainage and comprises approximately 38,519 acres of NFS lands and 10,757 acres of private lands within the following five subwatersheds: Little Fall Creek–Weiser River, Mica Creek–Weiser River, Jungle Creek–Weiser River, Granite Creek–Weiser River, and a portion of the upper East Fork Weiser River (Figure 1.1-1). The Project area is located in T14N, R1E, Section 1; T14N, R2E Section 6; T15N, R1E, Sections 1–5, 9–16, 21–27, 35, and 36; T15N, R2E, Sections 1–12, 14–22, and 28–32; T16N, R1E, Sections 1, 12, 13, 24–27, and 32–36; T16N, R2E, Sections 2–11 and 14–35; T17N, R2E, Sections 27–34, Boise Meridian (Figure 1.1-1).

1.2. Proposed Action

A brief overview of the Proposed Action follows; a more complete description is given in Chapter 2. Proposed landscape restoration treatments on approximately 24,000 acres would do the following:

- Apply thinning treatments to forest stands followed by prescribed burning.
- Apply regeneration treatments where vigorous, fire-resistant trees are absent by creating openings up to 10 acres in size and/or Shelterwood/Seed tree treatments up to 40 acres in size. Forest structure for wildlife habitat would be retained in these openings. Sites would be prepared for planting or natural regeneration using prescribed burning and/or hand scalping.
- Move forest stands toward desired conditions as described in the Forest Plan by returning fire to the ecosystem, promoting the development of large tree forest structures mixed with a mosaic of size classes, and improving growth and species composition and resiliency to insects, disease, and fire.
- Improve habitat for Family 1 wildlife species, represented by the white-headed woodpecker (*Leuconotopicus albolarvatus*), by restoring forest conditions that contribute to source habitat for these species and providing appropriate Family 2 habitat, represented by pileated woodpeckers (*Dryocopus pileatus*). Provide appropriate habitat for wildlife in Families 3, 5, 7, 11, 12, and 13.
- Improve water quality, enhance aquatic habitat, and restore riparian and floodplain function by reducing road-related impacts.
- Create a shaded fuelbreak (SFB) to protect values at risk.

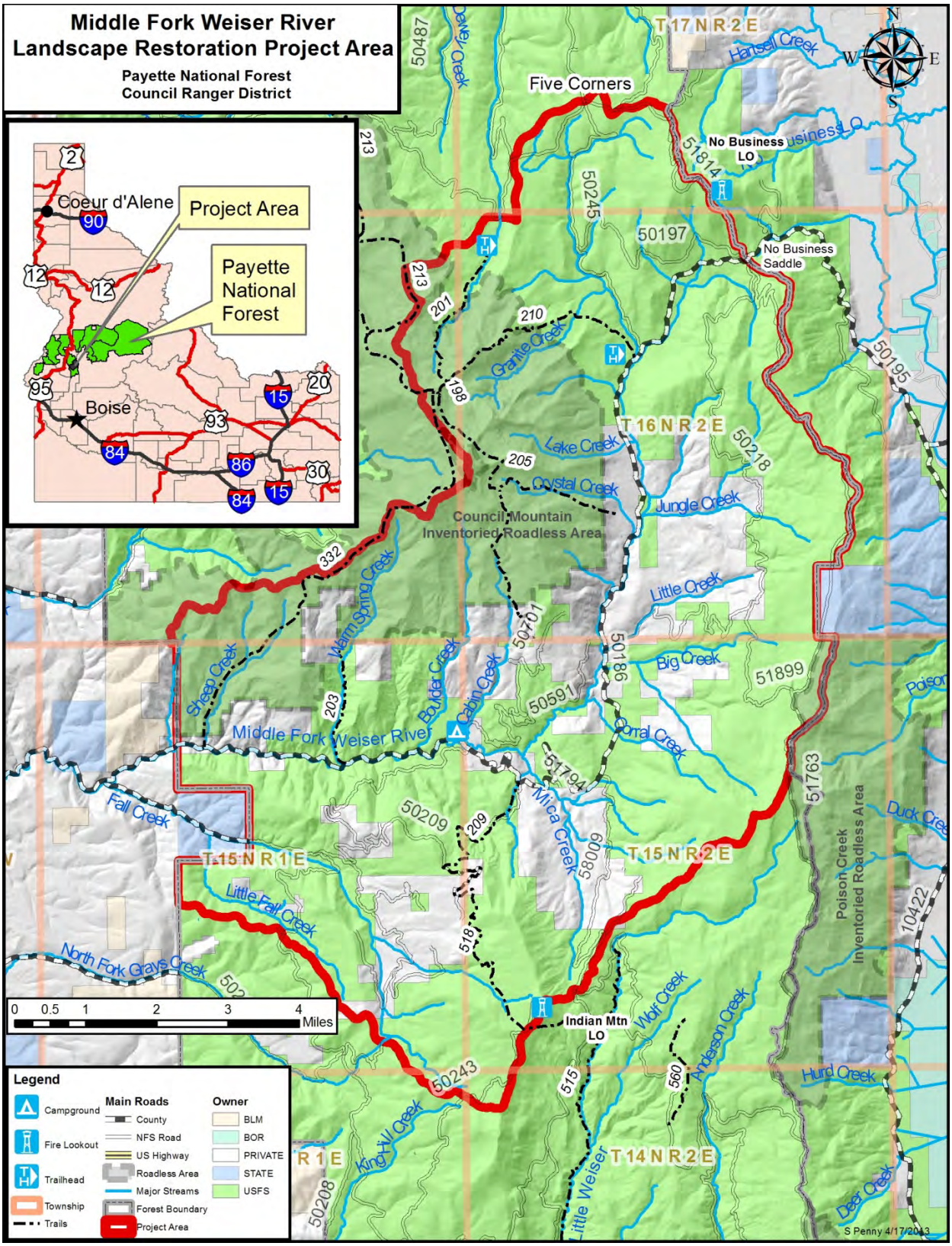


Figure 1.1-1. Project area map.

Thin plantations and reduce fuel loading in older stands using either skidding, lopping and scattering, mastication, or bio char and/or mechanical piling followed by burning.

- Remove, pile, burn, masticate, and/or biomass nonmerchantable material in harvest treatment areas.

The Project also proposes managing recreation use in the Project area, with an emphasis on identifying and hardening primary dispersed recreation areas, improving and realigning existing trails, and developing new trail opportunities.

1.2.1. Document Organization

This FEIS is tiered to the *Southwest Idaho Ecogroup Land and Resource Management Plans Final Environmental Impact Statement* (Forest Plan FEIS) (USDA Forest Service 2003a). Documented analyses in the Forest Plan FEIS have been referenced and/or summarized rather than repeated. Detailed information supporting the analyses presented in this document, unless specifically noted otherwise, is contained in the Project record located at the Council Ranger District Office. This FEIS is organized as follows:

- Chapter 1 introduces the Purpose and Need for which the Forest Service is proposing action, the public issues surrounding it, and other considerations.
- Chapter 2 presents and compares the alternatives, including the No Action alternative, with information about environmental effects and Project design features (PDFs) and mitigation measures.
- Chapter 3 describes the environment affected for each alternative and the direct, indirect, and cumulative effects likely to occur with implementation of each alternative considered.
- Chapter 4 lists IDT members or individuals who have contributed background information and analyses, lists references cited, and includes the glossary and list of acronyms.
- Sections refer to subdivisions within chapters.
- The following appendices provide additional documentation about the environmental analysis:
    - Appendix 1 – Maps
    - Appendix 2 – Road Treatment Table
    - Appendix 3 – Cumulative Effects
    - Appendix 4 – Monitoring and Evaluation
    - Appendix 5 – Riparian Conservation Area Thinning Guides
    - Appendix 6 – Appendix A of the Payette National Forest Land and Resource Management Plan
    - Appendix 7 – Legacy Tree Guidelines
    - Appendix 8 – Proposed Forest Plan Amendment

- Appendix 9 – Response to DEIS Comments Table
- Appendix 10 – Response to DEIS Comments – Opposing Literature Table

1.3. Historical and Existing Conditions

1.3.1. Land Ownership and Land Use Patterns

Large inholdings of private lands, predominantly owned by DF Development LLC, are located within the Project area (Figure 1.3-1). DF Development LLC recently purchased these lands from Southern Pine Plantations, which had recently purchased them from Potlatch Corporation. Much of the land owned by DF Development LLC has been managed by previous landowners (Southern Pine Plantations, Potlatch Corporation, and Boise Cascade) to maximize profit through timber harvest and, as a result, is populated by young-tree age classes. It is unknown at this time how the new landowners will manage their lands.

1.3.2. Precipitation

The Natural Resources Conservation Service's (NRCS) National Water and Climate Center administers a Snotel site (a weather station that can record snowfall data) on Squaw Flat at the northern end of the Project area at 6,240 feet elevation. Year-round data have been recorded since 1980, and complete data have been recorded since 1982. Mean yearly precipitation from 1982 to 2012 was 43.7 inches, and varied from a low of 24.4 inches in 1994 to a high of 65.7 inches in 1997. Median yearly precipitation was 43.5 inches. See Figure 1.3-2 for a graph of yearly precipitation from 1980 through 2012.

The National Weather Service operates a cooperative weather station in Council, Idaho, at 3,200 feet elevation, approximately 9 miles northwest of similar elevations in the Project area. Mean yearly precipitation recorded from 1948 to 2006 was 24.0 inches, with a low recorded in 1976 of 4.1 inches and a high in 1964 of 39.8 inches. Figure 1.3-2 displays these data.

Precipitation in the Project area generally increases with elevation. Elevations range from 3,840 feet, where the Middle Fork Weiser River exits the Project area, to 8,126 feet at the peak of Council Mountain. Precipitation also varies by time of year, with the majority occurring during winter months in the form of snow. Spring and fall rains occur, primarily due to low-pressure systems that form over the Pacific Ocean and track from the west, resulting in widespread storm events. During summer the jet stream moves north, causing a decrease in precipitation and dry, high-pressure air masses that affect local weather conditions. Summer precipitation is usually localized, occurring mostly in association with thunderstorm development.

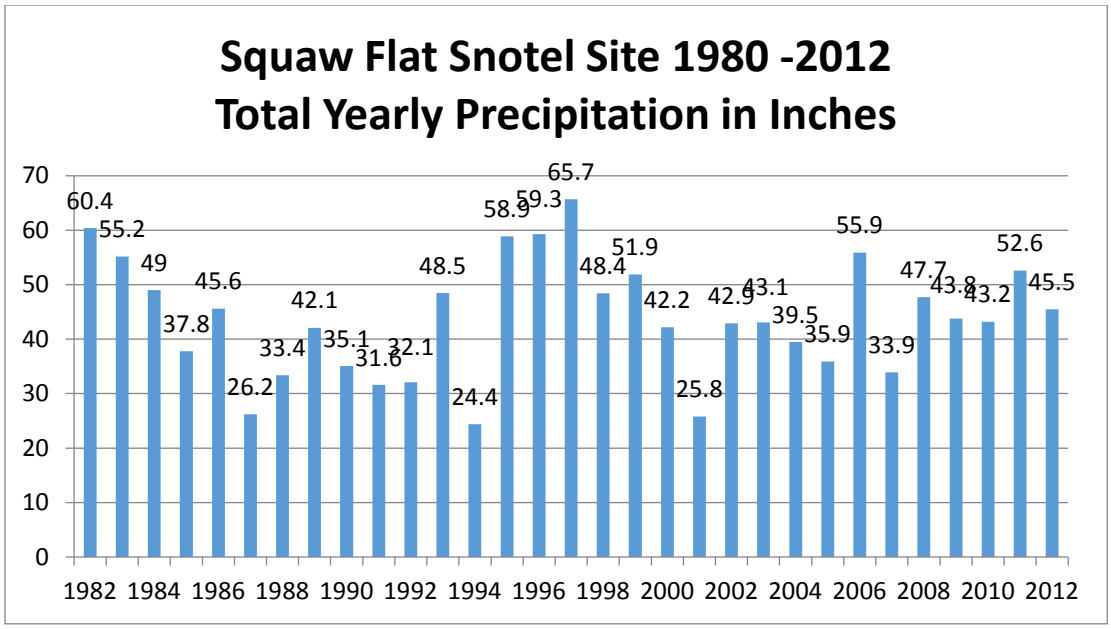


Figure 1.3-1. Graph of precipitation for the Squaw Flat Snotel site.

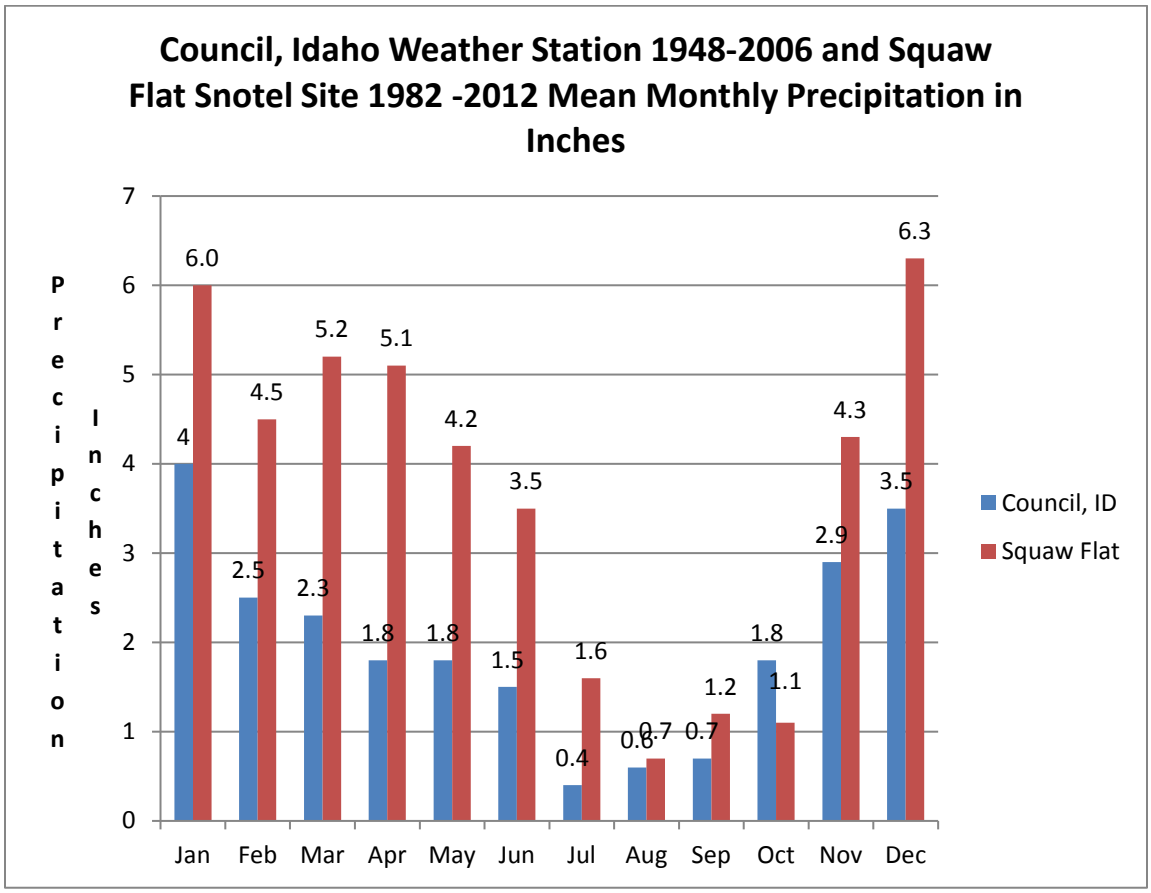


Figure 1.3-2. Mean monthly precipitation, Squaw Flat Snotel Site, 1982–2012, and Council, Idaho, Cooperative Weather Station, 1948–2006.

1.3.3. Geology

The Forest Plan describes the geology of the Project area as:

"The main geomorphic landforms found in the area are periglacial uplands and mountain slopes, plateaus and escarpments, and fluvial mountains. Slope gradients range from 15% to 40% on the periglacial uplands and mountain slopes, 30% to 50% on the fluvial mountains, and 15% to 80% on the plateaus and escarpments. Columbia River Basalts dominate the surface geology, with scattered inclusions of metasedimentary and granitic rock. Soils generally have low to moderate surface erosion potential, and moderate to high productivity." Table 1.3-1 displays the type and description of geology within the Project area. Figure 1.3-3 displays a map of the surface geology of the Project area. Imnaha Basalt (one of two members of the Columbia River Basalt group) dominates the area. These volcanic flows occurred around 15–18 million years ago and were followed by the Grande Ronde Basalt flows. The next most extensive formation of rocks is the Idaho Batholith, which formed between 75 and 95 million years ago. This material has a generally higher erosion risk than the basalt groups and their associated soils.

Table 1.3-1. Type and description of the geology in the Project area.

Type	Description	Acres
Extrusive	Columbia River Basalt Group, undivided	7
Extrusive	Grande Ronde Basalt, Columbia River Basalt Group	1,834
Extrusive	Imnaha Basalt, Columbia River Basalt Group	27,634
Intrusive	Foliated biotite granodiorite, older plutonic series, Idaho Batholith	4,184
Intrusive	Foliated hornblende-biotite tonalite, older plutonic series, Idaho Batholith	9,768
Intrusive	Mylonitized porphyritic biotite granodiorite of Salmon River suture zone, Idaho Batholith	697
Metamorphic	Biotite gneiss and biotite schist	1,870
Sedimentary, unconsolidated	Alluvial, landslide, and glacial deposits	3,281
Grand Total		**49,276**

1.3.4. Forested and Nonforested Vegetation

The vegetation in the Project area includes forested and nonforested vegetation types. The Forest Plan uses Potential Vegetation Groups (PVGs) to classify forested vegetation (USDA Forest Service 2003a, Appendix A). The PVGs are groups of habitat types that share similar environmental characteristics, site productivity, and disturbance regimes. The PVGs classify the landscape to provide a framework for studying succession of vegetation over time. The overall condition of forest stands in the Project area is departed from desired conditions for this Project.

Desired conditions for vegetation are based on Appendix A of the Forest Plan, with some site-specific modifications to foster restoration of wildlife habitat. The desired conditions for forested vegetation are based on Tables A-2, A-3, A-5, A-7, A-8, and A-9 (USDA Forest Service 2003a, Appendix A). The Forest Plan allows for modification of desired conditions at the project level to address site-specific biophysical conditions (USDA Forest Service 2003a).

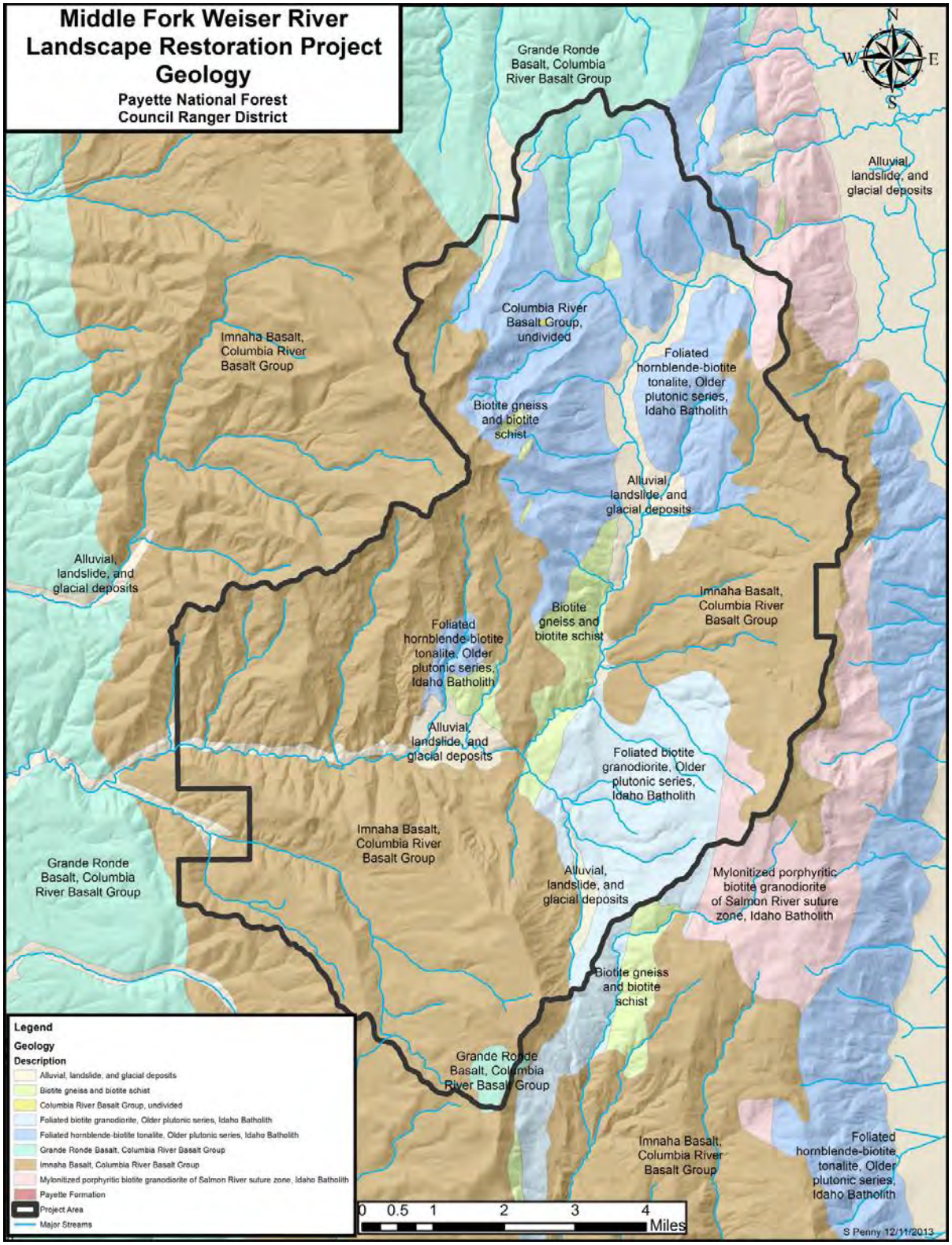


Figure 1.3-3. Map displaying the geology within the Project area.

Historically, wildfire disturbance helped shape these forested and nonforested landscapes. However, decades of fire exclusion, forest management, and grazing have substantially altered nonforested areas and forest structure, composition, and spatial patterns (Stine et al. 2014; Franklin and Johnson 2013; Hessburg et al. 2000, 2005; Taylor and Skinner 2003; Morgan and Parsons 2001) in the Project area, especially those areas that were historically within the nonlethal-to-mixed1 fire regimes (see Table 2.2-2 for fire regime classifications). Additionally, forested and nonforested areas in the mixed2-to-lethal fire regimes have been affected by fire exclusion (Perry et al. 2011).

The Grays Creek Fire, a large fire event in 2007, burned a total of 24,050 acres including 12,685 acres of NFS and private land within the Project area. The fire burned with varying severity across the forested landscape, with crown fire occurring in some stands, and effects ranged from large patches of mortality to light under burning. It affected mainly lower elevations in the western portion of the Project area. Timber salvage and subsequent planting occurred on private and NFS lands following the fire.

In the Project area, low- to mid-elevation forests generally have fewer early seral legacy trees than desired (e.g., ponderosa pine [*Pinus ponderosa*], western larch [*Larix occidentalis*], and Douglas-fir [*Pseudotsuga menziesii*]). Forest areas not burned by the Grays Creek Fire often have multiple canopy layers, dense forest structure, and continuous high fuel levels, and they are at increased risk for stand-replacing wildfires, insect outbreaks, or intensified disease outbreaks. Plantations harvested up through the 1970s are predominately even-aged ponderosa pine and lack coarse woody debris (CWD), snags, and forest structure diversity.

Compared with desired conditions, vegetation in the Project area displays the following trends:

- Less large-tree size class in the Warm Dry Douglas-fir and Dry Grand Fir PVGs (PVGs 2 and 5). See Appendix 6 for a description of PVGs.
- An overabundance of the large-tree size class in the Cool Moist Grand Fir, Warm Dry Subalpine Fir, Hydric Subalpine Fir, Persistent Lodgepole Pine, and High Elevation Subalpine Fir PVGs (PVGs 6, 7, 9, 10, and 11).
- Higher tree densities and more ladder fuels within stands.
- Less early seral tree species (e.g., ponderosa pine, Douglas-fir, western larch, whitebark pine [*Pinus albicaulis*], and/or aspen [*Populus* spp.]) than desired in PVGs 2, 5, 6, 7, 9, 10, and 11. Late seral tree species (e.g., grand fir [*Abies grandis*] and subalpine fir [*Abies lasiocarpa*]) are more widespread, compared with desired conditions within PVGs 2, 5, and 6.
- Increased tree densities in wet and dry meadows throughout the landscape.

Insect and disease considerations

Fire was likely the primary disturbance that maintained and influenced stand development prior to 20th century logging and fire suppression. In the absence of other disturbances, forest insects and diseases will act as the primary disturbance agents that influence stand development (Jorgenson 2013).

In PVGs 6, 7, 9, 10, and 11, western spruce budworm (*Choristoneura occidentalis*), Douglas-fir beetle (*Dendroctonus pseudotsugae*), and fir engraver beetle (*Scolytus ventralisare*) are expected to increase to uncharacteristic levels and change the forest composition, fuel dynamics, and tree

species in these stands (Jorgenson 2013). Additionally, the presence of nonnative balsam woolly adelgid (*Adelges piceae*) within the Project area is increasing in subalpine and grand fir.

1.3.5. Soil, Water, Riparian, and Aquatic Resources

In roughly the first half of the 19th century, the Project area was largely undeveloped. The absence of roads, especially in riparian areas, allowed stream channels to function without the impediment of restricted floodplains, increased drainage network, and reduced stream shade that is often characteristic of heavily roaded watersheds. Little to no soil was committed to log landings, skid trails, or other infrastructure associated with timber harvest. At that point in time, recreation, agriculture, ranching, mining, and the development of power line corridors were not significant sources of ground disturbance or water diversion in and adjacent to the Project area. Early disturbance came mostly from periodic wildfire or burning by Native American tribes. Immediately after the late 1860s, much of the ground disturbance was caused by livestock grazing (Jones 1989).

By the turn of the 20th century, private property owners and the Federal government began reconnaissance to establish access for timber removal. By the mid-1930s roads were built into the main drainages, and most of the main road systems were completed between the 1950s and 1970s. Many roads were built near streams or on steep grades, contributing sediment to channels and altering floodplains and riparian areas. Today, some of these old roads are vegetated with grass, shrubs, and trees, while others continue to erode, as evidenced by the presence of gullies and slope failures. Many of these roads still impact (constrict) stream floodplains, influence riparian vegetation, and alter the movement of water through the drainage system. Unmaintained roads are vulnerable to future events, such as floods or wildfire, which could remove or reduce the stabilizing effect of existing vegetation and make the road prisms susceptible again to erosion or mass failure. Table 1.3-2 displays current road and motorized trail miles in the Project area within the Middle Fork Weiser River watershed.

Table 1.3-2. Current road and motorized trail miles in the Project area.

Road Type	Number of Miles
National Forest System (open year-round)	55.2
County (open year-round)	18.1
National Forest System (open seasonally)	27.7
National Forest System (closed)	74.8
Unauthorized routes	64.9
Private (off Forest) roads	144.0
TOTAL ROADS	**384.7**
National Forest System two-wheel motorized trail	21.8
National Forest System all-terrain vehicle (ATV) trail	2.4
National Forest System non-motorized trail	3.8
TOTAL TRAILS	**28.0**

The presence or absence of vegetation within drainages can alter, through evapotranspiration and changes in hillslope shading, the amount of water reaching streams as surface and subsurface flow. This, in turn, can affect processes such as regulation of stream peak and base flows, development and maintenance of fish habitat, and growth and development of riparian vegetation. Climate-driven changes such as increased frequency of rain-on-snow events or higher-intensity rain events can exacerbate some of these effects, such as greater peak stream flows and fluctuations in water temperature, and, therefore, affect subsequent water quality.

Altered vegetation within Riparian Conservation Areas (RCAs) can affect levels of large woody debris (LWD) available to the channel, as well as stream shade and bank stability. Historical logging practices often harvested timber close to stream channels, and some RCAs within the Project area are still affected by the lack of large tree structure (see the RCA discussion in the Fisheries Specialist Report in the Project record). Regeneration harvest and subsequent slash disposal during the 1950s through the 1970s created tree plantations that lack snags and CWD (see discussion of field data collected in the Soils Specialist Report in the Project record).

Spring flooding of the Project area occurred as recently as June 2010, when heavy rains from two precipitation events occurring within 3 days of one another, coupled with rapid melting of a significant winter snowpack, flooded many of the main streams. Roads adjacent to and crossing the Middle Fork Weiser River and its tributaries were damaged by fill slope erosion, culvert failure, and ditch line erosion. The subwatersheds most affected within the Project area were Mica Creek-Weiser River and Jungle Creek-Weiser River. Specifically, many culverts where main tributaries crossed the Middle Fork Weiser River Road (NFS road 50186) plugged or failed entirely. This damage resulted in increased sediment delivery to the Middle Fork Weiser River, decreased bank stability, and loss of riparian vegetation (and consequently fish and wildlife habitat) where streambanks, or fillslopes functioning as streambanks, failed.

1.4. Forest Plan Desired Condition

Desired future conditions (DFCs) help guide natural resource management consistent with the Forest Plan, key issues, and ecological conditions of the Project area (see Chapter III, pages 6–7 in USDA Forest Service, 2003a). Forest Plan DFCs described for each resource (see Chapter III, pages 6–7 in USDA Forest Service 2003a), in conjunction with the Forest Plan direction outlined below, provide the parameters for identifying and defining project-specific DFCs. The Forest Plan describes DFCs in the following language:

Ecosystems on the Forest:

- Have ecological and watershed integrity, meaning they have a viable combination of all the diverse elements and processes needed to sustain the systems and to perform desired functions;
- Are dynamic in nature and resilient and resistant to natural and human-caused disturbances;
- Have a range of vegetative composition and structure that provide habitat for desired plant, wildlife, and aquatic species;
- Are managed in an environment of public and interagency trust, and cultural and socio-economic sustainability; and
- Are managed to promote meaningful relationships with Native American tribes to understand and incorporate tribal cultural resources, needs, interests, and expectations.

Ecosystems have the following physical, biological, social, and economic components and conditions:

- Soils retain all or most of their natural productivity and are in a condition that promotes vegetative growth, hydrologic function, long-term nutrient cycling, and erosional stability. Streams and lakes provide clean water, appropriate temperatures, and a variety

of connected habitats to support native and desired nonnative aquatic species. Smoke from wildland fire occasionally affects air quality.

- Forest, grassland, shrubland, and riparian plant communities are within a desired range of variability for composition, structure, patterns, and processes. Vegetation forms a diverse network of habitats and connective corridors for wildlife and provides desired levels of snags, CWD, and soil organic matter. Terrestrial and aquatic habitats support species diversity, with emphasis on maintaining or restoring threatened, endangered, and sensitive (TES) species; rare and unique plant communities; and species of cultural, commercial, and recreational significance. Riparian areas connect upland and aquatic habitats and promote stable and diverse stream channel conditions. Existing noxious weed populations are not expanding and new invader species are not becoming established.
- Disturbance processes—such as fire, insects, disease, floods, and landslides—contribute to functioning ecosystems. Where appropriate and desirable, fire plays its natural role but is suppressed where necessary to protect life and resources. Fire is used to manage vegetation and, where appropriate, to enhance ecosystem resiliency and lower hazardous fuel levels.
- Recreational settings range from primitive to developed, offering a wide spectrum of opportunities and uses. Facilities—such as roads, trails, campgrounds, and administrative sites—are constructed, reconstructed, or eliminated as needed to provide a balance of safe, effective, and environmentally responsible management activities. Visitors enjoy a variety of special attractions including National Recreation Areas, Wilderness Areas, Wild and Scenic Rivers, Scenic Byways, historic landmarks, and winter recreation areas. People have the opportunity to explore and learn about their cultural heritage. Significant cultural sites are preserved and accessible through working tribal and public partnerships.

1.5. Forest Plan and Management Area Direction

The Forest Plan embodies the provisions of the NFMA, its implementing regulations, and other guiding documents. The Forest Plan sets forth in detail the direction for managing the land and resources of the Forest. The Forest Plan divides the Forest into Management Areas (MAs) that describe current resource conditions, management emphases, Goals, Objectives, Standards, and Guidelines for the major resource programs within the area. The MA description and direction section of the Forest Plan describes each of these areas in detail, highlights resource areas of importance or concern within each area, and prescribes more specific management direction to address specific concerns not covered in the more general Forestwide direction.

Management prescriptions are defined as, “Management practices and intensity selected and scheduled for application on a specific area to attain multiple use and other goals and objectives” (36 CFR 219.3). Management Prescription Categories (MPCs) are broad categories that indicate the general management emphasis prescribed for a given area. The MPCs are based on Forest Service definitions developed at the national level and represent management emphasis themes ranging from Wilderness (1.0) to Concentrated Development (8.0). The national MPCs were customized during Forest Plan revision (completed in 2003) to better fit the needs and issues of the Forest.

The Project area is in the Weiser River MA 3.0. The MPCs listed in Table 1.5-1 apply to the Project area.

Table 1.5-1. Management Prescription Categories (MPCs) within the Project area.

Management Prescription Category	Number of Acres	Percent of Area
2.2—Research natural areas	67	<1%
4.1c—Maintain unroaded character with allowance for restoration activities	9,621	19%
5.1—Restoration and maintenance emphasis within forested landscapes	8,311	17%
5.2—Commodity production emphasis within forested landscapes	20,478	42%
Private land	10,798	22%
TOTAL	49,276	100%

The Council Mountain Inventoried Roadless Area (IRA) and Poison Creek IRA are in MPC 4.1c. Management actions in this MPC must be designed and implemented in a manner consistent with the unroaded landscape.

The Council Mountain Research Natural Area (RNA) is located at the peak of Council Mountain within the IRA and is in MPC 2.2. Totaling 111 acres, it has a representation of sagebrush (*Artemisia* spp.) and subalpine meadow communities and small stringers of subalpine fir plant communities on basalt substrates. Sixty-seven acres of this RNA are within the Project area. No activities are planned in this RNA.

1.5.1. Forest Plan Goals and Objectives

1.5.1.1. Wildlife Resources

The management direction of Forest Plan Goal WIGO01 is to, "Provide habitat capable of supporting viable populations of native and desired non-native wildlife species" (USDA Forest Service 2003a, page III-25). The management direction of Forest Plan Goals WIGO04 through WIGO06 is as follows (USDA Forest Service 2003a, page III-25):

- WIGO04—Provide habitat that will help keep Region 4 sensitive wildlife species from becoming listed (see Table 3.4-1 for the current list of species).
- WIGO05—Provide habitat capable of supporting the viability of wildlife management indicator species (MIS). The Payette National Forest MIS species are the white-headed woodpecker and pileated woodpecker.
- WIGO06—Provide well-distributed habitat and connective corridors important to sustaining MIS and other wildlife species.

1.5.1.2. Threatened, Endangered, Proposed, and Candidate (TEPC) Species Resources

The management direction of Forest Plan Goal TEGO01 is to, "Provide habitat capable of contributing to the survival and recovery of species listed under the ESA" (USDA Forest Service 2003a, page III-8). The management direction of Forest Plan Goals TEGO03 through TEGO06 is as follows:

- TEGO03—Balance the need for restorative actions to address the long-term threats to listed and proposed species with the short-term need to protect listed and proposed species and their habitats.
- TEGO04—Design and implement management actions to provide for ecological conditions, population viability, reproductive needs, and habitat components required by threatened, endangered, proposed, and candidate (TEPC) species.
- TEGO05—Provide for well-distributed habitat capable of maintaining self-sustaining, complex, interacting groups of TEPC species.
- TEGO06—Provide habitat capable of maintaining stable or increasing trends in abundance of TEPC species in all recovery units.

The TEPC Objective TEOB03 is to, "Identify and reduce road-related effects on TEPC species and their habitats using the WARS and other appropriate methodologies" (USDA Forest Service 2003a, page III-8).

1.5.1.3. Vegetation Resources

Vegetation Goals VEGO01 through VEGO07 provide direction to maintain or restore vegetative components, including size classes, canopy cover, structure, and snags (USDA Forest Service, 2003a, page III-30). Additionally, Vegetation Objective VEOB01 identifies and prioritizes areas for regeneration of the following:

- Aspen in both climax stands and as a seral component of coniferous stands
- Native herbaceous understory in shrub communities
- Woody riparian species
- Western larch
- Whitebark pine

These desired conditions are expected to provide for ecological processes, reduce uncharacteristic disturbances, maintain or enhance habitat for various species, facilitate regeneration of desirable plants, and maintain or restore spatial patterns important to other Goals of the Forest Plan.

VEST01 in the activity area shall be used to assess snag and CWD conditions for vegetative management actions.

1.5.1.4. Timberland Resources

Timberland Resources Goal TRGO01 states that the Forest will, "Manage forested vegetation to achieve: a) conditions that are resilient and resistant to uncharacteristic fire, insect, and disease damage and b) conditions that contribute to desired vegetative conditions, including distribution of tree sizes, species composition, and canopy cover" (USDA Forest Service 2003a, page III-41).

Timberland Resources Goal TRGO02 states that the Forest will, "Manage suited timberlands to achieve: a) Growth rates and yields that are compatible with other resources, b) Annual harvest of expected timber volume, c) Maintenance or improvement, where possible, of genetic diversity within tree species, d) Successful reforestation through the application of appropriate and available silvicultural techniques, and e) Vegetative conditions (structure, density, etc.) in

plantations and surrounding stands that result in reduced hazard for loss from uncharacteristic disturbance events" (USDA Forest Service 2003a, page III-41).

1.5.1.5. Recreation Resources

Recreation Goal REGO01 provides direction to, "Manage, operate, and maintain a year-round recreation program that offers a broad range of developed and dispersed recreation opportunities and experiences in a range of settings as reflected by the Recreation Opportunity Spectrum (ROS) in the Forest Plan." Forest Plan Goal REGO02 provides direction to, "Plan and manage the recreation program and recreation resources to meet established standards (e.g., Meaningful Measures) to provide for health and cleanliness, safety and security, facility conditions, responsiveness to customers, environmental setting, and permit administration" (see Appendix F of the Forest Plan for descriptions of ROS classes, USDA Forest Service 2003a).

Recreation Access Goal REGO05 states, "Manage motorized and non-motorized travel and travel-related facilities to: a) Provide for public safety, b) Meet resource objectives and access needs, c) Mitigate road and trail damage, and d) Minimize maintenance costs and user conflicts." Objective REOB10 states, "Use education and interpretation opportunities to foster dispersed camping that is at least 100 feet from trails, lakes, streams, or other occupied campsites, as terrain permits." Objective REOB11 states, "Monitor recreation resource conditions, visitor use levels, types of uses, and visitor expectation to guide recreation management actions" (see Appendix F of the Forest Plan [USDA Forest Service 2003a] for descriptions of ROS classes and Section 1.12.3 for a Project-related evaluation).

1.5.1.6. Soil, Water, Riparian and Aquatic Resources

The management direction for soil processes and productivity, hydrology and watershed processes, water quality, and aquatic and riparian habitat and species is as follows (USDA Forest Service 2003a, p. III-19):

- SWGO01—Maintain soil productivity and ecological processes where functioning properly, and restore where currently degraded. Maintain the physical, chemical, and biological properties of soils to support desired vegetation conditions and soil-hydrologic functions and processes within watersheds.
- SWGO02—Provide for stream channel integrity, channel processes, and the sediment regime under which the riparian and aquatic ecosystems evolved.
- SWGO05—Design and implement watershed management programs and plans that will restore water quality and watershed function to support beneficial uses.
- SWGO10—Provide riparian and aquatic habitat capable of supporting viable populations of native and desired non-native aquatic species.

Soil, Water, Riparian, and Aquatic Resources (SWRA) Objective SWOB16 is to, "Identify opportunities to restore degraded upland and aquatic habitat conditions …Opportunities should focus on restoring passage for fish and other aquatic species, and restoring desired ranges of water temperature, LWD, streambank stability, sediment levels, water chemistry, and pool size and numbers…" (USDA Forest Service 2003a, p. III-8).

The SWRA Objective SWOB18 is to, "Reduce road-related effects on soil productivity, water quality, and aquatic/riparian species and their habitats…" (USDA Forest Service 2003a, p. III-8).

1.5.1.7. Weiser River Management Area Objectives Pertinent to the Project

The white-headed woodpecker is a Region 4 sensitive species (USDA Forest Service, 2011a) and a Forest MIS. The Weiser River MA (MA 3) includes Wildlife Resources Objectives 0337 and 0338 to increase white-headed woodpecker and flammulated owl (*Otus flammeolus*) habitat by managing PVGs toward the desired ranges of tree size classes, tree canopy cover, tree species composition, snags, and CWD, as described in the Forest Plan (USDA Forest Service 2003a, Appendix A). Wildlife Resources Guideline 0341 states that an increase in white-headed woodpecker or flammulated owl habitat may be achieved by reducing tree densities and ladder fuels under and around existing large ponderosa pine trees and snags to reduce the risk of stand-replacing fire and to restore more open canopy conditions (USDA Forest Service 2003a).

Fire Management Objective 0376 directs the managers to, "Use prescribed fire and mechanical treatments within and adjacent to wildland-urban interface (WUI) areas…to manage fuels to reduce wildfire hazards" (USDA Forest Service 2003a).

- SWRA Objective 0318 includes direction to, "Improve water quality...by reducing road-related accelerated sediment through a combination of road decommissioning, realignment, reconstruction, and maintenance in the … Middle Fork Weiser River drainages" (USDA Forest Service 2003a, p. III-131).
- SWRA Objective 0319 includes direction to, "Restore riparian vegetation and floodplain function throughout the MA by reducing road-related impacts through relocation, realignment, or obliteration" (USDA Forest Service 2003a, p. III-131).
- SWRA Objective 0320 includes direction to, "Restore riparian areas by relocating or hardening dispersed recreation sites in…Cabin Creek...and the horse camping area in the Jungle Creek drainage' (USDA Forest Service 2003a, p. III-131).
- SWRA Objective 0322 includes direction to, "Reduce riparian road density and stream crossings in all drainages…" (USDA Forest Service 2003a, p. III-131).
- Vegetation Objective 0325 includes direction to, "Maintain and promote native grasses and aspen where they occur, and maintain or restore desired conditions for age and canopy class structure in sagebrush and bitterbrush (*Purshia tridentata*) cover types" (USDA Forest Service 2003a, p. III-131).

Vegetation Objective 0326 includes direction to, "Restore structure and composition of shrub and deciduous tree components in those portions of riparian areas where the components are missing or on a downward trend" (USDA Forest Service 2003, page III-131).

1.6. Watershed Condition Framework (WCF), Aquatic Conservation Strategy (ACS), and Watershed Aquatic Recovery Strategy (WARS)

In 2010 the Forest Service introduced the Watershed Condition Framework (WCF). The WCF is a comprehensive approach for classifying watershed condition, proactively implementing integrated restoration, and tracking and monitoring program accomplishments. As part of a national effort, the Forest completed a Watershed Condition Classification Assessment to evaluate and classify 6th-level watersheds (subwatersheds) in terms of their health and resiliency (Potyondy and Geir 2011; USDA Forest Service 2011a).

Three watershed condition classes were recognized as directly related to the degree or level of watershed functionality or integrity:

- Class 1 watersheds are "Functioning Properly" and exhibit high geomorphic, hydrologic, and biotic integrity relative to their natural condition. Class 1 watersheds are resilient and able to recover to desired conditions when disturbed by large natural events or management activities.
- Class 2 watersheds are "Functioning at Risk" and exhibit moderate geomorphic, hydrologic, and biotic integrity relative to their natural condition.
- Class 3 watersheds have "Impaired Function" and exhibit low geomorphic, hydrologic, and biotic integrity relative to their natural condition.

Class 3 watersheds have reached an undesirable level for some physical or biological threshold. Substantial changes to factors that caused the degraded state are needed to set them on a trajectory of improving conditions that sustain watershed integrity. One step of the WCF is to identify priority watersheds, in which Watershed Restoration Action Plans would identify all essential restoration activities needed to "improve the watershed condition class." While the Forest Plan direction is to identify and implement restoration opportunities in all watersheds, to date none of the Project area watersheds have been selected as a WCF priority watershed. One Project objective is to move all subwatersheds towards the next best condition class.

The Aquatic Conservation Strategy (ACS) provides direction, within the Forest Plan, to maintain and restore characteristics of healthy, functioning watersheds, riparian areas, and associated fish habitats (USDA Forest Service 2003a, pages B-48 through B-57). The ACS is a long-term strategy to restore and maintain the ecological health of watersheds and aquatic ecosystems contained within lands administered by the Forest. *The East Fork Weiser River is the only subwatershed in the Project area that is listed as an ACS priority watershed.*

The Forest Plan developed a Watershed and Aquatic Recovery Strategy (WARS) within the ACS to prioritize Forestwide watershed and aquatic restoration planning (USDA Forest Service 2003a). Within the Project area, *none of the subwatersheds are listed as WARS high priority for restoration, though all are listed as "Active" restoration focus, versus "Passive."* See Table 1.6-1 below for a summary of each subwatershed in the Project area and its associated ratings. The WCF Watershed Condition Classification, WARS Restoration Activity, WARS Priority, and ACS Priority are listed below for each subwatershed.

Table 1.6-1. Watershed Condition Framework (WCF), Aquatic Conservation Strategy (ACS), and Watershed and Aquatic Recovery Strategy (WARS) designations for the 6th Level Hydrologic Unit Code (HUC) subwatersheds in the Project area.

Subwatershed	6th Level HUC	6th Level HUC acreage (mi^2)	Project Acres	WCF Class	WCF Priority	WARS Rest	WARS Priority	ACS Priority
East Fork Weiser River	170501240203	20,906 (32.7)	1,438	3	Not currently	Active	Moderate	Yes
Granite Creek – Middle Fork Weiser River	170501240401	11,672 (18.2)	11,672	3	Not currently	Active	Low	No
Jungle Creek – Middle Fork Weiser River	170501240402	12,384 (19.4)	12,187	2	Not currently	Active	Low	No
Little Fall Creek – Middle Fork Weiser River	170501240404	16,200 (25.3)	7,122	2	Not currently	Active	Low	No
Mica Creek-Middle Fork Weiser	170501240403	17,564 (27.4)	16,857	3	Not currently	Active	Low	No

Note: Since the Forest Plan was written, subwatershed delineation by the Natural Resources Conservation Service (NRCS) has changed. The Middle Fork Weiser River HUC 5 was comprised of three subwatersheds that have since been split into four.

1.7. Purpose and Need

1.7.1. Purpose

The purpose of the Proposed Action is as follows:

1) Move vegetation toward the desired conditions (e.g., canopy cover in large tree size class, species composition, and size class distribution), with an emphasis on:
    a) Improving habitat for Family 1 species, such as the white-headed woodpecker, while maintaining habitat for Federally listed and sensitive species;
    b) Maintaining and promoting early seral species composition (e.g., aspen, whitebark pine, western larch, ponderosa pine, and Douglas-fir);
    c) Reducing the risk of uncharacteristic wildland fire, with an emphasis on restoring and maintaining desirable plant community attributes including fuel levels, fire regimes, and other ecological processes;
    d) Maintaining and promoting large tree size class in PVGs 2 and 5;
    e) Restoring spatial patterns by establishing varying patch sizes consistent with the historical range of variability that promote forest resilience to fire, insect, disease and climate change;
    f) Reducing tree densities in PVGs 2, 5, 6, 7, 10, and 11;
    g) Maintaining and promoting native grasses within nonforested habitats and restoring age and canopy class structure of sagebrush and bitterbrush;
    h) Restoring aspen and nonforested habitats by reducing conifer encroachment.
2) Move all subwatersheds within the Project area towards the desired condition for the soil, water, aquatic, and riparian resource with emphasis on:

a) Improving water quality by reducing road-related accelerated sediment through a combination of road obliteration, realignment, and maintenance.
b) Restoring hydrologic function, stabilizing unstable streambanks, and reducing channel condition risk through road obliteration and realignment and removal of culverts on long-term road closures.
c) Improving aquatic habitat and fish connectivity by obliteration and realignment of roads within RCAs and by removing or upgrading culverts.
d) Restoring riparian vegetation and reducing sediment impacts by reducing in size, rehabilitating portions of, and hardening dispersed recreation sites in RCAs.

3) Manage recreation use in the Project area with an emphasis on hardening primary dispersed recreation areas, updating Cabin Creek Campground, improving existing trails, and providing new trail opportunities including an off-highway vehicle (OHV) loop and a non-motorized trail.
4) Contribute to the economic vitality of the communities adjacent to the Forest.
5) Improve firefighter and public safety by establishing strategically placed, defensible fuel breaks within the Project area.

1.7.2. Need—Why Here? Why Now?

The need for the Proposed Action is driven by the difference between the current and desired conditions. The current conditions are departed from the desired conditions. The objective is to move toward the desired conditions found in Appendices A, B, and E of the Forest Plan (USDA Forest Service, 2003b). This type of restoration is recommended in the Idaho Department of Fish and Game (IDFG) report, *Preserving and Restoring the Old-Growth Ponderosa Pine Ecosystems in Idaho* (Mehl and Haughler 2004) and the *Idaho Statewide Forest Resource Strategy* (Kimball and Stephenson 2010), which includes restoration goals recommended by a broad range of Federal, State, and private partners. Within the Project area, the current conditions are as follows:

1) A loss of habitat for Family 1 wildlife species, such as the white-headed woodpecker, compared with desired conditions;
2) Less large tree size class than desired in the warm, dry forest types (PVGs 2 and 5), and higher canopy cover than desired;
3) Less of an early seral tree species component (e.g., whitebark pine, aspen, ponderosa pine, Douglas-fir, and western larch) than desired;
4) Increased stand and landscape homogeneity of size classes, species diversity, tree distributions (i.e., currently in some vegetation types the tree spacing is uniform in nature);
5) More high canopy cover class than desired in the large tree size class in some vegetation types (PVGs 2, 5, 6, 7, 10, and 11);
6) Increased conifer encroachment into aspen and nonforested habitats (e.g., shrublands, sagebrush, and grasslands);
7) Higher surface fuel loading in those areas that have missed one or more fire return intervals;
8) Impaired watershed function and integrity as a result of past and current disturbances, road-related erosion and sediment, floodplain and riparian area encroachment, and aquatic habitat fragmentation; and

9) Trail and recreation facilities that do not meet current design, accessibility, and maintenance standards.

The desired conditions for this Project are based on the Forest Plan, the WCF, and the most recent science concerning management of wildlife habitats.

1.8. Objectives and Measurements

The Purpose and Need drives the Proposed Action and is based on Forest Plan Goals and Objectives (see Section 1.5.1, "Forest Plan Goals and Objectives"). The purpose of the Proposed Action is represented by specific Objectives. **Objectives**, as the term is used for this Project, are concise, time-specific statements of actions or results designed to help achieve resource-specific Goals related to the Purpose and Need. In this document, they are tracked by measurements analyzed in Chapter 3. **Measurements** are resource specific and are used to compare how each alternative meets the Objectives of the Project.

1.8.1. Objectives and Measurements Identified

1.8.1.1. Vegetation (Forested and Nonforested)

Objective 1: Move vegetation toward the desired conditions, with an emphasis on promoting large tree forest structure, early seral species composition, and forest resiliency.

Measurements:

- Tree Size Class
  - Acres treated to promote or maintain the large tree size class
  - Distribution of tree size classes.
- Tree Canopy Cover
  - Percentage of area (acres) in each canopy cover class within the large tree size class
- Tree Species Composition
  - Acres treated to maintain and/or promote desired species composition
- Spatial Patterns
  - Percent departure from reference conditions per PVG

Objective 2: Maintain or restore a representation of native plant communities throughout the Forest.

Measurement:

- Acres of aspen treatment
- Acres of meadow treatment

1.8.1.2. Fire and Fuels

Objective 3: Restore and maintain desirable fuel levels, fire regimes, and ecological processes.

Measurement:

- Acres of departure from historical fire regimes

Objective 4: Establish and maintain strategically-placed SFBs to improve firefighter and public safety. Improve the defensible space adjacent to private lands and provide protection to infrastructure east of the Project area.

Measurement:

- Acres of SFB

1.8.1.3. Wildlife

Objective 5: Improve habitat for Family 1 wildlife species, as represented by the white-headed woodpecker, a Region 4 Sensitive Species (USDA Forest Service 2011b) and Forest MIS, by restoring forest conditions that contribute to source habitat for these species. Forested stands providing these source habitats should be restored to desired conditions within, or near, the Historical Range of Variability (HRV) (Morgan and Parsons 2001).

Measurement:

- The quantity and quality of Family 1 white-headed woodpecker habitat restored to conditions within HRV. Quantity is measured by acres of PVGs 2, 5, and portions of 6 in the Large Tree Size Class and Low Canopy Cover Class. Quality is measured by the presence of old forest characteristics (e.g., legacy trees, snags, CWD, canopy gaps, and understory patchiness) as described in the Forest Plan.

1.8.1.4. Soil, Water, Riparian, and Aquatic (SWRA) Resources

Objective 6: Improve watershed and aquatic function and integrity by moving all watersheds within the Project area towards the desired condition for soil, water, aquatic, and riparian resources with emphasis on:

1) Improving water quality by reducing road-related accelerated sediment through a combination of road obliteration, realignment, and maintenance.
2) Restoring hydrologic function, stabilizing unstable streambanks, and reducing channel condition risk through road obliteration and realignment.
3) Improving aquatic habitat, restoring riparian vegetation and reconnecting streams by obliterating and realigning roads within RCAs, reducing in size, rehabilitating portions of and hardening dispersed recreation sites, and removing or upgrading culverts.

Measurements:

- Water Quality (Sediment)
  - Amount of road-generated sediment reduced through road decommissioning and long-term closure over the long term as modeled by Geomorphic Road Analysis and Inventory Package (GRAIP) and GRAIP Lite
- Hydrologic Function (Channel Condition)

    - Total road density
    - Total road density within RCAs
- Fish Habitat
    - Number of fish barriers removed or improved (specifically to improve fish passage)
    - Stream miles improved (includes miles of fish habitat reconnected and miles of stream enhanced through road decommissioning and road graveling within RCAs)
    - Miles of roads in RCAs

1.8.1.5. Recreation

Objective 7: Manage recreation use in the Project area with an emphasis on identifying and hardening primary dispersed recreation areas, updating Cabin Creek Campground, improving existing trails, and developing new trail opportunities.

Measurements:

- Miles of open motorized trail by vehicle class (per Forest Motor Vehicle Use Map [MVUM]) for motorized trails, and miles of open and managed non-motorized trails.
- Miles of open road
- Change to existing dispersed recreation sites measured by number of sites and changes to recreation facilities and/or resource improvements at the existing sites.

Objective 8: Contribute to the economic vitality of local communities.

Measurements:

- Employment contribution (number of jobs on annual average).
- Income contribution.

1.9. Decisions to be Made

The Responsible Official for this Project is the Payette National Forest Supervisor. Based on the analysis presented in this document, the Forest Supervisor will make the following decisions and document them in a Record of Decision (ROD) following the FEIS.

Should the Forest Service implement this Project, including commercial and noncommercial vegetation treatments, fuels reduction, road management, watershed and fish habitat restoration, and recreation improvements at this time?

If so:

- What and how many acres should be treated and by what means?
- What action should be taken on recreation facilities, trails, and dispersed recreation sites?
- What watershed restoration and fish habitat improvements should be implemented?
- What road management actions should be implemented and what should the Minimum Road System for the Project area be?

- What PDFs or mitigation measures are necessary to assure compliance with the Forest Plan?
- What monitoring requirements are appropriate to evaluate project implementation and effectiveness?
- Should a site-specific, nonsignificant amendment of the Forest Plan be prepared to allow for creating more than 30% unsuitable Canada lynx (*Lynx canadensis*) habitat (Forest Plan Standard TEST15, USDA Forest Service, 2003a) within the Middle Fork Weiser River Lynx Analysis Unit (LAU) only?

1.10. Collaboration and Public Involvement

1.10.1. Collaboration

The Proposed Action was developed in response to agency direction and policy, input from interested members of the public, and from recommendations received in comments provided by the PFC to the Forest Supervisor on August 20, 2014.

The PFC's objectives are to collaborate on the design of a project at a landscape scale that would restore and improve wildlife habitat, forest resiliency to wildfire, and watershed health; enhance forest access and recreation; and recommend actions that are financially responsible and contribute to the economic vitality of communities adjacent to the Forest.

1.10.2. Scoping and Public Involvement

The Council on Environmental Quality (CEQ) defines scoping as, "…an early and open process for determining the scope of issues to be addressed and for identifying the significant issues related to a Proposed Action" (40 CFR 1501.7).

Among other things, the scoping process is used to invite public participation, help identify public issues, and obtain public comment during the EIS process. Scoping should begin early and continue until a decision is made. The public was invited to participate in the Project in various ways, as described below.

1.10.3. Public Mailing and Documents Availability

The IDT developed the Proposed Action, and on December 19, 2014, a scoping letter and map describing the Project were mailed (Project record) to approximately 171 individuals, livestock permittees, and other agencies and groups. In addition, a Notice of Intent to prepare an EIS was published in the December 24, 2014, edition of the Federal Register (Volume 79, Number 247), and a Request for Comments was published in *The Idaho Statesman*, the newspaper of record, on December 23, 2014, and in the *Adams County Record* on December 24, 2014. Fourteen public comments were received during the scoping period.

The Project also appeared in the USDA Forest Service's *Schedule of Proposed Actions* (SOPA) from April 2013 through March 2017. A public meeting was held in Council, Idaho, on January 12, 2015, prior to the release of the DEIS. Another public meeting was held on March 8, 2016, during the public comment period. In attendance were members of the PFC, general public, grazing allotment permittees, and an Adams County Commissioner. The Project concept was introduced and the Forest Service received feedback from those in attendance.

The DEIS was released for public comment on February 19, 2016. During the DEIS public comment period, 16 comment letters were received. These comments and the Forest's responses to them are located in the FEIS, Appendix 8.

Additionally, the Council Ranger District and the PFC conducted public field tours of the Project on June 25, 2013, July 24, 2013, September 19, 2014, and November 6, 2015, to show the public potential vegetation treatments, watershed improvements, and recreation improvements for the Project.

1.11. Issues and Indicators

Issues (along with Project Objectives) were used to develop alternatives and/or appropriate mitigation measures or PDFs to address the effects of proposed activities. Each issue is tracked using **indicators,** which compare the effects of the proposed activities by alternative.

Issues were grouped by resource and described using an issue statement and a list of indicators measuring the effects of the proposed activities. Chapter 2 includes a summary comparing the effects of the alternatives on issues and their indicators. Chapter 3 describes the environmental consequences of the alternatives in terms of the issues.

1.11.1. Wildlife

Issue Statement:

*High open **road densities** affect wildlife (e.g., elk) security and can lead to the removal of important habitat components (e.g., snags).*

Indicator:

- Change in elk security areas (Hillis et al. 1991).
- Miles of NFS roads and unauthorized roads closed by (1) physical closure and (2) various levels of decommissioning.
- Estimated effectiveness of closures and/or decommissioning.
- Effects of opening closed roads to allow for additional firewood harvest

Issue Statement:

*Treatments may adversely affect **source habitat** for wildlife species dependent on mixed conifer forests with multilayer structural characteristics. Such forests are associated with mixed to lethal fire regimes and associated processes (larger scales of insect and disease outbreaks and fire effects). Species of concern include listed and sensitive species and MIS.*

Background: A primary need Forestwide and in the Project area is to maintain and promote dry, lower-elevation, large tree and old forest characteristics for the associated wildlife species and reduce fragmentation that negatively affects species of concern. The processes, function, patch-size, and diversity of forested habitats must all be considered in order to properly address wildlife habitat needs.

Indicators:

- Quantity (acres) and distribution of habitat for species of concern.

- Quality (specifically old forest, snags, patch, and pattern) and distribution of habitat for species of concern.

Issue Statement:

Project activities (logging, log haul, prescribed burning, and temporary road construction) may cause disturbance to wildlife species of concern

Indicators:

- Disturbance effects on species of concern.

1.11.2. Soil, Water, Riparian, and Aquatic (SWRA) Resources

Issue Statement:

Proposed activities for roads, vegetation treatments, and prescribed fire may affect water quality by modifying soil erosion and sediment delivery.

Background: Management activities that have the potential to disturb soils and decrease ground cover can result in increased soil erosion and, with a flow path, can result in increased sediment delivery to streams via overland flow or channelized flow, especially if delivered via road infrastructure at stream crossings or ditch relief culverts.

Indicators:

- Miles of temporary road constructed, including use of unauthorized roads
- Miles of road realignment and reconstruction
- Miles of long-term road closures (road storage)
- Miles of road decommissioned
- Acres of ground-based mechanical vegetation treatment
- Acres of prescribed burn

Issue Statement:

Proposed vegetation treatments and prescribed burning in RCAs may negatively affect stream temperatures and LWD.

Indicators:

- Acres of vegetation treatment within RCAs
- Acres treated within one site-potential tree height

Issue Statement:

Proposed activities may change timing and duration of peak runoff, which may affect bank stability in sensitive channels.

Indicators:

- Total road density
- Number of drainages that are over 25% Equivalent Clearcut Area (ECA) (High Category)

Issue Statement:

Proposed activities may decrease long-term soil productivity and impair soil-hydrologic function.

Indicators:

- Percent detrimental soil disturbance (DD) within activity areas (Forest Plan Standard SWST02)
- Percent total soil resource commitment (TSRC) across the Project area (Forest Plan Standard SWST03)
- Levels of CWD retained within activity areas for long-term soil productivity

1.11.3. Transportation Resources

Issue Statement:

Proposed activities to the road system (e.g., road closures and decommissioning) may reduce the amount of access to the areas identified in the Forest Plan for active management.

Indicators:

- Suited timber lands within 0.25 mile of a Forest System road (includes closed roads)

1.12. Other Concerns Evaluated

The IDT evaluated other concerns that helped frame the scope of the analysis during the scoping process. These concerns were not considered issues because they were resolved through Project design and, therefore, were not used to develop alternatives analyzed in detail. These concerns are not addressed within the effects analysis by resource in Chapter 3 of this document because there were no effects on resources.

1.12.1. Cultural and Archaeological Resources

Several Federal laws and memorandums protect cultural and historic properties. Cultural resources are defined by tribes as resources that are essential for the continuation of the culture. Archeological resources are the material remains of the past left on the landscape. Forest Service handbook (FSH) and Forest Service manual (FSM) definitions are located in this document's glossary (Chapter 4.4).

A brief summary of each of the major laws, executive orders (EOs), memorandums or acts pertaining to the management of cultural and archaeological resources is provided in Section 1.13.

Since 1972 there have been over 50 Federal actions providing Payette National Forest Heritage Program staff with the opportunity to conduct cultural resource site inventories on a variety of projects throughout the Project area (see Appendix 3, Cumulative Effects, for a list of past projects). During the course of this work, heritage staff have identified and evaluated 36 archaeological sites using criteria established by the National Register of Historic Places (NRHP, 36 CFR 800.4(c)) that are located within the Project boundary. During the 2015 field season, approximately 1,259 acres of intensive survey in high-probability areas, based on the Forest's

predictive model (Bennett 1986; Dixon 2000), were conducted. Prior to 2015, 3,826 total acres were surveyed in the Project boundary, making the grand total of acres surveyed 5,085.

A total of 36 previously recorded sites occur in the Project area; 15 of these sites were not eligible for the NRHP. Heritage staff monitored the 21 eligible sites located within the Project boundary from 2009 to 2015. After monitoring, 13 sites remained eligible to the NRHP. The remaining 8 sites had changes in eligibility because no diagnostic artifact or subsurface components were found during monitoring and/or no stratigraphic context was found to yield additional information. In addition, many of the only diagnostic artifacts found at these sites were previously collected with no provenience recorded. Of the 13 total historic properties eligible for inclusion in the NRHP, 8 are Native American sites and 5 are historic sites. These sites will be avoided or the Project will be redesigned to exclude these sites during implementation. No new sites were found or recorded in the Project area.

Due to the landscape scale of the proposed Project, Forest Heritage staff recognized the need to implement a phased identification effort as defined in 36 CFR 800.4(b)(2). The Forest executed a Programmatic Agreement (PA PY 2013-2694) with the Idaho State Historic Preservation Office (SHPO) in October 2016.

The PA stipulates that the Forest Service shall do the following:

1. Sign a formal NEPA decision authorizing the Middle Fork Weiser River Landscape Restoration Project prior to completing stipulations 2–9.
2. Conduct systematic archaeological surveys (30-meter transects or less) of the Area of Potential Effects (APE) associated with the undertakings (Appendix A) as undertakings within the Middle Fork Weiser River Restoration analysis area are developed. The PNF archaeologist's surveys will conform to the Forests' Sites Identification Strategy (SIS) and will be reported to the Idaho SHPO using standard reporting formats.
3. Consult with tribes to assist in identifying historic properties within the undertaking's APE that may be of religious or cultural significance to the tribes.
4. Evaluate all new cultural resources found within the specific project undertaking APEs for their National Register eligibility and report those determinations to the Idaho SHPO using standard reporting formats.
5. Prepare reports and consult with Idaho SHPO and tribes that have expressed interest in the management of historic properties in the PNF after phased inventory is conducted following the Forest's SIS. This consultation will follow standard reporting formats (FSM 2362.16).
6. Mark all National Register eligible sites for avoidance prior to implementation.
7. Mark and avoid sites of significance to tribes that have expressed interest in the management of historic properties in the PNF during the duration Project implementation.
8. In the event that a potential adverse effect is identified within an undertaking's project area, the PNF will resolve these effects on historic properties following regulations found in 36CFR800.6.
9. The PNF will follow established provisions for managing unanticipated discoveries that may occur during project implementation (Appendix B - FSM 2364.13).

If the stipulations of the PA are met, the Project will be considered "No Adverse Effect." In addition, the Forest will consult with the tribes regarding the findings of additional inventory and

identified areas for protection as defined in applicable laws. Secondary consultations with the Idaho SHPO and interested tribes will occur as needed. As the Project is implemented, the 15 eligible historic properties and sites of cultural or religious significance will be flagged for avoidance and monitored. Project staff will be informed as to the locations of the Historic Properties so as to avoid potential impacts to them. If these requirements are followed, there will be no direct, indirect, or cumulative effects on archaeological resources.

1.12.2. Air Quality

Prescribed burning for fuels reduction and ecosystem restoration includes careful planning (prescription development) to minimize impacts on air quality by restricting prescribed burning to conditions when smoke dispersal would be optimal. To ensure that air quality meets Federal and State standards during prescribed burning, the Forest is part of a partnership known as the Montana/Idaho State Airshed Group. Before prescribed fires are ignited, fire managers are required to submit their plans to the Montana/Idaho State Airshed Group monitoring unit, which reviews existing air quality levels and weather conditions to determine which prescribed fires can be ignited and which, if any, must be delayed to ensure that air quality meets Federal and State standards.

The Hells Canyon National Recreation Area (Class I Airshed) is approximately 20 miles northwest of the proposed burn sites and is the only Class I Airshed near the Project. No nonattainment or sensitive areas (i.e., areas with large populations) are located near the Project area.

Prescribed fire burn plans, completed for all prescribed burns, address the following management actions with respect to air quality:

a) Consider other sources of emissions.
b) Identify sensitive areas.
c) Include descriptions of planned measures to reduce smoke impacts as appropriate.
d) Identify the potential risk for smoke intrusions into sensitive areas.
e) Describe ambient air monitoring plans, when appropriate.

The action alternatives would comply with air quality regulations and no regulatory distinction exists between alternatives. The action alternatives would allow for greater control over air quality impacts compared with the No Action alternative due to control over burning operations versus uncontrolled wildfires. The action alternatives include proposals to remove biomass from the Project area for use in plants that burn the material at high temperatures in controlled conditions and reduce particulate emission compared with material burned in prescribed fires or wildfires.

1.12.3. Recreation Opportunity Spectrum (ROS)

The Forest Plan (Appendix F) describes the ROS as a classification system in which components of recreation setting and facilities—such as access, developed sites, activities, and experiences—are organized and arranged along a continuum or spectrum. The continuum ranges from very primitive settings and experiences to highly concentrated, urbanized ones. Each class is defined in terms of its specific combination of activities, setting, facilities, and experience opportunities.

The ROS provides a framework for defining the types of outdoor recreation opportunities and experiences that the public might desire. It also provides a context and tool for estimating and

describing recreation resources as well as effects on those resources from alternative management strategies and actions. On the Forest, ROS is divided into summer and winter opportunities and there are separate maps and classifications for each season.

All recreation facility-related improvements are along main open road corridors that are within a Roaded Natural (RN) summer ROS. The winter ROS does not have RN but instead is primarily RM and Semi-primitive Motorized (SPM). Project-related proposals would not alter existing summer or winter ROS. All recreation facility improvements proposed under the Proposed Action alternative would maintain their existing ROS classifications.

Implementation of the proposed recreational trail projects would not change the existing winter or summer ROS. The proposed change in designation of a 2-mile section of Trail #198 from non-motorized to motorized use would be within a SPM ROS, so it would continue to meet the objectives within the ROS. No trail projects are planned within the Semi-primitive Non-motorized (SPNM) winter ROS.

Mechanical treatments occurring during the winter months could temporarily impact the winter ROS that is SPM in much of the Project area with noise, road use and other activities associated with logging, and running log trucks in the winter months. No other resource activities would affect the ROS in summer or winter months.

Continued future manipulation of the environment by any of the resources (recreation, range improvements, mechanical treatments, watershed improvements, fisheries habitat improvements, and wildlife habitat improvements) could eventually change the ROS to full modification across the Project area.

1.12.4. Visuals

Each of the alternatives has the potential to maintain, alter, or enhance the scenic character of the Forest landscape to varying degrees. While a natural-appearing landscape character is preferred, under the existing Visual Quality objectives (VQOs) in the Project area, Partial Retention (PR) and Roaded Modified (RM) manipulation of the scenic environment is acceptable. All recreation facility-related improvements are along main open road corridors that have a PR VQO. All recreation-related improvements proposed under the Proposed Action alternative meet PR guidelines.

Trail proposals for maintenance, new trail designations, changes to season of use (from open year round to open seasonally), and trail reroutes are located within PR and RM VQOs. All trail proposals, when implemented, would maintain their existing VQO.

For the scenic environment, in areas of interspersed ownership (prominent within the Project area), there is a potential for combined effects on visual resources from National Forest activities and those evident on other ownership lands. Management activities on other lands that do not blend into the landscape can negatively affect the experiences of Forest users who are viewing scenery. Development and timber harvest on private lands adjacent to National Forest are often accomplished with different objectives than on public lands.

1.12.5. Climate Change

Recent rapid climate change has raised concern over the ability of some species to adapt to landscape changes associated with this phenomenon. Diaz and Eischeid (2007) found an average increase of approximately 1.0 degree Fahrenheit (°F) over the last 20 years in the western United States with the greatest increases at high elevations. Diaz and Eischeid (2007) contend that

changes in annual shrub phenology (earlier flowering), increases in significant forest pest infestations, earlier spring runoff, intensified wildfires, and the disappearance of alpine and tundra ecosystems illustrate rapid changes in the hydrological, phenological, and biological indicators of western ecosystems that are a result of climate warming. Research findings (Gedaloff et al. 2005; Westerling et al. 2006) document increases in large western wildfires beginning in the mid-1980s and correlated climate variables, including increased spring and summer temperatures and early spring snow melt.

Climate data for the last 55 years (1951–2006) reveal that on average, temperatures in Idaho have increased 0.031% per year (Figure 1.12-1), and precipitation has increased 0.085% per year (Figure 1.12-2) (The Nature Conservancy 2011). Consistent with findings by Diaz and Eischeid (2007), the temperature increases have been more severe at higher elevations.

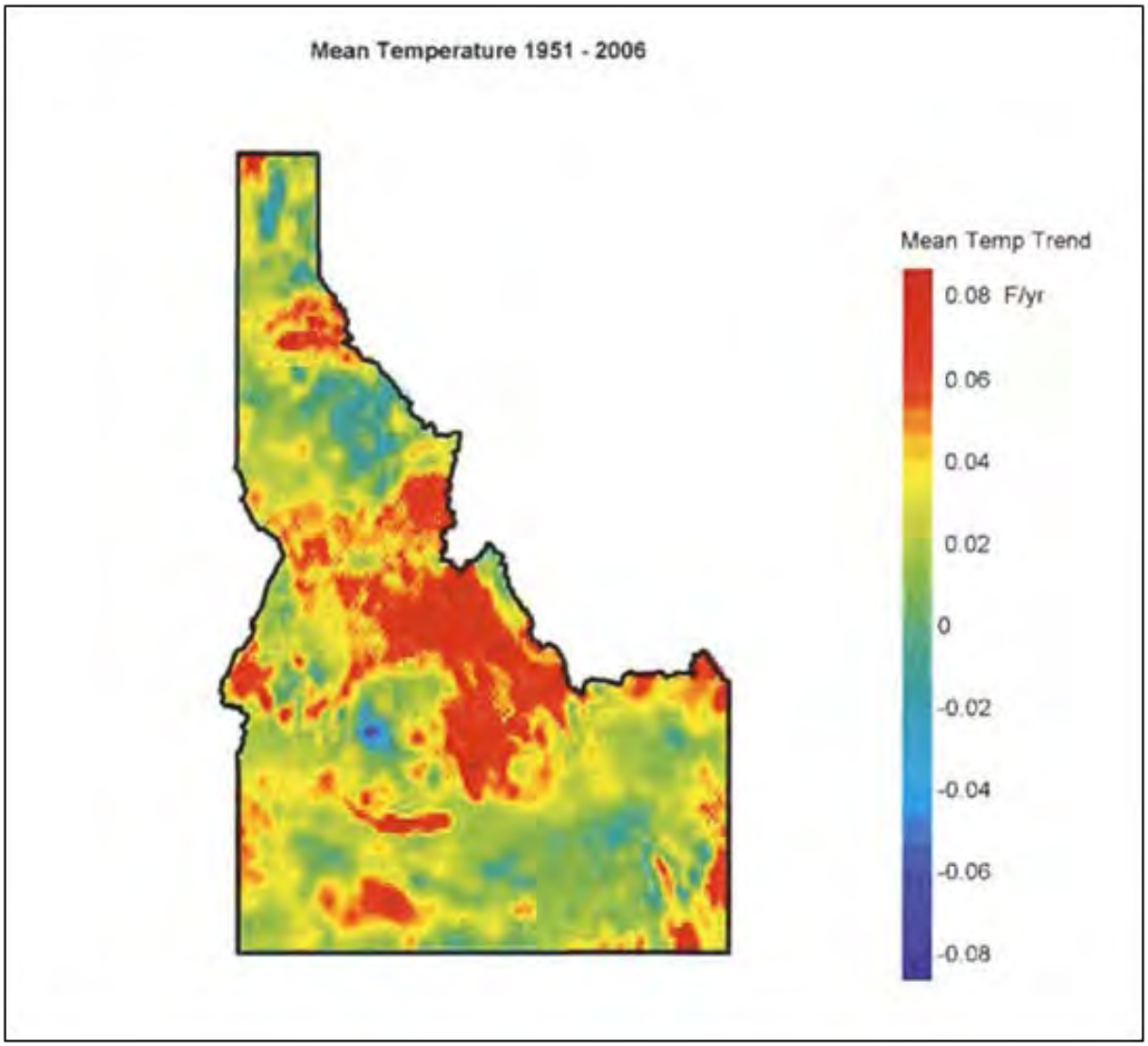


Figure 1.12-1. Average temperature changes for Idaho from 1951 to 2006.

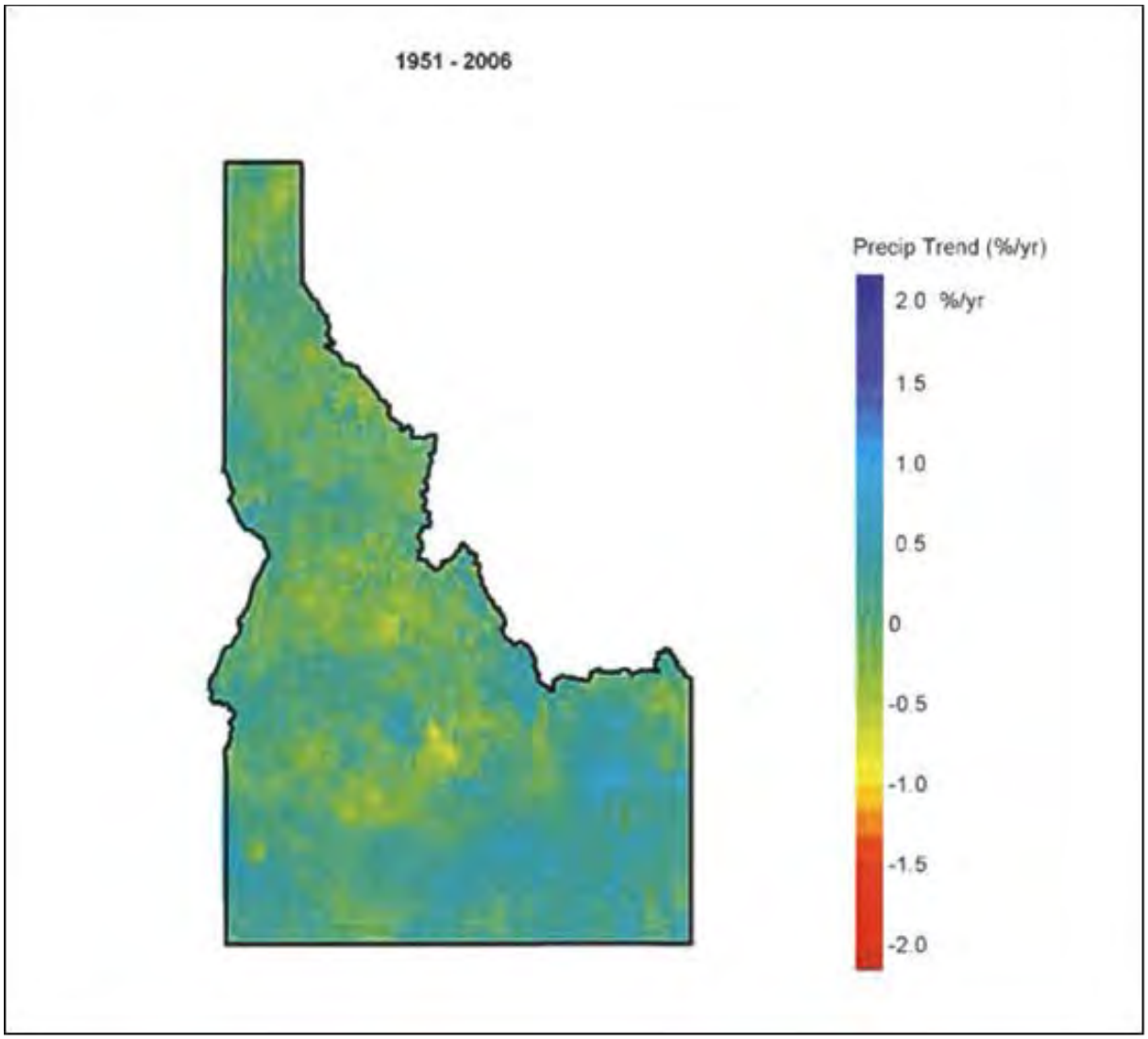


Figure 1.12-2. Average precipitation changes for Idaho from 1951 to 2006.

Restoration ecologists acknowledge that future climatic regimes may be different than the climatic regimes that developed historical representations of landscapes. However, Fule et al. (2009) argue that historical reference conditions remain useful in light of climate change evidence because historical forests were likely more resilient and resistant to drought, insect pathogens, and severe wildfire. Noss (2001) supports this approach and advocates that resilience and resistance are created by (1) maintaining a diversity of functional groups; (2) maintaining species richness and redundancy within functional groups; (3) identifying keystone species; and (4) maintaining keystone species at optimal, not just minimally viable, populations. This approach provides the best opportunity for species to adapt to changes. Noss (2001) also states that climate change is not the greatest threat to today's forests but is an additional stressor and suggests that restoring vegetative conditions will result in more adaptable forests. Millar et al. (2007) characterize climate change adaptation options as resistance, resilience, response, and realignment strategies. The resistance strategy includes actions that forestall impacts and protect highly valued resources. The resilience strategy includes actions that improve the capacity of systems to return to desired conditions after disturbance. The response strategy employs tools to facilitate transition of systems from current to new desired conditions, and the realignment

strategy uses restoration practices to enable persistence of ecosystem processes and functions in a changing climate. The Project is designed to enhance resiliency to climate-related stressors such as drought, wildfire, insects, and disease. Moving vegetation toward desired conditions, as described in Appendix A of the Forest Plan, would decrease vulnerability of vegetation and wildlife to climate change impacts and increase the adaptive capacity of the ecosystem elements (Perry et al. 2011; Churchill et al. 2013). In addition, improving watershed function through restoring more natural drainage patterns and riparian vegetation would increase resiliency of the watershed to disturbances such as flooding from rain-on-snow events or intense summer precipitation by increasing the steam network's ability to dissipate the energy of high flows.

1.12.6. Old Growth/Old Forest

Numerous comments regarding old forest/old growth were received during the scoping and comment periods. The rationale for utilizing old forest terminology instead of old growth is explained on page A-21 of the Forest Plan (Forest Service 2003a). Terminology regarding old forest and old growth from the Forest Plan are available in the glossary of this document. All proposed activities are designed to promote and retain old forest characteristics including snags, CWD, seral species, and seral species legacy trees.

Since old forests are an important component of habitat for many wildlife species, this resource is discussed under the Wildlife section in Chapter 3 and in the Wildlife Specialist Report in the Project record. Further information regarding old forest can be found in the Forested Vegetation Specialist report in the Project record.

1.12.7. Old Tree and Large Tree Retention

Numerous comments regarding which old trees and large trees should be retained and the best method(s), such as diameter limits, to achieve the retention of old trees and large diameter trees were received during the comment periods.

The Forest acknowledges the importance of retaining and promoting legacy trees and large tree size class appropriate for the forest type. The Project has been designed to incorporate the retention of these attributes while moving toward the desired vegetative conditions from the Forest Plan. Project design features have been incorporated into this Project to address these concerns.

Legacy tree guidelines proposed for utilization in this Project are included in the Appendices for this document. Additional information regarding old tree and large tree retention can be found in the Forested Vegetation Specialist Report.

1.12.8. Snags and Coarse Woody Debris

Comments regarding the importance of snags and CWD were received during the comment period. Snags and coarse woody debris are important ecological components.

Through site visits and ocular observations within the Project area, it has been determined that snag and CWD amounts vary widely throughout the Project area, depending on past management, natural events (e.g., Grays Creek fire, insect activity), and successional development. Some areas have desired amounts, while others do not. Although current levels of snags and CWD have not been quantified for the entire Project area, site visits and ocular observations were made. In addition, aerial detection surveys indicate that insect and disease has resulted in the creation of numerous snags throughout the Project area.

The desired amounts and sizes of snags and CWD are defined in the Forest Plan; see pages A-7–A-13 for desired conditions. Project design features have been identifies regarding snags and CWD to retain the desired amounts and sizes of snags and CWD (or trend toward desired amount and sizes when they are not currently present). With the implementation of these PDFs, snags and CWD would be retained at, or trend toward, the desired levels within activity areas. Management requirements and PDFs would be implemented to meet Forest Plan Standards and Guidelines. Since snags are an important component of habitat for many wildlife species, this resource is discussed under the Wildlife section in Chapter 3 and in the Wildlife Specialist Report in the Project record. Further information regarding snags and CWD can be found in the Forested Vegetation Specialist report available in the Project record.

1.12.9. Modification of Desired Conditions for Vegetation

Comments regarding the modification of desired conditions for forested vegetation in Management Prescription 5.2 – Commodity Production Emphasis within Forested Landscapes were received. Further information regarding this topic can be found in the Forested Vegetation Specialist Report in the Project record.

1.13. Applicable Laws and Executive Orders

A partial list of Federal laws and EOs pertaining to Project-specific planning and environmental analysis on Federal lands follows.

1.13.1. Archaeological Resources Protection Act of 1979

The purpose of the Archaeological Resources Protection Act (ARPA) is to protect irreplaceable archaeological resources on Federal and Native American lands.

This statute (16 U.S.C. 470aa-470mm; Public Law 96-95 and amendments to it) was enacted "...to secure, for the present and future benefit of the American people, the protection of archaeological resources and sites which are on public lands and Native American lands, and to foster increased cooperation and exchange of information between governmental authorities, the professional archaeological community, and private individuals (Sec. 2(4)(b))."

The reasons behind enactment include recognition that archaeological resources are an irreplaceable part of America's heritage and that they were endangered increasingly because of the escalating commercial value of a small portion of the contents of archeological sites.

The primary impetus behind ARPA was the need to provide more effective law enforcement to protect public archeological sites. Two improvements over the Antiquities Act, which was the statute designed to provide this protection prior to ARPA's enactment, were more detailed descriptions of the prohibited activities and larger financial and incarceration penalties for convicted violators. Section 6 of the statute describes the range of prohibited actions including damage or defacement in addition to unpermitted excavation or removal. Also prohibited are selling, purchasing, and other trafficking activities whether within the United States or internationally. Section 6(c) prohibits interstate or international sale, purchase, or transport of any archeological resource excavated or removed in violation of a State or local law, ordinance, or regulation.

This management requirement is listed in Section 2.3, Management Requirements. Additional information can be found in Section 1.12.1.

1.13.2. American Indian Religious Freedom Act

The American Indian Religious Freedom Act, Public Law No. 95-341, 92 Stat. 469 (August 11, 1978) (commonly abbreviated as AIRFA), is a United States Federal law and a joint resolution of Congress that was passed in 1978. The AIRFA was enacted to protect and preserve the traditional religious rights and cultural practices of Native Americans, Eskimos, Aleuts, and native Hawaiians.

1.13.3. Clean Air Act, as amended in 1990

The purposes of the Clean Air Act are, "…to protect and enhance the quality of the nation's air resources so as to promote the public health and welfare and the productive capacity of its population; to initiate and accelerate a national research and development program to achieve the prevention and control of air pollution; to provide technical and financial assistance to State and local governments in connection with the development and execution of their air pollution prevention and control programs; and to encourage and assist the development and operation of regional air pollution prevention and control programs."

1.13.4. Clean Water Act, as amended in 1977 and 1982

The primary objective of the Clean Water Act (CWA) is to restore and maintain the integrity of the nation's waters. This objective translates into two fundamental national goals: (1) eliminate the discharge of pollutants into the nation's waters, and (2) achieve water quality levels that are fishable and swimmable. The CWA establishes a nondegradation policy for all proposed Federal projects.

The CWA is addressed through PDFs and mitigation measures and monitoring (Section 2.5 and Appendix 4). For more information, see Section 3.5, "Watershed Resources" and the Water Resources Specialist Report, Appendix B in the Project record.

1.13.5. Civil Rights, Consumers, Minorities, and Women

All Forest Service actions can impact, positively or negatively, the civil rights of individuals or groups, including minorities and women. The need to analyze these potential impacts is required by the FSM and FSH (https://www.fs.fed.us/im/directives/). This Project would not affect civil rights, consumers, minorities, or women.

1.13.6. Endangered Species Act (ESA) of 1973, as amended

The purpose of the Endangered Species Act (ESA) is to, "…provide a means whereby the ecosystems upon which endangered species and threatened species depend may be conserved, to provide a program for the conservation of such endangered species and threatened species, and to take such steps as may be appropriate to achieve the purposes of the treaties and conventions set forth in subsection (a) of this section." The ESA also states, "It is further declared to be the policy of Congress that all Federal departments and agencies shall seek to conserve endangered species and threatened species and shall utilize their authorities in furtherance of the purposes of this Act." The ESA is addressed in Sections 3.4 "Wildlife Resources," 3.6 "Fisheries Resources," and 3.8 "Botany and Rare Plants."

1.13.7. Executive Order (EO) 11990—Protection of Wetlands

Executive Order 11990 provides direction to Federal agencies to protect the nation's wetlands when undertaking all activities. The order is addressed through PDFs.

1.13.8. Executive Order (EO) 11988—Floodplain Management

Under EO 11988, proposed activities must not increase flood hazards and must preserve the resource benefit of floodplains (the ability to dissipate flood flows and moderate flood peaks). This requirement is addressed through PDFs.

1.13.9. Executive Orders (EOs) Pertaining to Tribal Consultation

A requirement for regular and meaningful consultation between Federal and tribal government officials on Federal policies that have tribal implications was established under EO 12175.

Executive Order 12785 was enacted to reduce unfunded mandates upon State, local, and tribal governments; to streamline the application process and increase the availability of waivers to State, local, and tribal governments; and to establish regular and meaningful consultation and collaboration with State, local, and tribal governments on Federal matters that significantly or uniquely affect their communities.

Executive Order 13007 was enacted in order to (1) accommodate access to and ceremonial use of Native American sacred sites by Native American religious practitioners and (2) avoid adversely affecting the physical integrity of such sacred sites. Where appropriate, agencies shall maintain the confidentiality of sacred sites.

1.13.10. Executive Order (EO) 12898—Environmental Justice

Under EO 12898 each Federal agency is directed to achieve environmental justice (EJ) as 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 and low-income populations. The President also signed a memorandum emphasizing the need to consider these types of effects during NEPA analysis. On March 24, 1995, the Department of Agriculture completed an implementation strategy for EO 12898. Where Forest Service proposals have the potential to adversely affect minority or low-income populations disproportionately, effects must be considered and disclosed (and mitigated to the degree possible) through NEPA analysis and documentation.

1.13.11. Executive Order (EO) 13112—Invasive Species

Executive Order 13112 requires Federal agencies whose actions may affect the status of invasive species to identify such actions, prevent the introduction of invasive species, detect and respond rapidly to and control populations of such species, provide for restoration of native species and habitat conditions, and promote public education on invasive species. Additionally, Federal agencies are directed to not carry out actions that they believe are likely to cause or promote the introduction or spread of invasive species.

Activities proposed under the Project are not anticipated to substantially cause or promote the introduction or spread of invasive species. Information on noxious weeds can be found under Section 3.13.

1.13.12. Executive Order (EO) 13186—Responsibilities of Federal Agencies to Protect Migratory Birds

Under EO 13186 Federal agencies are required to evaluate the effects of Federal actions and agency plans on migratory birds with an emphasis on species of concern. No interagency determinations are to be made for migratory birds as with Federally listed species. This information is reviewed with the United States Department of the Interior (USDI) Fish and Wildlife Service (FWS); no mechanism is in place for the FWS to consult on Project effects. This issue is addressed in the Wildlife Specialist Report in the Project record.

1.13.13. Federal Noxious Weed Act of 1974

The Federal Noxious Weed Act provides for the control and management of nonindigenous weeds that injure or have the potential to injure the interests of agriculture and commerce, wildlife resources, or the public health. Noxious weed treatment would be conducted according to Federal and State law if implemented in conjunction with this Project.

1.13.14. Idaho Forest Practices Act

The purpose of the Idaho Forest Practices Act (IFPA) is to ensure the continuous growth and harvest of forest trees and to maintain forest soil, air, water, vegetation, wildlife, and aquatic habitat. The IFPA requires consistency with forest practice rules for Federal, State, and private lands in order to protect, maintain, and enhance the State's natural resources. Best Management Practices (BMP) and contract provisions would be used to meet specific IFPA regulations. Site-specific PDFs and mitigation measures are listed in Section 2.4.

1.13.15. Native American Graves Protection and Repatriation Act

The Native American Graves Protection and Repatriation Act provides a process for museums and Federal agencies to return certain Native American cultural items, such as human remains, funerary objects, sacred objects, or objects of cultural patrimony, to lineal descendants and culturally affiliated Native American tribes and Native Hawaiian organizations.

1.13.16. Migratory Bird Treaty Act of 1918

The proposed agency activities should not degrade habitat for migratory land birds that are known to exist in the Project area. Habitat for migratory species will be surveyed prior to Project implementation to ensure that appropriate measures have been taken to protect nest sites and other source habitat. For example, flammulated owls are neotropical migrants that wintering in Central America but nest in ponderosa pine forests of the northern Rocky Mountains. Flammulated owls have been documented in the Project area as recently as 2014. The stands where these birds were located would be surveyed again, prior to implementation of any timber harvest activities, to determine stand occupancy by flammulated owls. The survey transects would be sampled annually for, at least, the duration of the Project. A complete list of birds protected under the Migratory Bird Treaty Act is located in the wildlife specialist report in the Project record.

1.13.17. Facilitation of Hunting Heritage and Wildlife Conservation—Executive Order (EO) 13443

On August 16, 2007, President George W. Bush signed an EO directing appropriate Federal agencies to facilitate the expansion and enhancement of hunting opportunities and the management of game species and their habitat (FR Vol. 72, No. 160, August 20, 2007).

The Project area provides habitat for several game species including deer (Cervidae), elk (*Cervus canadensis*), American black bear (*Ursus americanus*), mountain lion (*Puma concolor*), gray wolf (*Canis lupus*), and forest grouse (Phasianidae). The effects on wolves and elk were considered in previous sections and in the Wildlife Specialist Report, which is included in the Project record). Mitigation has been included to minimize and avoid impacts to elk (primarily through effective road closures and obliteration of unauthorized roads) so that habitat is provided to support Idaho Department Fish and Game's population objectives. These measures should also benefit deer. In addition, Project-wide prescribed fires should improve forage for deer and elk across the landscape. Mountain lion presence is largely tied to the presence of deer, so activities that maintain or improve deer habitat should maintain mountain lion populations.

American black bears are habitat generalists. While they prefer mixed deciduous-coniferous forests with thick understories, they will utilize a variety of habitats. Special habitat features include fallen logs and debris, and standing hollow trees that provide denning sites for bears. Snag and CWD desired conditions apply to all management activity areas and will provide for these components on the landscape in amounts, distribution, and sizes that were historically expected to exist within each of the PVGs.

Dusky grouse (*Dendragapus obscurus*), spruce grouse (*Falcipennis canadensis*), and ruffed grouse (*Bonasa umbellus*) are all present in the Project area. Habitat use and needs vary between the species. Dusky grouse are found in open coniferous forests, often with a fir component. Douglas-fir provides day roosts, and the buds and needles are an important winter food. Subalpine fir, with its dense foliage, is often selected as a night roost. Ruffed grouse utilize dense forests with some deciduous trees or shrubs. Aspen is an important component of habitat. Young forests provide optimum habitat for the species. Spruce grouse occupy coniferous forests that include short-needled trees (lodgepole pine, spruce-fir). Berry-bearing shrubs (*Vaccinium* spp.) are a common component of habitats. Key features include forest structure that provides cover (e.g., lodgepole pine prior to self-pruning). All three grouse species are associated with forested habitats. The Proposed Action will reduce tree densities and canopy cover within dense stands, thus improving conditions for the dusky grouse. Prescribed fire treatments should help regenerate aspen forests, an important component of ruffed grouse habitat. There will likely be no impacts or improvement to spruce grouse habitat from this Project.

1.13.18. National Environmental Policy Act (NEPA) of 1969, as amended

The purposes of the NEPA are, "To declare a national policy which will encourage productive and enjoyable harmony between man and his environment, to promote efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of man; to enrich the understanding of the ecological systems and natural resources important to the Nation; and to establish a Council on Environmental Quality" (42 U.S.C. Sec. 4321). The law further states "...it is the continuing policy of the federal government, in cooperation with State and local governments, and other concerned public and private organizations, to use all practicable means and measures, including financial and technical assistance, in a manner calculated to foster and promote the general welfare, to create and maintain conditions under

which man and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of present and future generations of Americans" (42 U.S.C. Sec. 4331(a)). The format and content requirements of environmental analysis and documentation were established under NEPA.

1.13.19. National Forest Management Act (NFMA) of 1976

The National Forest Management Act (NFMA) guides development and revision of National Forest Land Management Plans and has several sections ranging from required reporting the Agriculture Secretary must submit annually to Congress to preparation requirements for timber sale contracts. There are several important sections within the NFMA, including Section 1 (purpose and principles), Section 19 (fish and wildlife resource), Section 23 (water and soil resource), and Section 27 (management requirements).

1.13.20. National Historic Preservation Act (NHPA) of 1966, as amended

The National Historic Preservation Act (NHPA) of 1966 changed the way in which the Federal government regarded its role in historic preservation. The NHPA authorized the Secretary of Interior to expand and maintain a NRHA composed of districts, sites, buildings, structures, and objects significant in American history, architecture, archaeology, engineering, and culture. This act requires Federal agencies to consult with the SHPO and Native American tribes when nonrenewable cultural resources, such as archaeological sites and historic structures, may be affected by a Federal action. Section 106 of NHPA requires Federal agencies to review the effects proposed projects may have on cultural resources in the Project area.

The Idaho SHPO has been consulted concerning proposed activities in the Project area. Section 1.12.1 "Cultural and Archaeological Resources" discusses Idaho SHPO consultation, and Section 1.14 discusses Native American tribal consultation.

1.13.21. Omnibus Public Land Management Act of 2009

Congress, under Title IV of the Omnibus Public Land Management Act of 2009, established the CFLR Program. The purpose of the CFLR Program is to encourage the collaborative, science-based ecosystem restoration of priority forest landscapes. The CFLR Program provides a means to achieve an all-lands approach to forest restoration and to also:

- Encourage ecological, economic, and social sustainability;
- Leverage local resources with national and private resources;
- Facilitate the reduction of wildfire management costs, including through re-establishing natural fire regimes and reducing the risk of uncharacteristic wildfire;
- Demonstrate the degree to which various ecological restoration techniques achieve ecological and watershed health objectives; and,
- Encourage use of forest restoration by-products to offset treatment costs, to benefit local rural economies, to and improve forest health.

Title IV also establishes the CFLR Fund, providing authority for funding of CFLR Projects selected by the Secretary of the USDA. In 2010 and 2011 the Forest submitted a CFLR Project, and on February 2, 2012, the Secretary of the USDA announced the selection of the Forest's Weiser-Little Salmon Headwaters CFLR Project, currently encompassing 900,000 acres of NFS

lands in the Council, New Meadows, and McCall Ranger Districts in Adams County, Idaho. The Project is part of the landscape within the Weiser-Little Salmon Headwaters CFLR Project.

Uses and Limitations of the CFLR Fund include:

- The CFLR Fund may only be used on NFS lands.
- The CFLR Fund may not be used to cover planning costs.
- The CFLR Fund may be used to pay for up to 50% of the cost of carrying out and monitoring ecological restoration treatments on NFS lands.
- No more than $4,000,000 may be spent from the CFLR Fund in any one fiscal year on any one project.
- The CFLR Fund for any one proposal may be expended for no more than 10 fiscal years.

1.14. Tribal Rights and Interests

This section describes the cultural history and legal context of and existing Federal agency relations with the Project area's affected Native American tribes. The United States government has a unique responsibility to Native American tribes. As Federal agencies undertake activities that may affect tribal rights, property interests, or trust resources, care must be taken to implement agency policies, programs, and projects in a knowledgeable and sensitive manner respectful of tribal sovereignty and needs. Implications from this responsibility for Forest Service decision-makers are described as they relate to the Project.

1.14.1. Federal Trust Responsibility

The modern concept of trust responsibility grows out of the 1814 Treaty of Ghent, in Chief Justice Marshall's decision in Cherokee Nation v. Georgia 1831 (Supreme Court 1831). Justice Marshall characterized Native American tribes as domestic dependent sovereign nations, involving (1) the government or nation-state status of tribes, and (2) a special tribal relationship with the United States (Strickland and Wilkinson 1982). Marshall described the trust relationship as one that "resembles that of a ward to his guardian," as a special relationship that exists nowhere else in the world. This relationship has been consistently recognized by Federal courts ever since and has been described as "special," "unique," "moral," and "solemn" (Strickland and Wilkinson 1982).

In addition, the rights reserved by Native American tribes in treaties and agreements, or which were not expressly terminated by the Congress, continue to this day. These governmental rights and authorities extend to any cultural and natural resources that are reserved by or protected in treaties, EOs, and Federal statutes. The courts have developed the Canons of Construction, guiding that treaties and other Federal actions "should when possible be read as protecting Indian rights Tribes hold in title in a manner favorable to Indians (Strickland and Wilkinson 1982)."

The primary focus of the Federal trust responsibility is the protection of Native American tribes' natural resources on reservations and the rights and interests of tribes on all tribal homelands. In fulfilling the trust obligation, Congress also adopted laws and policies that protect Native American tribes' rights to self-determination and promote the social well-being of tribes and their members. Under various laws and policies, agencies are responsible for implementing Federal resource laws in a manner consistent with the tribes' abilities to protect their members, to manage their own resources, and to maintain themselves as distinct cultural and sovereign tribal

governments. Forest Service trust responsibilities apply to those actions under their authority. For example, they can undertake activities affecting all resources, including plant and animal habitats, on lands they administer.

The Federal government's trust responsibility compels agencies to conduct their activities consistent with responsibilities that are established through case law to a tribe or tribes by virtue of inherent rights and sovereign authority, unextinguished aboriginal title, treaty, statute, judicial decisions, EO or agreement, of which give rise to legally enforceable remedies. In carrying out their trust responsibilities, the Forest Service must assess proposed actions to determine potential impacts on treaty rights, treaty resources, or other unextinguished tribal rights and interests. Where potential impacts exist, the agencies must consult with affected tribes and explicitly address those impacts in planning documents and final decisions. Consultation with the tribes is essential in carrying out that trust responsibility. A key issue is the Federal government's trust obligation to ensure that tribal rights and interests will be protected.

1.14.2. Tribal Consultation

Tribal governments have a special and unique legal and political relationship with the United States government as reflected in the United States Constitution, treaties, statutes, court decisions, EOs, and memoranda. This relationship imparts a duty on all Federal agencies to consult, coordinate, and communicate with Native American tribes on a government-to-government basis.

The intergovernmental consultation process serves as the primary means for the Federal agencies to carry out their trust obligations. Consultation is not a single event but instead is a process leading to a decision (e.g., the ROD for this EIS). Consultation means different things to different tribes. It can be either a formal process of negotiation, cooperation, and policy-level decision-making between tribal governments and the Federal government or a more informal process. Tribal rights and interests are discussed and considered or incorporated into the decision. Consultation can be viewed as an ongoing relationship between agencies and tribes, characterized by consensus-seeking approaches to reach mutual understanding and resolve issues. It may concern issues and actions that could affect the government's trust responsibilities, or other tribal interests.

Consultation minimally serves five purposes:

- To identify and clarify issues,
- To provide for an exchange of existing information and identify where information is needed,
- To identify and serve as a process for conflict resolution,
- To provide an opportunity to discuss and explain the decision, and
- To fulfill the core of the Federal trust obligation.

Legal requirements for Federal agencies to consult with sovereign Native American tribes have their basis in Federal law, court interpretations, and EOs. Applicable laws are described in Section 1.14.

1.14.3. Documentation of Tribal Consultation Efforts

Because Native American tribes can be affected by the policies and actions of the Forest Service in managing the lands and resources under its jurisdiction, the Forest Service has a duty to consult with tribes on matters affecting their interests. Because of this government-to-government relationship, efforts were made to involve local tribal governments and to solicit their input regarding the Proposed Action.

The Forest Service introduced this Project to the Shoshone-Paiute leaders during the Wings and Roots Program meeting (government-to-government consultation) on March 12, 2015. Updates were provided to the Shoshone-Paiute leaders during the Wings and Roots Program meeting on December 10, 2015, April 14, 2016, and December 13, 2016.

In accordance with EO 12875, letters describing the Proposed Action and requesting comments and concerns were sent to the tribal chairmen of the Nez Perce and Shoshone-Bannock Tribes on December 19, 2014. During informal consultation, the Forest Service presented the Proposed Action to the Nez Perce resource staff on December 3, 2014, and June 3, 2015. Updates were provided to Nez-Perce resource staff on June 1, 2016, and December 7, 2016.

The Nez-Perce and Shoshone-Bannock Tribes have not requested formal consultation on the Project. Additional coordination with the tribes will be conducted before a decision on this Project is made to ensure that tribal interests are considered.

Chapter 2 — Alternatives

2.1 Introduction

Chapter 2 describes the management alternatives considered for implementation of the Proposed Action. This chapter also discusses alternatives development and summarizes a comparison of the alternatives, contrasting both their accomplishment of the Purpose and Need and their response to the identified issues, which provides the information necessary for the Responsible Official to make an informed choice between alternatives.

Maps for each alternative considered in detail can be found in Appendix 1.

2.1.1. Range of Alternatives

Section 102(2)(3) of the NEPA states that all Federal agencies shall, "study, develop, and describe appropriate alternatives to recommended courses of action in any proposal which involves unresolved conflict concerning alternative uses of available resources." An Environmental Impact Statement (EIS) must also, "rigorously explore and objectively evaluate all reasonable alternatives." The courts have established that this direction does not mean that every conceivable alternative must be considered, but all selections and alternative discussions must permit a reasoned choice and foster informed decision-making and informed public participation.

The range of alternatives may extend beyond the limits set by Forest Plan Goals and Objectives under NEPA; however, the NFMA requires that the selected alternative fully comply with the Forest Plan unless the plan is amended in accordance with 36 CFR 219.10(f).

The range of alternatives presented in this chapter was determined by evaluating external and internal comments on and the Purpose and Need for this Project. This Project is intended to maintain or create resource conditions that are moving toward Project-specific desired conditions based on and consistent with Appendix A of the Forest Plan conditions, which might be expected to occur under natural disturbance and succession regimes (USDA Forest Service 2003a). By moving toward this condition, we can be more assured that the Forest and its ecosystem remain in a healthy and sustainable condition over time. Reducing the vulnerability of the Forest to possible severe and undesirable effects of fire, insects, disease, or other unforeseen events would create a forest more resilient in the face of inevitable change and future uncertainties and provide for flexibility and a variety of possible future resource and management needs.

Forest Plan Goals and Objectives, existing and desired conditions, and Standards and Guidelines; Federal laws, regulations, and policies; and economic viability also influenced alternatives development. Within these parameters, the alternatives developed by the IDT display a reasonable range of outputs, treatments, costs, management requirements, design criteria, and effects on resources. In addition to the alternatives considered in detail, the IDT examined other alternatives during the analysis process. Although these alternatives contributed to a reasonable range of alternatives, they were eliminated from further consideration. More information regarding this elimination is given in Section 2.1.2.

Using the information gathered from public and internal scoping and field-related resource information, the IDT formulated different alternative themes centered on various vegetation treatments, wildlife habitat effects, watershed improvement treatments, and transportation management. Based on these themes, the IDT assigned potential prescriptions to create the various alternatives. Each action alternative represents a site-specific proposal developed by IDT

evaluation of current and desired conditions. Unit identification and design were based on field reconnaissance, topographic maps, aerial photos, and resource data, which are available in geographic information system (GIS) format.

2.1.2. Alternatives Considered But Eliminated From Detailed Study

The IDT considered an alternative that would limit harvest of trees greater than a specified diameter (for example, 30 inches diameter at breast height [DBH]). This alternative was eliminated because the Project proposes to promote large trees and old forest conditions, and a diameter limit may restrict attainment of other silvicutural goals such as creating tree crown separation to reduce the risk of crown fire. In addition, all legacy trees should be retained (Legacy Tree Guidelines, Appendix 7).

The IDT considered an alternative that would maximize commodity production (timber harvest). The IDT eliminated this alternative because purely maximizing timber volume production would not be consistent with the Purpose and Need of the Project or with Forest Plan Standards and Guidelines. In addition, Alternative 4 proposes to increase the amount of commodity resulting from restoration efforts while remaining consistent with both the Purpose and Need of the Project and the best available science.

The IDT also considered a no new road construction or reconstruction alternative. This alternative was not analyzed because it would not meet the Purpose and Need for achieving desired conditions for vegetation in the Project area. The road density in the Project area is higher than desired, and by decommissioning and/or properly storing in conjunction with vegetation treatments, both road density and vegetation conditions will be improved. The alternatives considered in detail all use the combination of road and vegetation treatments to meet the Purpose and Need of the Project.

2.2. Alternatives Considered In Detail

The No Action alternative (Alternative 1), Proposed Action (Alternative 2), and three other action alternatives were considered in detail. No activities other than what is already occurring would occur under Alternative 1. The action alternatives present different ways of satisfying the Purpose and Need by responding with different emphases to the objectives and issues discussed in Chapter 1.

Areas, distances, mapped unit boundaries, and other measures used to define the alternatives are based on the best available information. Not all of the information was precisely measured in the field. Some differences may exist between estimates and field measurements when the Project is laid out on the ground. Because of the variability of existing conditions in proposed activity units, treatments are not expected to occur on every acre within every unit. For example, if the canopy cover and species composition of trees in part of a unit meets the DFC, the only treatment in that part of the unit would be prescribed burning. The estimated net proposed harvest acreage within each alternative is provided in the tables that accompany each of the alternatives. Changes that occur between planning and implementation would be within the resource parameters analyzed in this document. If changes are outside of the analysis parameters, the IDT will reanalyze that portion of the Project or it will be removed from the Project.

2.2.1. Alternative 1—No Action

The No Action alternative provides a baseline against which impacts of the various action alternatives can be measured and compared, and it represents the existing condition in the Project area. Under Alternative 1, none of the specific management activities proposed in this FEIS would be implemented to accomplish Project Goals and Objectives. Ongoing activities such as recreation, public fuelwood gathering, fire suppression, road maintenance, and existing road closures would continue at current levels.

2.2.2. Alternative 2—Proposed Action

Background for Vegetation Treatments

Forested vegetation refers to land that contains at least 10% canopy cover by forest trees of any size or land that formerly had tree cover and is currently at an earlier seral stage.

Forested vegetation is described by habitat type (Steele et al. 1981), which uses potential climax vegetation as an indicator of environmental conditions. At the Forest Plan level, forested habitat types have been further grouped into PVGs that share similar environmental characteristics, site productivity, and disturbance regimes (Table 2.2-1). These groupings simplify the description of vegetative conditions for use at the broad scale. The PVGs 1, 2, 4, 5, 6, 7, 8, 9, 10, and 11 are found in the Project area. The PVG 6 is most common, comprising 31% of the Project area (see Appendix 6 for a description of PVGs).

Table 2.2-1. Potential Vegetation Groups (PVGs) within the Project area.

Potential Vegetation Group	Acres within Project Area (National Forest System Lands only)	Percent of Project Area (%)
PVG 1—Dry Ponderosa Pine/Xeric Douglas-fir[a]	254	<1%
PVG 2—Warm Dry Douglas-fir/Moist Ponderosa Pine	3,300	9%
PVG 3—Cool Moist Douglas-fir[b]	0	0%
PVG 4—Cool Dry Douglas-fir[a]	138	<1%
PVG 5—Dry Grand Fir	4,246	11%
PVG 6—Cool Moist Grand Fir	12,426	33%
PVG 7—Warm Dry Subalpine Fir	4,702	13%
PVG 8—Warm Moist Subalpine Fir[a]	56	<1%
PVG 9—Hydric Subalpine Fir	576	2%
PVG 10—Persistent Lodgepole Pine	903	2%
PVG 11—High Elevation Subalpine Fir	419	1%
Total Forested Vegetation	**27,020**	**73%**
Grassland/Shrubland	10,061	27%
Total Analysis Area (National Forest System lands)	**37,081[c]**	

[a]PVGs 1, 4 and 8 were not analyzed since they represent less than 1% of the Project area
[b]PVG 3 was not analyzed since it generally does not encompass an entire stand (consequently no acres are designated in the Project area) and represents a small portion of the Project area (e.g., less than 1%).
[c]This total does not include private lands and NFS lands in the East Fork Weiser River subwatershed.

Vegetation across any landscape that historically developed under similar wildfire frequencies and intensities can be categorized into "fire regimes" (Table 2.2-2). Fire regimes are often characterized by the effects of fire on the overstory vegetation and the frequency or return interval of those fires. If most of the dominant overstory canopy is expected to survive a fire event, it is considered a nonlethal fire. By contrast, a fire that consumes or kills 90% or more of

the existing vegetation is considered to be a lethal fire regime. If the intensity is in between, it is classified as a mixed fire regime, either mixed1 or mixed2 (USDA Forest Service 2003a).

Historically, stands in the nonlethal fire regime experienced fire every 5–25 years. Fire in these stands commonly occurred as low-intensity ground fires, with flame lengths from 1 to 4 feet, and resulted in overstory tree mortality of 10% or less (Agee 1998). The mixed1 fire regime differs from the nonlethal fire regime in that it generally had a decreased frequency of fire return and an increased lethality in the overstory from a fire occurrence. Estimates of the historical fire return interval for the mixed1 fire regime are 5 to 70 years (Agee 1998). Relatively frequent surface fires maintained early seral species such as ponderosa pine and Douglas-fir, but the decreased fire frequency compared with the nonlethal fire regime allowed greater fuel accumulations and larger regeneration patches to develop. The resultant fires would burn with greater intensity and lethality. Overstory mortality would be approximately 10%–50% (Table 2.2-2). Additionally, the patches of moderate-to-high severity in the mixed1 fire regimes were generally larger in extent and more frequently distributed than the patches seen in the nonlethal fire regime.

Mixed2 fire regimes continue the pattern of decreased frequency and increased lethality. The fire return interval was historically between 70 and 300 years (Agee 1998).Overstory mortality between 50% and 90% (Table 2.2-2). The patches of mortality are generally larger in size than those for the mixed1 fire regime, with fewer and smaller areas of low-to-moderate intensity among the patches of high intensity. Within any given fire regime patch, some areas might, for site-specific reasons, have a different historical fire-return interval, resulting in different effects on the vegetation compared with other sites within the patch. These areas are the minority within the patch, tend to be small, and contribute to the overall patch diversity.

Table 2.2-2. Fire regime classifications.

Fire Regime	Fire Interval	Fire Intensity	Vegetation Patterns (Agee 1998)
Nonlethal	5–25 years	Low—10% mortality or less	Relatively homogenous, with small patches generally <1.0 acre of different seral stages, densities, and compositions created from mortality.
Mixed1	5–70 years	Low to moderate—10%–50% mortality	Relatively homogenous, with patches created from mortality ranging in size from <1.0 to 600 acres of different seral stages, densities, and compositions.
Mixed2	70–300 years	Moderate to high—50%–90% mortality	Relatively diverse, with patches created by mixes of mortality and unburned or underburned areas ranging in size from <1 to 25,000 acres of different seral stages, densities, and compositions.
Lethal	100–400 years	High—over 90% mortality	Relatively homogenous, with patches sometimes >25,000 acres of similar seral stages, densities, and compositions. Small inclusions of different seral stages, densities, and compositions often result from unburned or underburned areas.

Design of Treatment Areas

Vegetation treatments include Noncommercial, Commercial, Meadow Restoration, Prescribed Burn, and Associated Actions. Vegetation treatments are needed to promote early seral species, create a mosaic pattern at the fine and large scales (e.g., structural diversity, density, and canopy cover), maintain and promote large tree structure (including legacy trees), and reduce fuel loading. Currently, in some areas of the Project, the vegetation conditions are outside of desired conditions with regard to tree size class distributions, species composition, and canopy cover distributions (USDA Forest Service 2014).

Riparian Conservation Area (RCA) Delineation

The Forest Plan (USDA Forest Service 2003a, Appendix B) outlines criteria to aid the IDT in delineating RCAs for perennial and intermittent streams, ponds, lakes, reservoirs, and wetlands. The RCAs within the Project area have been identified by the IDT using "Option 2, Delineation Method for Forested Streams" (USDA Forest Service 2003a, Appendix B). Option 2 provides a more site-based delineation of an RCA boundary using site-potential tree heights. While PVGs occur within the Project area that, under Option 2, would have RCA widths based on site-potential tree heights that are narrower than 120 and 240 feet, these PVGs are intermixed with PVGs where the 120- and 240-foot RCA distances are appropriate. For consistency and to reduce error during Project layout, one distance was used for all PVGs—the most conservative RCA distance. Table 2.3-3 lists the RCA delineation distance by water source.

Table 2.2-3. Riparian Conservation Area (RCA) delineation distance by water source.

Water Body	RCA Width
Perennial Streams	240-foot slope distance (two site-potential tree heights)
Intermittent Stream Providing Seasonal Rearing and Spawning Habitat	240-foot slope distance (two site-potential tree heights)
Intermittent Stream	120-foot slope distance (one site-potential tree height)
Ponds, Lakes, Reservoirs and Wetlands	120-foot slope distance from edge of saturated (hydric) soils) (one site-potential tree height)
Seeps and Springs	30 feet and 120 feet, respectively

Note: RCA distance is measured slope distance from the ordinary high water mark (either side of the stream).

In RCAs with a specific vegetation treatment objective (i.e., aspen restoration, targeted fuels reduction, or upland vegetation restoration), portions of the RCA (the outer half only, as described in Appendix 5, with some exceptions) could be treated following a site-specific assessment as long as soil and water requirements can be met. The treatment Objectives within RCAs are based on DFCs as defined in Appendix A of the Forest Plan (USDA Forest Service 2003a) by PVG and also on MA-specific Objectives in the Forest Plan. Input on treatment design would be given by the District hydrologist and/or fisheries biologist to ensure all riparian functions are maintained or improved, as required by Forest Plan Standard SWST01 (USDA Forest Service 2003a). Further description of treatments proposed within RCAs is below, within subsections of the "Vegetation Treatments" section.

Other Considerations

A reduction in treatments acres is expected based on locations of northern goshawk (*Accipiter gentilis*) Post Fledging Areas (PFAs) and nest stands, elk wallows, archeological sites, and additional streams and other water sources that would be identified during implementation. These specific guidelines below would be followed:

- There are nine identified northern goshawk PFAs; within the PFAs, northern goshawk replacement and nest stands would not receive mechanical treatment. Stands within northern goshawk PFAs would be identified prior to marking operations and would be designed to meet management recommendations for northern goshawk in the southwestern United States (Reynolds et al. 1992).
- See Section 2.4 "Project Design Features/Mitigation Measures" for more information on resource protection measures.

2.2.2.1. Vegetation Treatments

Under Alternative 2 a variety of vegetation treatments are proposed on 20,713 acres and prescribed burn is proposed on 24,200 acres (Table 2.2-4). Of the acres proposed for vegetation treatment, 3,000 acres are within RCAs, and of the acres proposed for prescribed fire treatment 6,319 acres are within RCAs (Table 2.2-5). Vegetation and fuels treatments in PVGs 7–11 would not move more than 30% of suitable Canada lynx source habitat to unsuitable, following the 2000 Canada Lynx Conservation Assessment and Strategy (LCAS; Ruediger et al. 2000) requirements.

Noncommercial Treatments

Noncommercial Thinning (NCT)—1,279 acres (153 acres in Riparian Conservation Areas)

Noncommercial thinning (NCT) would be completed in mature stands and plantations with density-related stress and in mature stands targeted for prescribed burning.

In areas targeted for prescribed fire treatments, NCT would be completed where necessary. Slash produced from NCT would be lopped and scattered or piled (machine or hand) and burned. To help achieve DFC, NCT would be permitted within the outer half of RCAs. All NCT in RCAs would be completed by hand and would generally not cut trees larger than 8 inches DBH; the majority of cut material would be lopped and scattered. If piling is needed, slash would only be piled by hand within RCAs and would be approved by the Council Ranger District (District) hydrologist or fisheries biologist.

Within plantations, NCT would be completed to improve wildlife habitat, increase growth rates and tree vigor, improve stand resiliency to natural disturbance, and reduce density-related competition. Plantations targeted for NCT are generally <30 years old and have an average DBH of 8–12 inches. Implementation of NCT would generally cut trees <8 inches DBH and prune residual trees, when practical, up to 6 feet high. Post treatment, these stands would retain approximately 70–100 trees per acre. Thinning would favor early seral species but would retain a mixture of species and variable densities, depending on site-specific objectives. Where reserve trees within plantations receiving this treatment are causing Forest health problems (primarily due to mistletoe [*Arceuthobium* species]), trees may be killed by girdling. Girdled trees would be marked with wildlife tags as necessary to meet desired snag numbers and sizes.

Treatment intent of NCT:

- Reduce noncommercial tree densities, increase growth rates, improve wildlife habitat, and improve tree vigor.
- Improve stand resiliency to natural disturbance by reducing density-related competition.
- Maintain and promote early seral species with variable densities depending upon site-specific objectives.
- Promote spatial heterogeneity in species diversity (i.e., retention of naturally regenerating aspen or other desired species when present), canopy cover, and density.
- Expand the opportunity for prescribed burn by changing the fuel profile.
- Reduce fire severity potential and fuel loading prior to prescribed burning.

- Reduce the potential for undesired fire effects (i.e., mortality of legacy trees).
- Aid in the retention of desired leave trees.

Restoration of Burned Areas/Plantations (BA/PL)—3,240 acres (391 acres in RCAs)

Restoration of Burned Areas/Plantations (BA/PL) treatment would be completed in plantations burned during the Grays Creek Fire. Plantations within this area burned at mixed severities; salvage-harvested areas were replanted following the fire. Many of these plantations have experienced mixed survival; specifically, intermixed patches of dense, moderate, low, and no survival of regeneration occurred. Plantations have had 1-, 3-, and 5-year survival plots and adequate stocking rates; however, due to a combination of drought, herbivory (pocket gophers), and dense brush, some of these plantations have experienced increased mortality.

The BA/PL treatments would include NCT, piling (mechanical or hand), and pruning in areas with dense regeneration, brush removal, and replanting in areas with low stocking. The NCT effort would generally cut trees <10 inches DBH and prune residual trees, when practical, up to 6 feet high. No mechanical piling would occur within RCAs and all hand piling would be approved by the District hydrologist or fisheries biologist.

Treatment intent in dense regeneration areas:

- Reduce noncommercial tree densities, increase growth rates, improve wildlife habitat, and improve tree vigor.
- Improve stand resiliency to natural disturbance by reducing density-related competition.
- Maintain and promote early seral species with variable densities depending upon site-specific objectives.
- Promote spatial heterogeneity in species diversity (i.e., retention of naturally regenerating aspen or other desired species when present), canopy cover, and density.

Treatment intent in brush areas with low stocking:

- Reduce competition to seedlings from brush and grass.

Treatment intent in low stocking areas:

- Meet desired stocking levels.

Commercial Treatments—10,385 acres

Stands would be thinned through commercial logging. Potential harvest systems include ground based, skyline, and/or helicopter. Harvested trees would generally be removed with the limbs and tops attached. The limbs and tops would be utilized as biomass or other products, where practical; in certain units a portion of this material would also be redistributed back into the harvest unit to enhance soil productivity and nutrient cycling. Where appropriate and needed, noncommercial-sized (e.g., <8 inches DBH) trees would be cut to reduce ladder fuels and promote desired advanced regeneration. Following tree harvest, these stands could be underburned as described in the prescribed burn section below. Commercial vegetative treatments have been divided into the categories described below.

Commercial Thin-Free Thin (CT-FT)—2,875 acres (347 acres within the outer half of RCAs)

Commercial thin-free thin (CT-FT) would allow the flexibility to use different thinning methods for varying stand conditions and objectives. The CF-FT would be accomplished by low thinning (removing trees from the lower crown classes), some crown thinning (removing trees from the dominant and codominant crown classes), and occasional sanitation cutting (removing trees to improve stand health by reducing the anticipated spread of insects or disease, especially mistletoe infections). Merchantable material would be removed from the site and utilized as markets allow. Noncommercial material (slash) would be lopped and scattered, mechanically harvested for fuelwood decks, removed, hand piled, machine piled, and/or broadcast burned to reduce fuel loading. No mechanical piling would be allowed within RCAs; hand piling would require approval by the District hydrologist or fisheries biologist. See Appendix 5 for a complete description of requirements associated with RCA harvest.

These treatments would generally be completed in forested areas dominated by mature, vigorous ponderosa pine, Douglas-fir, and/or western larch with canopy cover >35%. Approximately, 1.0% of the CT-FT treatment areas would be located in PVG 11 stands and potentially include promoting and maintaining whitebark pine (e.g., removal of subalpine fir and artificially regenerating rust-resistant trees).

Following treatment, these stands would be a mosaic of thinned areas, clumps of trees, and small openings. Lower canopy cover (20%–30% post treatment canopy cover) would generally be targeted in PVG 2. Higher canopy cover (25%–40%) would generally be the desired post-treatment condition in PVGs 5 and 6. Portions of stands with natural openings and heavily thinned areas would have less canopy cover, perhaps as low as 10%. These openings would eventually develop more canopy cover where seedlings establish and grow. Following prescribed burning, up to an additional 10%, with an average of 5%, of the overstory trees would be expected to die. The average canopy cover in these stands after harvest and underburn operations would be between 20% and 40%.

This treatment includes the following specifications:

- Legacy western larch, ponderosa pine, and Douglas-fir should be retained. See Appendix 7 for legacy tree identification guidelines.
- Seral species (western larch, ponderosa pine, aspen, whitebark pine, and/or Douglas-fir) should generally be favored for retention over nonseral species (e.g., grand fir and subalpine fir), and preference should be given to retention of larger diameter trees.
- Nonlegacy trees >20 inches DBH should generally be given retention preference. When these trees must be selected for retention or removal, the following guidelines should be utilized:
    - Give preference to larger diameter, vigorous, early seral trees for retention.
    - Consider the appropriateness of retaining clumps and/or skips as described below.
        - Dwarf mistletoe that cannot be isolated would cause mid- to long-term forest health issues
- Trees with lower mistletoe ratings would generally be favored over heavily infected trees. When possible, trees with mistletoe ratings of 0–3 would be favored over trees with ratings of 4–6. When trees with mistletoe ratings of 4–6 can be isolated (i.e., greater than

40 feet from uninfected host trees) while addressing mid- to long-term stand objectives, these infected trees should be retained to meet wildlife objectives.

  - Give preference to retaining tree(s) exhibiting characteristics of high wildlife value (e.g., cavities, stem rot, broken tops with structure for nesting) even if this results in slightly higher than desired stocking.
  - Consider safety concerns when designating trees for retention/removal, including hazard trees in and/or adjacent to campgrounds, dispersed campsites, and roads/trails open to the public.
  - Consider operational concerns when designating trees for retention/removal, including hazard trees, skid trails, skyline corridors, and landings.
  - In large tree size class stands (generally stands that have 11 or more trees per acre that are ≥20 inches DBH), retain at least 11 20-inch DBH or larger trees per acre. This consideration may require retaining large diameter trees that do not meet the description for preference as described above.

- Retention/removal of nonlegacy late seral species should follow these guidelines:
  - Give preference for retaining late seral species when necessary to meet residual structural objectives (i.e., large tree size class and/or old forest characteristics).
    - Generally give preference to vigorous, healthy, larger-diameter, late seral trees. Preference to retaining late seral tree(s) exhibiting characteristics of high wildlife value (e.g., cavities, stem rot, broken tops with structure for nesting) should also be given, especially when not common in a stand, even if this results in slightly higher than desired stocking. These would also be good areas in which to consider skips, as described below.
  - Retain late seral trees >20 inches DBH not meeting merchantability specifications due to damage, poor form, or indicators of rot to meet wildlife objectives.
  - Give preference for removing late-seral (e.g., grand fir, subalpine fir, and/or Douglas-fir [PVG 2]) trees that are causing direct crown/root competition to large diameter and/or vigorous western larch and ponderosa pine.

- Creation of clumps (small groups retained with spacing closer than desired spacing specifications), skips (areas with higher densities than specified in the rest of the unit that will not have any trees cut), and gaps (areas where the unit will have a wider average spacing than specified for the rest of the unit) should follow these guidelines:
  - Retain clumps of trees, commercial and noncommercial sized, throughout the harvest area to meet wildlife and visual objectives. These clumps would consist of 2–20 or more trees and should be designed to enhance spatial variability within each given stand.
  - Design skips consistent with the principles identified in Franklin et al. (2013, pp. 81–87). Skips are defined as portions of units not treated mechanically. These skips should not generally exceed 15% of a stand.
  - Create small openings <2.0 acres in areas dominated by grand fir, low-vigor trees, or diseased trees or in areas with a high potential of aspen regeneration. Where aspen are

present, conifers could be removed within the aspen stand to improve stand integrity. These openings should not generally exceed 10% of a stand and should consider the following recommendations.

  - Small openings of up to 2.0 acres may be used to stimulate aspen regeneration. In aspen patches, nonlegacy coniferous trees would be removed within 50 feet of the aspen patch. To be considered an aspen patch, an area must have an average spacing of less than 20 feet between stems and be larger than 1/10 acre in size.
  - In openings outside of aspen patches, a minimum of 5–10 trees per acre would be retained, with leave tree preference given to legacy trees; vigorous serals (e.g., ponderosa pine, western larch, and aspen) in the dominant and codominant crown classes; and high wildlife value nonlegacy/nonseral species. Secondary preference would be given to dominant nonseral trees. These openings should rarely be wider than 50–100 feet and be well distributed across the area. Consideration of whether existing openings and the general thinning and burning prescription would create sufficient openings should be taken prior to intentionally creating additional openings. Artificial regeneration may be prescribed in patches between 1.0 and 2.0 acres if no suitable seed trees are present.

- Release legacy ponderosa pine and western larch by removing younger trees for approximately twice the canopy drip line of the legacy tree(s). As discussed earlier, overlap of other legacy tree crowns is acceptable, and these other legacy trees should be retained. Release of replacement/future legacy trees/clumps should also be considered. In addition, retention of replacement trees should be considered if a desirable legacy tree replacement is within this area.

Treatment intent of CT-FT:

- Reduce stand density and increase mean diameter.
- Maintain and promote large tree forest structure and old forest characteristics while restoring the desired species composition and stand densities.
- Release legacy ponderosa pine, western larch, and Douglas-fir by removing younger trees for approximately twice the canopy drip line of the legacy tree(s). Overlap of other legacy tree crowns is acceptable and these other legacies would be retained. Release of replacement/future legacy trees/clumps would also be considered. In addition, retention of replacement trees would be considered if a desirable legacy tree replacement is within this area.
- Promote resiliency, reduce competition, and improve growth rates for remaining trees.
- Improve habitat for wildlife species that require large tree and old forest characteristics with low-to-moderate canopy cover.
- Maintain whitebark pine by reducing density of subalpine fir and artificially regenerating rust-resistant trees.
- Reduce potential for crown fire spread should a wildland fire occur.
- Restore a heterogeneous, fine-scale mosaic pattern.

Free Thin–Patch Cut-Modified Shelterwood (FT-PC-MSw)—5,343 acres (1,058 acres would occur within the outer half of RCAs. Only free thinning would occur within the outer half of the RCAs unless aspens are present.)

This treatment would be implemented primarily in PVGs 6, 7, 9, 10, and 11, which have evidence (e.g., relic trees, stumps, snags) of previously having an early seral tree species (e.g., aspen, whitebark pine, ponderosa pine, western larch, and/or Douglas-fir) component. Approximately 0.1% of the FT-PC-MSw treatment area is PVG 11 and potentially has whitebark pine present. Merchantable material would be removed from the site and utilized as markets allow. Noncommercial material (slash) would be lopped and scattered, mechanically harvested for fuelwood decks, removed, hand piled, machine piled, and/or broadcast burned to reduce fuel loading. No mechanical piling would be allowed within RCAs; hand piling would require approval by the District hydrologist or fisheries biologist. See Appendix 5 for a complete description of requirements associated with RCA harvest.

Implementing patch cuts would allow for regeneration (i.e., patch cut with reserves ranging from 3.0 to 10.0 acres, generally on less than 50% of a stand). In patch cuts, approximately 0–9 trees per acre would be retained as reserve trees. The patch would be either naturally or artificially regenerated after treatment. Unless the stand is predominately lodgepole pine (*Pinus contorta*) and the intent is lodgepole pine regeneration, these stands would only be naturally regenerated. In modified Shelterwood/Seed tree treatment areas (i.e., <40 acres) approximately 10–25 trees per acre would be retained as reserve trees and artificial or natural regeneration would be used to meet objectives.

Reserve tree preference would be legacy trees, replacement legacy trees, high-value wildlife trees (i.e., cavities, broken tops with structure for nesting), dominant nonserals, and healthy, vigorous serals in any crown class.

In portions of stands with an early seral component still remaining, free thinning or modified Shelterwood would be implemented. Free thin treatment would occur as described above. Portions of each stand (approximately 5–10%) not meeting the criteria for patch cuts, modified Shelterwood, or free thinning would not receive commercial treatment during this entry (e.g., skips).

Following treatment, these stands would be a mosaic of thinned areas, clumps of trees, and small openings. Canopy cover in thinned areas would average 10–30%; Canopy cover could be over 40% in untreated areas. Canopy cover in created patch cuts would generally be 0–10%, and less than 10 acres in size. Following prescribed burning, up to an additional 30%, and an average of 10%, of the overstory trees would be expected to be killed. The average canopy cover in these stands following harvest and underburn operations would be between 15% and 40%.

Treatment intent of FT-PC-MSw:

- Restore a heterogeneous fine- and landscape-level scale mosaic pattern by establishing varying patch sizes consistent with spatial patterns that improve forest resilience to disturbance.
- Retain and remove portions of stands that historically would not have been dominated by early seral species as clumps, skips, and gaps.
- Maintain early seral species in microsites.
- Reduce stand density and increase mean diameter.

- Maintain and promote large tree forest structure and old forest characteristics while restoring the desired species composition, and stand densities.
- Release legacy ponderosa pine, western larch, and Douglas-fir by removing younger trees for approximately twice the canopy drip line of the legacy tree(s). As discussed earlier, overlap of other legacy tree crowns is acceptable and these other legacies would be retained. Release of replacement/future legacy trees/clumps would also be considered. In addition, retaining replacement trees would be considered if a desirable legacy tree replacement is within this area.
- Promote resiliency, reduce competition, and improve growth rates for remaining trees.
- Maintain whitebark pine by reducing density of subalpine fir and artificially regenerating rust-resistant trees.
- Improve habitat for wildlife species that require large tree and old forest characteristics with low-to-moderate canopy cover.
- Promote and maintain willows (*Salix* species) in PVGs 7, 9, 10, and 11.
- Reduce potential for crown fire spread should a wildland fire occur.

Commercial Thin/Mature Plantations (CT-MP)—1,080 acres (177 acres in the outer half of RCAs)

This treatment would be applied to stands that were previously artificially regenerated (plantations). These stands are typically >30 years old and were planted predominately with ponderosa pine, Douglas-fir, and/or western larch. These mature plantations contain commercial trees with an average DBH >10 inches and would typically average approximately 70–80 trees per acre (which would generally result in crown spacing of 10–15 feet) after thinning. Thinning would generally favor retaining larger, early seral trees and be completed to create stands with variable densities while promoting a mix of desired species. Merchantable material would be removed from the site and utilized as markets allow. Noncommercial material (slash) would be lopped and scattered, mechanically harvested, hand piled, machine piled, and/or broadcast burned to reduce fuel loading. The cost of slash treatment, CWD, and fuel loading would be considerations in determining the method of noncommercial material treatment. No mechanical piling would be allowed within RCAs; hand piling would require approval by the District hydrologist or fisheries biologist. See Appendix 5 for a complete description of requirements associated with RCA treatments.

Following treatment, these stands would appear more open. Canopy cover in these stands are currently moderate to high and would be reduced to low canopy cover (between 25% and 35%) after treatment.

Treatment intent of CT-MP:

- Promote large tree forest structure while restoring the desired species composition and stand densities.
- Promote spatial heterogeneity in species diversity (i.e., retention of naturally regenerating aspen or other desired species when present), canopy cover, and density.
- Reduce stand density and increase mean diameter.

- Promote resiliency, reduce competition, and improve growth for remaining trees.
- Reduce potential for crown fire spread in the event of a wildland fire.

Conifer Removal in Aspen Stands (CT-ASP)—1,087 (181 acres within the outer half of RCAs or adjacent to seeps and springs)

This treatment would be implemented in forest types with evidence (e.g., relic early seral trees, stumps, snags) of previously having a dominant aspen overstory. The treatment would occur in stands that still have a dominant component of aspen present. To be considered an aspen patch, an area must have an average spacing of <20 feet between stems and be larger than 1/10 acre in size (not dependent on age class). Merchantable conifers would be removed from the clone and utilized as markets allow (if within an RCA, PDFs and Appendix 5 requirements would be met). Noncommercial material (slash) would be lopped and scattered, mechanically harvested for fuelwood decks, removed, hand piled, machine piled, and/or broadcast burned to reduce fuel loading. No mechanical piling would be allowed within RCAs; hand piling would require approval by the District hydrologist or fisheries biologist. See Appendix 5 for a complete description of requirements associated with RCA harvest.

Following treatment, these stands would be a mosaic of thinned areas, clumps of trees, and openings around aspen clones. The average canopy cover in these stands after harvest and underburn operations would be between 15% and 40%. Conifer canopy cover within and adjacent to aspen clones would generally be reduced to less than 25%.

Treatment intent of CT-ASP:

- Re-establish aspen stands where they have departed from desired conditions as described in Campbell and Bartos (2000). The CT-ASP would generally remove all conifers potential exceptions for retention include legacy ponderosa pine, western larch, and Douglas-fir. Conifers within 100 feet of the south and west edges of aspen stands and within 50 feet on the north and east edges of aspen stands would be removed. Whole tree yarding would be used to limit slash concentrations within the aspen stands. If slash levels exceeded quantities that would allow effective prescribed burning, excess would be hand piled in the outer half of RCAs and burned. To initiate suckering of the root system, units would be burned; additionally, aspen may, in limited cases, be girdled or felled when other treatment options have failed. Active ignition for the prescribed burn would occur within the RCA where SWRA resource conditions would be maintained or improved.
- Establish varying patch sizes and densities (using FT-PC-MSw treatments as described above) consistent with spatial patterns created by historical fire regimes in areas adjacent to aspen clones. Retain portions of stands that historically would not have been dominated by early seral species as skips.
- To ensure that aspen are restored in riparian areas, both commercial harvesting and hand treatments (including girdling, NCT, and felling conifer trees) may occur within the outer half of RCAs and adjacent to seeps and springs. No equipment would be permitted within perennial or intermittent RCAs or within 30 feet of seeps and 120 feet of springs (see Appendix 5 for definition of seep vs. spring). Location and treatment type within RCAs, seeps, and springs would be determined on a site-by-site basis. In some locations near

seeps and springs, fencing may be needed to protect aspen and soils during recovery, and this would be determined on a site-specific basis.

Additional Vegetation Treatments—5,809 acres

These treatments would include a combination of commercial logging, NCT, and prescribed burn. Treatment areas would be those with unique characteristics (e.g., geography, hydrology, geomorphology, and species composition) that make treatment highly variable from stand to stand. Potential commercial harvest systems include ground based, skyline, and/or helicopter. Harvested trees would generally be removed with the limbs and tops attached. The limbs and tops would be utilized as biomass or other products, where practical. Where appropriate and needed, noncommercial-sized (i.e., <8 inch DBH) trees would be cut to reduce ladder fuels and promote desired species composition. Following treatment, these stands could be underburned as described in the prescribed burn section below. These additional vegetative treatments have been divided into the categories described below. As with other vegetation treatments described, no equipment would be permitted within perennial or intermittent RCAs or within 30 feet of seeps or 120 feet of springs.

Vegetation Treatments in Stands with Low Site Quality (LSQ)—850 acres (166 acres within the outer half of RCAs)

These stands typically have stocking rates not conducive to commercial harvest; however, in many cases restoration needs exist in overstocked forested pockets. In many of these stands, an early seral species component is being affected by increased ladder fuels and insect/disease issues. Approximately 5% of the low site quality (LSQ) treatment areas occur in PVG 11 and potentially in stands containing whitebark pine. Thinning (commercial and noncommercial), piling (machine or hand), and prescribed fire treatments are proposed in timber stands with lower densities. No mechanical piling would be allowed within RCAs; hand piling would require approval by the District hydrologist or fisheries biologist. These stands generally will not contribute to the Allowable Sale Quantity (ASQ).

Treatment intent of LSQ:

- Maintain legacy trees while reducing stand densities and ladder fuels.
- Restore natural fire disturbance regime to improve understory plant diversity and vigor and provide habitat for native species.
- Move the Project area toward a prefire suppression vegetative condition related to stand density, tree size class, and species composition to enable the reintroduction of fire into a fire-adapted ecosystem.
- Maintain whitebark pine by reducing density of subalpine fir and artificially regenerating rust-resistant trees.
- Promote resiliency and reduce competition for remaining trees.

Commercial and Non Commercial Thinning within Nonforested (dry and wet)

Nonforested stratum includes nonforested areas and wet meadow areas typically incapable of supporting more than 10% stocking rates of conifers. Thinning (commercial and noncommercial) and prescribed fire treatments are proposed in these areas to address Forest Plan Objective 0325 for the Weiser River MA, which states, “Maintain and promote native grasses and aspen where

they occur…" (USDA Forest Service 2003b). Approximately, 4,519 acres will be treated with noncommercial treatments and 55 acres with commercial/noncommercial treatments. These stands generally will not contribute to the ASQ.

Nonforested Treatment (NFT)—4,519 acres (405 acres within the outer half of RCAs)

The NFT areas include grasslands, sagebrush, scablands, and dry meadows. Fire exclusion has led to an expansion of young conifers along the edges and a decadency of upland shrubs, grasses, and forbs. Treatment of encroaching conifers includes a combination of felling, skidding, and lop and scatter or hand piling, followed by burning. No mechanical piling would be allowed within RCAs; hand piling would require approval by the District hydrologist or fisheries biologist. The remaining dry meadow complexes may be treated with prescribed fire.

Since the conifer encroachment is generally concentrated along the nonforested edge, it is expected that only 40% of each nonforested treatment area would need hand thinning and piling. Conifer canopy cover within nonforested treatment areas will generally be reduced to less than 10%. Prescribed fire treatment may occur throughout the entire treatment type.

Treatment intent of NFT:

- Restore natural fire disturbance regime in dry meadows to enhance upland meadow species, increase meadow acreage, improve plant diversity and vigor, and provide habitat for native species.
- Move the Project area toward a prefire suppression vegetative condition related to stand density, tree size class, and species composition to enable the reintroduction of fire into a fire-adapted ecosystem.

Wet Meadow Treatment (WMT)—55 acres (all within the outer half of RCAs)

The WMT areas include wet meadows, many of which have higher tree densities and reduced riparian vegetation within the Project area. The preferred approach is to treat wet meadows in one entry using a combination of mechanical treatment or hand treatment followed by prescribed burn. Treatment prescriptions for wet meadows would be designed with input from the District wildlife biologist, hydrologist, and soil scientist.

Equipment would not be allowed within 30 feet of seeps, 120 feet of springs, or anywhere on hydric soils. Treatment would be limited to the outer half of these RCAs. In some locations near seeps and springs, fencing may be needed and this would be determined on a site-by-site basis. Conifer canopy cover within and adjacent to wet meadows will generally be reduced to less than 10%.

Treatment intent of WMT:

- Restore physical and biological (terrestrial and aquatic diversity and abundance) and ecological meadow processes (evapotranspiration) and functions (flow dispersal, ground water recharge, and sediment retention) appropriate for the current climate regime and comparable to reference conditions, and offer resiliency to future climate regimes by restoring functional processes.
- Restore fire in wet meadows to enhance riparian habitat for native riparian-dependent species, increase meadow acreage, improve plant diversity and vigor, provide habitat for native species, increase water availability for wetland species, and provide wetter conditions for a longer duration each year.

- Provide diverse wildlife habitat for native riparian-dependent species.

Proposed Vegetation Treatments within RCAs—2,933 total acres

As described above, thinning and prescribed fire treatments are proposed in RCAs to maintain upland vegetation within the desired conditions. These acres are not additional acres of proposed treatment and are accounted for in the treatments listed above. The RCA treatments would apply to nonriparian vegetation in the outer half of RCAs and would move more vegetation toward DFCs as described in the Forest Plan (USDA Forest Service 2003a, pp. III-30, A-15 and III-131; Objectives 0325 and 0326). Appendix 5 of this document describes in detail PDFs and requirements for RCA treatments.

Shaded Fuelbreak (SFB)—370 acres (52 acres in outer half of RCAs)

The SFBs would be created using existing NFS roads (50186, 50206, and 51763) and terrain features on approximately 370 acres to provide areas to control large or emerging fires in a safe manner for firefighters and also protect the values to the east of the Project (Tamarack Ski Area and structures in this area) and other private lands. This treatment would involve reducing crown closure, piling and burning ladder fuels (excavator or hand piles), or using a masticator to reduce fuel loading. The width of the fuelbreak would range from 0 to –500 feet wide, depending on fuel type, site slope, and the risk level associated with protecting improvements and increasing firefighter safety.

As with the prescribed fire treatments described above, prescribed burning would, with the approval of the District hydrologist or fisheries biologist, be directly applied to portions of the RCAs within the SFB and allowed to back in other portions. Active ignition would occur within the RCA only where soil and water resource conditions would be maintained or improved.

Thinning (commercial and noncommercial), piling (machine or hand), and prescribed fire treatments are proposed in SFBs.

Treatment intent of SFB:

- Increase fire fighter safety.
- Provide protection for values at risk (WUI, private land, past investments).
- Maintain legacy trees while reducing stand densities and ladder fuels.
- Promote resiliency and reduce competition for remaining trees.

Fuel Reduction within an Riparian Conservation Area (FR-RCA)—15 acres

The FR-RCA would occur within approximately 0.5 mile of a stream corridor or on about 15 acres within an RCA near the junction of two open NFS roads (50186 and 50206). Location of the FR-RCA treatment area was based on location of the SFB, proximity to county-maintained road 50206, and presence of high conifer density and fuel loading in the RCA understory. Within this defined location, RCA treatments would occur within the inner RCAs but would not occur within 15 feet of the stream channel; treatments would include understory/overstory thinning and prescribed burning. Treatments would be done by hand, remove less than 40%–50% of the canopy cover, and be developed in consultation with the District fisheries biologist and/or hydrologist to ensure that streambank stability, LWD recruitment, stream shade, and ground cover are addressed and riparian functions are maintained or improved as required by Forest Plan SWST10 (USDA Forest Service 2003a).

Treatment intent of FR-RCA:

- Reduce fuel loading within RCA boundaries where they intersect with fuelbreaks.
- Improve firefighter safety (ingress and egress via the adjacent NFS roads) by reducing fine- and ladder-fuel loading.
- Create a gradual transition between the treated upland and the stream channel, which would move treated stands toward desired conditions in Appendix A of the Forest Plan (USDA Forest Service 2003a) and increase the likelihood of achieving desired effects from prescribed burn operations.

Prescribed Fire Treatments (PFT)—24,200 acres (6,319 acres within RCAs)

Proposed prescribed burning would occur on approximately 24,200 acres (Table 2.2-4) over the next 15–20 years. Commercial activities would generally be completed prior to applying fire. Reintroducing 500–10,000 acres of fire annually for the next 15–20 years would move forested and nonforested vegetation towards conditions that more closely represent DFCs.

Table 2.2-4. Vegetation treatment summary, including acres of prescribed burn treatments—Alternative 2.

Type of Vegetation Treatment	Acronym	Total Acres
Noncommercial Thin	NCT	1,279
Burned Areas/Plantations	BA/PL	3,240
Commercial Thin-Free Thin	CT-FT	2,875
Free Thin–Patch Cut-Modified Shelterwood	FT-PC-MSw	5,343
Commercial Thin/Mature Plantations	CT-MP	1,080
Conifer Removal in Aspen Stands	CT-ASP	1,087
Vegetation Treatments in Stands with Low Site Quality	LSQ	850
Nonforested Treatment	NFT	4,519
Wet Meadow Treatment	WMT	55
Shaded Fuelbreak	SFB	370
Fuel Reduction within a Riparian Conservation Area (RCA)	FR-RCA	15
Total Acres of Vegetation Treatments		**20,713**
Prescribed Fire Treatments	PFT	24,200

Note: Acres includes area within RCAs.

Primary target areas (9,400 acres) for treatment consist of stands with historically high fire frequencies and lower severities (grasslands and stands dominated by seral species such as ponderosa pine, Douglas-fir, and western larch). Secondary target areas (14,800 acres) include stands with historically moderate fire frequency and mixed severities stands comprised of both seral and nonseral species (i.e., grand fir).

A mosaic-like application of fire would reintroduce fire to approximately 75% of treated primary targeted acres and 50% of treated secondary targeted acres. All acres targeted for fire application would be available for NCT in order to minimize mortality from prescribed burning and aid in moving towards DFCs. Only those acres identified for vegetation treatments within RCAs would be included in the acres available for NCT.

Fire would only be applied to nontarget areas to minimize fire intensities and severities. These stands comprise young plantations, stands of historically low frequency and high severities, and stands set aside for other resource concerns or objectives (e.g., wildlife cover). Approximately 20% of nontarget acres located within the proposed burning areas would be expected to receive

fire through backing (low-intensity fire spread without additional lighting). This minimal fire spread would not alter overall stand conditions within the nontarget areas.

Prescribed burning would be used to reduce fuel loads and rejuvenate vegetation. Aspen stands in the Project area are in particular need of rejuvenation and regeneration. Coniferous trees have encroached on aspen stands due to the lack of natural fire (Swanson et al. 2010). In the past, fire killed encroaching conifers and induced aspen root sprouting. After treatment, these areas would appear more open.

Existing barriers to fire spread (barren ridgelines, roads, and trails) would be used where possible to contain prescribed burns within specified boundaries. In areas where existing barriers are insufficient to control fire spread, handline would be constructed. Hand-constructed fireline would be limited to use only where necessary. The integrity of existing trails and roads would be considered in the application of fire, and damage caused by these actions would be repaired. Constructed fireline would be rehabilitated after use.

Fire would be ignited by hand or aerially. Prescribed burning operations may occur from early spring to late fall. Fire may be applied to tree wells in winter or early spring to reduce fuel accumulation and to reduce the potential for tree mortality during regular broadcast burning. Maintenance burning (burning after initial application of fire) would occur every 5–10 years to maintain DFCs in high-frequency fire regimes. Prescription parameters (wind speed, fuel moisture, smoke dispersion, and other resource area objectives) would influence burn opportunities. Active ignition for the prescribed burn would occur within the RCA where SWRA resource conditions would be maintained or improved and where approved of in advance by the District hydrologist and/or fisheries biologist. Active ignition within riparian vegetation would not occur, but fire would be allowed to back in RCAs.

All burning would follow Forest Plan Standards and Guidelines (USDA Forest Service 2003a) and adhere to national and State air quality regulations. Specific conditions under which burning would occur would be developed through a prescribed burn plan prior to ignition.

Table 2.2-5 displays only those acres within RCAs proposed for treatment.

Table 2.2-5. Vegetation treatment acres within Riparian Conservation Areas (RCAs), Alternative 2.

Type of Vegetation Treatment within RCAs	Acronym	Total Acres
Noncommercial Thin	NCT	153
Burned Areas/Plantations	BA/PL	391
Commercial Thin-Free Thin	CT-FT	347
Free Thin–Patch Cut-Modified Shelterwood[a]	FT-PC-MSw	1,058
Commercial Thin/Mature Plantations	CT-MP	177
Conifer Removal in Aspen Stands	CT-ASP	181
Vegetation Treatments in Stands with Low Site Quality	LSQ	166
Nonforested Treatment	NFT	405
Wet Meadow Treatment	WMT	55
Shaded Fuelbreak	SFB	52
Fuel Reduction within an Riparian Conservation Area (RCA)	FR-RCA	15
Total Acres of Vegetation Treatments in RCAs		**3,000**
Prescribed Fire Treatments[b, c]	PFT	6,319

[a]Only CT-FT would be used in this type of treatment unless there is aspen present where Conifer Removal in Aspen Stand treatment would be utilized in that portion of the outer RCA.
[b]The PFT is not counted in the grand total of treatment acres due to the overlap of treatment acres with many of the vegetation treatments.
[c]Prescribed burn would be allowed to back into inner RCAs.

Associated Actions

A number of activities associated with implementing these vegetation treatments are necessary.

Road Maintenance—Road maintenance includes work on open and closed NFS roads and the following activities, dependent on designated maintenance level (ML): surface blading, culvert and ditch cleaning, removal of encroaching brush, installation of drivable dips or water bars, culvert installation and replacement, culvert removal and crossing stabilization, cut and fill stabilization, and surface replacement. This maintenance would occur on NFS roads used by the Project, both those open for public and/or administrative use, including seasonally open roads, and those designated for long-term storage (ML 1). Approximately 137.5 miles of roads are proposed for maintenance.

Temporary Roads—Temporary roads are defined as roads authorized by contract, permit, lease, other written authorization, or emergency operation that are not intended to be part of the Forest transportation system; that are not necessary for long-term resource management; that are not forest roads or forest trails; and that are not included in a forest transportation atlas. Both planned and incidental temporary roads would be utilized and obliterated after Project implementation. Planned temporary roads are defined as routes identified during the planning process and depicted on Project maps. Some of the planned temporary roads would be newly constructed; however, most of the planned temporary roads have existing roadbeds (unauthorized routes) in place. Up to 9.7 miles of planned new and 34.8 miles of existing unauthorized routes would be used as temporary roads and obliterated after use. Incidental temporary roads are roads needed to complete vegetation treatments but cannot yet be identified due to the level of site-specificity necessary. These incidental temporary roads would be preferentially located on existing roadbeds (unauthorized routes) where possible and be obliterated when logging is completed. Incidental temporary roads would require approval by resource specialists prior to construction and would be limited to 7.0 miles or less of temporary road (not on an existing roadbed) throughout the Project area.

Harvest Residue Management—Management of forest residues may include machine and hand pile burning, mastication, residue recycling via fuelwood and within-unit residue redistribution, broadcast/underburning, lop and scatter, and removal for biomass or biochar for energy.

Site Preparation—After harvest activities are completed, but prior to planting in proposed areas, site preparation may be completed to reduce competition to seedlings from brush and grass. All site preparation activities would be consistent with wildlife and SWRA resource requirements, specifically detrimental disturbance and CWD.

Planting—Planting of ponderosa pine, rust-resistant whitebark pine, western larch, Douglas-fir, and/or Engelmann spruce seedlings on all proposed regeneration treatments would be completed as necessary to meet desired stocking levels. The species mix would depend on elevation and site conditions. Fencing or tree tubes may be used where necessary, especially in whitebark pine planting units.

Firewood Availability—Areas and roads currently closed and used for timber harvest would be evaluated for firewood retrieval, including firewood decks. These areas may be made available for public use for a limited time period. The NFS roads currently closed may be opened for a limited time to the public in the summer for firewood retrieval if resource objectives are met and the road has a minimum of 10 cords of firewood available. Snags identified for retention to meet wildlife habitat needs would be tagged as not to be cut. Roads in long-term closure would not be opened. Areas not meeting the minimum number of snags as defined in the Forest Plan (USDA Forest Service 2003a) would not be opened.

Watershed Improvement and Restoration Treatments

Proposed watershed treatments would improve watershed function and resiliency by minimizing the impact of the road and trail network throughout the Middle Fork Weiser River subwatersheds and restoring vegetation and soil productivity in riparian areas. Treatments include road and trail decommissioning, improvements, and reroutes; dispersed recreation site improvements within the Middle Fork Weiser River RCA; and vegetation treatments designed to restore or enhance native riparian vegetation through mechanical or hand treatment, prescribed burning, and planting and seeding.

Since impediments to watershed function, such as road density and disturbance in RCAs, are present in relatively equal proportions within each subwatershed, the higher the percentage of NFS land, the greater the immediate opportunity to restore the subwatershed to DFCs, as stated in the Purpose and Need section. Table 2.2-6 displays land ownership and Watershed Condition Class (as defined by the WCF) by subwatershed.

Table 2.2-6. Land ownership, Forest Plan restoration Objective, and Watershed Condition Class by subwatershed.

Watershed	National Forest System lands (%)	Forest Plan/Project Restoration Objective	Watershed Condition Class
Granite Creek	93	Move Toward Appropriate Function	Impaired (Class 3)
Mica Creek	73	Move Toward Appropriate Function	Impaired (Class 3)
Jungle Creek	65	Move Toward Appropriate Function	At Risk (Class 2)
Little Fall Creek	34	Move Toward Appropriate Function	At Risk (Class 2)

Road treatments proposed for this Project were developed using the TAP conducted in 2013 (USDA Forest Service 2013a). Changes to the NFS road network are proposed to reduce road-related impacts to water quality and fish habitat, as well as reduce overall road density and comply with the Travel Rule (36 CFR Parts 212, 251, 261, and 295, 2005) requirement of establishing a MRS.

Roads that are recommended to remain on the landscape as part of the MRS would be maintained and improved to reduce sediment production (guided by recommendations from site-specific sediment modeling). Aquatic Organism Passage (AOP) would be improved at two crossings as described below. The NFS roads not needed for future management or access and unauthorized routes are identified for decommissioning.

The NFS road treatments proposed throughout the Project area include maintenance and/or improvement (see “Transportation Management” section below).

Long-term Closure of Roads—17.8 miles

The NFS roads that were either known to resource specialists as high-priority candidates for long-term closure due to their location (e.g., located within an RCA or known to be contributing to sediment delivery in streams) and/or were field surveyed due to their proximity to streams or stream crossings and found to be inhibiting proper stream or watershed function and were identified as unneeded for a period of at least 30 years would be put into long-term closure (total of 17.8 miles; Table 2.2-7). To improve the condition of these roads, work includes scarifying (if needed), installing cross-ditches, removing or bypassing culverts and establishing vegetation at stream crossings, and blocking or recontouring the entrance. This would both reduce impacts on watershed function and save road maintenance funds, enabling maintenance-free storage of the road.

Table 2.2-7. Soil, water, riparian, and aquatic resource improvement treatment summary, Alternative 2.

Type of Treatment	Miles or Number
Long-term Closure	17.8 miles
Total Road Decommissioning	80.7 miles
National Forest System Road Decommissioning	16.1 miles
Unauthorized Route Decommissioning	64.6 miles
Total Road Decommissioning in Riparian Conservation Areas	24.6 miles
National Forest System Road Decommissioning	7.1 miles
Unauthorized Route Decommissioning	17.3 miles
Aquatic Organism Passage/Habitat Connectivity	2 culverts

Road Decommissioning—80.7 miles

Decommissioning treatments proposed range from full recontour to spot treating isolated areas, such as stream crossings, on roads that have little-to-no defined prism and have recovered based on the professional judgment of the District hydrologist or soil scientist to a point where features blend with the surrounding terrain and hydrologic and soil functions are largely restored. Natural recovery is not a common occurrence, and usually these "recovered roads" are legacy, nonengineered skid trails or temporary roads that were never recontoured following past management activities. Roads that were engineered (prism and drainage structures) largely require treatment to restore natural physical and biological processes (Lloyd et al. 2013).

Roads identified for decommissioning that were also recognized during planning as needed for administration of grazing permits (i.e., as stock driveways or access to range improvements) would be treated to allow passage of cattle and provide for other necessary grazing permit activities but would not be designed for motorized access. The maximum restoration of soil-hydrologic function would be achieved while providing access to grazing permittees as well as a barrier to unauthorized use, which would result in decompaction of most of the road surface and a remnant path wide enough for livestock passage and grazing permit activities. These roads are exceptions to the description of road treatments above; they would be closed to public use and be incorporated into the grazing annual operating instructions (AOIs) as authorized infrastructure for use by the permittee only. These roads are identified in the Project data, and final actions would be determined during implementation.

Approximately 80.7 miles of road would be decommissioned, including 16.1 miles of NFS roads and 64.6 miles of unauthorized routes (Table 2.2-7). A total of 24.6 miles of routes proposed for decommissioning are located within RCAs (Table 2.2-7).

Aquatic Organism Passage (AOP)/Habitat Connectivity

Two culverts that restrict proper hydrologic function and passage of fish and other aquatic organisms would be replaced (Table 2.2-7):

1) NFS road 50186 at the Middle Fork Weiser River near the junction with NFS road 50245
2) NFS road 50186 at Big Creek

Temporary culverts or bridges would be installed where planned temporary roads cross intermittent or perennial streams or on closed system roads where culverts have been removed. Where needed, AOP would be provided.

Transportation Management

All road miles are approximate and based on field and GIS data.

Five sources of material are identified and would be used for road improvement (Table 2.2-8). Road surface material sources will be the same in each of the action alternatives.

Table 2.2-8. Material to be used for road improvement, including the source, location, access road, and type.

Source of Material	Location	National Forest System Access Road	Material Type
Five Corners	SW ¼ NE ¼ Section 29, T. 17 N., R. 2 E	51817	Pit-run and crushed aggregate
Wolf Creek Crossing	SW ¼ NE ¼ Section 33, T. 15 N., R. 2 E	50326	Pit-run and crushed aggregate
Jungle Pit	T. 16 N., R.2 E., SEC 23	51796	Pit-run and crushed aggregate
Fall Creek Pit	NE ¼ NE ¼ Section 23, T. 15 N., R. 2 E.	50436	Pit-run and crushed aggregate
Warm Bar Pit	NW ¼ SE ¼ Section 11, T. 15 N., R. 1 E.	50186	Rip-rap and crushed aggregate

Road Reconstruction—11.0 miles

Road reconstruction in the Project area includes any activity that improves or realigns an existing NFS road as defined below:

- Road improvement—Activity that results in an increase of an existing road's traffic service level expansion of its capacity or a change in its original design function.
- Road realignment—Activity that results in a new location of an existing road or portions of an existing road and treatment of the old roadway.

Approximately 8.8 miles of road resurfacing would be completed on NFS road 50214 (King Hill–Fall Creek Road), NFS road 50245 (Granite Creek Road), and NFS road 50692 (Little Creek Road) using crushed rock sources to improve the road surface and reduce watershed and fisheries impacts from sedimentation. Road reconstruction within RCAs totals 5.5 miles.

In addition to the areas identified above, spot graveling of roads would occur at crossings, dips, and soft spots.

<u>Road Realignment</u>

To reduce sediment and other road effects on water quality and riparian habitat, 3.0 miles of existing NFS road would be realigned away from RCAs; 2.2 miles of road would be constructed in the realignment for a net decrease of 0.8 mile of road. Roads to be realigned include segments of the following NFS roads: 50489, 50566, 50707, 51547, and 51791.

Road Maintenance—137.5 miles

Other Road Actions

<u>Implement Long-Term Storage Best Management Practices (BMPs)</u>

Approximately 5.5 miles of NFS road that are currently ML 1 would have BMPs implemented. These are roads that were designated as 1 in the past but where BMPs were never implemented

(i.e., culverts are still in place; prisms, cuts, or fills are unstable). These ML BMPs are designed to ensure the road can be stored, with minimal maintenance, for a period up to 30 years. Treatment would include removing culverts, installing water bars to ensure surface drainage, outsloping, or other treatments that would reduce sediment transport from the road and preserve the integrity of the road prism for future use.

Maintenance Level (ML) 1 to ML 2 Roads

Approximately 14.2 miles of NFS road that are currently ML 1 would be converted to ML 2 and would remain closed to public travel. These are roads that currently have easements for access by DF Development LLC. Converting the roads to ML 2 would allow for maintenance while providing private access. The BMPs required to put these roads into long-term storage consistent with the ML 1 designation were never implemented, so this ML 1 to ML 2 conversion will not result in "undoing" treatments like restored stream crossings, waterbars, or cut and fill stabilization on the ground. Physical closure would be ensured through maintenance or installation of gates or other physical barriers.

Ensure Effective Closure on Year-round and Seasonally Closed National Forest System (NFS) Roads

If needed, closed NFS roads would be improved to ensure effective closure through the use of gates (ML 2 roads only), barriers, or obliterating the first portion of the road (generally the line of sight distance from the start of the road to where it turns out of view; this applies to ML 1 roads only). Ensuring effective closures may also be implemented in ongoing road maintenance activities.

Recreation

Recreational use within the Project area is low in the spring and winter, moderate during the summer, and higher in the fall, during hunting season. One developed campground, Cabin Creek, is located in the Project area, and additional camping occurs in dispersed sites adjacent to open roads. Both motorized and non-motorized trails occur within the area. Trail use is low-to-moderate. Trail maintenance, minor trail realignments, trail reestablishments, and trail construction to realign trails around private land are proposed. Work would focus on trails on the east side of Council Mountain, which are located in the headwaters of main tributaries to the Middle Fork Weiser River. Trailhead development off private land is also proposed to better accommodate recreational use of these trails.

Developed and Dispersed Recreation Improvements

Cabin Creek Campground would be improved as follows:

- Install one single vault toilet to replace the old existing one and relocate the new toilet to meet all required health and safety codes.
- Add new site markers to individual campsites, replace an existing fee tube and information kiosk, install accessible tables, and build an accessible pathway to the water system.
- Gravel the main campground loop road and widen the road and turn at the campground access to accommodate full-size recreational vehicles.

The Horse Cabin Flat dispersed site would be improved by installing hitch rails, designating up to five camping sites with metal fire rings using boulders, installing gravel and site signs to mark the allowed camping locations, and adding a single vault toilet.

The crossing of the Middle Fork Weiser River at the dispersed camping area near the confluence with Jungle Creek would be hardened for stock use and to minimize resource damage and focus motorized access to the existing bridge approximately 300 feet from this crossing. Other general improvements would be made to the site, such as reducing in size and hardening campsites and providing physical barriers to direct use in order to minimize impacts to the adjacent Middle Fork Weiser River.

Roads identified for decommissioning located at the intersection with NFS open or seasonally open roads would be evaluated for site-specific dispersed recreational opportunities within 300 feet of the NFS road junction if no resource concerns are identified.

The Forest Service will evaluate sites for motorized access via both spur road (see above, by leaving 300 feet or less of a decommissioned road as dispersed site access) and walk-in access from the main road. Because non-motorized dispersed recreational opportunities may be decreased, the Forest Service will evaluate a reasonable number of spurs and dispersed campsites specifically for walk-in sites, as resource conditions allow. For walk-in sites, the access route may be narrowed from a width of 14 to 16 feet to hiking trail standards or some intermediate width, based on on-site conditions.

Trail Improvements

The south portion of NFS trail 198 (4.4 miles) and the east portion of NFS trail 205 (2.0 miles) would be rerouted to avoid sections currently on private land with no easement held by the Forest Service to provide legal access to these trails. New trailheads would be established on NFS land near Cabin Creek Campground for NFS trail 198 and 0.5 mile north of Lake Creek on NFS road 186 for NFS trail 205.

Motorized use is currently present and allowed within the Council Mountain IRA. To accommodate continued two-wheel motorized access on the entirety of NFS trail 198, the designation of a short section (2.0 miles) of the trail would be changed from non-motorized to two-wheel motorized use.

Trail maintenance (including proper signing) would be performed to bring all 28 miles of existing open designed trail to trail class and standard, as defined in the Trail Management Objective (TMO) (TMOs for each trail are found in the Forest Service - Payette National Forest Trails database called INFRA Trails) for that trail, within the Project area. Maintenance levels would vary from routine to heavy, depending on the trail condition and trail class. The NFS trail 518 would need to be reestablished/reconstructed in several sections.

A new motorized OHV loop trail (open to vehicles 70 inches and less in width) would be constructed and formally designated for seasonal use. This trail would be constructed using closed NFS road 50166 and closed NFS road 50485 for a motorized trail approximately 3 miles long. This trail would require constructing 0.5 mile of new trail to complete and close the loop.

Approximately 0.8 mile of former NFS trail 202 would be signed and formally designated as open for non-motorized use. This trail would be designated as NFS trail 212 and is referred as NFS trail 212 in this FEIS. For this trail, switchback construction would be needed to mediate the steep sections. This is the only proposed action proposed in the East Fork Weiser River subwatershed.

The trailhead for NFS trail 209 (an all-terrain vehicle [ATV] trail) would be relocated onto NFS lands. The map would need to be corrected to coincide with the actual trail location. The designation of NFS trail 209 would be changed from “open year round” to “seasonal” to coincide with other seasonal trail and road designations in the immediate area.

Portions of NFS trail 198 (not to exceed 1.0 mile) would be re-routed near the base of Council Mountain to reduce resource impacts and improve sustainability. Work would also need to be done to reduce congestion of multiple trail junctions in this sensitive upper elevation trail network.

Approximately 3.4 miles of the West Mountain Jeep Road NFS road 51763 would be converted from Level 2 open road to a trail open to all vehicles to better reflect the type of motor vehicle use this route can accommodate. This change would add 3.4 miles of trail to the NFS trail system.

Council Mountain and Poison Creek Inventoried Roadless Areas (IRAs)

The following activities are proposed for the Council Mountain and Poison Creek IRAs (These miles are included in those described in previous sections and not additional proposals):

- Sign and formally designate 0.8 mile of NFS trail 212 as open for non-motorized use. Complete needed switchback trail construction to mediate the steep sections.
- Reroute the south portion of NFS trail 198 (2.3 miles located in the IRA) and the east portion of NFS trail 205 (1.5 miles located in the IRA) to avoid sections currently on private land with no easement held by the Forest Service to provide legal access to these trails.
- Reroute portions of NFS trail 198 near the base of Council Mountain to reduce resource impacts and improve sustainability. Work to reduce congestion of multiple trail junctions in this sensitive upper-elevation trail network.
- Motorized use is currently present and allowed within the Council Mountain IRA. To accommodate continued two-wheel motorized access on the entirety of NFS trail 198, change the designation of a short section (2 miles) of the trail from non-motorized to two-wheel motorized use.
- Full obliteration would occur on 10 segments (1.0 mile) of unauthorized route.
- Trail maintenance would occur on 15 miles.

Council Mountain Research Natural Area (RNA)

No activities are proposed in the Council Mountain RNA.

2.2.3. Alternative 3

Alternative 3 addresses internal and external comments requesting a more effective watershed restoration effort and proposals to address wildlife security. This alternative would treat PVGs 2, 5, and 6 but not PVGs 7–11 and would emphasize watershed restoration treatments in the Granite Creek subwatershed.

2.2.3.1. Vegetation Treatments

Under Alternative 3, vegetation treatments are identical to those under Alternative 2 except for the following, which are not included in this alternative:

- Treatments in PVGs 7–11
- Proposed SFBs
- Proposed fuels reduction within an RCA treatment

The description and intent of treatments are identical to those described in Section 2.2.2. Table 2.2-9 summarizes the vegetation treatments proposed in Alternative 3, and Table 2.2-10 summarizes the vegetation treatments proposed in RCAs. Vegetation and fuels treatments in PVGs 7–11 would not move more than 30% of suitable Canada lynx source habitat to unsuitable, following the 2000 LCAS (Ruediger et al. 2000) requirements. Additionally, none of the whitebark pine populations in PVG 11 would be maintained or artificially regenerated with rust-resistant trees.

Prescribed Fire Treatments—16,600 acres (4,511 acres within RCAs)

Proposed prescribed burning would occur on approximately 16,600 acres over the next 15–20 years. The types of treatments are identical to Alternative 2. The primary target area is 2,800 acres and the secondary target is 13,800 acres.

Associated Actions

The types of associated actions proposed under Alternative 3 are identical to those proposed under Alternative 2. Approximately 8.1 miles of new planned temporary road would be constructed and 27.5 miles of existing unauthorized routes would be utilized as temporary road and fully recontoured following use. The types of road maintenance actions proposed under Alternative 3 would be identical to those proposed under Alternative 2. Roads proposed for maintenance total 129.7 miles.

Table 2.2-9. Vegetation treatment summary, Alternative 3.

Type of Vegetation Treatment	Acronym	Total Acres
Noncommercial Thin	NCT	921
Restoration Burned Areas/Plantations	BA/PL	3,178
Commercial Thin-Free Thin	CT-FT	2,697
Free Thin–Patch Cut-Modified Shelterwood	FT-PC-MSw	4,946
Commercial Thin/Mature Plantations	CT-MP	1,039
Conifer Removal in Aspen Stands	CT-ASP	900
Vegetation treatments in stands with Low Site Quality	LSQ	715
Dry Nonforested Vegetation Treatment	NFT	3,592
Wet Meadow Treatment	WMT	43
Shaded Fuelbreak	SFB	0
Fuel Reduction within a Riparian Conservation Area (RCA)	FR-RCA	0
Total Acres of Vegetation Treatments		**18,031**
Prescribed Fire Treatments	PFT	16,600

Note: Acres include area within RCAs.

Table 2.2-10. Vegetation treatment acres within the outer portion of Riparian Conservation Areas (RCAs), Alternative 3.

Type of Vegetation Treatment within RCAs	Acronym	Total Acres
Noncommercial Thin	NCT	109
Burned Areas/Plantations	BA/PL	380
Commercial Thin-Free Thin	CT-FT	331
Free Thin–Patch Cut-Modified Shelterwood[a]	FT-PC-MSw	977
Commercial Thin/Mature Plantations	CT-MP	172
Conifer Removal in Aspen Stands	CT-ASP	148
Vegetation Treatments in Stands with Low Site Quality	LSQ	161
Nonforested Treatment	NFT	347
Wet Meadow Treatment	WMT	43
Total Acres of Vegetation Treatments in RCAs		**2,668**
Prescribed Fire Treatments[b, c]	PFT	4,511

[a]Only CT-FT would be used in this type of treatment unless there is aspen present where Conifer Removal in Aspen Stand treatment would be utilized in that portion of the outer RCA.
[b]The PFT is not counted in the grand total of treatment acres due to the overlap of treatment acres with many of the vegetation treatments.
[c]Prescribed burn would be allowed to back into inner RCA.

Watershed Improvement and Restoration Treatments

Proposed watershed improvement restoration treatments would be the same as under Alternative 2 with additions and changes as noted below. Table 2.2-11 summarizes treatments under Alternative 3.

Table 2.2-11. Soil, water, riparian, and aquatic resource improvement treatment summary, Alternative 3.

Type of Treatment	Miles and Number
Long-term Closure	15.0 miles
National Forest System Road Decommissioning	23.3 miles
Unauthorized Route Decommissioning	64.6 miles
Total Road Decommissioning	87.9 miles
Total Road Decommissioning in Riparian Conservation Areas	26.2 miles
National Forest System Road Decommissioning	8.8 miles
Unauthorized Route Decommissioning	17.4 miles
Aquatic Organism Passage/Habitat Connectivity	3 culverts

Long-term Closure of Roads—15.0 miles

The description of long-term closure treatment under Alternative 3 is identical to Alternative 2. However, fewer miles would be put into long-term closure; these miles would be decommissioned instead (see below).

Road Decommissioning—87.9 miles

The description of road decommission treatment under Alternative 3 is identical to Alternative 2. Decommissioning would include 23.3 miles of NFS road and 64.6 miles of unauthorized routes. In addition to those routes proposed for decommissioning under Alternative 2, Alternative 3 would decommission the following roads:

- All of NFS roads 50166, 50240, 50485, and 51547 would be decommissioned instead of put into long-term closure (full recontouring, only portions of these roads are proposed for decommissioning under Alternative 2).
- The NFS road 50489 would be decommissioned, not realigned.

This alternative would reduce future access for vegetation treatments currently provided by the roads listed above but would result in greater benefit to the soil and water resources.

The description of Road Decommissioning with Permittee Coordination is identical to Alternative 2.

A total of 26.2 miles of routes proposed for decommissioning would be located within RCAs.

Aquatic Organism Passage (AOP)/Habitat Connectivity

In addition to the two AOPs proposed under Alternative 2, Alternative 3 would replace one additional culvert for AOP and improve hydrologic function on Jungle Creek (NFS road 50192).

Transportation Management

Road Surface Material Sources

The road surface material sources would be the same as under Alternative 2 (five gravel pits).

Road Reconstruction—8.8 miles

Road Improvement

Road reconstruction activities would be completed on NFS road 50214 (King Hill–Fall Creek Road), NFS road 50245 (Granite Creek Road), and NFS road 50692 (Little Creek Road). Road reconstruction within RCAs would total 5.1 miles.

Road Realignment

Alternative 3 does not include any road realignment.

Road Maintenance—129.7 miles

Other Road Actions

The types of treatment and miles are identical to those described under Alternative 2.

Implement Best Management Practices (BMPs)

Approximately 5.5 miles of NFS road that are currently ML 1 would have BMPs implemented. This is the same as described for Alternative 2.

Maintenance Level (ML) 1 to ML 2 Roads

Approximately 14.2 miles of NFS road that are currently ML 1 would be converted to ML 2. This is the same as described for Alternative 2.

Ensure Effective Closure on Year-round and Seasonally Closed National Forest System (NFS) Roads

As described for Alternative 2, if needed, closed NFS roads would be improved to ensure effective closure.

Recreation

Developed and Dispersed Recreation Improvements

All recreation improvements proposed under Alternative 3 are identical to those proposed under Alternative 2 with one exception: the 3-mile OHV Loop Trail using NFS road 50166 and closed NFS road 50485.

Council Mountain and Poison Creek Inventoried Roadless Areas (IRAs)

Recreation improvements and road decommissioning as proposed in Alternative 3 are identical to those described in Alternative 2.

Council Mountain Research Natural Areas (RNAs)

No activities are proposed in the Council Mountain RNA under Alternative 3.

2.2.4. Alternative 4

Alternative 4 was developed to address internal and external comments concerning additional restoration in higher-elevation stands that contain a viable seral tree component. This alternative would treat stands in PVGs 7–11 that have a viable seral species component in addition to those stands proposed for treatment under Alternative 2. This treatment plan is consistent with direction in the 2013 LCAS (Interagency Lynx Biology Team 2013), which provides flexibility of forest management in "Secondary Areas" that do not support core populations of Canada lynx. The 2013 LCAS does not identify LAUs in "Secondary Areas" and allows for the creation of a mosaic of habitat in the Project.

Alternative 4 would require a site-specific, nonsignificant amendment (FSH 1926.51) of the Forest Plan. Specifically, the amendment would address the Forestwide Standard TEST15 (USDA Forest Service 2003a, p. III-12), "Unless a broad-scale assessment has been completed that substantiates different historical levels of unsuitable habitat, limit disturbance within each LAU as follows: If more than 30% of lynx habitat within a LAU is currently in unsuitable condition, no additional habitat may be changed to unsuitable habitat as a result of vegetative management projects." Should Alternative 4 be selected, a site-specific, nonsignificant Forest Plan amendment would be prepared and attached to the decision document for this Project. The amendment would allow for more than 30% of Canada lynx habitat to be made unsuitable with Project activities within the Middle Fork Weiser River LAU.

Vegetation Treatments

The description and intent of treatments are identical to those described in Section 2.2.2 and include additional areas proposed for treatment. Table 2.2-12 summarizes the vegetation treatments proposed under Alternative 4, and Table 2.2-13 summarizes the vegetation treatments proposed for RCAs under Alternative 4. Alternative 4 increases treatment acres in PVGs 7–11, specifically correlating to FT-PC-MSw, NCT, and LSQ treatments. Treatment in stands potentially containing whitebark pine would also increase under Alternative 4 to 357 acres.

The WMTs differ from Alternative 2 by treating the inner half of RCAs (191 acres), as well as the outer half of RCAs (80 acres). Additional acres treated in the outer half of RCAs (i.e., 55 acres under Alternative 2 versus 80 acres in Alternative 4) are due to the increased number of

acres proposed for treatment in PVGs 7–11 under Alternative 4. Inner RCA WMT would be done by hand only.

Table 2.2-12. Vegetation treatment summary, Alternative 4.

Type of Vegetation Treatment	Acronym	Total Acres
Noncommercial Thin	NCT	2,039
Restoration Burned Areas/Plantations	BA/PL	3,244
Commercial Thin-Free Thin	CT-FT	2,999
Free Thin–Patch Cut-Modified Shelterwood[a]	FT-PC-MSw	6,076
Commercial Thin/Mature Plantations	CT-MP	1,090
Conifer Removal in Aspen Stands	CT-ASP	1,087
Vegetation Treatments in Stands with Low Site Quality	LSQ	1,203
Dry Nonforested Vegetation Treatment	NFT	4,999
Wet Meadow Treatment	WMT	271
Shaded Fuelbreak	SFB	370
Fuel Reduction within a Riparian Conservation Area (RCA)	FR-RCA	15
Total Acres of Vegetation Treatments		**23,393**
Prescribed Fire Treatment[b]	PFT	27,400

Note: Acres include area within RCAs. None of these treatments are proposed within the inner portion of RCAs except for the FR-RCA treatment.
[a]Only CT-FT would be used in this type of treatment unless there is aspen present where Conifer Removal in Aspen Stand treatment would be utilized in that portion of the outer RCA.
[b]Prescribed fire would be allowed to back into RCA.

Prescribed Fire Treatments—27,400 acres (7,422 acres within RCAs)

Proposed prescribed burning would occur on approximately 27,400 acres over the next 15–20 years. The types of treatments are identical to those proposed under Alternative 2. The primary target area is 9,400 acres and the secondary target is 18,000 acres.

Table 2.2-13 displays only those acres within RCAs proposed for treatment.

Table 2.2-13. Vegetation treatment acres within Riparian Conservation Areas (RCAs), Alternative 4.

Type of Vegetation Treatment within RCAs	Acronym	Total Acres
Noncommercial Thin	NCT	282
Burned Areas/Plantations	BA/PL	394
Commercial Thin-Free Thin	CT-FT	384
Free Thin–Patch Cut-Modified Shelterwood[a]	FT-PC-MSw	1,199
Commercial Thin/Mature Plantations	CT-MP	181
Conifer Removal in Aspen Stands	CT-ASP	181
Vegetation Treatments in Stands with Low Site Quality	LSQ	209
Nonforested Treatment	NFT	459
Wet Meadow Treatment	WMT	271
Shaded Fuelbreak	SFB	52
Fuel Reduction within a Riparian Conservation Area (RCA)[b]	FR-RCA	15
Total Acres of Vegetation Treatments within RCAs		**3,627**
Prescribed Fire Treatment[b,c]	PFT	7,422

[a]Only CT-FT would be used in this type of treatment unless there is aspen present where Conifer Removal in Aspen Stand treatment would be utilized in that portion of the outer RCA.
[b]The PFT is not counted in the grand total of treatment acres due to the overlap of treatment acres with many of the vegetation treatments.
[c]Prescribed fire would be allowed to back into RCA.

Associated Actions

The types of associated actions proposed under Alternative 4 are identical to those proposed under Alternative 2. Approximately 8.3 miles of new planned temporary road would be constructed, and 39.8 miles of existing unauthorized routes would be utilized as temporary road and fully recontoured following use. The types of road maintenance actions proposed under Alternative 4 are identical to those proposed under Alternative 2. Roads proposed for maintenance total 137.5 miles. Table 2.2-14 summarizes treatments under Alternative 4.

Table 2.2-14. Soil, water, riparian, and aquatic resource improvement treatment summary, Alternative 4.

Type of Treatment	Miles and Number
Long-term Closure	17.8 miles
National Forest System Road Decommissioning	16.1 miles
Unauthorized Route Decommissioning	60.6 miles
Total Road Decommissioning	76.7 miles
Total Road Decommissioning in Riparian Conservation Areas	23.6 miles
National Forest System Road Decommissioning	7.2 miles
Unauthorized Route Decommissioning	16.4 miles
Aquatic Organism Passage/Habitat Connectivity	2 culverts

Watershed Improvement and Restoration Treatments

Long-term Closure of Roads—17.8 miles

The description and location of long-term closure treatments proposed under Alternative 4 is identical to those proposed under Alternative 2.

Road Decommissioning—76.7 miles

The description of road decommission treatments proposed under Alternative 4 is identical to those proposed under Alternative 2. Decommissioning would include 16.1 miles of NFS roads and 60.6 miles of unauthorized routes, totaling 76.7 miles.

A total of 23.6 miles of routes proposed for decommissioning would be located within RCAs.

Aquatic Organism Passage (AOP)/Habitat Connectivity

AOP proposed under Alternative 4 is identical to that proposed under Alternative 2.

Transportation Management

Addition of Unauthorized Roads to the National Forest System (NFS) for Administrative Use

The TAP prepared for the Project area recommended adding 4.0 miles of unauthorized roads to the NFS (Add to System roads) because they are necessary to facilitate vegetation management access for current and future projects. These roads generally have a road prism or portion of road prism in place and are overgrown from years of natural establishment and would require reconstruction to bring them to Forest Service specifications. Reconstruction could include reestablishing the road prism, blading the surface, installing or reinstalling culverts for drainage, improving ditches, and incorporating other road maintenance activities. These routes would be incorporated in the Forest Road Atlas. Once utilized for treatment, the roads would be put into a

ML 2 closure (see definition in Glossary). Alternatives 4 and 5 are the only alternatives that propose Add to System roads.

Road Surface Material Sources

Road surface material sources proposed under Alternative 4 are identical to those proposed under Alternative 2 (five gravel pits).

Road Reconstruction—17.3 miles

Road Improvement

Road reconstruction activities would be completed on NFS road 50214 (King Hill–Fall Creek Road), NFS road 50245 (Granite Creek Road), and NFS road 50692 (Little Creek Road).

Road Realignment

Alternative 4 proposes road realignments described under Alternative 2 and additional miles of road realignment. These additional miles of realignment are in conjunction with the Add to System roads described above.

Approximately 8.7 miles of existing NFS road and unauthorized routes would be realigned and 4.5 miles of road would be constructed during realignment for a net decrease of 4.2 miles of roads and unauthorized routes. Roads to be realigned include segments of the following NFS roads: 50489, 50192, 50566, 50707, 51306, 51547, and 51791.

Road reconstruction within RCAs would total 6.9 miles.

Road Maintenance—137.5 miles

Other Road Actions

The types of treatment and miles are identical to those described for Alternative 2.

Implement Best Management Practices (BMPs)

Approximately 5.5 miles of NFS road that are currently ML 1 would have BMPs implemented. This is the same as described for Alternative 2.

Maintenance Level (ML) 1 to ML 2 Roads

Approximately 14.2 miles of NFS road that are currently ML 1 would be converted to ML 2. This is the same as described for Alternative 2.

Ensure Effective Closure on Year-round and Seasonally closed National Forest System (NFS) Roads

As described in Alternative 2, if needed, closure methods on NFS roads would be improved to ensure effective closure.

Recreation

Recreation Improvements

All recreation proposals under Alternative 4 are identical to those proposed under Alternative 2.

Council Mountain and Poison Creek Inventoried Roadless Areas (IRAs)

Recreation improvements and road decommissioning as proposed in Alternative 4 are identical to those described in Alternative 2.

Council Mountain Research Natural Areas (RNAs)

No activities are proposed in the Council Mountain RNA.

2.2.5. Alternative 5

Alternative 5 was developed in response to DEIS public comments and from IDT member recommendations to optimize priority restoration opportunities. This alternative incorporates activities from all of the action alternatives and is presented as a separate alternative for ease of comparison. Alternative 5 would not need a site-specific, nonsignificant amendment (FSH 1926.51) of the Forest Plan because the proposed vegetation treatments would not make more than 30% modeled Canada lynx source habitat unsuitable.

Minor corrections to the vegetation and roads GIS data were made to Alternative 5 in the development of this alternative between Draft and Final EIS preparation. Very few changes were made to numbers and figures under Alternatives 2, 3, and 4, unless a significant error was encountered during review. As a result, small discrepancies exist among the other alternatives. All activities included or excluded from other alternatives are described below.

2.2.5.1. Vegetation Treatments

Alternative 5 includes all of the vegetation treatments under Alternative 2 and some of the Alternative 4 treatments that emphasize whitebark pine regeneration, aspen regeneration, and wet meadow restoration. In addition to the shaded fuelbreaks proposed under Alternatives 2 and 4, more are proposed for Alternative 5 to extend the treatment along 8.9 miles of main Forest Service road for fire safety ingress/egress within the Adams County WUI boundary. No other vegetation treatments are being proposed specifically related to this WUI boundary. Table 2.2-15Table 2.2-15.Vegetation treatment summary, Alternative 5summarizes the vegetation treatments proposed under Alternative 5, and Table 2.2-16 summarizes the vegetation treatments proposed for RCAs under Alternative 5.

Prescribed Fire Treatments— 27,200 acres (7,400 acres within RCAs)

Proposed prescribed burning would occur on approximately 27,200 acres over the next 15–20 years. The types of treatments proposed under Alternative 5 are identical to those proposed under Alternative 2. The primary target area is 11,200 acres and the secondary target is 16,000 acres.

Associated Actions

The types of associated actions proposed under Alternative 5 are identical to those proposed under Alternative 2. Approximately 8.9 miles of new planned temporary road would be constructed, and 39.9 miles of existing unauthorized routes would be utilized as temporary road and fully recontoured following use. The types of road maintenance actions proposed under Alternative 5 are identical to those proposed under Alternative 2. Roads proposed for maintenance total 137.4 miles. Table 2.2-17 summarizes treatments under Alternative 5.

Table 2.2-15.Vegetation treatment summary, Alternative 5.

Type of Vegetation Treatment	Acronym	Total Acres
Noncommercial Thin	NCT	1,369
Restoration Burned Areas/Plantations	BA/PL	3,229
Commercial Thin-Free Thin	CT-FT	2,879
Free Thin–Patch Cut-Modified Shelterwood[a]	FT-PC-MSw	5,367
Commercial Thin/Mature Plantations	CT-MP	1,070
Conifer Removal in Aspen Stands	CT-ASP	1,087
Vegetation Treatments in Stands with Low Site Quality	LSQ	947
Dry Nonforested Vegetation Treatment	NFT	4,944
Wet Meadow Treatment	WMT	315
Shaded Fuelbreak	SFB	458
Fuel Reduction within a Riparian Conservation Area (RCA)	FR-RCA	15
Total Acres of Vegetation Treatments		**21,679**
Prescribed Fire Treatment[b]	PFT	27,200

Note: Acres include area within RCAs. None of these treatments are proposed within the inner portion of RCAs except for the FR-RCA and WMT treatments.
[a]Only CT-FT would be used in this type of treatment unless there is aspen present where Conifer Removal in Aspen Stand treatment would be utilized in that portion of the outer RCA.
[b]Prescribed fire would be allowed to back into RCA.

Table 2.2-16. Vegetation treatment acres within Riparian Conservation Areas (RCAs), Alternative 5.

Type of Vegetation Treatment within RCAs	Acronym	Total Acres
Noncommercial Thin	NCT	116
Burned Areas/Plantations	BA/PL	380
Commercial Thin-Free Thin	CT-FT	336
Free Thin–Patch Cut-Modified Shelterwood[a]	FT-PC-MSw	971
Commercial Thin/Mature Plantations	CT-MP	168
Conifer Removal in Aspen Stands	CT-ASP	181
Vegetation Treatments in Stands with Low Site Quality	LSQ	169
Dry Nonforested Vegetation Treatment	NFT	432
Wet Meadow Treatment[b]	WMT	315
Shaded Fuelbreak	SFB	83
Fuel Reduction within a Riparian Conservation Area (RCA)[b]	FR-RCA	15
Total Acres of Vegetation Treatments within RCAs		**3,162**
Prescribed Fire Treatment [c, d]	PFT	7,386

[a]Only CT-FT would be used in this type of treatment unless there is aspen present where Conifer Removal in Aspen Stand treatment would be utilized in that portion of the outer RCA.
[b]None of these treatments are proposed within the inner portion of RCAs except for the FR-RCA and WMT treatments.
[c]The PFT is not counted in the grand total of treatment acres due to the overlap of treatment acres with many of the vegetation treatments.
[d]Prescribed burn would be allowed to back into inner RCA.

Table 2.2-17. Soil, water, riparian, and aquatic resource improvement treatment summary, Alternative 5.

Type of Treatment	Miles and Number
Long-term Closure	19.3 miles
Road Decommissioning	76.1 miles
National Forest System Road Decommissioning	16.0 miles
Unauthorized Route Decommissioning	60.1 miles
Total Road Decommissioning in Riparian Conservation Areas	23.4 miles
National Forest System Road Decommissioning	7.1 miles
Unauthorized Route Decommissioning	16.3 miles
Aquatic Organism Passage/Habitat Connectivity	2 culverts

Watershed Improvement and Restoration Treatments

Long-term Closure of Roads—19.3 miles

The miles of road proposed to be put into long-term closure for Alternative 5 are greater than for any other alternative. Roads associated with the OHV loop not included in Alternative 5 would be put into long-term closure instead of being decommissioned as proposed in Alternative 3.

Road Decommissioning—76.1 miles

The descriptions of road decommissioning treatments proposed under Alternative 5 are identical to those proposed under Alternative 4 with exception of a small section of a road that was Add to System under Alternative 4. Decommissioning would include 16.0 miles of NFS roads and 60.1 miles of unauthorized routes, totaling 76.1 miles.

A total of 23.4 miles of routes proposed for decommissioning would be located within RCAs.

Aquatic Organism Passage(AOP) /Habitat Connectivity

The number of AOP improvements proposed under Alternative 5 is identical to that proposed under Alternative 2 and 4.

Transportation Management

Addition of Unauthorized Roads to the National Forest System (NFS) for Administrative Use

Alternative 5 proposes all but one section of the Add to System roads proposed for Alternative 4. This section was deemed unnecessary through further IDT evaluation to facilitate access for future restoration opportunities. Another difference from Alternative 4 is that all Add to System roads included in Alternative 5 would be put into long-term closure (ML 1) rather than left as ML 2 closed roads.

Road Surface Material Sources

Road surface material sources proposed under Alternative 5 are identical to those proposed under Alternative 2 (five gravel pits).

Road Reconstruction—17.3 miles

Road Improvement

Road reconstruction activities would be completed on NFS road 50214 (King Hill–Fall Creek Road), NFS road 50245 (Granite Creek Road), and NFS road 50692 (Little Creek Road). Road reconstruction within RCAs would total 6.9 miles.

Road Realignment

Under Alternative 5 road realignments would be as described under Alternative 4 with exception of one road realignment that would instead be a temporary road as under Alternative 2. Most of the road realignments are in conjunction with the Add to System roads described above or they are associated with additional vegetation treatments included for Alternative 5. Under Alternative 5 all road realignments would be put into long-term closure (ML 1) after use.

Approximately 8.9 miles of existing NFS road and unauthorized routes would be realigned and 3.9 miles of road would be constructed during realignment for a net decrease of 5.0 miles of roads and unauthorized routes. Roads to be realigned include segments of the following NFS roads: 50489, 50192, 50566, 50707, 51306, 51547, 51791, and several unauthorized routes.

Road Maintenance—137.4 miles

Other Road Actions

The types of treatment and miles are identical to those described for Alternative 2.

Implement Best Management Practices (BMPs)

Approximately 5.5 miles of NFS road that are currently ML 1 would have BMPs implemented. This is the same as described for Alternative 2.

Maintenance Level (ML) 1 to ML 2 Roads

Approximately 14.2 miles of NFS road that are currently ML 1 would be converted to ML 2. This is the same as described for Alternative 2.

Ensure Effective Closure on Year-round and Seasonally Closed National Forest System (NFS) Roads

As described for Alternative 2, if needed, closure methods on NFS roads would be improved to ensure effectiveness.

Recreation

Recreation Improvements

The recreation proposals under Alternative 5 include those proposed under Alternative 2 with the following exceptions:

- The proposed OHV loop (as in Alternative 3) would not be constructed. However, the roads associated with the OHV loop would be put into long-term closure (ML 1) instead of being decommissioned as proposed for Alternative 3. The conversion of NFS road 51763 to a trail provides a similar recreational experience and far greater benefit to the public and is, therefore, a better focus for limited Forest resources than the seasonal OHV loop would be. Other open roads in the Project area also provide OHV loop experiences of greater recreational value than the proposed loop.

- The NFS trail 205 would not be rerouted around private land and would instead be removed from the Forest trail system for the benefit of elk security. This area is already accessible to both motorized and non-motorized users via NFS trails 332, 198, 210, and 201.

Council Mountain and Poison Creek Inventoried Roadless Areas (IRAs)

Recreation improvements and road decommissioning as proposed for Alternative 5 are identical to those described for Alternative 2 with exception of the 205 trail reroute. Trail 205 would also be removed from the NFS trail system under Alternative 5.

Council Mountain Research Natural Areas (RNAs)

No activities are proposed in the Council Mountain RNA.

2.2.6. Comparison of Alternatives

Table 2.2-18 displays and compares the alternatives by activity. Table 2.2-19 compares the alternatives by objective. Table 2.2-20 compares the alternatives by issue. Acres and miles used in this analysis are approximations based on computer calculations. Small discrepancies in road miles and acreages among alternatives are due to rounding totals and GIS data corrections between Draft and Final EIS preparation. Actual figures may vary from these planning numbers.

Table 2.2-18. Comparison of alternatives by activity.

Proposed Treatments	Alternatives				
	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Commercial and Noncommercial Vegetation Treatment (acres)					
Noncommercial Thin	0	1,279	921	2,039	1,369
Restoration Burned Areas/Plantations	0	3,240	3,178	3,244	3,229
Commercial Thin-Free Thin	0	2,875	2,697	2,999	2,879
Free Thin–Patch Cut-Modified Shelterwood	0	5,343	4,946	6,076	5,367
Commercial Thin/Mature Plantations	0	1,080	1,039	1,090	1,070
Conifer Removal in Aspen Stands	0	1,087	900	1,087	1,087
Vegetation Treatments in Stands with Low Site Quality	0	850	715	1,203	947
Dry Nonforested Vegetation Treatment	0	4,519	3,592	4,999	4,944
Wet Meadow Treatment[a]	0	55	43	271	315
Shaded Fuelbreak	0	370	0	370	458
Riparian Conservation Area (RCA) Fuels Treatment	0	15	0	15	15
Total Vegetation Treatments		**20,713**	**18,031**	**23,393**	**21,679**
Acres of Vegetation Treatments in RCAs[b]	0	3,000	2,668	3,627	3,162
Prescribed Burn (acres)					
Prescribed Burn	0	24,200	16,600	27,400	27,200
Prescribed Burn within RCAs (includes Vegetation Treatments in RCAs)	0	6,319	4,511	7,422	7,386
Temporary Roads (miles)					
Existing Prism (existing unauthorized routes that would be used in harvest then obliterated)	0	34.8	27.5	39.8	39.9
New Temporary Road Construction	0	9.7	8.1	8.3	8.9
Soil, Water, Riparian, and Aquatic Resource Improvement Treatment (miles)					
Long-term Closure	0	17.8	15.0	17.8	19.3
NFS Road Decommissioning	0	16.1	23.3	16.1	16.0
Unauthorized Route Decommissioning	0	64.6	64.6	60.6	60.1
Road Decommissioning (includes the unauthorized routes used as temporary roads listed above)	0	80.7	87.9	76.7	76.1

[a]Wet meadow treatment is proposed in the outer half of RCAs under Alternatives 2 and 3. It includes both the inner and outer portions of RCAs in Alternatives 4 and 5.
[b]Included in total above.

Proposed Treatments	Alternatives				
	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Road Decommissioning within Riparian Conservation Areas (miles)					
Total Miles (included in the miles of road decommissioning listed above)	0	24.6	26.2	23.6	23.4
Aquatic Organism Passage (AOP)/Habitat Connectivity					
Number of AOPs Improved	0	2	3	2	2
Transportation Management (miles)					
Road Realignment	0	2.2	0	4.5	3.9
Add to System Roads	0	0	0	4.0	3.9
Total Road Reconstruction (includes road realignment and Add to System roads)	0	11.0	8.8	17.3	16.6
Implement Best Management Practices (BMPs) on roads where not previously implemented	0	5.5	5.5	5.5	5.5
Maintenance Level (ML) 1 to ML 2 Roads	0	14.2	14.2	14.2	14.2
Ensure Effective Closure on Year-round and Seasonally Closed National Forest System Roads[a]	0	All	All	All	All
Recreation Improvements[b] – Trails (miles)					
Trail Reroute to Provide Legal Access from Trailhead (198 and 205)	0	6.4	6.4	6.4	4.4
NFS Trail 198 Converted from Non-motorized to Two-wheel Motorized	0	2.0	2.0	2.0	2.0
Trail Maintenance	0	28	28	28	28
New OHV Trail open to Vehicles up to 70 inches Wide	0	3.0	0	3.0	0
New Non-motorized Trail (NFS trail 212)	0	0.8	0.8	0.8	0.8
Convert 3.4 miles of West Mountain Jeep Road (NFS road 51763) (ML 2 road) to a “Trail open to All Vehicles”	0	3.4	3.4	3.4	3.4

[a]Ensuring effective closures may also be implemented in on-going road maintenance activities.
[b]See Section 2.2.2 Recreation Improvements for additional proposals in all action alternatives including developed and dispersed recreation improvements and addition trail maintenance and trailhead improvements.

Table 2.2-19. Comparison of alternatives by objective.

Vegetation Resource Objective 1: Move vegetation toward the desired future conditions defined in the Forest Plan, with an emphasis on promoting large tree forest structure, early seral species composition, and forest resiliency.					
Measurement	**Alternative 1**	**Alternative 2**	**Alternative 3**	**Alternative 4**	**Alternative 5**
Tree Size Class Acres treated to promote the large tree size class Acres treated to maintain the large tree size class	 0 0	 4,610 7,364	 4,139 7,118	 5,335 9,316	 4,722 8,203
Tree Canopy Cover Percentage of area (acres) in each canopy cover class within the large tree size class	Varies by Potential Vegetation Groups (PVGs); see Table 3.2 17 for comparison of alternatives for canopy cover.				
Tree Species Composition Acres treated to maintain and/or promote desired species composition	0	15,754	14,396	17,738	15,948
Vegetation Resource Objective 2: Maintain or restore a representation of native plant communities throughout the Forest.					
Measurement	**Alternative 1**	**Alternative 2**	**Alternative 3**	**Alternative 4**	**Alternative 5**
Acres of Aspen Treatments	0	1,087	900	1,087	1,087
Acres of Meadow Treatment (wet and dry)	0	4,574	3,635	5,270	5,258
Fire and Fuels Resource Objective 3: Restore and maintain desirable fuel levels, fire regimes, and ecological processes.					
Measurement	**Alternative 1**	**Alternative 2**	**Alternative 3**	**Alternative 4**	**Alternative 5**
Acres Moved towards Historical Fire Regimes	0	24,200	16,600	27,400	27,200
Fire and Fuels Resource Objective 4: Establish and maintain strategically placed shaded fuelbreaks to improve firefighter and public safety, improve the defensible space adjacent to private lands, and provide protection to infrastructure to the east of the Project area.					
Measurement	**Alternative 1**	**Alternative 2**	**Alternative 3**	**Alternative 4**	**Alternative 5**
Acres of Shaded Fuelbreak	0	370	0	370	458

Wildlife Objective 5: Improve habitat for Family 1 wildlife species, as represented by the white-headed woodpecker, a Region 4 Sensitive Species (USDA Forest Service 2011b) and Forest Management Indicator Species (MIS), by restoring forest conditions that contribute to source habitat for these species. Forested stands providing these source habitats should be restored to conditions within, or near, the Historical Range of Variability (HRV).					
Measurement	**Alternative 1**	**Alternative 2**	**Alternative 3**	**Alternative 4**	**Alternative 5**
Quantity and quality of Family 1 – white-headed woodpecker habitat restored to conditions within HRV. Quantity is measured by acres of PVGs 2 and 5, and portions of PVG 6 in the large tree size class and low canopy cover class. Quality is measured by the presence of old forest characteristics (e.g., legacy trees, snags, coarse woody debris (CWD), canopy gaps, and understory patchiness), as described in the Forest Plan (USDA Forest Service 2003a).	0 (742 current total)	3,985	4,054	4,039	4,004
Soil, Water, Riparian, and Aquatic (SWRA) Resources Objective 6: Improve watershed and aquatic function and integrity by moving all watersheds within the Project area towards the desired condition for the soil, water, aquatic, and riparian resources.					
Road Density by Subwatershed (miles/square miles); All Ownership/National Forest Land Only					
Subwatershed	**Alternative 1**	**Alternative 2**	**Alternative 3**	**Alternative 4**	**Alternative 5**
Granite Creek	4.6/4.2	3.0/2.5	2.6/2.1	3.1/2.6	3.1/2.6
Jungle Creek	5.9/3.1	5.3/2.1	5.3/2.1	5.4/2.2	5.5/2.3
Little Fall Creek	3.4/3.9	2.7/1.8	2.7/1.8	2.8/1.9	2.9/2.2
Mica Creek	4.8/2.6	4.0/1.6	4.0/1.6	4.1/1.6	4.1/1.7
RCA Road Density by Subwatershed (miles/square miles); All Ownership/National Forest Land Only					
Subwatershed	**Alternative 1**	**Alternative 2**	**Alternative 3**	**Alternative 4**	**Alternative 5**
Granite Creek	5.5/4.8	3.7/2.8	3.3/2.4	3.8/2.9	3.8/2.9
Jungle Creek	7.1/3.2	6.1/1.8	6.1/1.8	6.2/1.9	6.2/1.9
Little Fall Creek	5.2/5.1	4.1/1.8	4.1/1.8	4.1/2.0	4.2/2.1
Mica Creek	5.3/2.8	4.6/1.8	4.6/1.8	4.6/1.9	4.6/1.8
Number of Fish Barriers Replaced					
Stream Miles Improved – includes miles of fish habitat reconnected and miles of stream enhanced through road decommissioning and graveling within RCAs.					
Subwatershed	**Alternative 1**	**Alternative 2**	**Alternative 3**	**Alternative 4**	**Alternative 5**
Granite Creek	0	20.4	23.2	19.6	20.0
Jungle Creek	0	9.2	9.2	8.5	8.8
Little Fall Creek	0	6.9	6.9	6.1	6.9
Mica Creek	0	8.1	8.1	8.0	8.0
Miles Reconnected with Culvert Replacements	0	6.3	6.8	6.3	6.3
Graveling within RCAs	0	5.5	5.5	5.5	5.5
Total	0	56.4	59.7	54.0	55.5

Miles of Roads within RCAs by Subwatershed; All Ownership/National Forest Land Only					
Subwatershed	**Alternative 1**	**Alternative 2**	**Alternative 3**	**Alternative 4**	**Alternative 5**
Granite Creek	29.2/23.7	19.9/13.7	18.2/12.0	20.4/14.3	20.0/14.2
Jungle Creek	41.7/12.8	36.4/7.2	36.3/7.1	36.8/7.5	36.7/7.6
Little Fall Creek	20.7/7.4	16.5/2.6	16.5/2.6	16.7/3.0	16.7/3.1
Mica Creek	34.8/13.4	30.6/8.4	30.4/8.3	30.6/8.5	30.3/8.5
Total	126.4/57.3	103.4/32.8	100.4/29.9	104.5/33.3	103.7/33.3
Percent of total road-generated sediment reduced over the long term modeled by Geomorphic Road Analysis and Inventory Package (GRAIP) and GRAIP Lite					
Subwatershed	**Alternative 1**	**Alternative 2**	**Alternative 3**	**Alternative 4**	**Alternative 5**
Granite Creek	0%	36.1%	48.3%	35.5%	Alt 4[a]
Jungle Creek	0%	15.5%	15.5%	14.4%	Alt 4[a]
Little Fall Creek	0%	41.1%	41.1%	41%	Alt 4[a]
Mica Creek	0%	18.1%	18.2%	17.9%	Alt 4[a]
Number of harvest units meeting Appendix A desired conditions for CWD, both in general and in the large (greater than 15 inches diameter) size class.	No harvest planned	Trend toward Forest Plan desired conditions as described in Appendix A more quickly than Alternative 1 in proposed harvest units.			
Recreation Objective 7 : Manage recreation use in the Project by identifying and hardening primary dispersed recreation areas, updating Cabin Creek Campground, improving existing trails, closing and rehabilitating unwanted user-created motorized routes, and developing new trail opportunities.					
Measurement	**Alternative 1**	**Alternative 2**	**Alternative 3**	**Alternative 4**	**Alternative 5**
Miles of open non-motorized trail	3.8	2.6[b]	2.6[b]	2.6[b]	2.6[b]
Miles of open two-wheel motorized trail	21.8	31.2[c]	31.2[c]	31.2[c]	29.3[d]
Miles of open ATV and OHV trails open to all vehicles	2.4	8.8[e]	5.8[f]	8.8[e]	5.8[f]
Miles of open year-round and seasonally open National Forest System and county roads	113.6	107.7	104.7	107.7	111.5
Change to existing dispersed recreation sites measured by changes to recreation facilities and/or resource improvements at the existing sites	Existing number	+up to 20 dispersed sites improved			
Economics Objective 8: Contribute to the economic vitality of local communities.					
Measurement	**Alternative 1**	**Alternative 2**	**Alternative 3**	**Alternative 4**	**Alternative 5**
Employment contribution (number of jobs on annual average).	0	39	36	43	41
Income contribution ($ thousands)	$0	$1,420	$1,306	$1,544	$1,493

[a]For this indicator, sediment reduced is within 0.1% of Alternative 4.
[b]Alternatives 2, 3, 4, and 5 change in non-motorized trail = 3.8 (existing) + 0.8 (addition of #212) – 2.0 (portion of #198 to two-wheel) = 2.6 miles.
[c]Alternatives 3 and 4 change in two-wheel trail = 21.8 (existing) + 2.0 (addition of #198 motorized section) + 6.4 (reroutes around private land) + 1 (reroutes in general) = 31.2 miles.
[d]Alternative 5 change in two-wheel trail = 21.8 (existing) + 2.0 (addition of #198 motorized section) + 4.4 (reroutes of #198 around private land) + 1 (reroutes in general) – 1.9 (removal of #205) from system = 29.3 miles.
[e]Alternatives 2 and 4 change in ATV/OHV = 2.4 (existing ATV) + 3.0 (new OHV) + 3.4 (road to trail conversion) = 8.8 miles.
[f]Alternatives 3 and 5 change in ATV/OHV = 2.4 (existing ATV) + 3.4 (road to trail conversion) = 5.8 miles.

Table 2.2-20. Comparison of alternatives by issue.

Wildlife Issue: High open road densities affect wildlife (e.g., elk) security and can lead to the removal of important habitat components (e.g., snags).					
Indicators	**Alt 1**	**Alt 2**	**Alt 3**	**Alt 4**	**Alt 5**
Change in elk security areas (Hillis et al. 1991). (Using all roads, routes and motorized trails buffered 0.5 mile and polygons greater than 250 acres. See elk section in Wildlife Resources for additional analysis.	Current Condition 2 areas 1,278 acres	2 areas 858 acres (no change in number of areas, decrease of 420 acres)	3 areas 1,140 acres (change in number of areas, decrease of 138 acres)	2 areas 858 acres (no change in number of areas, decrease of 420 acres)	2 areas 1,401 acres (no change in number of areas, increase of 123 acres)
Miles of NFS roads and unauthorized roads a) closed by physical closure, including LTC or b) decommissioned by treatments described in Chapter 2.[a]	a) 0 b) 0	a) 72.0 b) 80.7	a) 65.6 b) 87.9	a) 78.2 b) 76.6	a) 78.2 b) 76.1
Estimated effectiveness of closures and/or decommissioning by a) closed by physical closure, including LTC or b) decommissioned by treatments described in Chapter 2.[a]	a) Moderate b) High	a) Moderate b) High	a) Moderate b) High	a) Moderate b) High	a) Moderate b) High
Effects of opening closed roads to allow for additional firewood harvest.	No opening of closed roads.	No impact on elk, assuming road opening would occur outside of rifle hunting season. Cavity-dependent wildlife species would be detrimentally impacted by snag removal; this would require site-specific snag analysis. Amount and duration of snag removal would not likely lead to Federal listing of any protected species.			
Wildlife Issue: Treatments may adversely affect source habitat for wildlife species dependent on mixed conifer forests with multilayer structural characteristics. Such forests are associated with mixed-to-lethal fire regimes and associated processes (larger scales of insect and disease outbreaks and fire effects). Species of concern include listed and sensitive species and management indicator species.					
Indicators					
Quantity (acres) and distribution of habitat for species of concern.	See discussion in Wildlife Resources section of Chapter 3.				
Quality (specifically old forest, snags, patch and pattern) and distribution of habitat for species of concern.	See discussion in Wildlife Resources section of Chapter 3.				

[a]Total road decommissioning is 80.7, 87.9, 76.7, and 76.1 miles for Alternatives 2, 3, 4, and 5, respectively. The physical closure miles are less than full obliteration.

Wildlife Issue: Project activities (logging, log haul, prescribed burning, and temporary road construction) may cause disturbance to wildlife species of concern.					
Indicator	**Alternative 1**	**Alternative 2**	**Alternative 3**	**Alternative 4**	**Alternative 5**
Disturbance effects on species of concern	See discussion in Wildlife Resources section of Chapter 3.				

Soil, Water, Riparian, and Aquatic (SWRA) Issue: Proposed activities for roads, vegetation treatments, and prescribed fire may degrade water quality by increasing soil erosion and sediment delivery.					
Indicators	**Alternative 1**	**Alternative 2**	**Alternative 3**	**Alternative 4**	**Alternative 5**
Miles of temporary road constructed	0	34.8	27.5	39.8	41.0
Miles of new temporary road	0	9.7	8.1	8.3	8.9
Miles of road realignment and reconstruction	0	11.0	8.8	17.3	16.6
Miles of new long-term closures (road storage)	0	17.8	15.0	17.8	21.6
Miles of road decommissioned – System	0	16.1	23.3	16.1	16.0
Miles of road decommissioned – Unauthorized		64.6	64.6	60.6	60.1
Acres of mechanical treatment[a]	0	18,820	16,591	21,308	22,515
Acres of prescribed fire[b]	0	24,200	16,600	27,400	27,200

Soil, Water, Riparian, and Aquatic (SWRA): Treatments that propose vegetation treatment and prescribed burning in Riparian Conservation Areas (RCAs) may negatively affect stream temperatures and large woody debris (LWD).					
Indicators	**Alternative 1**	**Alternative 2**	**Alternative 3**	**Alternative 4**	**Alternative 5**
Acres of vegetation treatment within RCAs	0	3,000	2,668	3,627	3,162
Acres treated within one site potential tree height	0	12	0	203	190

[a]For this indicator, mechanical treatment acres assume only 40% of dry, nonforested will actually receive mechanical treatment (mostly machine piling), as not every acre is in need of conifer removal. Assume 300 acres of machine piling for the shaded fuelbreak in Alternatives 2 and 4. These acreages are likely still high, as treatment in wet and dry meadows and some RCAs will be done by hand.

[b]Prescribed fire acres are rounded to the nearest 100 acres.

Soil, Water, Riparian, and Aquatic(SWRA): Proposed activities may change timing and duration of peak runoff, which may affect bank stability in sensitive channels.						
Indicators		**Alternative 1**	**Alternative 2**	**Alternative 3**	**Alternative 4**	**Alternative 5**
Total Road Density by subwatershed (all ownership)	Granite Creek	4.6	3.0	2.6	3.1	3.1
	Jungle Creek	5.9	5.3	5.3	5.4	5.3
	Little Fall Creek	3.4	2.7	2.7	2.8	2.8
	Mica Creek	4.8	4.0	4.0	4.1	4.2
Number of subwatersheds that are over 25% Equivalent Clearcut Area (High Category)		1	2	2	2	2
SWRA: Proposed activities may decrease long-term soil productivity and impair soil-hydrologic function.						
Indicators		**Alternative 1**	**Alternative 2**	**Alternative 3**	**Alternative 4**	**Alternative 5**
Percent detrimental soil disturbance (DD) within activity areas (Forest Plan Standard SWST02)		The Forest Plan would be attained over time	Compliant with the Forest Plan Standard (with Project design features, mitigation measures and Best Management Practices)			
Percent total soil resource commitment (TSRC) across the Project area (Forest Plan Standard SWST03)		3.1	2.3	2.1	2.3	2.3
Levels of Coarse Woody Debris (CWD) retained within activity areas for long term soil productivity		Initially unchanged and trend toward desired condition	Trend toward Forest Plan desired conditions as described in Appendix A more quickly than Alternative 1			
Transportation Resources: Proposed activities to the road system (e.g., road closures and decommissioning) may reduce the amount of access to the areas identified in the Forest Plan for active management.						
Indicator		**Alternative 1**	**Alternative Alt 2**	**Alternative 3**	**Alternative 4**	**Alternative 5**
Suited timber lands within 0.25 mile of a Forest System road (includes closed roads) (Percent Change in Area)		No Change	-7.1	-12.2	-1.9	-2.2

2.3. Management Requirements

Management requirements are established Standards that Project activities must adhere to in order to protect Forest resources; they may be implemented before, during, or after a project to meet Forest Plan and other direction. The Proposed Action includes the most pertinent management requirements and Project design features listed in Tables 2.3-1 through 2.3-8. Additional applicable management direction (Standards and Guidelines) for wildlife is listed in the wildlife analysis in Chapter 3 (Section 3.4). More management direction, including a complete list of Standards and Guidelines that apply to all action alternatives, can be found in the Forest Plan (USDA Forest Service 2003a).

Table 2.3-1. Management Requirements: Forested Vegetation.

Management Requirements	Objective	Implementation Mechanism
The activity area shall be used to assess snag and coarse wood conditions for vegetation management actions (USDA Forest Service 2003a, p. III-30, VEST1).	Retain Coarse Woody Debris (CWD) to maintain soil productivity, ecological function and other benefits	Silvicultural prescription
Vegetation management actions associated with developed recreation shall be designed to meet recreation objectives, not vegetative desired conditions described in Appendix A (USDA Forest Service 2003a, p. III-30, VEST2).	Protect investments in developed recreation areas	Silvicultural prescription
Minimum stocking requirements for plantation certification shall meet those specified by Potential Vegetation Group (PVG) in the Forest Plan (USDA Forest Service 2003a, p. III-42, TRST1).	Ensure adequate stocking and consistency with the National Forest Management Act (NFMA)	Silvicultural prescription
Even-aged regeneration treatments shall not exceed 40 acres and shall be separated by stands not defined as an opening (USDA Forest Service 2003a, p. III-42, TRST2).	Ensure consistency with NFMA	Silvicultural prescription
Openings created by timber harvest will no longer be considered an opening when a new forest stand is established as documented through certification exams (USDA Forest Service 2003a, p. III-43, TRST3).	Ensure consistency with NFMA	Silvicultural prescription
Wood products harvested within Riparian Conservation Areas (RCAs), from high risk landslide prone areas and/or PVG 1, shall not contribute to the Allowable Sale Quantity (USDA Forest Service 2003a, p. III-43, TRST4 and TRST5).	Ensure treatments on lands determined to be not suited for timber production are designed to meet other resource needs/concerns	Silvicultural prescription

Table 2.3-2. Management Requirements: Soil, Water, Riparian, and Aquatic Resources (SWRA).Management Requirements	Objective	Implementation Mechanism
Trees that are felled within Riparian Conservation Areas (RCAs) must be left unless determined not to be necessary for achieving soil, water, riparian and aquatic desired conditions. Felled trees or snags left in RCAs shall be left intact unless resource protection or public safety requires bucking them into smaller pieces (USDA Forest Service 2003a, p. III-22, SWST10).	Retain large woody debris in riparian areas to be available for sediment filtering, recruitment in streams, and soil needs.	Contract specifications
Do not store fuel or other toxicants or perform refueling within RCAs. Exceptions must have authorization of Fish Biologist or Hydrologist and have approved spill containment plan commensurate with the amount of fuel stored (USDA Forest Service 2003a, p. III-22, SWST11).	Reduce potential for fuel spills that could affect fish or fish habitat.	Contract specifications
Management actions shall be designed in a manner that maintains or restores water quality to fully support beneficial uses and native and desired non-native fish species and their habitat (USDA Forest Service 2003a, p. III-21, SWST01).	Design and implement management programs and plans that will restore water quality and watershed function to support beneficial uses.	Project design
Apply Best Management Practices (BMPs) as described in the National Core BMP Technical Guide (USDA Forest Service 2012; Forest Service Manual [FSM] 2550).	Reduce or minimize effects of management activities on soil and water resources.	Contract specifications, mitigation measures
Maintain detrimental disturbance levels at 15% or less within activity areas following completion of proposed activities (USDA Forest Service 2003a, p. III-21, SWST02, FSH 2509.18).	Maintain the physical, chemical, and biological properties of soils to support desired vegetation conditions and soil- hydrologic functions and processes within watersheds.	Contract specifications, mitigation measures
Apply mitigation and restoration measures within the activity area so that total soil resource commitment (TSRC) levels are moved back toward 5% or less following completion of the activities (USDA Forest Service 2003a, p. III- 21, SWST03).	Limit the extent of soil committed to nonproductive land uses, such as roads and landings, to the minimum necessary for Forest management; maintain soil productivity and ecological processes where functioning properly, and restore where currently degraded.	Contract specifications, mitigation measures
Neither degrade nor retard attainment of properly functioning soil, water, riparian, and aquatic desired conditions except where outweighed by demonstrable short or long-term benefits to watershed resource conditions or where the Forest Service has limited authority (such as access roads) (USDA Forest Service 2003a, p. III-22, SWST04, FSH 2520).	Maintain surface and ground water in streams, lakes, wetlands, and meadows to support healthy riparian and aquatic habitats; stability and effective function of stream channels; and downstream uses. Restore and maintain flow regimes sufficient to create and sustain soil- hydrologic and water quality conditions; and riparian, aquatic and wetland habitat; and to achieve patterns of sediment, nutrient, and large woody debris routing within their inherent range of capability.	Project design, contract specifications, mitigation measures

Within legal authorities, ensure that new proposed management activities within watersheds containing 303(d) listed waters improve or maintain overall progress toward beneficial use attainment for pollutants that led to the listing (USDA Forest Service 2003a, p. III-22, SWST07).	Manage water quality to meet requirements under the Clean Water Act, with special emphasis on de-listing water quality limited waters under section 303(d) and supporting stated development and implementation of Total Maximum Daily Loads.	Project design, contract specifications, mitigation measures
Conduct field verification to delineate perennial and intermittent streams, seeps, springs, and bogs for riparian and wetland buffers (FSM 2520).	Ensure protection of riparian areas and wetlands.	Inventory and mapping to determine flow regime. Timber sale layout will further verify flow regime and delineations and determine Project design.
Conduct site-specific analysis or field verification of landslide-prone models to identify landslide prone areas in proposed management areas that may alter soil- hydrologic processes. Design management actions to avoid the potential for triggering landslides (USDA Forest Service 2003a, p. III-23, SWST12).	Avoid altering vegetation or hydrologic conditions on landslide-prone areas, which could increase probability of slope failure.	Project design, mitigation measures

Table 2.3-3. Management Requirements: Wildlife.

Management Requirements	Objective	Implementation Mechanism
The Forest shall consult with the National Marine Fisheries Service and Fish and Wildlife Service as needed and appropriate to comply with consultation requirements under the Endangered Species Act and Magnuson-Stevens Act (USDA Forest Service 2003a, p. III-11, TEST01).	Fulfill requirements for consultation regulations.	Project design
Design and implement projects to meet the terms of Forest Service-approved portions of recovery plans. If a recovery plan does not yet exist, use the best information available (for example, Biological Assessments, Biological Opinions, letters of concurrence, Forest Service-approved portions or Conservation Strategies) until a recovery plan is written and approved (USDA Forest Service 2003a, p. III-11, TEST03).	Ensure the Project components meet the intent of the Forest Plan.	Project design
Mitigate, through avoidance or minimization, management actions within known nesting, wintering, or roosting sites of threatened, endangered, proposed, and candidate (TEPC) species if those actions would adversely affect the survival of wintering or roosting populations. During project planning, determine sites, periods, and appropriate mitigation measure to avoid or minimize effects (USDA Forest Service 2003a, p. III-11, TEST13).	Comply with mitigation measures designed to avoid disturbance of nesting, wintering, or roosting sites.	Project design
Unless a broad-scale assessment has been completed that substantiates different historical levels of unsuitable habitat, limit disturbance within each Lynx Analysis Unit (LAU) as follows: If more than 30% of lynx habitat within a LAU is currently in unsuitable condition, no additional habitat may be changed to unsuitable habitat as a result of vegetative management projects. Fire use or fire hazard reduction and associated vegetation management activities within the wildland urban interface watersheds that develop or maintain fuel profiles needed to reduce the risk of wildfire threats to the wildland urban interface areas are NOT bound by this standard (USDA Forest Service 2003a, p.III-27, TEST13).	Conservation of Canada lynx (listed under the Endangered Species Act [ESA]) and Canada lynx habitat; compliance with the Canada Lynx Conservation Assessment and Strategy (Interagency Lynx Biology Team 2013)	Project design
Mitigate management actions within known nesting or denning sites of Management Indicator Species (MIS) or Sensitive Species if those actions would disrupt the reproductive success of those sites during the nesting or denning period (USDA Forest Service 2003a, p. III-27, WIST03).	Conservation of sensitive species	Project design, monitoring, contract specifications
In northern goshawk territories with known active nest stands, identify alternate and replacement nest stands during project-level planning when it is determined that the proposed activity is likely to degrade nest stand habitat (USDA Forest Service 2003a, p. III-11, WIST05).	Conservation of sensitive species	Project design, monitoring, contract specifications
The northern Idaho ground squirrel will receive priority consideration for all management activities that occur within their known occupied habitat. The intent of this standard is not to exclude all other activities within this habitat, but rather to reduce or minimize potential impacts to this species while emphasizing habitat improvement within and adjacent to known sites (USDA Forest Service 2003a, pp. III- 132,161; Standards 0339, 0529).	Conservation of ESA-listed species	Project design, monitoring, contract specifications
An increase in habitat for the white-headed woodpecker or flammulated owl may be achieved by the following methods: a) reducing tree densities and ladder fuels under and around existing large ponderosa pine trees and snags to reduce the risk of tree-replacing fire and b) restoring more open canopy conditions (USDA Forest Service 2003a, pp. III- 133, 149; Guidelines 0341, 4442).	Restoration of habitat for sensitive species	Project design

Table 2.3-4. Management Requirements: Range Resources.

Management Requirements	Objective	Implementation Mechanism
After completing vegetation treatments, livestock grazing practices (for example, salting locations, rest, temporary closure of stock water, herding, season of use, duration, and temporary electric fencing) may be altered as needed to hasten or enhance site recovery or treatment (USDA Forest Service 2003a, p. III-46, RAGU03).	Minimize impacts from livestock grazing.	Annual operating instructions

Table 2.3-5. Management Requirements: Noxious Weeds.

Management Requirements	Objective	Implementation Mechanism
All seed used on National Forest System (NFS) lands will be certified to be free of seeds from noxious weeds listed on the current All States Noxious Weeds List (USDA Forest Service 2003a, p. III-36, NPST02).	Prevent invasion/expansion of noxious weeds.	Project design, contract specifications, mitigation measures
Revegetate areas, as designated by the Forest Service, where the soil has been exposed by ground-disturbing activity. Implement other measures, as designated by the Forest Service, to supplement the influence of re- vegetation in preventing the invasion or expansion of noxious weeds. Earth-disturbing equipment used on NFS lands shall be cleaned to remove all visible plant parts, dirt, and material that may carry noxious weed seeds. Cleaning shall occur prior to entry onto the project area and again upon leaving the project area, if the project area has noxious weed infestations (USDA Forest Service 2003a, p. III-36, NPST03).	Prevent invasion/expansion of noxious weeds.	Project design, contract specifications, mitigation measures
Materials such as hay, straw, or mulch that are used for rehabilitation and reclamation activities shall be free of noxious weed seed, and shall comply with the 1995 weed-free forage special order against use of non-certified hay, straw, or mulch. Materials that are not covered under a weed seed free certification, and that have the potential to contain noxious weed seed, shall be inspected and determined to be free of weed seed before purchase and use (USDA Forest Service 2003a, p. III-36, NPST06).	Prevent invasion/expansion of noxious weeds.	Project design, contract specifications, mitigation measures
Gravel or borrow material source sites with noxious weed species present shall not be used, unless effective treatment or other mitigation measures are implemented (USDA Forest Service 2003a, p. III-37, NPST08).	Prevent invasion/expansion of noxious weeds.	Project design, contract specifications, mitigation measures
The Forest shall comply with the intent and direction established in the above provisions or clauses in a manner similar to that required of contractors or permittees (USDA Forest Service 2003a, p. III-37, NPST09).	Prevent invasion/expansion of noxious weeds.	Project design, contract specifications, mitigation measures
Projects that may contribute to the spread or establishment of noxious weeds shall include measures to reduce the potential for spread and establishment of noxious weed infestations (USDA Forest Service 2003a, p. III-37, NPST10).	Prevent invasion/expansion of noxious weeds.	Project design, contract specifications, mitigation measures

Table 2.3-6. Management Requirements: Threatened, Endangered, and Sensitive (TES) Plants.

Management Requirements	Objective	Implementation Mechanism
Management actions that occur within occupied, sensitive plant species habitat must incorporate measures to ensure habitat is maintained where it is within desired conditions, or restored where degraded (USDA Forest Service 2003a, p. III- 33, BTST01).	Minimize negative impact on sensitive plant habitat; restore degraded habitat.	Project design

Table 2.3-7. Management Requirements: Cultural Resources.

Management Requirements	Objective	Implementation Mechanism
Avoid all known cultural sites during project implementation. If a new cultural site is discovered during the project, stop activities in the area until a Forest Service archaeologist evaluates the site and its importance. Apply any protective measures recommended (National Historic Preservation Act; Forest Service Manual; USDA Forest Service 2003a, pp. III-69 to III-70).	Protect cultural resources until they can be evaluated for eligibility for the National Register of Historic Places.	Project design

Table 2.3-8. Management Requirements: Recreation.

Management Requirements	Objective	Implementation Mechanism
All projects shall be designed to meet the adopted Visual Quality Objectives (VQOs) as displayed on the Forest VQO map (USDA Forest Service 2003a, p. III–67, SCST01).	Protect or enhance Forest scenic value.	Project design

2.4. Project Design Features/Mitigation Measures

Project design features are designed to avoid, reduce, or eliminate undesirable effects. Mitigation measures are designed to rectify or compensate for undesirable effects from proposed activities. Unless noted otherwise in the decision document, the PDFs/mitigation measures are mandatory if the Responsible Official selects an action alternative for implementation.

The PDFs/mitigation measures listed in Tables 2.4-1 through 2.4-10 are practices the IDT developed during this Project analysis to address site-specific environmental concerns and to meet Forest Plan Standards and Guidelines. Each feature or measure includes a description, the Objective, applicable Forest Plan Standard/Guideline (USDA Forest Service 2003a), the enforcement mechanism and person(s) responsible for enforcement, and an effectiveness rating with the basis for that rating.

The NEPA regulations (40 CFR 1508.20 Mitigation) state the following:

"Mitigation" includes

- Avoiding the impact altogether by not taking a certain action or parts of an action.
- Minimizing impacts by limiting the degree or magnitude of the action and its implementation.
- Rectifying the impact by repairing, rehabilitating, or restoring the affected environment.
- Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action.
- Compensating for the impact by replacing or providing substitute resources or environments.

Project design features were created to use design criteria to prevent the need of a mitigation measure.

Project design feature/mitigation effectiveness is rated as follows for this Project:

- High—Highly effective (estimated at greater than 90%) at meeting the objective, and one or more of the following types of documentation or rationale is available:
    - Research or literature
    - Administrative studies
    - Experience: professional judgment of an expert
    - Fact: evident by logic or reason
- Moderate – Moderately effective (estimated at 60% to 90%), and its effectiveness is supported either by evidence or logic. Implementation of this PDF or mitigation measure needs to be monitored, and it may be modified if needed to achieve its objective.
- Low – Somewhat effective (estimated at less than 60%), but its effectiveness is not supported by substantial evidence or professional judgment indicates limited success in implementation or meeting objectives. Implementation of this PDF or mitigation measure needs to be monitored, and it may be modified if necessary to achieve its objective.

Table 2.4-1. Project design features and mitigation measures for wildlife.

#	Project Design Feature	Objective	Effectiveness and Basis	Applicable Forest Plan Standard/Guide	Enforcement
Wildlife					
1	Prior to any ground-disturbing activity, including but not limited to the construction of log landings, vehicle turnouts or parking areas, skid trails, or road construction and maintenance, road decommissioning and obliteration, and prescribed burning, the Wildlife Biologist or designated Wildlife Staff should conduct on-site surveys at least three times during a 7-day period in potential northern Idaho ground squirrel (NIDGS) (*Urocitellus brunneus*) habitat to determine the presence of NIDGS. Surveys would be conducted to identify the presence of NIDGS in or within harvest units and prescribed fire areas. The Wildlife Biologist would determine potential habitat areas to be surveyed based on GIS maps, aerial photos, and professional expertise. If occupied NIDGS sites are discovered, additional measures described below would be implemented to minimize potential effects: Mechanical thinning operations, skidding, decking, slash piling, and prescribed burning are prohibited in occupied NIDGS sites without approval by the Wildlife Biologist. If necessary, project activities may be shifted to a time period outside the NIDGS above-ground activity period (April 1 to August 15). If project activities are shifted to the fall season, wildlife staff would identify NIDGS dens with pin flags and coordinate all activities in these known sites. Fall activities would be allowed only if soil moisture levels are dry enough to prevent soil damage from machinery, as determined by the Sale Administrator, Soil Scientist, Wildlife Biologist, and Timber Management Assistant. If wet soil conditions prevent project activities in fall, the activities may be shifted to winter. This would require at least 18 inches of firm snow and/or 4 inches of frozen soil prior to activity approval by the Sale Administrator, Wildlife Biologist, and Timber Management Assistant. If project activities at any NIDGS site cannot be appropriately mitigated, that project unit and the associated project activities may be dropped from the timber sale. In harvest units where NIDGS are found, ground-disturbing activities should occur in the time period from September 1 through March 15.	Provide protection to Federally listed NIDGS, feeding sites, seasonal burrows, late summer estivation dens, and winter hibernacula.	HIGH: research, literature, Forest Plan, agency direction, logic	TEST01 TEST02 TEST03 TEST06 TEST12 TEST13 TEGU01 TEGU02 TEGU06 WIGU01	Timber Sale Contract, Wildlife Biologist, Soil Scientist, Timber Management Assistant, Sale Administrator, Burn Plan, Fire Management Officer

#	Project Design Feature	Objective	Effectiveness and Basis	Applicable Forest Plan Standard/Guide	Enforcement
Wildlife					
2	If occupied NIDGS sites are found adjacent to haul routes on National Forest System (NFS) lands, a speed limit of 15 mph would be recommended where determined necessary by the Wildlife Biologist. Monitoring would also be required. If speed limits or other protections are needed on county or State roads, the Forest Service would work with the appropriate agencies to resolve the issue.	Provide protection to Federally listed NIDGS from vehicle-caused mortality.	MODERATE: research, literature, Forest Plan, agency direction, logic	TEST01 TEST02 TEST03 TEST06 TEST12 TEGU01 TEGU02 TEGU06 WIGU01 WIGU04	Timber Sale Contract, Wildlife Biologist, Timber Management Assistant, Sale Administrator, Burn Plan, Fire Management Officer
3	In harvest units with known NIDGS sites, slash piles created from harvest activities must be removed from landings not later than March 15 of the year immediately following the harvest year in each of these units.	Provide protection to Federally listed NIDGS from direct mortality from slash piles, machinery, vehicles, or slash burns.	MODERATE: research, literature, Forest Plan, agency direction, logic	TEST01 TEST02 TEST03 TEST06 TEST12 TEGU01 TEGU02 TEGU06 WIGU01 WIGU04	Timber Sale Contract, Wildlife Biologist, Timber Management Assistant, Sale Administrator, Burn Plan, Fire Management Officer

#	Project Design Feature	Objective	Effectiveness and Basis	Applicable Forest Plan Standard/Guide	Enforcement
Wildlife					
4	Known northern goshawk nests would be protected within a 30-acre forested nest stand as determined by the Wildlife Biologist in coordination with the Sale Administrator and the Timber Management Assistant. All activities within these nest stands would be restricted to those approved by the Wildlife Biologist and coordinated with the Sale Administrator and the Timber Management Assistant. During operations, if a new northern goshawk nest is located, onsite activities would be halted until a survey by wildlife staff can determine if the nest is active. A 30-acre forested nest stand would be identified, as above. If the nest is active, harvest activities in that 30 acres would be halted until the end of the nesting season (March 1 to Sept. 30). Harvest activities may resume earlier than Sept. 30 if the Wildlife Biologist determines that the birds are no longer present. All identified northern goshawk nest stands would have a post-fledgling area of at least 600 acres and a foraging area of at least 6,000 acres identified by the Wildlife Biologist in consultation with the Timber Management Assistant. Within each post-fledgling area, five other nest stands would be identified by the Wildlife Biologist. These nest stands would have the same restrictions on human activities as noted above. The post-fledgling areas and foraging areas may have other activity restrictions applied from March 1 to Sept. 30, depending on site-specific information, and as determined by the Wildlife Biologist in coordination with the Sale Administrator and Timber Management Assistant. Refer to the Project record for nest site locations and associated units.	Provide protection to northern goshawk, nests, PFAs, and foraging areas.	HIGH: research, literature, Forest Plan, agency direction, logic	WIST02 WIST03 WIST04 WIST05 WIGU01 WIGU05 WIGU06 WIGU07 Forest Service General Technical Reports RM-217 and PNW-GTR-733 as required by the Forest Plan	Timber Sale Contract, Wildlife Biologist, Timber Management Assistant, Sale Administrator, Burn Plan, Fire Management Officer

#	Project Design Feature	Objective	Effectiveness and Basis	Applicable Forest Plan Standard/Guide	Enforcement
Wildlife					
5	Any temporary roads or closed NFS roads physically opened for access to project activities that would remain open during elk rifle season would be blocked with a temporary gate or other physical closure during use and until once again permanently closed or obliterated following management activities.	Minimize negative effects on wildlife; ensure contractors and employees do not have unfair advantage during hunting seasons; minimize damage to native surface roads that could result in increased erosion and sediment delivery.	HIGH: research, literature, Forest Plan, agency direction, logic	TEST01 WIST02 WIST03 WIGU01 WIGU02 WIGU05 WIGU06 WIGU08 WIGU13 SWST04	Timber Sale Contract, Wildlife Biologist, Sale Administrator, Engineering Contract Administrator

#	Project Design Feature	Objective	Effectiveness and Basis	Applicable Forest Plan Standard/Guide	Enforcement
Wildlife					
6	In areas closed to public motorized access, prohibit contractors and their employees from access with motorized vehicles for purposes other than implementing contract or other authorized FS activities.	Minimize negative effects on wildlife; ensure contractors and employees do not have unfair advantage during hunting seasons.	HIGH: research, literature, Forest Plan, agency direction, logic	TEST01 WIST02 WIST03 WIGU01 WIGU02 WIGU05 WIGU06 WIGU08 WIGU13	Timber Sale Contract, Wildlife Biologist, Sale Administrator, Burn Plan, Fire Management Officer
7	Prior to any ground-disturbing activity, including, but not limited to, the construction of log landings, vehicle turnouts or parking areas, skid trails, road construction or maintenance, and prescribed fire, the Wildlife Biologist, or designated Wildlife Staff, must conduct onsite surveys to identify threatened, endangered, proposed, or candidate species; Management Indicator Species (MIS); or Sensitive species presence. In particular, spring surveys would be used to identify wildlife reproduction sites, such as elk calving, deer fawning, mammal denning, and bird nesting. Project activities may be altered to protect the wildlife species, as practicable, using measures approved by the Wildlife Biologist, following coordination with the Timber Management Assistant, Fire Management Officer, and Sale Administrator. Mitigate management actions within known nesting or denning sites of MIS or Sensitive Species if those actions would disrupt the reproductive success of those sites during the nesting or denning period.	Minimize negative effects on wildlife, especially during reproductive periods.	MODERATE: Forest Plan, agency direction, logic	TEST06 TEST12 TEST13 WIST03	Timber Sale Contract, Wildlife Biologist, Sale Administrator, Burn Plan, Fire Management Officer

#	Project Design Feature	Objective	Effectiveness and Basis	Applicable Forest Plan Standard/Guide	Enforcement
Wildlife					
8	Provide a radius of two elk sight distances (total of 400 feet) of vegetation (where available and practicable) to protect mineral licks and elk wallows. No harvest or prescribed burning would be allowed in these sites, without approval by the Wildlife Biologist. Exact boundaries of each protected site would be identified by the Wildlife Biologist, following coordination with the Timber Management Assistant, Fire Management Officer, and Sale Administrator.	Minimize negative effects on wildlife, address big game vulnerability to hunting mortality, and to provide adequate habitat security.	HIGH: research, literature, Forest Plan, agency direction, logic	WIGU13	Timber Sale Contract, Wildlife Biologist, Sale Administrator, Burn Plan, Fire Management Officer
9	During timber harvest, retain existing snags with the following stipulations: Timber contract provision would specify to leave standing dead trees. Snags would not be cut without permission of the Sale Administrator unless there is a safety or emergency situation.	Ensure habitat for snag-dependent species.	MODERATE: research, literature, administrative studies, logic	WIGU01	Timber Sale Layout, Contract, Administrator, Wildlife Biologist

#	Project Design Feature	Objective	Effectiveness and Basis	Applicable Forest Plan Standard/Guide	Enforcement
	Wildlife				
10	All activities within great grey owl nesting and rearing sites would be restricted to those approved by the Wildlife Biologist and coordinated with the Sale Administrator/TMA. A site specific silvicultural prescription will be developed by the Wildlife biologist in coordination with the District Silviculturalist, for forested stands where known great gray owl nesting and rearing sites existed. These forested stands are generally located in PVGs 6, 9, and 10 that are immediately adjacent to meadows (including wet meadows, dry meadows or other nonforested openings). Habitat requirements for the great gray owl considered within the prescription include but are not limited to timing restrictions, DWD, number of snags per acre, snag size class, conifer encroachment into opening, condition of forested stand, forest stand structure, tree species composition, and forest size class. Prior to any ground-disturbing activity, including, but not limited to, the construction of log landings, vehicle turnouts or parking areas, skid trails, road construction or maintenance, and prescribed fire, the Wildlife Biologist, or designated Wildlife Staff, must conduct onsite surveys to identify whether the great grey owl nest stand is active. During operations, if a new great grey owl nest is located, onsite activities would be halted until a survey by Wildlife Staff can determine if the nest is active.	Minimize negative effects on wildlife, especially during reproductive periods.	HIGH: research, literature, Forest Plan, agency direction, logic	TEST12 WIGO01 WIGO02 WIGO03 WIGO04 WIOB01 WIOB03 WIOB07 WIOB09 WIST01 WIST02 WIST03 WIST04 WIGU01 WIGU05	Timber Sale Contract, Wildlife Biologist, Sale Administrator, Burn Plan, Fire Management Officer

Table 2.4-2. Project design features and mitigation measures for botanical resources.

#	Project Design Feature	Objective	Effectiveness and Basis	Applicable Forest Plan Standard/Guide	Enforcement
Botanical Resources					
11	Prior to any ground-disturbing activity, including but not limited to, the construction of log landings, biomass storage, vehicle turnouts or parking areas, skid trails, road construction or maintenance, and prescribed fire, the Forest Botanist or designated staff must conduct on-site surveys where rare plant habitat occurs to identify Sensitive plant populations. Project activities may be altered to protect the rare species, using measures approved by the Forest Botanist and coordinated with the Timber Management Assistant, Fire Management Officer, and Sale Administrator.	Maintain or restore occupied rare plant habitat.	MODERATE: Forest Plan, agency direction, logic	TEST06 TEST12 TEST13 WIST03, BTST01 BTGU01	Timber Sale Contract, Wildlife Biologist, Sale Administrator, Burn Plan, Fire Management Officer, Forest Botanist
12	All existing rare plant populations within the activity area would be designated for protection by a Botanical Specialist prior to project implementation.	Avoid risk to rare plant sites.	HIGH: logic	BTGU01	Forest Botanist

Table 2.4-3. Project design features and mitigation measures for Soil, Water, Riparian and Aquatic Resources (SWRA).

#	Project Design Feature	Objective	Effectiveness and Basis	Applicable Forest Plan Standard/Guide	Enforcement
Soil, Water, Riparian and Aquatic Resources					
13	The Project IDT has selected Option 2, as directed in the Forest Plan, Appendix B (USDA Forest Service 2003a), in the step down process for Riparian Conservation Areas (RCAs). Option 2 uses two site-potential tree heights (240 feet) for perennial streams and intermittent streams providing fish habitat. One site-potential tree height (120 feet) would be applied to intermittent streams not providing seasonal fish habitat, springs, ponds, lakes, and wetlands. A 30-foot RCA distance would be applied to seeps. Any previously unmapped RCA discovered during implementation would be delineated. Limited equipment use and harvest would be allowed in the outer half of RCAs in stands identified and approved for RCA thinning as described in the RCA Thinning Guidelines (Appendix 5, FEIS). Project design features would still apply to minimize ground disturbance. No mechanized equipment, new skid trails, temporary roads, or landings would be allowed within RCAs unless evaluated and approved by the Fisheries Biologist or Hydrologist. The Hydrologist, Soil Scientist and /or Fisheries Biologist would provide required mitigations to maintain watershed condition indicators, including but not limited to chipping the landing material, rehabilitating skid trails and landings within the same year of use, and leaving trees cut during landing construction on the site as CWD. The RCA treatment prescriptions would be developed by the Silviculturist, Fisheries Biologist, and Hydrologist to ensure riparian functions and watershed condition indicators are maintained. The Wildlife Biologist would also provide input for wet meadow treatments. Any RCAs discovered during layout may be considered for treatment if they meet the intent of RCA treatments, maximum RCA treatment acres analyzed or would not be surpassed, and all project design features and restrictions can be adhered to.	Maintain riparian function.	HIGH: experience, logic, Belt et al. 1992, McDade et al. 1990, Gregory et al. 1991	SWST01 SWST04 SWST10	Sale Administrator, Timber Sale Contract Provision, Fisheries Biologist or Hydrologist

#	Project Design Feature	Objective	Effectiveness and Basis	Applicable Forest Plan Standard/Guide	Enforcement
Soil, Water, Riparian and Aquatic Resources					
14	Prohibit yarding of logs across perennial and intermittent streams unless fully suspended above the stream channel. Minimize skyline corridors and require full suspension within RCAs (including landslides and landslide-prone areas). Sale Administrator would coordinate with Fisheries Biologist and/or Hydrologist prior to identifying skyline corridors where felling of trees would be necessary within RCAs. These trees would be left in place outside of harvest units.	Maintain channel integrity.	HIGH: logic, experience	SWST10	Design and Layout, Contract, Administrator
15	No storage of fuel or refueling within RCAs unless approved by a Fisheries Biologist and/or Hydrologist. Unattended equipment should not be parked in RCAs. Timber sale contract provisions (as well as other contracts) shall require a spill response plan be included in the contract to meet state Best Management Practices (BMPs).	Minimize potential for fuel spill in stream.	HIGH: logic	SWST01 SWST04 SWST11	Sale Administrator, Harvest Inspector, Timber Sale Contract Provision, Fisheries Biologist or Hydrologist

#	Project Design Feature	Objective	Effectiveness and Basis	Applicable Forest Plan Standard/Guide	Enforcement
Soil, Water, Riparian and Aquatic Resources					
16	No active ignition of prescribed fire in inner RCAs unless approved by Fisheries Biologist and/or Hydrologist. Instances where active ignition may occur could include areas that would minimize severity and intensity and where active ignition could take the place of fire line construction. Noncommercial thinning treatments (limbing and noncommercial understory thinning by hand) in outer RCAs would only occur in areas where prescribed fire is expected to be implemented and would not occur within riparian vegetation. No ladder fuel treatment would occur within the inner RCA unless approved by the Fisheries Biologist and/or Hydrologist. Slash produced by these treatments would be lopped and scattered or hand piled as directed by the Fisheries Biologist, Soil Scientist and/or Hydrologist. No construction of mechanical fireline shall occur in RCAs, and handline should be minimized. Promptly reclaim all fireline following burn activities. Reclamation activities shall include, but are not limited to, placing waterbars, pulling material removed (including mineral soil) back onto fireline, and pulling slash as available onto the surface. Also see project design feature (PDF) #39. All burn plans and associated treatments shall be annually reviewed by district resource specialists. Additional site-specific concerns regarding prescribed fire treatments would be addressed at that time.	Minimize loss of shade to perennial stream channels.	HIGH: experience	SWST01 SWST04 SWST07 FMGU06	Fuels Specialist, Burn Boss, Fisheries Biologist, or Hydrologist, Contracting Officer's Representative, Soil Scientist
17	When constructing or reconstructing roads within RCAs or installing culverts on intermittent or ephemeral channels use wood straw, jute matting, or other erosion-control measures as deemed necessary by the Fisheries Biologist or Hydrologist. Add gravel or surface 100 feet of new or reconstructed roads on either side of intermittent and perennial streams where necessary.	Minimize sediment delivery to channel.	HIGH: experience, logic, Burroughs and King 1989, Foltz 2007	SWST01 SWST04	Timber Sale Contract, Sale Administrator, Harvest Inspector Fisheries Biologist, Hydrologist, Engineering Representative

#	Project Design Feature	Objective	Effectiveness and Basis	Applicable Forest Plan Standard/Guide	Enforcement
Soil, Water, Riparian and Aquatic Resources					
18	Roads identified for obliteration, including unauthorized roads used as temporary roads as well as those being obliterated for soil and water restoration, would be decompacted to the depth of compaction, recontoured, blended with the surrounding terrain, seeded with native seed (where need is identified), and provided with a minimum of 50% to maximum of 80% ground cover (vegetation transplants at a rate of 15 per 100 linear feet, natural mulch, coarse woody debris (CWD), and agricultural or wood straw, in that order of preference) to an extent deemed necessary by a Fisheries Biologist and/or Hydrologist. In addition to the above treatment, stream crossings would receive planted vegetation plugs and additional ground cover to an extent deemed necessary by a Fisheries Biologist and/or Hydrologist, to reduce erosion, facilitate recovery of soil biological function and stabilize streambanks. Retained travelway would be effectively closed at entrance to prevent unauthorized use. Winterize temporary roads that would be retained until reforestation and biomass activities are completed. Install drainage features to control runoff and reduce erosion; *these features should be inspected annually after each winter to ensure they are still effective for the life of the road (less than 3 years).* Newly constructed temporary roads would not require vegetation transplants. Temporary roads would be fully obliterated within 3 years of harvest unless otherwise agreed to in writing.	Minimize sediment delivery to channel and rehabilitate riparian area; reduce levels of total soil resource commitment.	HIGH: experience, logic, Burroughs and King 1989, Foltz 2007; experience, local monitoring	SWST01 SWST04 SWST03(b) SWST08	For Temporary Roads–Sale Administrator and/or Harvest Inspector For All Roads–Timber Sale Contract Provisions, Hydrologist, Soil Scientist, Fisheries Biologist, Wildlife Biologist
19	If snow conditions allow, use a snow bridge as an alternative to road construction and culvert placement. Where a temporary culvert is needed in a temporary road, it would be removed within the same field season unless approved by the Fisheries Biologist and/or Hydrologist.	Minimize sediment delivery to channel and rehabilitate riparian area; reduce levels of total soil resource commitment.	HIGH: experience, logic, Burroughs and King 1989, Foltz 2007, experience, local monitoring	SWST01 SWST04 SWST03(b) SWST08	Sale Administrator, Harvest Inspector Timber Sale Contract Provisions

#	Project Design Feature	Objective	Effectiveness and Basis	Applicable Forest Plan Standard/Guide	Enforcement
Soil, Water, Riparian and Aquatic Resources					
20	Closed Maintenance Level (ML) 1 roads temporarily opened for vegetation management that are proposed to return to ML 1 closure would have: entrance recontoured, crossings removed, cut and fill recontoured at stream crossings, vegetation transplants at crossings, drainage features installed and scarifying and reseeding to promote revegetation when vegetation management actions are completed. The PDFs for culvert replacements would be applied to culvert installations and post-treatment culvert removal on re-constructed closed ML 1 roads (described above and in the Project Biological Assessment, located in the Project record). Roads not identified for long-term closure that may be needed for administrative use in the more immediate future would be closed by installing water bars as needed, where needed, and physically closing to prohibit motorized use.	Reduce long term sediment production.	HIGH: logic, experience, local monitoring, Foltz and Maillard 2003	SWST01 SWST04 SWST08	Fisheries Biologist, Soil Scientist, Hydrologist, Engineering Representative
21	All new permanent road construction and reconstruction where cuts and fills are disturbed would require placing slash windrows and/or erosion control measures (e.g., hydroseeding and mulching) where erosion is identified as a concern, such as within contributing areas at all perennial and intermittent crossings and exposed steep cutslopes. Add gravel or surface 100 feet on either side of intermittent and perennial channels on all new construction except where it is determined that existing shallow, rocky soils would provide sufficient protection from erosion. Spot rocking and armored dips would also be incorporated into road designs by project engineers.	Reduce long term sediment production.	HIGH: experience, logic, Belt et al. 1992	SWST01 SWST04 SWST08	Engineer, Hydrologist, Soil Scientist, Fisheries Biologist
22	Install culvert or other crossing structures on natural channels after spring peak flows; the Fisheries Biologist or Hydrologist would determine when dewatering the channel is necessary. For permanent culverts, incorporate elements of the natural channel, such as substrate size and gradient, when reconstructing the channel where fish habitat or potential fish habitat exists. The following permits shall be acquired prior to project implementation: Variance letter to exceed turbidity levels from Idaho Department of Environmental Quality, Stream Channel Alternation Permit from Idaho Department of Water Resources. In addition, a 404 Dredge and Fill Permit would be obtained from the United States Army Corps of Engineers.	Minimize effects on fish and fish habitat.	HIGH: logic, experience	NA	Fisheries Biologist Hydrologist, Engineering Representative

#	Project Design Feature	Objective	Effectiveness and Basis	Applicable Forest Plan Standard/Guide	Enforcement
Soil, Water, Riparian and Aquatic Resources					
23	Stream channels shall be dewatered prior to in-stream work with heavy machinery. The stream would likely be diverted using a temporary corrugated plastic or metal pipe and a temporary cofferdam. If water drafting is necessary, screen opening size would be the standard 3/32-inch or smaller (as required by the Forest Plan; USDA Forest Service 2003a). The culvert design team would specify stockpiling and staging areas; access to the site would be via an established roadway. Some trees may have to be felled within the RCA to complete construction; however, the number of trees cut shall be minimized to the extent possible and felled trees will be left intact as CWD/Large Woody Debris (LWD).	Minimize effects on fish and fish habitat.	HIGH: logic, experience	NA	Fisheries Biologist Contract Administrator, Hydrologist, Engineering Representative
24	Block nets shall be installed, and fish observed within the project area would be cleared from the area using dipping, seining, and/or electrofishing methods. Fish would be transported to an unaffected portion of the creek above the in-stream work and released. Block nets would be removed after fish removal.	Minimize effects on fish and fish habitat.	HIGH: logic, experience	NA	Fisheries Biologist, Engineering Representative, Contract Administrator
25	During culvert installation activities on natural channels, a spill-containment kit would be available on-site that would accommodate potential spills from the equipment used during implementation. No fuels would be stored in RCAs unless there is no other alternative. Refueling or servicing of vehicles or equipment would not take place in RCAs. All equipment would be in good repair and free of leakage of lubricant, fuels, coolants, and hydraulic fluid. In-stream work with heavy machinery would be minimized to the extent possible. Detectable sheens shall be reported to the Environmental Protection Agency, and any spills over 25 gallons shall be reported to Idaho Department of Environmental Quality.	Minimize effects on water quality.	HIGH: logic, experience	SWST01 SWST04 SWST11	Contract Administrator, Hydrologist, Fisheries Biologist, Engineering Representative

#	Project Design Feature	Objective	Effectiveness and Basis	Applicable Forest Plan Standard/Guide	Enforcement
Soil, Water, Riparian and Aquatic Resources					
26	During culvert installation and construction of new trail crossings, Sedimats or similar containment system would be placed within the natural channel to collect released fine sediments and minimize effects on downstream segments. These would be removed from the channel at the conclusion of Project activities. Sediment-control measures may also include erosion-control matting, mulch, straw wattles, straw bales, and/or slash. The culvert/bridge installation and associated activities would be conducted in a manner that would minimize the potential for input of additional fine sediment or effecting riparian habitat; the Forest Service shall design a site-specific erosion-control plan that suits the contracted activity. For Aquatic Organism Passage (AOP) culverts, stream simulation material would be washed (i.e., sprayed with water using pump and hose setup), to set fine material prior to reintroduction of flow. Flow would slowly be reintroduced into the streambed to minimize loss of downstream surface water and to minimize turbidity.	Minimize effects on water quality.	HIGH: logic, experience	FRST05	Contract Administrator, Hydrologist, Fisheries Biologist, Soil Scientist, Engineering Representative
27	Culvert replacement/removal site rehabilitation may include seeding and mulching disturbed areas and planting with native vegetation. Straw wattles may also be used to stabilize the road fill. All project-related materials and waste shall be removed from the site when construction is complete.	Reduce erosion.	HIGH: logic, experience	NA	Contract Administrator, Hydrologist, Fisheries Biologist, Engineering Representative
28	During installation of the vault toilets, if located in RCAs, follow programmatic consultation.	Reduce erosion.	HIGH: logic, experience	NA	Contract Administrator, Hydrologist, Fisheries Biologist, Engineering Representative

#	Project Design Feature	Objective	Effectiveness and Basis	Applicable Forest Plan Standard/Guide	Enforcement
Soil, Water, Riparian and Aquatic Resources					
29	Locate and approve water drafting sites prior to use. The project Fisheries Biologist and/or Hydrologist must approve the sites. No vehicles allowed in stream courses at any time for the purpose of withdrawing water. Drafting hoses would be required to be fitted with screens with a 3/32-inch mesh.	Minimize impacts to stream channels, RCAs, and fisheries.	HIGH: logic, experience	SWST01	Contract Administrator, Engineering Representative, Fisheries Biologist, Hydrologist
30	New trail crossings (including fords and bridges) associated with the trail reroutes would be designed to allow passage of all aquatic organisms and shall comply with SWST08. Armor potential erosion sites (e.g., trail approaches) with appropriate rock or other erosion-control measure. Select the site for the crossing to minimize effects on aquatic resources. Follow bridge/culvert project design features outlined above if the crossing would involve a bridge.	Allow passage of and minimize effects on aquatic organisms.	HIGH: logic, experience	SWST08	Fisheries Biologist, Hydrologist, Recreation Specialist, Contract Administrator
31	Utilize all applicable BMPs and Soil Water Conservation Practices for harvest and road activities.	Reduce/limit levels of soil disturbance, erosion and potential sedimentation; meet requirements of State of Idaho Non-point Source Pollution Management Plan; maintain water quality and associated beneficial uses.	HIGH: National Core BMP Technical Guide, Vol. I (FS-990a); local monitoring	SWST01 SWST02 SWST03 SWST04 SWGU08	Timber Sale Design and Layout, Sale Administrator

#	Project Design Feature	Objective	Effectiveness and Basis	Applicable Forest Plan Standard/Guide	Enforcement
Soil, Water, Riparian and Aquatic Resources					
32	<u>Ground-Based Harvesting</u> Specific soil impacts from harvest activities will be judged according to monitoring definitions set forth in the national Forest Soil Disturbance Monitoring Protocol (FSDMP). Areal soil impacts within units will be considered within the primary context of maintaining hillslope soil hydrologic function, captured in the Forest Plan. **All ground-based harvesting use cases** Ground-based mechanized harvesting equipment will be considered only when: • Soil moistures are sufficiently low that unacceptable soil rutting, displacement, and compaction, per national soil monitoring protocol indicators (FSDMP), would not occur OR • Soil is frozen to a depth of 6 inches, OR • Soil is armored with minimum 8 inches of packed snow, OR • Soil is armored with minimum 16 inches of unpacked snow OR • Soil moisture is below 20% (determined when soil is dry to the touch and does not form a ball when pressure is applied by hand) The Forest Service will determine when these conditions exist. *In addition,* **Feller-buncher (or other noncabled harvesting systems)** • Harvesting equipment is allowed to traffic portions of units up to 35% slope • On fine-textured soils, harvesting equipment may traffic up to 45% slope for short distances (<200 feet) to accommodate stepped hillslope terrain. Longer distances (>200 feet) may be allowed with approval of the Forest Service Soil Scientist. **Off-Road Jammer** • Where ground-based harvesting equipment is restricted, logs will be winched to designated skid trails or processing areas.	Minimize soil disturbance from heavy machinery.	HIGH: logic, experience, local monitoring, Cambi 2015, Reeves 2011, Powers et al. 2005, Page-Dumroese et al. 2009a, 2009b	SWST02	Timber Sale Design and Layout, Soil Scientist, Timber Sale Administrator, Timber Sale Contract,

33	<u>Skid Trails and Skidding</u> Specific soil impacts from skidding activities will be judged according to monitoring definitions set forth in the national FSDMP. Areal soil impacts within units will be considered within the primary context of maintaining hillslope soil hydrologic function, as described in the Forest Plan. Reuse of relict skid trails and landings should be favored. Terrain and landing locations should be considered when planning new skid trail types and locations. Constructed skid trails are physically akin to temporary roads and, therefore, should be kept to a minimum, with consideration given to other log-retrieval options including nonconstructed skid trails and skyline systems. **All skidding use cases** • All skid trails must be designated and preapproved by the Forest Service before timber-felling operations begin • Skidding equipment must remain on skid trails <u>Soil Moisture Requirements</u> o Soil moistures must be sufficiently low that unacceptable soil rutting, displacement, and compaction, per national FSDMP indicators, would not occur OR o Soil must be frozen to a depth of 6 inches, OR o Soil must be armored with minimum 8 inches of packed snow, OR o Soil must be armored with minimum 16 inches of unpacked snow OR o Soil moisture must be below 20% (determined when soil is dry to the touch and does not form a ball when pressure is applied by hand) The Forest Service will determine when the above conditions exist. *In addition to the above,* **Skidding on nonconstructed skid trails** • Trails will be spaced an average minimum distance of 100 feet • Skidding allowed on slopes up to 35% • On fine-textured soils, skidding may be allowed up to 45% slope for short distances (< 200 feet) to accommodate stepped hillslope terrain and as an alternative to constructed skid trails, with approval of Soil	Minimize potential for detrimental soil disturbance from heavy machinery.	HIGH: logic, experience, local monitoring, Cambi 2015, Reeves et al. 2011; Powers et al. 2005	SWST02	Timber Sale Design and Layout, Sale Administrator, Soil Scientist

#	Project Design Feature	Objective	Effectiveness and Basis	Applicable Forest Plan Standard/Guide	Enforcement
Soil, Water, Riparian and Aquatic Resources					
	Scientist **Skidding on constructed skid trails** • Construction (i.e., benching) of skid trails allowed when harvesting hillslopes up to 45% slope gradient • Constructed trails will not exceed 30% road grade, except for short distances. Steeper constructed skid trail grades may be approved by Soil Scientist • Constructed trails will be spaced an average minimum distance of 200 feet **Off-trail skidding** • In units where hand felling is required specifically for oversized trees, the Soil Scientist may approve limited use of skidding tractors off of designated trails to skid these oversized trees on hillslopes less than 35%. • In units where residue retention is favored, the Soil Scientist may approve use of mechanized travel off of designated trails to redistribute harvest cull materials. These instances should be in alignment with Forest Plan Standards for maximum allowable soil detrimental disturbance (USDA Forest Service 2003a).				

34	<u>Harvest Activity Impact Remediation</u> *Remediation will occur within 1 year following harvest activities.* Areas of relict soil compaction outside of designated skid trail network and identified during implementation are candidates for remediation, as determined by the Forest Service. Constructed skid trails, landings, and temporary road surfaces will be considered total soil resource commitment (not detrimental soil disturbance) until remediated. **Decompaction/Subsoiling** Subsoiling is inherently destructive to the soil profile and should be implemented judiciously for the primary purpose of restoring soil porosity and reducing soil strength. Compaction—directly observed or inferred from the number of passes by machinery—will be the primary determinant of the depth and extent of subsoiling in all instances. Unless otherwise agreed in writing (i.e., some landings may be retained as dispersed camping sites): • Subsoiling techniques will emphasize slight lifting and fracturing, not plowing or mixing, to a maximum depth of 16 inches and spanning the entire width of the compacted surface. Constructed skid trails, landings, and temporary road surfaces will be decompacted in full and recontoured in to natural slope profile. Exceptions to decompacting and recontouring may be permitted, per the Soil Scientist, due to operational infeasibility. *Skid trail and landings will be rehabilitated within 1 year of completion of harvest in that unit.* • Nonconstructed skid trails will be fully subsoiled to a minimum distance of 200 feet from landings UNLESS o Impacts are mainly limited to track ruts and the centerline of the skid road is not compacted and still vegetated. In these instances, subsoil only within defined track ruts. o Subsoiling would fracture the roots of tree greater than 8 inches diameter breast height. This is typically defined by the tree drip line, or a set radius around such trees would be determined by the Forest Service. **Soil Displacement Rehab** Displaced mineral soil will be pulled back according to the below. On slopes greater than 35% this pull back must be completed by hand.	Drive post-disturbance soil recovery; minimize newly created or existing areas of total soil resource commitment and detrimental disturbance.	HIGH: Research, logic, experience, local monitoring, Certini 2005, Powers et al. 2005, Han et al. 2009		Timber Sale Administrator, Timber Sale contract, Soil Scientist

#	Project Design Feature	Objective	Effectiveness and Basis	Applicable Forest Plan Standard/Guide	Enforcement
Soil, Water, Riparian and Aquatic Resources					
	• When mechanical soil displacement exposes one-half of the vertical thickness of the mineral soil surface horizon, OR • in ruts with berms longer than 10 feet				

#	Project Design Feature	Objective	Effectiveness and Basis	Applicable Forest Plan Standard/Guide	Enforcement
Soil, Water, Riparian and Aquatic Resources					
34	**Soil Cover** • Forest residues should be replaced as protective cover on *all disturbed components of the harvest system network* at loads and distributions resembling the PVG being managed. When in doubt, cover should 50-80%, OR the minimum amount necessary to inhibit overland flow. • Soil cover remediation should favor harvest residue recycling (PDF 35) to enable integrated soils/fuels/ecology objectives, as coordinated with fuels colleagues. • Coarse woody debris objectives (PDF 38) will be met. On skid trails coarse wood shall be arranged leaving a 3 to 6-foot opening every 100 feet (+/- 20 feet) at existing trails if available. • On landings used to process wood chips, depth of residual chip material should not exceed 4 inches prior to obliteration. o Waterbar if needed.				

#	Project Design Feature	Objective	Effectiveness and Basis	Applicable Forest Plan Standard/Guide	Enforcement
Soil, Water, Riparian and Aquatic Resources					
35	Harvest Residue Recycling *This 'demonstration' PDF will be favored in implementation, with candidate units predetermined during layout.* Harvest waste byproducts intended for large landing pile burns will be sorted at landings into fine (<4 inch) and coarse (>4 inch) residues for the following uses. This PDF will not substitute for CWD objectives and requirements (PDF 38). **Coarse residues** would be made available to public for firewood at sorting location, or transported to other publically accessible location as needed (e.g., via service contract) **Fine materials** will be redistributed within units *as soil-building substrate for subsequent broadcast burn*, according to the following: • Determination of candidate units will proceed in collaboration with Fuels Management Specialist, Soil Scientist, and Timber Management Assistant. • Soil Scientist may approve mechanized travel off of designated trails in service of this specific PDF provided Forest Plan Standards for maximum allowable soil detrimental disturbance are met (SWST04). • Target loading rates of returned material will be determined according to PVG and integrated fire/soils/ecology objectives. • Residues should be scattered, not piled, unevenly, in manner that facilitates subsequent broadcast burn. • Residues should be scattered preferentially across harvested openings when possible. • Residue mats near base of leave trees should be avoided to preserve shallow live roots during broadcast burn.	Increase stand resilience by buffering belowground moisture and temperature conditions (TRGO01). Increase ecological use of prescribed fire (FMOB02, FMOB04). Divert harvest byproducts from burn piles and towards value-added products (TRBO03). Enhance soil-hydrologic processes soil C sequestratio n (SWOB03 SWOB16).	HIGH Logic Experience Hungerford 1980 Jurgensen et al. 1997	FMGU03 TRGU02 SWST04	Timber Sale Design and Layout, Soil Scientist, Fuels Management Specialist

#	Project Design Feature	Objective	Effectiveness and Basis	Applicable Forest Plan Standard/Guide	Enforcement
Soil, Water, Riparian and Aquatic Resources					
36	Cable Yarding Remediation Reclaim disturbed skyline/cable corridors by pulling soil berms back to original configuration and scattering slash (as available) on all areas of soil disturbance to provide for minimum of 50% to a maximum of 80% effective cover where available. Ensure that surface runoff is not directly channeled into skyline corridors from landing areas. Rehabilitation will be done within one calendar year of harvest.	Reduce potential for erosion, rutting, and detrimental soil disturbance in corridors; facilitate revegetation.	HIGH: logic, experience, local monitoring	SWST01 SWST04 SWGU05	Timber Sale Administrator, Timber Sale Contract
37	Improve road drainage (installing water bars/dips, cleaning relief culverts, etc.) as needed on all roads used for harvest activities pre-haul, during, and post-haul. Minimize disturbance to existing vegetated ditch lines if already properly draining to avoid undue soil disturbance that could increase ditch erosion and sedimentation into streams.	Reduce road-related sediment inputs; improve road surface conditions.	HIGH: logic, experience, Burroughs and King 1989	SWST01 SWST04 SWGU08	Project Engineer, Timber Sale Road Package, Contract Provision

#	Project Design Feature	Objective	Effectiveness and Basis	Applicable Forest Plan Standard/Guide	Enforcement
Soil, Water, Riparian and Aquatic Resources					
38	<u>Coarse Woody Debris</u> Retain total amounts of CWD as evenly distributed as possible in the tonnages and diameters described below and in 6-foot or greater lengths (if tonnages and/or sizes are unavailable, then assure that trends toward desired conditions are achieved). Total tonnage is measured following the completion of all activities and must retain the percentages of the large-sized CWD (greater than 15-inch diameter) identified in the Forest Plan (Forest Plan, Appendix A, page A-9, Table A-9; USDA Forest Service 2003a). • For PVGs 2 and 5: retain CWD in amounts of 4–14 tons per acre with at least 75% of the tonnage provided from CWD that is greater than 15 inches in diameter. • For PVGs 3, 4, and 6: retain CWD in amounts of 4–14 tons per acre with at least 65% of the tonnage provided from CWD that is greater than 15 inches in diameter. • For PVG 7: retain CWD in amounts of 5–19 tons per acre with at least 50% of the tonnage provided from CWD that is greater than 15 inches in diameter. • For PVGs 8, 9, and 10: retain CWD in amounts of 5–19 tons per acre with at least 25% of the tonnage provided from CWD that is greater than 15 inches in diameter. • For PVG 11: retain CWD in amounts of 4–14 tons per acre with at least 25% of the tonnage provided from CWD that is greater than 15 inches in diameter. If needed for meeting CWD tonnages, all available cull material over 8 inches large-end diameter and longer than 6 feet or other noncommercial material (e.g., decked firewood) shall be utilized to meet the CWD requirement. Preference should be given to larger-diameter material to meet these requirements. A contract provision requiring CWD to be returned from the log landing to the harvest unit would be utilized in tractor units where CWD deficiencies are identified prior to contract preparation.	Maintain CWD for long-term site productivity and for wildlife species.	HIGH: Graham et al. 1991, 1994	SWST04	Timber Sale Contract, Administrator, Soil Scientist

#	Project Design Feature	Objective	Effectiveness and Basis	Applicable Forest Plan Standard/Guide	Enforcement
Soil, Water, Riparian and Aquatic Resources					
39	<u>Prescribed Fire</u> Prescribed burn activities should employ the following techniques to minimize the degree and extent of soil damage: • **Broadcast burn** techniques should favor low soil burn severity by promoting incomplete forest floor consumption, and avoiding prolonged (>6 hour) smoldering of matted fuel beds greater than 3 inches thick. Some incidental moderate soil burn severity is expected and acceptable provided it is not spatially extensive. When shallow root mortality risks meeting landscape ecology objectives, or when fuel loading is heavy (>10 trees/acre 0-10 inch CWD), broadcast burns should be timed to co-occur with >20% mineral soil moisture. • **Pile burning** generally results in moderate to high soil burn severity based on pile size diameter. To minimize their effects within treatment units, piles should be <10 feet in diameter and well dispersed. Larger piles on landings should be decked on logs to create an insulating air cushion, or subsequent burn scars restored according to TSRC restoration guidelines. • **Site Preparation** burns that entail near-complete combustion of postharvest forest residues over extensive areas are generally inconsistent with Forest Plan and regional soil quality Standards on soil cover, nutrient losses, and thermal impacts. This site preparation technique will only be permitted with approval of Soil Scientist. • **CWD** will be retained at the desired condition or maintained at existing levels if presently below the desired condition (see descriptions by PVG above), as much as practicable. • **Fireline reclamation** will occur following burn activities. Reclamation activities would include, but are not limited to, pulling all material removed for fireline construction back onto fireline (including mineral soil as available), pulling available slash onto the surface to achieve a minimum 50% ground cover of the disturbed soil, and constructing waterbars as necessary.	Maintain CWD for long-term site productivity and for wildlife species.	HIGH: Certini 2005, Busse 2014, Graham et al. 1991, 1994	SWST04	Prescriptions for Prescribed Burn, Fuels Specialist, Soil Scientist

#	Project Design Feature	Objective	Effectiveness and Basis	Applicable Forest Plan Standard/Guide	Enforcement
Soil, Water, Riparian and Aquatic Resources					
40	Landslide Prone (LSP) Terrain Management activities located on clusters of high- and moderate-risk landslide prone areas (per PNF LSP map) or on other susceptible landforms (field-verified by Soil Scientist if possible), will maintain landform stability in the following ways: • Limit harvested gap openings to 20 meters diameter between clumps of established conifers. • Avoid any pile burning and root mortality from broadcast burning (PDF 39). • Favor longer-lived species such as ponderosa pine and Douglas-fir, where ecologically appropriate. • Avoid road and skid trail construction on LSP areas, and avoid concentrating water onto LSP areas from road drainage.	Reduce potential for landslides by avoiding earthwork and favoring root reinforce-ment.	HIGH: Moos et al. 2016, Roering et al. 2003, Sidle 1992, Shaub 2001, Burroughs and Thomas 1977, Megahan 1977	TRST05 SWST12 SWGU04	Road Layout and Road Design Package, Timber Sale Layout and Marking, Prescriptions for Prescribed Burn, Soil Scientist, Fuels Specialist

Table 2.4-4. Project design features and mitigation measures for rangeland.

#	Project Design Feature	Objective	Effectiveness and Basis	Applicable Forest Plan Standard/Guide	Enforcement
Rangeland					
43	Protect range improvements such as fencing and water troughs from prescribed fire.	Protect improvements.	HIGH: logic	N/A	Fuels Specialist, Burn plan.
44	Per "The Payette National Forest Noxious Weed and Poisonous Plant Control Program EA and DN", treat populations of noxious weeds found in the planning area. Control measures may include spraying, biological controls, or other methods as needed (USDA Forest Service 1987).	Control noxious weeds.	HIGH: fact, experience	NPST10 NPGU01 NPGU05	Range Specialist
45	In order to prevent the potential spread of noxious weeds into the project or treatment areas, Forest Service contractors associated with project activities would clean all off-road equipment prior to entry onto the treatment area. When working in treatment areas identified as containing weed infestations, contractors would be required to clean equipment before leaving and moving to a new treatment area. This cleaning would remove plants, dirt, and material that may carry noxious weed seeds.	Limit the risk of new infestations of noxious weeds into the area.	HIGH: fact, experience	NPST03 NPST04 NPGU03	Timber sale contract, Administrator

#	Project Design Feature	Objective	Effectiveness and Basis	Applicable Forest Plan Standard/Guide	Enforcement
Rangeland					
46	Any materials such as mulches and straw used for rehabilitation, reclamation, etc., would be free of noxious weed seeds and comply with the 2003 “Weed Free Hay Order” against the use of noncertified hay, straw, or mulch. Materials not covered in the special order, which have the potential to contain noxious weed seed, would be inspected and determined to be weed seed-free before purchase and use. Certification that these materials are free of noxious weed seed would be done by qualified individuals, such as the Idaho Seed Lab, County Weed Supervisor, or Forest Service Noxious Weed Management Specialist.	Limit the risk of new infestations of noxious weeds into the area.	HIGH: fact, experience	NPST01 NPST02 NPST03 NPST06	Soil Scientist, Range Specialist.
47	Source sites for gravel and borrow materials would be inspected before materials are used or transported. If noxious weeds are present, they would be treated to prevent seed production before use or transport. The source would not be used if noxious weed species were present that are not currently found at the site unless effective treatment or other mitigation measures identified by the District Ranger are implemented. Written documentation of the inspection by county weed agents, Forest Service Noxious Weed Management Specialists, or other individuals who the Forest Service stipulates are qualified would be required before materials are used.	Limit the spread of noxious weeds in the Project area.	HIGH: fact, experience	NPST07 NPST08 NPGU02	Range Specialist, Botanist, Engineer, Administrator.

Table 2.4-5. Project design features and mitigation measures for threatened, endangered, proposed, candidate, and sensitive species.

#	Project Design Feature	Objective	Effectiveness and Basis	Applicable Forest Plan Standard/Guide	Enforcement
Threatened, Endangered, Proposed, Candidate Species and Region 4 Sensitive Species					
48	Ground-disturbing activities would be stopped in any areas where previously unknown listed or sensitive fish, wildlife, or botanical species are discovered until a Fisheries Biologist, Wildlife Biologist, or Botanist, respectively, reviews the affected area and prescribes appropriate mitigation to ensure protection of the species.	Provide protection to threatened, endangered, and sensitive species.	MODERATE: logic	TEST01 TEST02 TEST03 TEST06 TEST12 TEST13 TEGU01 TEGU02 TEGU06 WIST02 WIST03 WIST06 WIGU01 WIGU05 WIGU06 WIGU07	Fish Biologist, Wildlife Biologist, Botanist, Sale Administrator, Burn Plan, Fire Management Officer.

Table 2.4-6. Project design features and mitigation measures for forested vegetation.

#	Project Design Feature	Objective	Effectiveness and Basis	Applicable Forest Plan Standard/Guide	Enforcement
Forest Vegetation and Timber					
49	Following harvest and prescribed burning operations, the larger aspen stands would be evaluated for the need to protect aspen regeneration from damage by cattle, deer, and elk. Possible protection measures would include temporary electric fencing or rough windrow fencing using felled aspen trees.	Protect aspen regeneration from large animal damage.	HIGH: experience, logic	VEGO04 VEGO05 VEGO06	Silviculturist and Wildlife Biologist would evaluate and implement with available resources or contracts.
50	Use the bark beetle (Scolytidae) contract provision for stands where substantial amounts of ponderosa pine would be harvested, if the proposed unit is near a plantation with a component of ponderosa pine.	Minimize bark beetle population buildup.	HIGH: experience, logic	TRGO01	Timber Sale Contract, Sale Administrator
51	Include a timber sale contract provision that requires firewood to be made accessible to the public by requiring firewood to be decked separate from slash piles and in locations where removal would be practical.	Provide firewood gathering opportunities for the public	HIGH: logic	TRGO04	Timber Sale Contract, Sale Administrator
52	In each treatment unit, CWD (tons per acre) shall be evaluated to ensure desired ranges based on PVG. If necessary, material would be left behind of the appropriate size classes to meet Standards (PDF 38). When CWD in the larger size classes is not available for retention in an activity area, smaller size classes may be utilized to meet desired conditions described in Forest Plan, Appendix A (USDA Forest Service 2003a). These smaller size classes should only be utilized when the resulting fire hazard risk would remain within defined fuels management objectives.	Maintain Forest Plan consistency.	MODERATE to HIGH: experience	VEGU03	Silviculturist Contract Administrator Fire Management Specialist Silvicultural Prescription Contract Burn Plan

#	Project Design Feature	Objective	Effectiveness and Basis	Applicable Forest Plan Standard/Guide	Enforcement
Forest Vegetation and Timber					
53	Management activities shall emphasize: Leaving all dead standing trees (snags), unless falling is necessary for safety. Retaining snags away from roads to reduce the potential for removal.	Maintain snags for long-term site productivity and wildlife species.	HIGH: experience	VEST01	Silviculturist Contract Administrator Fire Management Specialist Silvicultural Prescription Contract Burn Plan
54	Sufficient live trees of appropriate size should be retained for future CWD and snag recruitment where CWD or snag levels are below desired ranges (to meet Appendix A of the Forest Plan; USDA Forest Service 2003a).	Move toward desired CWD and snag levels.	MODERATE to HIGH: experience	VEGU03	Silviculturist Fire Management Specialist Silvicultural Prescription Burn Plan
55	Retain forest stands that meet the definition of large tree size class. Management actions are permitted in such stands as long as they would continue to meet the definition of a large tree size class stand.	Ensure movement toward desired tree size objectives defined in the Forest Plan for PVGs 2 and 5.	HIGH: experience		Silviculturist, Contract Administrator, Fire Management Specialist, Silvicultural Prescription, Contract, Burn Plan

#	Project Design Feature	Objective	Effectiveness and Basis	Applicable Forest Plan Standard/Guide	Enforcement
Forest Vegetation and Timber					
56	Prior to decommissioning routes or completing long-term closure activities, approval by the District Timber Management Assistant or Silviculturist shall be obtained to ensure that utilization of these routes for access, haul, and/or skid trail is not necessary to complete any planned or proposed vegetation treatments.	Utilize existing routes to complete vegetation treatments.	MODERATE to HIGH: experience	N/A	Hydrologist/Soil Scientist/ District Timber Management Assistant
57	All acres treated with mechanical or prescribed fire treatments require a silvicultural prescription.	Ensure movement toward desired conditions to meet stand objectives.	MODERATE: experience	N/A – Forest Service Manual/Handbook Direction	Silviculturist, Fire Management Specialist, Silvicultural Prescription, Burn Plan

Table 2.4-7. Project design features and mitigation measures for legacy trees/old forest.

#	Project Design Feature	Objective	Effectiveness and Basis	Applicable Forest Plan Standard/Guide	Enforcement
Legacy Tree/Old Forest					
58	Ponderosa pine, western larch, and Douglas-fir that fit the definition of legacy trees should be retained during harvest. See Appendix 7 of this document for legacy tree guidelines for the Project.	Retain/maintain early seral legacy trees for ecological function, diversity and wildlife habitat.	HIGH: logic, experience	N/A—Appendix 7	Timber Sale Contract, Wildlife Biologist, TMA, Contract Administrator, Burn Plan, Fuels Specialist
59	Retain/maintain forest stands that meet the definition of old forest as defined in the Forest Plan, Appendix A (USDA Forest Service 2003a). Management actions are permitted in such stands as long as they would continue to meet the desired conditions	Retain/maintain old forest characteristics, such as legacy trees, snags, and CWD appropriate for the forest type.	HIGH: logic, experience	N/A – Appendix A of the Forest Plan	Silvicultural Prescription, Silviculturist, Wildlife Biologist

Table 2.4-8. Project design features and mitigation measures for air quality.

#	Project Design Feature	Objective	Effectiveness and Basis	Applicable Forest Plan Standard/Guide	Enforcement
Air Quality					
60	Identify sensitive areas for smoke impacts and coordinate all burning with Montana/Idaho State Airshed Group.	Avoid smoke immersion into nonattainment or sensitive areas.	HIGH: logic, experience	ASGU02	Burn Plan, Fuels Specialist

Table 2.4-9. Project design features and mitigation measures for cultural resources.

#	Project Design Feature	Objective	Effectiveness and Basis	Applicable Forest Plan Standard/Guide	Enforcement
Cultural Resources					
61	Project activities shall follow stipulations agreed to in Memoranda Of Agreement with the State Historic Preservation Office (SHPO) per 36CFR800.4 (b)(2). The stipulations shall include but are not limited to the following requirements prior to implementation of individual projects: • Avoid all cultural resource sites during project implementation unless alternative treatments are developed and agreed to by all consulting parties. • All known sites would be monitored and flagged prior to implementation to ensure avoidance. • If existing surveys are determined to be inadequate, inventories would be conducted according to the Secretary of the Interior's standards, and a secondary consultation with Idaho SHPO and appropriate SHPO approval would be required for: o Log and biomass landing construction o Proposed Timber Harvest Units o Prescribed fireline construction o Newly constructed temporary roads o Road decommissioning o Proposed recreation actions o Fish passage barrier improvements and associated road rehabilitation	Prevent damage to cultural resource sites.	HIGH: experience	N/A	Timber Sale Contract, Burn Plans, Forest Archaeologist Burn Boss, Contract Administrators

Table 2.4-10. Project design features and mitigation measures for recreation and visual quality.

#	Project Design Feature	Objective	Effectiveness and Basis	Applicable Forest Plan Standard/Guide	Enforcement
Recreation and Visual Quality					
62	Ridgeline silhouettes should not have unnatural-appearing breaks along them.	Meet visual quality objectives.	MODERATE: logic	SCGU06	Layout Forester
63	Install adequate drainage structures in new trail construction and ensure sediment transport is minimized where trails are located within RCAs, as per Forest Service Trail Construction Specifications. Stream crossings shall comply with Forest Plan Standard SWST 08 (USDA Forest Service 2003a).	Provide water quality protection during trail construction.	HIGH: logic, experience	REST02	Recreation Staff, Engineer
64	Where necessary, restrict log hauling during periods of high recreation use, such as the opening day of big game hunting season.	Provide restrictions for public safety.	MODERATE: logic	N/A	Contract Administrator, Contract
65	During the week the Forest shall close and sign groomed snowmobile routes in the project area that are being used as timber hauling routes. The routes would be open to snowmobiles on Saturdays and Sundays. All log-hauling activity would be stopped after 10 pm on Friday and reopened Monday morning. If logging contractor vehicles are used to fuel or maintain equipment over the weekend, warning signs would be placed prominently so that snowmobilers would be aware that they may encounter vehicles on the road even on weekends. The Forest shall post reduced speed limits in the shared use areas. The Forest shall post signs and maps in parking and chain-up areas alerting snowmobiles coming into the logging area to the activities and potential hazards in the area. Contractors operating on groomed snowmobile routes should contact Adams County for required permits.	Ensure safety of snowmobilers during log hauling.	HIGH: Logic	REOB08 REOB20 REOB23 REGU23 REGU26	Contract Administrator, Contract
66	The Forest shall add protection measures for existing NFS trails in all timber sale contracts; annual operating plans for grazing, mining, and special use authorizations; and prescribed fire implementation documents; and reestablish any trail heads lost to these proposed activities.	Provide trail protection.	HIGH: Logic	REGU26	Inspection by Recreation Specialist

2.5. Identification of the Preferred Alternative

The Proposed Action is Alternative 2. The preferred alternative is Alternative 5.

The Responsible Official's selected alternative for implementation could be this alternative or another alternative considered in detail. The final decision will be documented in the ROD.

Chapter 3 — Affected Environment

3.1. Introduction

Chapter 3 describes the existing physical, biological, and human aspects of the environment in the Project area.

3.1.1. Purpose and Content

Chapter 3 describes the physical and biological resources and socioeconomic environment that may be affected by the alternatives presented in Chapter 2, and the effects the alternatives may have on the resources. The sections covering "Affected Environment" and "Environmental Consequences" are combined in this chapter to provide a concise depiction of the potentially affected resources and predicted effects under the different alternatives.

The environmental effects analysis forms the scientific and analytic basis for the comparison of alternatives.

Chapter 3 is organized by resource. It describes the affected environment and environmental consequences for resources that could be affected by any of the four alternatives analyzed in detail. The following resource areas are included:

3.2 Vegetation Resources
3.3 Fire and Fuels
3.4 Wildlife Resources
3.5 Watershed Resources
3.6 Fisheries Resources
3.7 Soils Resources
3.8 Botany and Rare Plants
3.9 Recreation
3.10 Roadless
3.11 Transportation
3.12 Economics/Socioeconomics
3.13 Range Management and Noxious Weeds

3.1.2. Analysis Calculations

In the modeling and analyses included throughout Chapter 3, road miles, treatment acres, and other quantitative measurements are all best estimates based on the latest available information. The modeling and analyses conducted for this FEIS are intended and designed to indicate relative differences between the alternatives rather than to predict absolute amounts of activities, outputs, or effects.

3.1.3. Incomplete or Unavailable Information

The CEQ regulations for implementing procedural provisions of the NEPA (40 CFR 1502.22) require Federal agencies to identify relevant information that may be incomplete or unavailable for evaluating reasonably foreseeable significant adverse effects in an EIS. If the information is essential to a reasoned choice between alternatives and the cost of gathering it is not excessive, it must be included or addressed in the EIS.

The ecology, inventory, and management of ecosystems are complex and developing disciplines. However, central ecological relationships are well established, and a substantial amount of credible information about biological and physical resources of ecosystems and social/economic interests within the Project area is known. The alternatives were evaluated using the best available information.

The data collection and evaluation effort for this analysis can generally be categorized into six basic groups:

- Field data were collected, compiled, and analyzed to support effects disclosures (e.g., vegetative stand surveys, cultural surveys).
- Resource databases were used to compile and summarize information.
- GIS spatial analyses were used to link database information to geographic locations.
- Information and analyses documented in Forest Plan and Project resource specialist reports were prepared by Forest Service resource experts in the fields pertaining to each resource assessed in detail identified under Section 3.1.1.
- Current scientific literature reviews were conducted.

Following review of the above information with the IDT, the Responsible Official determined that relevant information was sufficiently complete and available for evaluating reasonably foreseeable significant adverse effects in this EIS important to making a reasoned choice between alternatives. Additional detail about the data used by IDT members to support their analyses and the limitations of these data are summarized in each resource section and discussed in greater detail in Project record resource specialist reports.

3.1.4. Resources not Evaluated in this Chapter

Two resource areas were determined by the IDT to not be measurably affected by the action alternatives developed to address the Project's Purpose and Need (Section 1.7) and/or issues (Section 1.11) because they do not exist within any of the Project areas described in the resource sections in Chapter 3 or the activities proposed would not affect the resources. Therefore, the analysis of effects of proposed alternatives on the following resources are not discussed:

- Wilderness and Recommended Wilderness
- Wild and Scenic Rivers

3.2. Vegetation Resources

3.2.1. Scope of the Analysis

3.2.1.1. Direct and Indirect Effects Analysis Area

The scope of the direct and indirect effects analysis for vegetation resources (forested and nonforested) is the Project area outside the East Fork Weiser River subwatershed on NFS lands. From this point forward it will be defined as the "analysis area." The direct and indirect effects analysis area comprises approximately 37,081 acres. This analysis area was chosen because it is large enough to represent differences in vegetative characteristics affected both by environmental factors (e.g., historical fire regimes) and past management activities.

3.2.1.2. Cumulative Effects Area

The scope of cumulative effects analysis for vegetation resources is the Project area (including private lands, IRAs, and the East Fork Weiser River subwatershed). This Project area comprises approximately 50,000 acres.

3.2.1.3. Temporal Scale

Time frames as defined in the Forest Plan are used for the direct and indirect effects analysis: temporary (1–3 years), short term (3–15 years), and long term (15 or more years) (USDA Forest Service 2003a). Time frames for the cumulative effects analysis are specified in that section and use the same definitions: temporary, short term, and long term. These are considered appropriate time scales for analysis because maintenance and future management will need to determine the appropriate objectives for management within the next 15–30 years for this analysis area.

- For the tree size class measurements, a quantitative analysis has been performed for the temporary time scale (immediately after vegetation treatments, including prescribed burning, are implemented), and a qualitative description has been completed for the short-term and long-term measurements of "distribution of tree size classes."
- Regarding the tree canopy cover measurement, a quantitative analysis has been performed for the temporary time scale and a qualitative description has been completed for the short-term and long-term measurements of "percentage of area in each canopy cover class within the large tree size class (LTSC)."
- Regarding the tree species composition measurement, a quantitative analysis has been performed for the temporary time scale of "acres treated to maintain and/or promote desired species composition." A qualitative description of how species compositions have been affected in the short and long terms is also included in this section.
- For the spatial pattern measurement, a quantitative analysis has been completed for the temporary and long-term time frames concerning "percent departure from reference conditions."
- Regarding the aspen, nonforested (grasslands and shrublands), and wet meadow measurements, a quantitative analysis for the "acres treated to maintain/promote desired canopy cover" has been completed only for the temporary time frame, and a qualitative

description of how aspen, nonforested vegetation, and wet meadows would be affected has been completed for the short and long terms.

3.2.2. Data Sources and Methodology

3.2.2.1. Walk-through Surveys

Current stand conditions were characterized by updating the PVGs (USDA Forest Service 2003a) and strata/working group (USDA Forest Service 2004) data based on walk-though surveys. Field crews performed walk-through surveys on most forested stands on NFS lands (excluding the IRAs) within the analysis area during the 2013 and 2014 field seasons. Additionally, in 2014 some stands designated as nonforested (predominately high-elevation meadows) were also visited.

The walk-through surveys categorized stands by habitat type, tree size, canopy cover, and species composition; these categories were utilized to update assignments of PVGs, strata, and existing species composition based on more site-specific information. A snapshot of existing vegetative conditions, the strata and species composition classification accounts for past management activities (such as timber harvest), amount of down woody debris/snags, and for natural disturbance events (such as wildfire). These data were used for characterizing the existing conditions, analyses, and designs of the alternatives.

Snags

Snag densities are variable across the landscape. With recent increases in insect/disease activity within the analysis area, tree mortality, and consequently snag densities, have been increasing. Strata were used as a general estimate to calculate snags per acre, which indicated that some size classes were deficit while others were within desired conditions (see the Vegetation Specialist Report in the Project record). In all treated stands with deficit snag densities, Project Design features 53 and 54 were used to move snag densities toward desired conditions.

3.2.3. Analysis Process and Objectives

3.2.3.1. Analysis Process

To complete the quantitative analysis, stands were classified—based on tree size class, canopy cover class, past management, and vigor—into strata.

To complete an effects analysis of the different alternatives at different time scales, the existing strata were modified, based on the treatments (or lack thereof) at the temporary, short-term, and long-term time scales.

The assignment of post-treatment strata for the temporary and long-term time frames utilized modeling in representative stands, professional judgment, and reviews of pertinent literature and research.

3.2.3.2. Objectives and Measurements

The Objectives and associated measurements below will be used to compare alternatives, ascertain achievement of treatment objectives, and determine compliance with design features and the Forest Plan Standards and Guidelines (USDA Forest Service 2003a).

Objective 1: Move vegetation toward the desired conditions, with an emphasis on promoting large tree forest structure, early seral species composition, and forest resiliency.

Measurements:

- Tree Size Class
  - Acres treated to promote or maintain the LTSC.
  - Distribution of tree size classes.
- Tree Canopy Cover
  - Percentage of area (acres) in each canopy cover class within the LTSC.
- Tree Species Composition
  - Acres treated to maintain and/or promote desired species composition.
- Spatial Patterns
  - Percent departure from reference conditions per PVG.

Objective 2: Maintain or restore a representation of native plant communities throughout the Forest.

Measurements:

- Aspen
  - Acres treated to maintain and/or promote aspen.
- Nonforested and Wet Meadow
  - Acres treated to maintain and/or promote nonforested vegetation.
  - Acres treated to maintain and/or promote wet meadow.

3.2.4. Affected Environment

3.2.4.1. Desired Conditions

The direct and indirect effects analysis area is dominated by forested vegetation; approximately 27,020 acres are forested. Much of the grassland/shrubland also contains scattered trees, but it does not possess the minimum canopy coverage to be considered forest. The analysis area is dominated by forest types and fire regimes that were historically open ponderosa pine forest (e.g., PVGs 2, 5, and portions of 6), with a mosaic of mixed conifer forest types (e.g., PVGs 7, 9, 11, and portions of 6). The distribution of forest types and historical vegetation in the analysis area is driven primarily by subtle changes in soils, elevation, aspect, and topography.

Background

Forested Vegetation

The Forest Plan utilizes PVGs developed by Mehl et al. (1998) to classify forested vegetation (USDA Forest Service 2003, Appendix A). PVGs are groups of habitat types that share similar environmental characteristics, site productivity, and disturbance regimes and that are used to classify the landscape, providing a framework for studying succession of vegetation over time.

This classification allows for a more efficient and operational way to understand the ecological complexity of the landscape by grouping approximately 71 habitat types into 11 PVG types.

Additionally, nonforested vegetation and wet meadow/seeps types were also analyzed. For analysis purposes, shrublands and grasslands are combined into nonforested vegetation.

Table 3.2-1 identifies the acreage of different groups of vegetation in the direct and indirect effects analysis area. Descriptions (USDA Forest Service 2003a, Appendix A; Mehl et al. 1998) of the vegetation types within the analysis area are included below the table.

Table 3.2-1. Vegetation within the analysis area (acres and percent).

Potential Vegetation Group (PVG) and Vegetation Type	Acres within analysis area —National Forest System (NFS) Lands Only	Percent of analysis area
PVG 1—Dry Ponderosa Pine/Xeric Douglas-fir	254	<1%
PVG 2—Warm, Dry Douglas-fir/Moist Ponderosa Pine	3,300	9%
PVG 3—Cool, Moist Douglas-fir	0	0%
PVG 4—Cool, Dry Douglas-fir	138	<1%
PVG 5—Dry Grand Fir	4,246	11%
PVG 6—Cool, Moist Grand Fir	12,417	33%
PVG 7—Warm, Dry Subalpine Fir	4,702	13%
PVG 8—Warm, Moist Subalpine Fir	56	<1%
PVG 9—Hydric Subalpine Fir	576	2%
PVG 10—Persistent Lodgepole Pine	903	2%
PVG 11—High-elevation Subalpine Fir	419	1%
Total Forested Vegetation	27,020	73%
Grassland/Shrubland	10,061	27%
Analysis Area Total (NFS Lands)	37,081	

Note: The total does not include private lands and NFS lands in the East Fork Weiser River subwatershed. The PVG data were collected and updated during walk-though surveys. Only PVGs 2, 5, 6, 7, 9, 10, and 11 are carried forward in this analysis; PVGs 1, 3, 4, and 8 are not carried forward in this analysis because they represent less than 1% of the area, each. See Appendix 6 for more details.

Disturbance Regimes

Prior to European settlement, the principal disturbance process that shaped vegetation distribution, development, and succession on the landscape was fire, with insects and other disturbance processes playing minor roles (Mehl et al. 1998; Morgan and Parsons 2001; Kennedy and Fontaine 2009).

Fire

Table 3.2-2 is a summary of PVGs/vegetation and their associated fire regimes, fire return intervals, fire intensities, and vegetation patterns. Vegetative patterns that typically resulted from the historical fire regimes (i.e., fire disturbance that occurred on the landscape prior to European settlement (Hann et. al. 2004) are described in Table 3.2-2.

Insects and Disease

Numerous site visits to the analysis area were conducted by USFS Forest Health and Protection specialists (USDA Forest Service 2012a, 2013b, 2014) who noted activity and/or susceptibility of numerous insects and disease within the analysis area, some of which are summarized below. These reports were considered in the development of the alternatives and are available in the Project record.

Table 3.2-2. Fire regime descriptions.

Fire Regime	Fire Interval	Potential Vegetation Group (PVG) and Vegetation Type	Fire Intensity	Vegetation Patterns (Agee 1998)
Nonlethal	5–25 years	**PVG:** 1, 2, 3, and 5	Low: 10% mortality or less	Relatively homogenous with small patches generally <1.0 acre of different seral stages, densities, and compositions created from mortality
Mixed1	5–70 years	**PVG:** 3, 4, 5, 6, 7, and 10 **Vegetation Types:** Aspen, Perennial Grass Slopes, Perennial Grass Montane, Mountain Big Sagebrush, Montane Shrub, and Bitterbrush	Low to moderate:10–50% mortality	Relatively homogenous with patches created from mortality ranging in size from <1.0 to 600 acres of different seral stages, densities, and compositions
Mixed2	70–300 years	**PVG:** 6, 7, 8, 9, 10, and 11 **Vegetation Types:** Perennial Grass Slopes, Perennial Grass Montane, Mountain Big Sagebrush, Montane Shrub, and Bitterbrush	Moderate to high: 50–90% mortality	Relatively diverse with patches created by mixes of mortality and unburned or underburned areas ranging in size from <1.0 to 25,000 acres of different seral stages, densities, and compositions
Lethal	100–400 years	**PVG:** 8, 9, and 10[a]	High: over 90% mortality	Relatively homogenous with patches sometimes >25,000 acres of similar seral stages, densities, and compositions; small inclusions of different seral stages, densities, and compositions often result from unburned or underburned areas

[a]PVGs 8, 9, and 10 are predominately lethal but there are also possibility of low and moderate severity in these PVGs (Mehl et al. 1998, Crane and Fischer 1986).

Western spruce budworm (*Choristoneura occidentalis*) has increased across the western United States in the past few years (DeRose et al. 2013). Since the mid-2000s, western spruce budworm defoliation has been evident on West Mountain west of Cascade, Idaho, and in the Forest. Stand conditions that favor western spruce budworm outbreaks are densely stocked stands of host trees, where the tree vigor is compromised due to tree competition; these conditions are common throughout the analysis area. Aerial detection surveys in 2014, 2015, and 2016 indicated that the analysis area has experienced widespread defoliation. The primary hosts for western spruce budworm are Douglas-fir, grand fir, and subalpine fir, but defoliation can also occur on Engelmann spruce (*Picea engelmannii*) and lodgepole pine when western spruce budworm populations are high.

In addition, outbreaks of the spruce beetle—*Dendroctonus rufipennis* (Kirby)—have occurred; spruce beetle is the most significant natural mortality agent of mature spruce. Spruce beetle outbreaks cause extensive tree mortality and modify stand structure by reducing the average tree diameter, height, and stand density. Residual trees are often slow-growing, small- and intermediate-sized trees, which eventually become dominant.

In 2012, 2013, 2014, 2015, and 2016 the western spruce budworm, Douglas-fir beetle, and subalpine fir decline were quite prevalent in the analysis area. The fir engraver beetle is expected to become more active as the current western spruce budworm and other bark beetle activity increases in the next few years, especially if the weather becomes droughty. In addition, the nonnative balsam woolly adelgid (*Adelges piceae*) is affecting many of the subalpine firs and

some grand firs throughout the analysis area (Jorgenson 2013; USDA FHP 2012, 2013, 2014, 2015; USDA 2016).

Desired Conditions

Desired conditions do not represent a static state; the conditions are dynamic because the ecosystem is dynamic. Achievement of desired conditions, well distributed across the planning unit, is a long-term goal of Forest management (USDA Forest Service 2003a). Tradeoffs in the achievement of one or more of the desired vegetative conditions specified in the Forest Plan may be considered. In these instances, decisions should be based not only on which vegetative component(s) are important to emphasize at any point in time but also on how to effectively move all components toward the desired conditions over the long term.

In order to conserve habitat for the species of greatest conservation concern, this analysis utilizes desired conditions for forested vegetation from the Forest Plan that emphasize restoring and maintaining vegetation on all acres. This is a modification of the desired conditions specified in the Forest Plan on approximately 20,478 acres of this analysis area that are within MPC 5.2. If MPC 5.2 desired conditions had been utilized for this Project, the desired conditions in those areas would have emphasized commodity outputs, particularly timber and production. Desired conditions for vegetation on this Project are based on Appendix A, Tables A-2, A-3, A-5, A-7, A-8, and A-9 of the Forest Plan (USDA Forest Service 2003a).

The Forest Plan allows for modification of desired conditions at the project level to address site-specific biophysical conditions. Therefore, the desired conditions were modified at the project level based on site-specific biophysical conditions to foster restoration of wildlife habitat for species of greatest conservation concern. It should also be noted that these modifications to the desired conditions do not modify any Standards or Guidelines associated with Forest Plan management direction. Further documentation regarding the differences between these desired conditions can be found in the Forest Plan and the Forest Vegetation Specialist Report (see the Project record).

The following sections provide the metrics that will be utilized to determine how well each alternative meets the Project objectives for each of the measurements identified in Section 3.2.3.2.

Tree Size Class

Tree size class is determined by the size of the overstory trees. The average diameter of the trees in the overstory, or uppermost tree layer, determines the stand's tree size class. A canopy layer has a distinct break in height and must have nonoverlapping canopy cover of at least 10%. A few individual trees (such as relic trees) representing distinctly different tree size are not recognized as defining a distinct canopy layer. Table 3.2-3 displays the diameter groupings and tree size class criteria & terminology used in the Forest Plan and this analysis.

Table 3.2-1. Tree size class definitions.

Diameter at Breast Height (DBH) (inches)	Total Non-overlapping Canopy Cover* of Trees (%)	Tree Size Class
≥20.0	≥10	Large
12.0–19.9	≥10	Medium
5.0–11.9	≥10	Small
0.1–4.9	≥10	Sapling
0	NA	GFSS[a]

[a]GFSS = grass/forb/shrub/seedling size class.

Tree Size Class Measurement

Acres treated to promote or maintain the LTSC—This measurement was selected because there is currently a deficit of LTSC stands in PVGs 2 and 5 (see Table 3.2-4). The desired condition for this measurement is to maintain and/or promote enough acres to move toward the desired LTSC distributions shown in Table 3.2-4 of this document. This range of desired LTSC is based on the desired percent ranges for the LTSC in Table A-3 of the Forest Plan (USDA Forest Service 2003). The actual desired ranges, as well as the existing amounts of LTSC, are displayed in Table 3.2-4. For example, in PVG 2 the desired condition is to have 1,947–2,640 acres within the LTSC.

Table 3.2-4. Desired and existing large tree size classes (LTSCs), by Potential Vegetation Group (PVG).

PVG	Desired Acres (% in parenthesis) within the LTSC		Existing LTSC Stands
	Minimum	Maximum	
2	1,947 (59%)	2,640 (80%)	653 (20%)
5	2,802 (66%)	3,566 (84%)	2,052(48%)
6	3,477 (28%)	6,954 (56%)	8,118(65%)
7	940 (20%)	987 (21%)	3,533(75%)
9	179 (31%)	213 (37%)	412 (72%)
10[a]	181 (20%)	181 (20%)	860(95%)
11	92 (20%)	159 (27%)	348(83%)
Other PVGs	N/A	N/A	287
Total	8,965	14,462	16,261

[a]References to PVG 10 are to be applied to the medium tree size class (overstory tree average diameter ranges from 12.0 to 19.9 inches DBH [diameter at breast height]). The overstory trees in PVG 10 stands (persistent lodgepole pine) generally do not attain an average diameter within the LTSC (DBH) even though individual trees may equal or exceed 20 inches DBH.

Distribution of tree size classes—The desired condition for the distribution of tree size classes is based on Table A-2 and Table A-3 of the Forest Plan (USDA Forest Service 2003a). These values are displayed in comparison to the current conditions in Table 3.2-5 and Figure 3.2-1.

Table 3.2-5. Desired and existing conditions of tree size class by acres in Potential Vegetation Groups (PVG).

PVG	Grass/Forb/ Shrub/Seedling (GFSS)	Sapling	Small	Medium	Large
2, Desired Condition	132–165	99–231	165–693	231–1,155	1,947–2,640
2, Existing Condition	**160**	461 (O)	**431**	1,596 (O)	653 (D)
5, Desired Condition	127–170	127–297	170–934	297–1,274	2,802–3,566
5, Existing Condition	188(O)	58(D)	**506**	1,442 (O)	2,052(D)
6, Desired Condition	869–993	869–1,118	1,366–3,353	2,235–4,470	3,252–6,504
6, Existing Condition	130(D)	455(D)	**1,318**	**2,396**	8,118(O)
7, Desired Condition	329–752	517–705	987–1,034	1,505–1,693	940–987
7, Existing Condition	20(D)	0(D)	94 (D)	1,055(D)	3,533(O)
9, Desired Condition	75-86	46–86	98–127	144–167	179–213
9, Existing Condition	0(D)	1(D)	0(D)	163(D)	412(O)
10, Desired Condition[a]	145–208	99–145	416–434	181	N/A
10, Existing Condition[a]	0(D)	0(D)	43(D)	860(O)	N/A
11, Desired Condition	38–63	59–63	80–92	92–159	59–113
11, Existing Condition	0(D)	0(D)	0(D)	72(D)	348(O)

Note: Desired conditions are expressed as a range. “D” indicates that existing conditions are deficit compared with desired conditions; “O” indicates overabundance. **Bold** numbers indicate conditions within desired range.

[a]References to PVG 10 in the above table are to be applied to the medium tree size class (overstory tree average diameter ranges from 12.0 to 19.9 inches DBH [diameter at breast height]). The overstory trees in PVG 10 stands (persistent lodgepole) generally do not attain an average diameter within the LTSC (DBH) even though individual trees may equal or exceed 20 inches DBH.

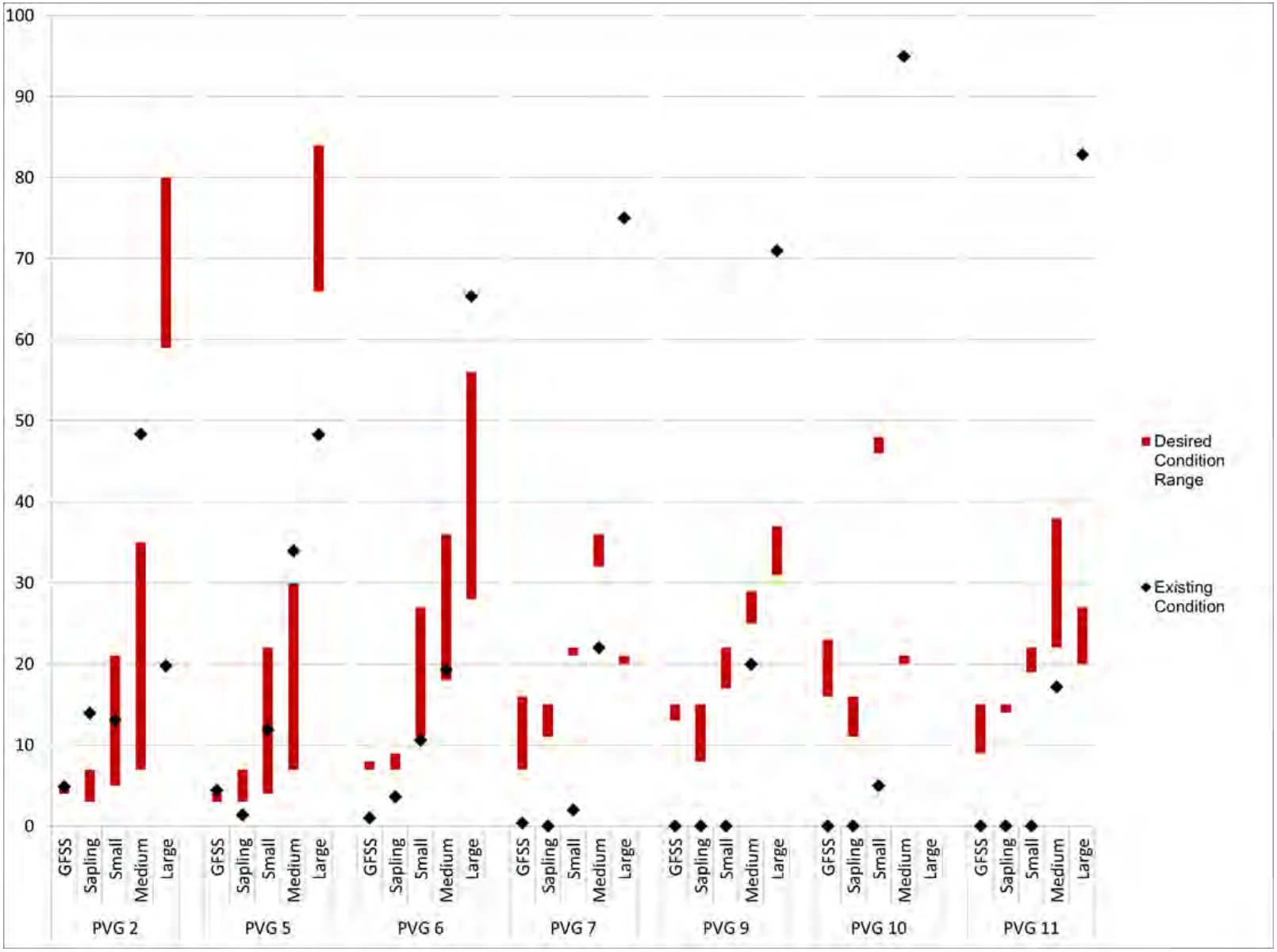


Figure 3.2-1. Percent tree size class by Potential Vegetation Group (PVG): desired condition vs. existing condition.

Canopy Cover Class

The Forest Plan identifies desired conditions for canopy cover class only for stands in the LTSC. Canopy cover is used in two different calculations. The first calculation is used to determine tree size class, as described in the tree size class section above. Once the tree size class is determined, canopy cover class is determined as the *total nonoverlapping canopy cover of all trees in a stand, except seedlings*. (Trees in the seedling tree size class are used to estimate canopy cover class only when they represent the only structural layer present.) This total nonoverlapping canopy cover determines the canopy cover class assigned to each stand. Areas with less than 10% canopy cover are considered either nonforested or in an earlier stage of plant succession.

Table 3.2-6 identifies the canopy cover class criteria utilized in this analysis.

Table 3.2-6. Canopy cover class criteria.

Canopy Cover Class	Total Nonoverlapping Canopy Cover
Nonforested or GFSS	0–9%
Low	10–39%
Moderate	40–69%
High	70% or more

Tree Canopy Cover Measurement

- Percentage of area (acres) in each canopy cover class within the LTSC

The desired condition for the tree canopy cover class measurement is based on Table A-5 of the Forest Plan (USDA Forest Service 2003). These desired values are in Figure 3.2-2 in comparison with existing conditions. These desired conditions apply only to stands within the LTSC.

Table 3.2-7. Percent of large tree size class (LTSC) canopy cover by Potential Vegetation Group (PVG): existing condition vs. desired condition. Desired condition is the range in the parenthesis ().

PVGs	Percent Canopy Cover Class (LTCS)		
	Low	Moderate	High
PVG 2	16 (74-94)	50 (6-26)	34 (0)
PVG 5	11 (25-45)	68 (55-75)	21 (0)
PVG 6	4 (0-20)	42 (80-100)	55 (0)
PVG 7	13 (0-14)	57 (86-100)	30 (0)
PVG 9	17 (0)	55 (51-71)	28 (39-49_
PVG 10	19 (0)	38 (81-100)	42 (0-19)
PVG 11	24 (0-16)	60 (84-100)	16 (0)

PVG 10 includes both medium and large size classes.

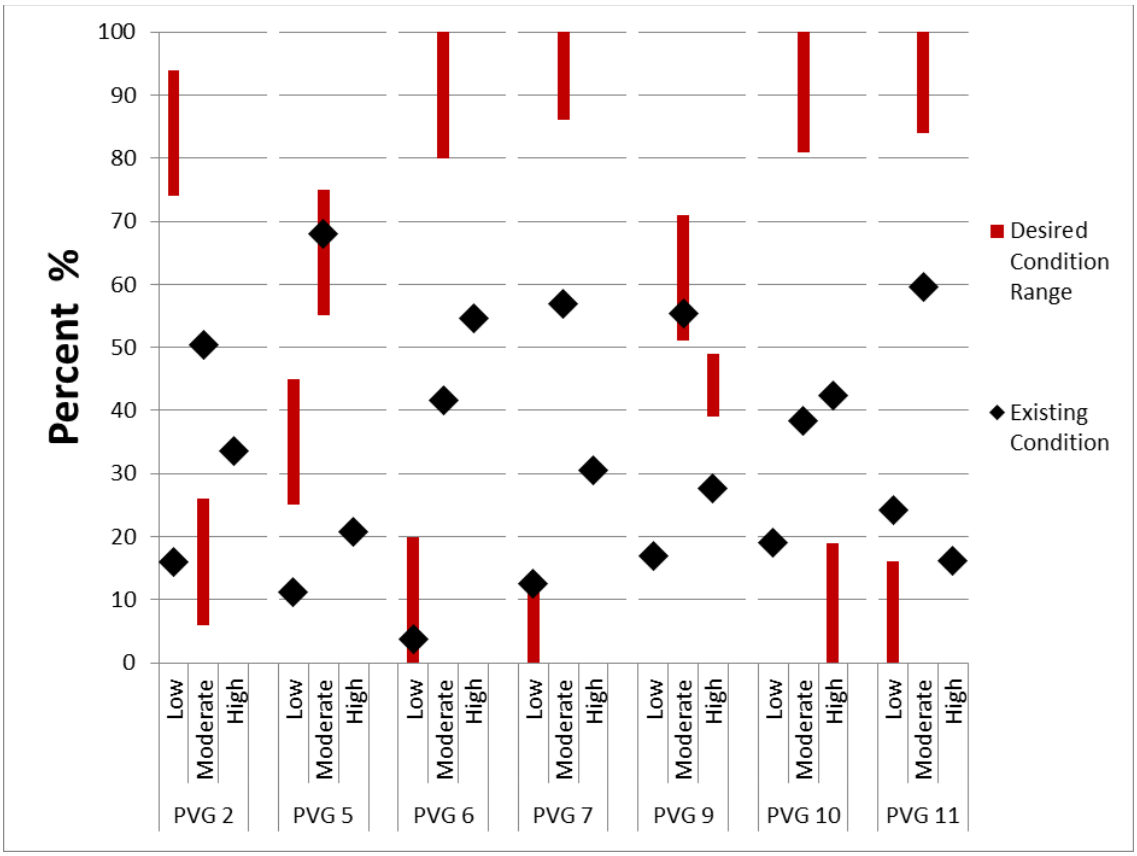


Figure 3.2-2. Percent of LTSC canopy cover by Potential Vegetation Group (PVG): desired condition vs. existing condition. The desired condition range in the high canopy cover class for PVGS 2, 5, 6, 7, and 11 are 0%. The desired condition range in the low canopy cover class for PVGs 9 and 10 are 0%. The PVG 10 includes both medium and large tree size classes (LTSCs).

Species Composition

The desired species compositions for this Project are based on Table A-7 of the Forest Plan (USDA Forest Service 2003a, p. A-7).

Species composition data for this analysis were derived from strata/working group averages and field validations.

Tree Species Composition Measurement

- Acres treated to maintain and/or promote desired species composition

The desired condition for tree species composition is to maintain and/or promote seral species to move toward and/or maintain the desired species compositions (see Table 3.2-8 for the desired species compositions). The emphasis of acres treated to maintain and/or promote the desired species compositions is on early seral species (see Table 3.2-9 for the status of overstory species) and especially aims to promote species in decline, specifically western larch, whitebark pine, and quaking aspen.

The desired species compositions (in comparison to the existing species compositions) are displayed in Table 3.2-8.

Table 3.2-8. Species composition by Potential Vegetation Group (PVG).

Species	PVG 2		PVG 5		PVG 6		PVG 7		PVG 9		PVG 10		PVG 11	
	Desired	Existing All Size Classes	Desired	Existing All Size Classes	Desired	Existing All Size Classes	Desired	Existing All Size Classes	Desired	Existing All Size Classes	Desired	Existing All Size Classes	Desired	Existing All Size Classes
Aspen	T	—	T	—	T	—	6–11%	—	T	—	T	—	T	—
Lodgepole Pine	T	—	T	*1%*	1–5%	*4%*	28–42%	**15%**	29–37%	**15%**	82–94%	**28%**	18–25%	*18%*
Ponderosa Pine	81–87%	**55%**	80–88%	**31%**	23–41%	24%	T	[5%]	—	[2%]	—	[3%]	—	[2%]
Whitebark Pine	—	—	—	—	—	—	—	—	—	—	T	—	32–47%	—
Western Larch	—	—	0–1%	—	15–29%	—	T	—	T	—	—	—	—	—
Douglas Fir	10–16%	[28%]	7–17%	[30%]	15–25%	[29%]	24–34%	**20%**	T	[10%]	T	[16%]	—	[16%]
Engelmann Spruce	—	—	T	*1%*	0–2%	[3%]	3–5%	[13%]	28–33%	*28%*	T	[13%]	8–13%	[16%]
Grand Fir	—	[13%]	0–1%	[25%]	9–23%	[25%]	T	[10%]	—	[4%]	—	[5%]	—	[3%]
Subalpine Fir	—	—	—	[25%]	0–3%	[5%]	12–21%	[32%]	29–33%	[35%]	T	[32%]	18–29%	[41%]
OTHER	—	[4%]	—	[9%]	—	[10%]	—	[5%]	—	[6%]	—	[4%]	—	[3%]

Notes:

Bold indicates a deficit, *Italics* is within the desired range, and brackets [O] indicate an overabundance. T = Trace.

Existing species compositions displayed in this table are based on working group data. Working groups were not updated during the walk-through surveys. Species composition may have error because the data are from a mid-level analysis. Additionally, working group data do not account for western larch, aspen, or whitebark pine as individual species; instead, they are lumped into the "Other" category.

References to PVG 10 in the above table are to be applied to the medium tree size class (overstory tree average diameter ranges from 12.0 to 19.9 inches DBH [diameter at breast height]). The overstory trees in PVG 10 stands (persistent lodgepole) generally do not attain an average diameter within the LTSC (DBH) even though individual trees may equal or exceed 20 inches DBH.

Table 3.2-9. Status of overstory species in forested Potential Vegetation Groups (PVGs) (Morgan and Parsons 2001).

PVG	Tree Species								
	POTR	PICO	PIPO	LAOC	PIAL	PSME	PIEN	ABGR	ABLA
2	Seral	Trace	Seral, Climax			Climax			
5	Seral	Seral	Seral	Trace		Seral	Trace	Climax	
6	Seral	Seral	Seral	Seral		Seral	Seral	Climax	Trace
7	Seral	Seral	Trace	Trace		Seral	Seral	Trace	Climax
9	Seral	Seral		Trace		Trace	Seral, Climax		Climax
10	Seral	Seral[a]			Seral	Trace	Seral		Climax
11		Seral			Seral, Climax		Trace		Climax

Notes:
POTR = *Populous tremuloides* (quaking aspen); **PICO** = *Pinus contorta* (lodgepole pine); **PIPO** = *P. ponderosa* (ponderosa pine); **LAOC** = *Larix occidentalis* (western larch); **PIAL** = *P. albicaulis* (whitebark pine); **PSME** = *Pseudotsuga menziesii* (Douglas-fir); **PIEN** = *Picea engelmennii* (Engelmann spruce); **ABGR** = *Abies grandis* (grand fir); **ABLA** = *A. lasiocarpa* (subalpine fir).
Trace is defined as species not explicitly modeled during the development of the Historical Range of Variability (USDA Forest Service 2003a). These species were not included in the model for those PVGs because they occur in habitat types that represent only a minor part of the PVGs across the ecogroup or because little information is known about their historical occurrence within a PVG (the latter was especially the case with quaking aspen).
[a]Denotes persistent seral species. Climax in one habitat type.

For species composition, finer scales (such as stand-level prescriptions) are not expected to mirror desired Forestwide values, due to the specific mix of habitat types present in individual areas. For example, quaking aspen (*Populus tremuloides*) is a minor component of many PVGs, but because it is a trace species, Forestwide data do not capture its distribution and abundance well. For this reason, these early seral trace species—especially species in decline, such as aspen, whitebark pine, and western larch—should be retained where they are found on the landscape (these three species are found in the analysis area in varying abundance, depending on site characteristics).

The proper species mix for each stand should be determined by habitat types and other concerns, such as wildlife or WUI. This landscape contains five dominant PVGs (four forested PVGs represent 66% and nonforested represent 27% of the landscape); the remaining PVGs within the landscape are less than 2% each; thus, the Forestwide desired species composition should be viewed as a general goal. Although the desired stand-level species compositions may deviate from these Forestwide desired conditions, both would, in general, result in landscapes dominated by early seral species for the PVGs and fire regimes already present in the analysis area. These early seral species are better adapted to site conditions and usually more resilient to disturbances (e.g., reproductive strategies or physiological adaptations) such as fire (Franklin et al. 2013; Lyon and Stickney 1976).

In addition, Vegetation Goals VEGO01 through VEGO07 provide direction to maintain or restore vegetative components, including size classes, canopy cover, structure, and snags (USDA Forest Service 2003, p. III-30), together with Vegetation Objective VEOB01, which identifies and prioritizes areas for regenerating the following:

- Aspen, both in climax stands and as a seral component of coniferous stands
- Native herbaceous understory in shrub communities
- Woody riparian species
- Western larch

- Whitebark pine

The decline of whitebark pine and other distressed five-needle white pines was brought to the attention of the chief of the U.S. Forest Service through the reports *Managing for Healthy White Pine Ecosystems in the United States to Reduce the Impacts of White Pine Blister Rust* (Samman et al. 2003) and *Whitebark Pine in Peril: A Case for Restoration* (Schwandt 2006).

Perkins et al. (2016), state that desired conditions for whitebark pine are dependent on the creation of nutcracker-caching habitat, reducing competing vegetation, decreasing surface and canopy fuels using direct or indirect treatments, manipulating forest composition, and diversifying age class structure.

These desired conditions would encourage whitebark pine regeneration, conserve seed sources, and promote rust resistance (Perkins et al. 2016). Furthermore, these desired conditions meet Forest Plan Goals, which include maintaining ecological processes, reducing uncharacteristic disturbances, maintaining or enhancing habitat for various species, facilitating regeneration of desirable plants, and maintaining or restoring important spatial patterns (Perkins et al. 2016, USDA Forest Service 2003a).

Spatial Patterns

With (1997) described a landscape mosaic as spatially complex, heterogeneous assemblages of patch types that cannot be simply categorized into discrete elements such as patches, matrices, and corridors. Furthermore, recent advances in theory and empirical studies of vegetation and landscape ecology indicate that to achieve long-term biological diversity across landscapes, management needs to consider the major disturbance processes, including variability and scale, that determine ecosystem components and their subsequent spatial patterns (Hessburg et al. 2015; Hessburg et al. 2000; McGarigal 2014; Kennedy and Fontaine 2009; Crane and Fischer 1986; Baker 1992; Baker and Cai 1992; Hessburg et al. 2007; Churchill et. al. 2013; Franklin et. al. 2013). Because fire was historically a major disturbance process in the West and in the analysis area (Barrett 1994a, 1994b; Barrett et al. 1997; Mehl et al. 1998; Morgan and Parsons 2001), historical fire regimes have been recommended to help set the context for the individual components of the desired conditions (Wallin et al. 1996).

Although no quantifiable desired condition metrics are identified in the Forest Plan regarding spatial patterns, the following concepts from recent research (Hessburg et. al. 2015; Stine et. al. 2014; Churchill et. al. 2013; Franklin et. al. 2008, Franklin et. al. 2013; Van Pelt 2008) regarding landscape restoration, including spatial pattern, were incorporated during Project design:

- Regional landscapes function as multilevel, cross-connected, patchwork hierarchies. Management should be completed at appropriate scales to effectively restore multilevel landscape patterns, processes, and dynamics.
- Topography provides a natural template for vegetation and disturbance patterns at local landscape, successional patch, and tree neighborhood scales. Topography can be utilized as a template to restoration of successional and habitat patchworks.
- Disturbance and succession drive ecosystem change. Movement toward restoring natural fire regimes and the variation in successional patterns may help so that other ecological processes may follow.

- Predictable patch size distributions historically emerged from linked climate-disturbance-topography-vegetation interaction. Restoring size distributions of historical successional patches may allow them to adapt to changing climate and disturbance regimes.
- Successional patches are ‘‘landscapes within landscapes.’. In dry pine and dry-to-mesic mixed-conifer forests, restoration of characteristic tree clumps and gap variation within patches may aid in restoration of these landscapes.
- Widely distributed large, old trees provide a critical backbone to dry pine and dry-to-mesic mixed-conifer forest landscapes. Retention and expansion of existing relict trees, old forests, and post-disturbance large snags and down logs in these types are critical to restoration of these landscapes.
- Utilization of the individuals, clumps, and openings concepts and methods offers a practical approach to restoring spatial patterns that are likely to enhance resilience and climate adaptation.

Evaluating spatial pattern is a daunting task that requires both a conceptual framework to organize and simplify ecosystem complexity and knowledge of a particular system’s detail (Spies and Turner 1999). Quantitative methods are available (McGarigal 2014, Hessburg et. al. 2013; Stine et. al. 2014, McGarigal and Marks 1995) to describe spatial patterns. The challenge and art of management is to simplify without losing important attributes or losing sight of the underlying complexity (Spies and Turner 1999). As acknowledged by Stine et al. (2014) and Kennedy and Fontaine (2009), within mixed conifer forests, despite recent contributions to the body of literature on the subject, there is still much scientific uncertainty and lack of consensus on the characteristics of fire regimes including spatial pattern.

Characterizing the landscape as a shifting mosaic of patches of different ages and development stages is a useful way of understanding vegetation dynamics (Bormann and Likens 1979). McGarigal (2014) states that measuring the proportional abundance of different classes may be one of the simplest and perhaps most useful pieces of information in quantifying landscape composition.

The mix of historical fire regimes on the landscape helps to determine the appropriate patch size and arrangement (see Table 3.2-2 for a description of the fire regimes in the analysis area). For example, portions of a landscape dominated by nonlethal fire regimes (e.g., PVG 2 and PVG 5) may be primarily LTSC with fine-grain patches of smaller tree size class, whereas portions of a landscape dominated by mixed fire regimes (e.g., PVGs 6, 7, and 11) may have numerous small to large patches of different tree size classes. The desired condition for spatial pattern is that the size, arrangement, configuration, and abundance would be trending toward and/or near the historic range. Due to a lack of available reference conditions regarding the configuration and arrangement for the local area, no quantifiable analysis regarding arrangement or configuration was completed for this analysis. For this analysis, the abundance of different successional stages have been compared with reference conditions by calculating the amount of vegetation departure from reference conditions utilizing the process defined in the *Fire Regime Condition Class (FRCC) Guidebook* (Hann et al. 2004). This departure is calculated by (1) determining the abundance (in percent) of each successional class (either existing or projected); (2) identifying the amount of similarity (in percent) that the existing conditions have to the reference conditions; and (3) adding the cumulative similarities and subtracting that resulting value from 100%. The resulting value is the amount of vegetation departure the landscape has or is projected to have. Strata data were utilized to compare existing conditions with the desired reference conditions. The desired reference conditions were adapted from the Forest Plan (USDA Forest Service

2003a, Appendix A) and the Morgan and Parsons (2001) documentation of the historical range of variability.

Spatial Patterns Measurement

Percent departure from reference conditions, per PVG (Table 3.2-10Table 3.2-10. **)**—The desired condition for spatial patterns is to trend toward the reference conditions in the long term. The desired condition is not to achieve the reference conditions at all points in time, because vegetation is dynamic. However, the desired conditions can be viewed as a reference from which the abundance of different successional stages can be compared. The desired spatial pattern reference conditions are shown in Table 3.2-10. Movement toward reference conditions will be dependent on landscape prescriptions with increased frequency of variable sized openings and successional patches (Dickenson 2014; Stine et al. 2014; Hessburg et. al. 2015; Franklin et al. 2008). A diversity of treatment types will potentially increase landscape heterogeneity; specifically, it is expected, and desired, that the successional stages would shift in mosaics throughout the landscape, both spatially and temporally.

Table 3.2-10. Percent desired (successional stages and canopy cover) condition by Potential Vegetation Group (PVG).

PVG	Early Seral	Mid Seral Closed	Mid Seral Open	Late Seral Closed	Late Seral Open
2	6%	3%	14%	12%	65%
5	5%	12%	6%	50%	27%
6	8%	24%	3%	58%	7%
7	11%	32%	3%	50%	4%
9	14%	12%	19%	21%	34%
10	2%	6%	54%	20%	18%
11	12%	32%	3%	49%	4%

Note: References to PVG 10 late seral in the above table are to be applied to the medium tree size class (overstory tree average diameter ranges from 12.0 to 19.9 inches DBH [diameter at breast height]). The overstory trees in PVG 10 stands (persistent lodgepole) generally do not attain an average diameter within the LTSC (DBH) even though individual trees may equal or exceed 20 inches DBH.

Quaking Aspen

Quaking aspen stands and patches of aspen within larger stands are important for biodiversity in conifer-dominated forest landscapes. Aspen distribution within the analysis area has been altered by resource management and human settlement influences, wildfire management, and livestock grazing (Gallant et al. 2003). Campbell and Bartos (2000), based off of Forest Inventory Analysis data, concluded that aspen has declined approximately 61% in Idaho and 50–96% across the whole western United States. Aspen stands in properly functioning condition will often have the following characteristics: multiaged stems in the stand, adequate regeneration to perpetuate the stand, age classes mostly less than 100 years old, and good undergrowth beneath the canopy (Campbell and Bartos 2000).

Aspen stands at risk of further decline are described as having greater than 25% canopy cover of conifer species (overstory or understory); aspen canopy cover less than 40%; dominant aspen trees greater than 100 years old; and/or less than 500 stems per acre of aspen regeneration (5–15 feet tall) (Bartos 2000, Campbell and Bartos 2000; Strong et al. 2010, Strong 2011a, Strong 2011b; Swanson et al. 2010a, 2010b; Seager et al. 2013, Shinnerman et al. 2013).

Within the analysis area most aspen clones are seral; however, there are some locations in higher elevations where aspen persist, which is consistent with Mueggler (1988).

Aspen Measurement

Acres treated to maintain and/or promote aspen—The desired condition in stands or portions of stands that are treated to maintain and/or promote aspen is to have 25% or less canopy cover of coniferous trees intermixed in the aspen stand after treatment.

Nonforested Vegetation and Wet Meadows

At the landscape level, nonforested ecosystems are a mosaic of patches. Nonforested vegetation groups have increased susceptibility to conifer encroachment during the past century (Hessburg et al. 2015; Dickenson 2014; USDA Forest Service 2009). In some instances, this may reflect a process of contraction following a disturbance such as wildfire. Conifer encroachment into nonforested vegetation and meadows has been reported across the Pacific Northwest, in the Sierra Nevadas, and in the Intermountain region (Vale 1981; Rochefort et al. 1994; Taylor 1995; Griffiths et al. 2005; Gallant et al. 2003). Elsewhere, it may reflect a change in land use, such as cessation of sheep grazing, or a shift in climate (USDA Forest Service 2007). Within the analysis area, nonforested vegetation has been altered primarily by wildfire management (fire exclusion) and livestock grazing (Gallant et al. 2003). The USDA Forest Service (2007) found that the most effective strategy for conservation and maintenance of meadow habitats is one that targets tree removal during the early stages of encroachment, followed by prescribed burning for maintenance.

Nonforested and Wet Meadow Measurements

- Acres treated to maintain and/or promote nonforested vegetation

The desired condition in grasslands and shrublands is to maintain less than 10% canopy cover of conifer trees at all time scales.

- Acres treated to maintain and/or promote wet meadow

The desired condition for this measurement is to maintain less than 10% canopy cover of conifer trees at all time scales.

3.2.4.2. Current Conditions

This section compares the existing conditions to the desired conditions for the measurements identified in Section 3.2.3.2. The current conditions were used as the basis for the design of the proposed action and other action alternatives.

Tree Size Class

Measurement: Acres treated to promote and/or maintain the LTSC

This measurement depicts how many acres would be treated to maintain and/or promote the LTSC within desired canopy covers and species compositions in the long term. Table 3.2-5 identifies the minimum and maximum acres, by PVG, desired within the LTSC, as well as the existing acres within the LTSC. Specifically, PVGs 2 and 5 together are deficit by 2,059 to 3,520 acres, while PVGs 6, 7, 9, 10, and 11 have an overabundance of 5,034 to 9,070 acres.

Measurement: Distribution of tree size classes

Refer to Table 3.2-4 and Figure 3.2-1 for displays of the desired and current distributions of tree size classes by PVG. The PVGs 2 and 5 exhibit a deficit of the LTSC and an overabundance of the medium size class. In PVG 2, grass/forb/shrub/seedling (GFSS) and small size class are at desired conditions. The PVG 5 has a slight overabundance of GFSS, and the small size class is within desired conditions. The PVGs 7, 9, and 11 exhibit an overabundance of the LTSC and a deficit in all other size classes. The PVG 6 has an overabundance of the LTSC, a deficit of sapling and GFSS, and it is at the low range of desired conditions for both the small and medium size classes. The PVG 10 has an overabundance of the medium size class and a deficit in all other size classes.

Canopy Cover Class

Figure 3.2-2 displays the current conditions for canopy cover class in the LTSC stands, as compared with the desired conditions. This comparison indicates that PVGs 2 and 5 are deficit while PVGs 9, 10, and 11 are overabundant in the low canopy cover class. Low canopy cover in PVGs 6 and 7 is within historical range. The PVGs 6, 7, 10, and 11 are deficit and PVG 2 is overabundant in the moderate canopy cover class. Moderate canopy cover in PVGs 5 and 9 is within historical range. The PVGs 2, 5, 6, 7, 10, and 11 are overabundant in the high canopy cover class and PVG 9 is deficit. The overabundance in high canopy cover in the LTSC decreases early seral communities, increases landscape homogeneity, increases in dominance of single patch type, and decreases in patch diversity. These conditions are a result of past management in the analysis area, primarily fire suppression, combined with years of tree growth, natural seedling establishment, seedling growth, and a minimal amount of recent natural disturbance.

Species Composition

Table 3.2-8 displays the desired species composition ranges and the existing species compositions for all tree size class stands and the existing species compositions for all stands.

Currently, undisturbed stands are declining in early seral species and increasing in climax species as stands move through succession, as discussed by Steele et al. (1981), Steele (1994), and Crane and Fischer (1986). A comparison of Forest inventory data over time indicates a decline in early seral species (e.g., ponderosa pine) in unmanaged stands in the Forest, which is consistent to findings by Franklin et al. (2013) and Covington et al. (1997). Plantations in the analysis area have an abundance of early seral species because seral species were usually planted after regeneration harvests.

These Forestwide trends are consistent with field observations in the analysis area, indicating an overabundance of late-seral species (most notably grand fir and subalpine fir) and a decline in the vigor of desired early seral species in mature stands (see Table 3.2-8). This decline in the vigor of western larch, aspen, whitebark pine, Douglas-fir, and ponderosa pine is noted throughout the analysis area, in many of the mature stands with mortality of the larger-diameter pine, larch, and Douglas-fir due to western pine beetle, *Ips* species, Douglas-fir beetles, and competition as the primary causal factors (Jorgenson 2013). Observations also indicate that many of the plantations are near-monocultures of ponderosa pine, with limited amounts of western larch and Douglas-fir.

These trends in species compositions can be attributed primarily to fire suppression and past timber management, which have reduced the number and frequency of surface fires, removed many of the large, early seral tree species, and resulted in increased growth of shade-tolerant species, such as grand fir. Historical data and forest inventories across the western United States

have shown declines in early seral tree species and increases in climax (shade-tolerant) tree species (Sloan 1998a, 1998b; Covington and Moore 1994; Stein 1987).

Field review of the analysis area indicates that western larch, aspen, ponderosa pine, whitebark pine, and Douglas-fir are all in decline in mature and overmature stands, and most notably in undisturbed stands. Although Forestwide data indicate that Douglas-fir is slightly overabundant in PVG 6, field review indicates that competition with grand fir, as well as Douglas-fir beetle activity in the analysis area, are causing moderate levels of mortality in large-diameter Douglas-fir.

With regard to whitebark pine across its range, approximately 84% of whitebark pine occurs on Federal land and 48% occurs in designated and recommended wilderness areas and IRAs (Keane 2000). This latter designation poses challenges, both legal and philosophical, for whitebark pine restoration efforts (Keane 2011, Keane et al. 2012, Keane 2013). The analysis area has approximately 403 acres of PVG 11 that are not in wilderness areas or IRAs, allowing for some treatment possibilities to maintain and promote whitebark pine populations.

Spatial Patterns

Vegetative spatial patterns within the analysis area have been altered by a host of resource management and human settlement influences, including timber management, wildfire management, livestock grazing, road and trail construction, changes in ownership and use patterns, etc. These findings are consistent with research across the interior West regarding spatial patterns in ponderosa pine and mixed-conifer forests (Franklin et al. 2007; Youngblood et al. 2009; Churchill et al. 2013; Stine et al. 2014; Dickinson 2014; McGarigal 2014; Hessburg et. al. 2015; Franklin et. al. 2008, 2013). Table 3.2-11 provides a reference condition to analyze spatial patterns throughout the analysis area. The reference condition is based on Forest Plan desired conditions of canopy cover and age structure.

The potential consequences to biological diversity and sustainability increase whenever Forest conditions are outside of, and remain outside of, the desired conditions (Morgan and Parsons 2001; Stine et al. 2014). The vegetation departure rating is currently outside of desired conditions within the analysis area, and many stands throughout are considered to be uncharacteristic. Consequences include increased susceptibility to stand-replacing fires where few ever occurred historically, which can put soils, streams, and fish at risk (Morgan and Parsons 2001).

To reduce the overall vegetation departure rating and move it toward desired conditions, five things need to occur across the landscape: (1) promotion of age class diversity and younger age/structure classes (e.g., GFSS, sapling, and small size classes) in PVGs 6, 7, 9, 10, and 11; (2) reduction of canopy cover from high to low in PVGs 2 and 5; (3) reduction of canopy cover from high to moderate in PVGs 6, 7, 10, and 11; (4) maintenance and promotion of early seral species in PVGs 2, 5, 6, 7, 10, and 11; and (5) promotion of movement into the LTSC in PVGs 2 and 5.

A qualitative comparison of changes in vegetation density and spatial pattern was done by comparing historical (1938) with current (2014) aerial photos (Figure 3.2-3, Figure 3.2-4, and Figure 3.2-5). This comparison of aerial photos indicates that forested sites have increased tree densities and canopy cover in comparison to historical conditions. In addition, areas that were historically open (non-forested) have experienced conifer encroachment throughout the analysis area. These photos indicate that increases in tree density and encroachment of trees into nonforested habitats has altered the vegetative spatial patterns. This has resulted in reduced heterogeneity and resilience throughout the analysis area. These findings are consistent with other research regarding spatial patterns and landscape restoration in the inland pacific

landscapes (Hessburg et. al. 2015; Hessberg and Haugo 2016; Stine et.al. 2014; Franklin et. al. 2008; Franklin et.al. 2013). Comparing historical to current provides a visualization of the changes in vegetation structure and pattern that support the quantitative data and best available science (Dickinson 2014; McGarigal 2014; Hessburg et. al. 2015; Hessberg and Haugo 2016; Stine et.al. 2014; Franklin et. al. 2008; Franklin et.al. 2013).

Table 3.2-11. Reference conditions and existing distribution of successional classes.

Potential Vegetation Group (PVG)		Early Seral[a]	Mid Seral Closed[a]	Mid Seral Open[a]	Late Seral Closed[a]	Late Seral Open[a]	Uncharacteristic[b]	Overall Vegetation Departure
PVG 2	Desired	6%	3%	14%	12%	65%	0%	64
	Existing	***19***	***24***	***37***	***10***	***3***	***6***	
PVG 5	Desired	5%	12%	6%	50%	27%	0%	39
	Existing	***6***	***28***	***18***	***33***	***5***	***10***	
PVG 6	Desired	8%	24%	3%	58%	7%	0%	40
	Existing	***5***	***22***	***8***	***27***	***3***	***35***	
PVG 7	Desired	11%	32%	3%	50%	4%	0%	43
	Existing	***0***	***8***	***17***	***42***	***10***	***23***	
PVG 9	Desired	14%	12%	19%	21%	34%	0%	39
	Existing	***0***	***0***	***7***	***20***	***40***	***33***	
PVG 10	Desired	20%	6%	54%	20%	18%	0%	57
	Existing	***0***	***5***	***0***	***33***	***41***	***22***	
PVG 11	Desired	12%	32%	3%	49%	4%	0%	44
	Existing	***0***	***0***	***18***	***51***	***20***	***12***	
PVG 99[c]	Desired	100%					0%	40
	Existing	60%					40%	
Vegetation Departure Rating		N/A						43

[a]Based on Appendix A of the Forest Plan (USDA Forest Service 2003a) and Morgan and Parsons (2001).
[b]Uncharacteristic is defined as high canopy cover stands in PVGs 2, 5, 6, 7, and 11 (canopy cover >69%) and low canopy cover stands in PVGs 9 and 10 (canopy cover <39%), as defined by Morgan and Parsons (2001).
[c]PVG99 is defined as nonforested vegetation (grassland and shrublands).
Additional notes:
These reference conditions are based upon desired conditions outside of MPC 5.2 as documented in the Forest Plan (USDA Forest Service 2003a, Appendix A) and Morgan and Parsons (2001); midpoint values were used.
References to PVG 10 in the above table are to be applied to the late seral including large and medium tree size classes (overstory tree average diameter ranges from 12.0 to 19.9 inches DBH [diameter at breast height]). The overstory trees in PVG 10 stands (persistent lodgepole) generally do not attain an average diameter within the LTSC (DBH) even though individual trees may equal or exceed 20 inches DBH.
This chart summarizes the desired conditions outlined in the Forest Plan for PVGs in all Management Prescription Categories except for 5.2. Desired future conditions are based on the historical range of variability from Morgan and Parsons (2001).

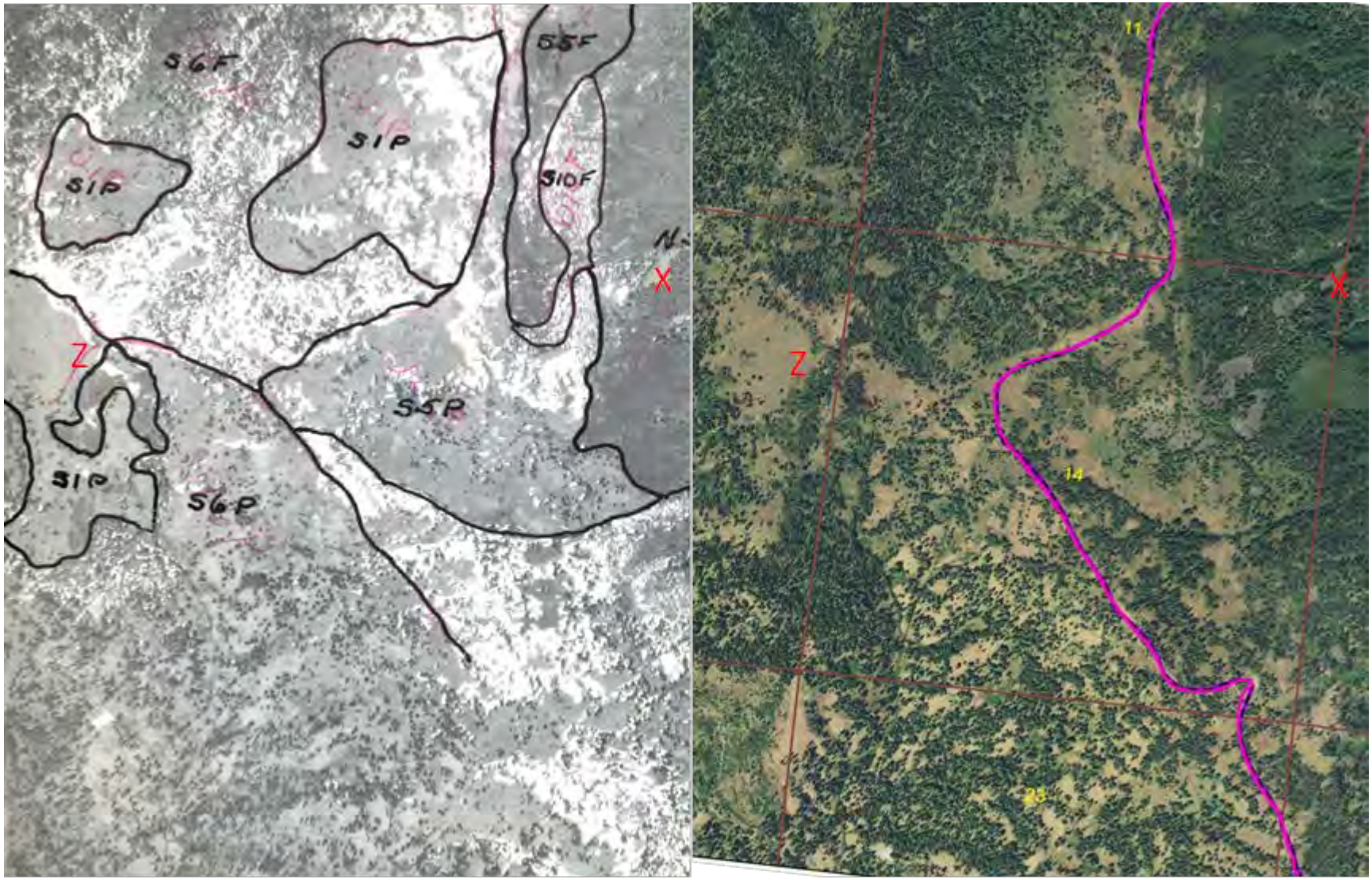


Figure 3.2-3. Comparison of 1938 (left) to 2014 (right) aerial photos in No Business Canyon T16N, R2E, Sec. 10, 11, 14, 15, 22 & 23 (X and Z denote points of comparison).

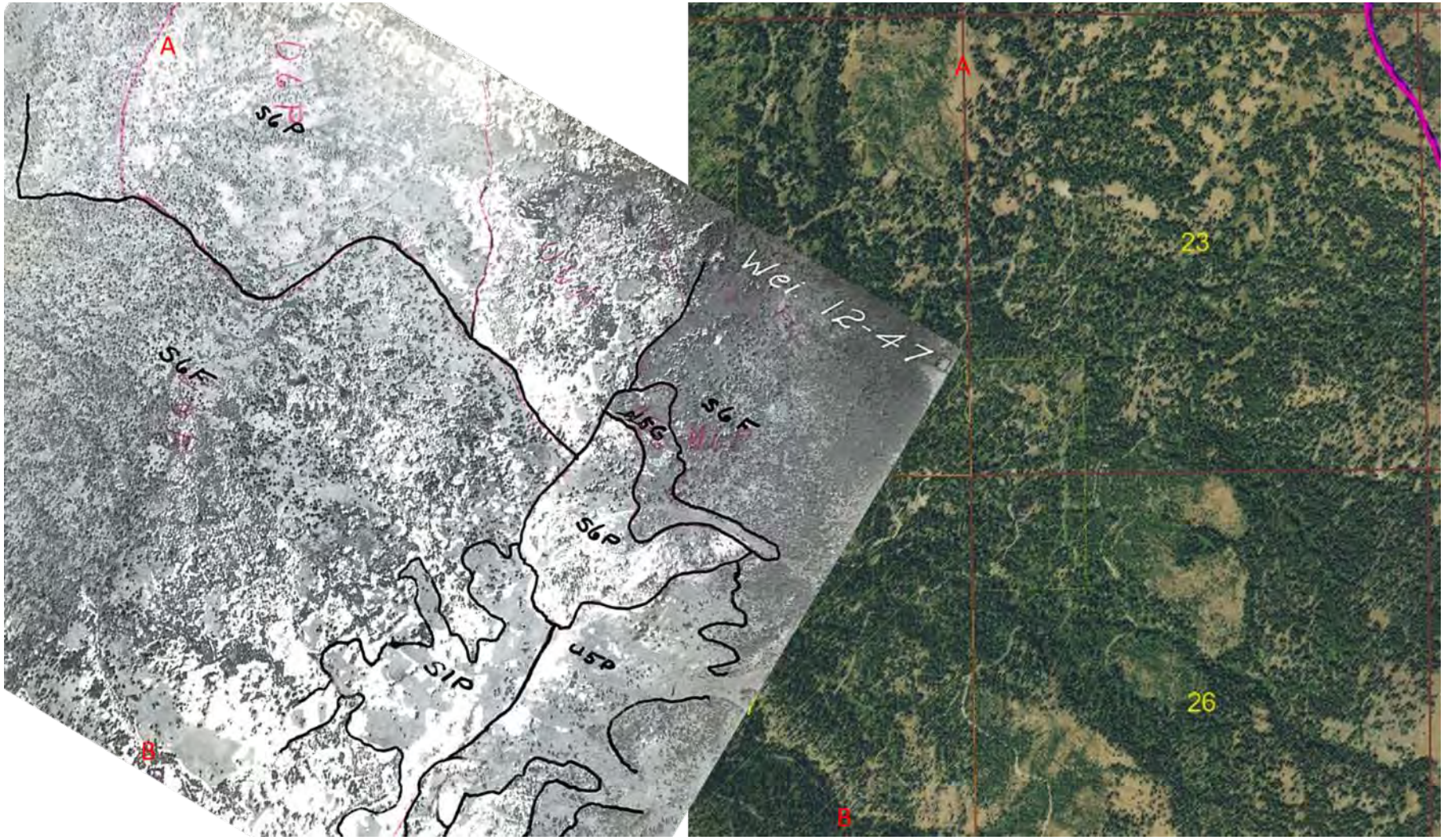
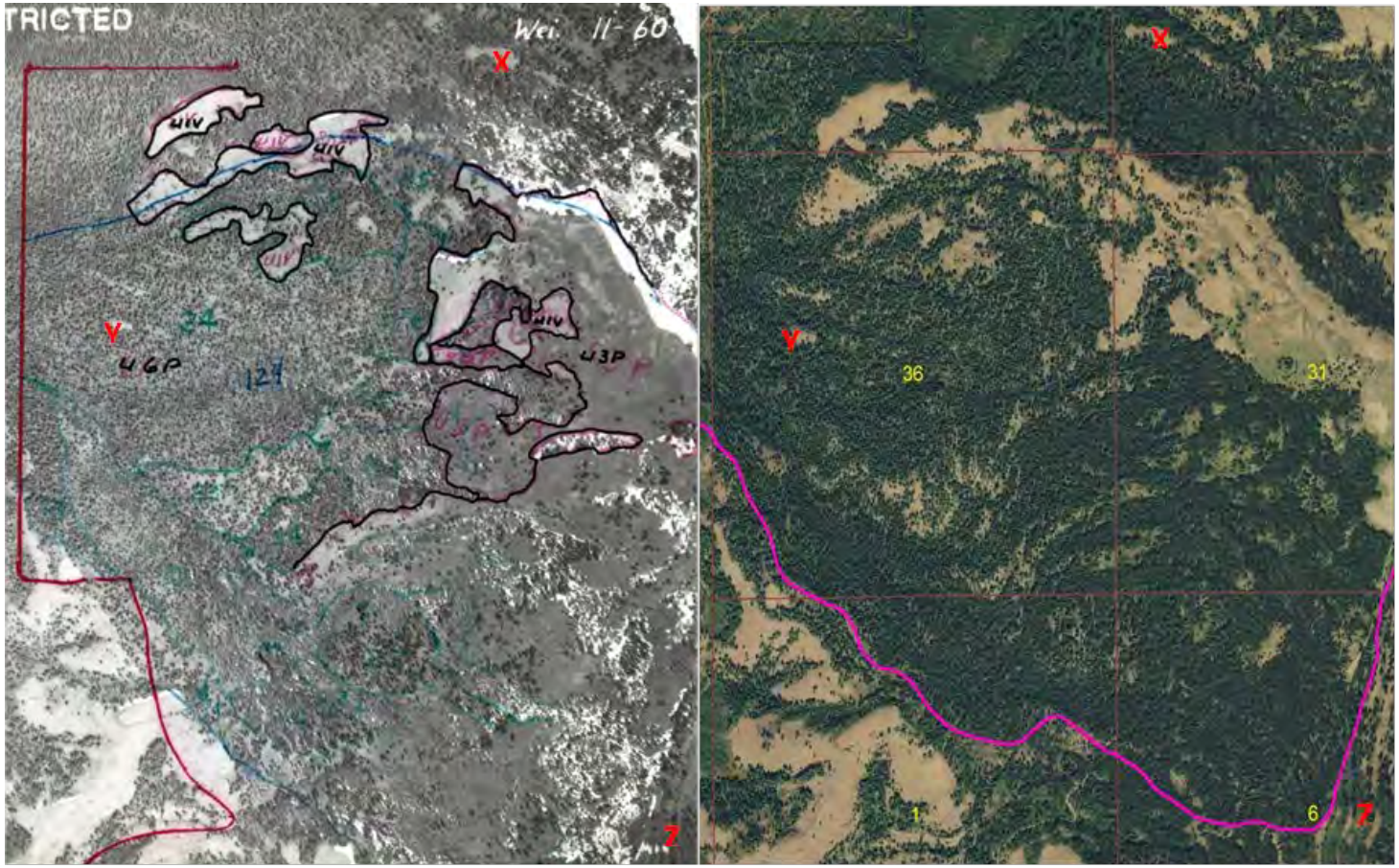


Figure 3.2-4. Comparison of 1938 (left) to 2014 (right) aerial photos in Jungle Creek T16N, R2E, Sec. 22, 23, 26 & 27 (A and B denote points of comparison).

Figure 3.2-5.



Comparison of 1938 (left) to 2014 (right) aerial photos in Burnt Basin T15N, R1E, Sec. 31 & 36 T14N, R1E, Sec. 1 & 6 (X, Y, and Z denote points of comparison).

Aspen

Measurement: Acres treated to maintain and/or promote aspen with less than 25% canopy cover

Approximately 1,100 acres of aspen stands were identified in the analysis area as exhibiting some level of aspen decline and/or conifer encroachment. It is anticipated that removal of conifer encroachment would aid in rejuvenating the aspen component. Aspen has been identified in the Forest Plan as a species that should receive priority for regeneration (VEOB01). Based on a field review of aspen stands in the analysis area, the desired condition is to maintain at least these 1,100 acres of aspen in a sustainable condition for the long term. To achieve this, the canopy cover of coniferous trees should be reduced and maintained at less than 25% in portions of these stands.

Nonforested Vegetation and Wet Meadow

Measurement: Acres treated to maintain and/or promote nonforested vegetation with less than 10% canopy cover

Nonforested vegetation (specifically, herbaceous understory in shrub communities) has been identified in the Forest Plan as a community that should receive priority for restoration (VEOB01). Based on field reviews, approximately 10,000 acres of grasslands and shrublands are in need of reducing conifer encroachment. The desired condition, therefore, is to treat at least the amount of grasslands and shrublands that will maintain them in the short term with <10% canopy cover.

Measurement: Acres treated to maintain and/or promote wet meadow

Wet meadows within the analysis area have been altered by resource management and human settlement influences, wildfire management, and livestock grazing (Borgmann et al. 2008, USDA Forest Service 2009, Thompson et al. 2007).

Wet meadows (specifically, riparian vegetation) have been identified in the Forest Plan as a community that should receive priority for restoration (VEOB01). Based on field reviews, approximately 315 acres of wet meadows are in need of conifer encroachment removal. The desired condition, therefore, is to treat at least the amount of wet meadows that will maintain them in the short term with <10% canopy cover.

3.2.5. Direct and Indirect Effects

The effects of the alternatives on forested vegetation are measured by how each alternative would change the current condition in comparison with the desired conditions for the objectives and applicable measures.

To evaluate the direct and indirect effects of the alternatives on the forested vegetation, strata and working group data were utilized to develop quantitative estimates for the current and short-term (immediately after treatment) effect. For longer-term estimates, qualitative descriptors and applicable research were utilized to describe the effects of treatments.

3.2.5.1. Tree Size Class

Figure 3.2-1 compares the existing distribution of tree size classes by PVG with the desired conditions. Table 3.2-12 below identifies the number of acres that would be treated to maintain or promote the LTSC by alternative. The effects of each alternative on the percentage of area in each tree size class are discussed below.

Table 3.2-12. Acres that promote and/or maintain large tree size class (LTSC) by alternative.

Measurement	Desired	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
Acres Treated to Promote the LTSC	-	0	4,610	4,139	5,335	4,722
Acres Treated to Maintain the LTSC	-	0	7,964	7,118	9,316	8,203
Total Acres Treated to Promote or Maintain the LTSC	8,965–14,462	0	12,574	11,257	14,651	12,925

Note: All PVGs are included in the total acres.
This table represents all treated stands within the analysis area that maintain and/promote LTSC (does not include shaded fuel break or Dry Nonforested Vegetation Treatment.

Large Tree Size Class (LTSC) Measurements

Measurement: Acres treated to maintain and promote the LTSC

Table 3.2-12 displays the amount of acres treated to maintain (existing LTSC stands) and promote (existing medium tree size class stands) LTSC stands. This measurement was selected because there is currently a deficit of LTSC stands in PVGs 2 and 5 (see Table 3.2-4). By maintaining existing large tree stands in that size class and enhancing the resiliency and resistance of the stands to disturbances that could move the stands out of the LTSC, and by promoting the development of medium tree size class stands into the LTSC with desired characteristics (e.g., canopy cover and species compositions), management actions would move toward the desired conditions for PVGs 2 and 5.

Alternative 1 (No Action)

Alternative 1 would not treat any acres to maintain or promote the LTSC. This would have varying effects on meeting the desired levels of LTSC depending on the PVG. The PVGs 2 and 5 would continue to increase in canopy cover and density, which would slow the progression rate of medium size class stands into LTSC. Long-term potential effects are stand stagnation equating to less acres moving into LTSC and increased competition/densities that reduce resilience in these PVGs.

The PVGs 6, 7, 9, 10, and 11would continue to have more LTSC in high densities. The PVGs 9 and 10 would move closer to desired conditions; however, overall resilience of stands would diminish as density increased. Short- and long-term effects would be stand stagnation until disturbance (either wildfire or insect/disease) reduces densities.

Commonalities of All Action Alternatives

Due to PDF #55, all action alternatives are designed to maintain LTSC stands by managing densities to enhance the resiliency and resistance of the stands to disturbance events such as wildfire and insects. While this PDF would aid meeting the desired conditions in the short and long term in PVGs 2 and 5, this is not the case in PVGs 6, 7, 9, 10, and 11.

In these higher PVGs, there is already an overabundance of the LTSC. In addition, many of the treatments that would aid in promoting more LTSC stands with other desired characteristics (e.g., desired species composition and canopy covers) would, in the mid to long term, create an even larger overabundance of the LTSC. Alternative 4 would treat the most acres to both maintain and promote the LTSC, thus potentially moving the most acres toward LTSC in PVGs 7–11. Alternative 3 would treat the fewest acres.

Alternatives 2, 4, and 5 would continue to maintain and promote (i.e., increase) an over-abundance of LTSC in PVGs 6, 7, 9, 10, and 11(includes SFB); while Alternative 3 would only maintain an over- abundance through no action in these PVGs.

The continued overabundance in LTSCs in the higher PVGs and, consequently, the deficit in GFSS, would neither meet desired conditions in the short term nor in the long term. In the long term (without future management and/or disturbance at the stand level), seedling, sapling, and small tree size classes for PVGs 6, 7, 9, 10, and 11 would remain below the desired range for all action alternatives (see Table 3.2-8 and Table 3.2-9). However, the additional treatments under Alternatives 2, 4, and 5 (i.e., in PVGs 6–11), would create a mosaic of openings (mimicking disturbance) that would allow regeneration and differentiation of size classes (just not at the stand level).

Measurement: Distribution of tree size classes

Alternative 1 (No Action)

Current tree size class distributions are displayed in Table 3.2-5 above. Tree size class percentages would change slowly over time as growth occurs; some tree size classes would develop into the next size larger class while others would fall into the lower size class due to natural disturbance events (e.g., insects and wildfire).

In addition, at current stand densities, many of the dense stands would have high susceptibility to insect attacks, which could affect the tree size class in some of these stands.

Of the 5,381 acres of plantations, approximately 45% (2,421 acres) are estimated to have moderate to high densities; the remaining plantations (2,960 acres) are associated with the Grays Creek Fire of 2007. Plantations within this area burned at mixed severities; areas that had salvage harvests were replanted following the fire. Many of these plantations have mixed survival; specifically, there are intermixed patches of dense, moderate, low, and no survival of regeneration. Plantations have had 1-, 3-, and 5-year survival plots and adequate stocking rates; however, due to a combination of drought, herbivory (pocket gophers [Geomyidae]), and dense brush, some these plantations have experienced increased mortality. Under this alternative, many of these dense plantations would be susceptible to western pine beetle infestations (DeMars and Roettgering 1982, Lowrey et. al. 2015). Western pine beetle activity was documented in a number of these plantations during field reconnaissance. Many of these plantations are currently in, or entering into, the size class and density ranges where susceptibility to western pine beetle is anticipated to increase (Jorgenson 2013). These dense plantations would also be susceptible to density-induced growth rate reductions; once the reductions occur, the trees are not anticipated to return to the higher diameter growth rates (Basford et al. 2010), which would further slow the development of these stands into larger tree size classes.

Mature stands in the grand fir forest (PVGs 5 and 6), subalpine fir (PVGs 7, 9, and 11), and lodgepole pine (PVG 10) types, especially in the northern and eastern portions of the analysis area, have seen recent and intensifying activity of Douglas-fir beetle, fir engraver beetle, balsam woolly adelgid, western balsam bark beetle (Dryocoetes confusus Swaine), spruce beetle, mountain pine beetle (Dendroctonus ponderosae), and western spruce budworm (USDA FHP 2013, 2014, 2015 and 2016), whereas the central and southwestern portions of the analysis area have recently seen increases in western pine beetle and Ips beetle activity (USDA FHP 2008, 2009, 2010, 2011, 2012, 2013, and 2014). Under Alternative 1, the dense conditions in many of these mature stands would lead to higher susceptibility to Douglas-fir beetle, western pine beetle, and western spruce budworm (Lowrey et. al. 2015, Jorgenson et al. 2013).

Susceptibility of the analysis area to disturbance would continue to increase without treatment. Specifically, PVGs 2 and 5 would continue to exhibit increases in understory/overstory grand fir and Douglas-fir densities, leading to more ladder fuels. Densities in PVG 6, 7, and 11 would continue to increase, which would lead to increased mortality, decreased growth, and increased ladder fuels. If a landscape-level disturbance were to occur, large expanses of mature forests could be converted to GFSS, creating a single large cohort of GFSS instead of multiple smaller cohorts (i.e., GFSS, seedling, sapling, and small), which would not perpetuate size class differentiation. Conversely, if no disturbance were to occur, then the size class distribution would continue to not meet desired conditions. Therefore, Alternative 1 would not be expected to reach desired conditions in the short to long term.

Effects Common to All Action Alternatives

All action alternatives propose six types of treatments that could directly affect tree size class and growth of stands into the next larger size class: NCT, BA/PL, CT-MP, CT-FT, CT-ASP, and FT-PC-MSw treatments. Additionally, treatments such as LSQ, WMR, SFB, RCA Fuels Treatment (RCA-FT), and prescribed burning would indirectly affect size class and growth. Treatments SFB, RCA-FT, and prescribed burning were not included in the size class analysis. The remaining eight treatments were utilized in the size class analysis based on how they affect individual tree growth and could increase tree size class and growth via direct mortality and/or removal of trees.

None of the alternatives' proposed treatments would affect tree size class distribution immediately post-treatment. No LTSC stands would shift to smaller size classes with any of the alternatives (e.g., in a large tree stand proposed for prescribed fire-only treatment that is also on the cusp of having enough canopy cover of trees greater than 20 inches in diameter, silvicultural prescriptions and burn plans would be limited to ensure that the stand would not reduce to a smaller size class). All vegetative treatments, including mechanical treatments and prescribed burning, would retain stands in their existing tree size classes.

None of the alternatives would move toward the desired GFSS and sapling tree size class in PVGs 6, 7, 9, 10, and 11, which would move further from the desired conditions as there is currently an overabundance of the LTSC and a deficit of the GFSS and sapling tree size class in all of these PVGs. Additionally, Agee (2007) stated that ecosystem management using HRV should recognize the importance of scale and avoid focusing on individual structural stages (i.e., maintaining only LTSCs) because it creates a quasi-static system. Although regeneration treatments are proposed in all action alternatives, these treatments would retain too much canopy cover in the large and medium tree stands to qualify as GFSS stands; however, portions of each stand would have openings with reserve trees that allow for some regeneration. The proposed regeneration treatments are designed to retain clumps of untreated areas within each unit and to retain biological legacies such as legacy trees, snags, and CWD to maintain structure and ecological processes identified by the applicable science (USDA Forest Service 1997; USDA and USDI 2014; Interior Columbia Basin Ecosystem Management Project [ICBEMP] 1999; Perera et al. 2004; Franklin et al. 2008; Lindenmayer et al. 2008). The proposed regeneration treatments attempt to mimic a disturbance of moderate severity, with a mosaic created within the proposed regenerated stands.

Alternative 2

Noncommercial treatments (including NCT and BA/PL) outside of harvest units could occur on up to 4,519 acres in both mature forests and plantations**Error! Reference source not found.**. Understory thinning would occur in all commercial treatments (CT-ASP, CT-FT, CT-MP, FT-PC-

MSw, and LSQ), equating to 11,235 acres (Table 2.2-18). The CT-MP treatment would occur on up to 1,080 acres. The CT-FT treatment would occur on up to 2,875 acres. All treatments would promote growth of residual trees by removing shade-tolerant species, increasing available growing space, and reducing competition for moisture, sunlight, and nutrients (Oliver and Larson 1996; Cochran and Barrett 1993, 1999a, 1999b; Basford et al. 2010; Fiedler et al. 2010). These treatments would reduce tree densities and promote maintenance and development of early seral species, large trees, and legacy trees. The CT-FT post-treatment canopy cover would generally be less than 40%; canopy cover in these stands would average 25%.

The FT-PC-MSw treatments would occur on up to 5,343 acres (Table 2.2-18). In some areas, FT-PC-MSw units receiving free thin treatments would exhibit effects similar to those described for CT-FT treatments (above). In areas receiving the patch cut, 0–10 of the larger-diameter trees per acre would be retained. In areas treated with a modified Shelterwood, 10–20 of the larger-diameter trees per acre would be retained, with 5–10% of each stand retained in untreated reserve areas (skips). Overall, the FT-PC-MSw treatment would maintain the LTSC by leaving the larger, more fire-resistant ponderosa pine, Douglas-fir, and western larch, if available. Specifically, intermediate treatments (i.e., the FT portion of the FT-PC-MSw treatment) would occur in both medium and large size classes in order to reduce stocking, which would, in turn, improve diameter growth and reduce competition. It is expected that regeneration treatments (PC and MSw) would occur only on a portion of these stands, with the intent that LTSCs (in any PVG) would not be reduced. After completing harvest and site preparation treatments, the average canopy cover in these stands would be below 25%. Canopy cover in the created openings would be less than 10%. Canopy cover in the thinned areas would average 25%; canopy cover could be greater than 40% in untreated areas. Overall canopy cover would be reduced further following prescribed fire treatment.

The CT-ASP would treat approximately 1,087 acres. The interspaces between aspen clones would receive FT-PC-MSw treatments; effects would be similar to those described above. Within an area adjacent to the clones (50 feet to the north and east and 100 feet to the south and west), treatments would promote growth of aspen by removing most conifers, increasing available growing space, and reducing competition for moisture, sunlight, and nutrients. Overall, the CT-ASP treatment would maintain the LTSC by leaving the larger, more fire-resistant ponderosa pine, Douglas-fir, and western larch within the interspaces between clones. The average canopy cover in these CT-ASP treatment areas would be below 25%. Canopy cover in the created openings would be around 10%. Canopy cover in the thinned areas would average 25%; canopy cover could be greater than 40% in untreated areas.

In the short to long term (5–30 years), vegetation treatments (excluding SFB and NFT) are anticipated to increase the rate of diameter growth (Basford et al. 2010; Cochran and Barrett 1999a; Cochran and Barrett 1999b), which would aid in moving the treated medium tree size stands (approximately, 4,610 acres) toward the LTSC and maintain existing large tree stands in that tree size class (Table 3.2-12 and Table 3.2-13).

The proposed burns (6,882 acres of prescribed burning only) would generally be low-intensity ground fires not anticipated to reduce the tree size class, as larger-diameter trees are generally more resistant to mortality than the smaller-diameter trees in a stand, primarily due to thicker bark. Although some mortality of large-diameter trees (including some legacy trees) is anticipated, past experience and monitoring indicate that prescribed burning typically kills less than 5% of the largest tree size class trees in a stand. This alternative has a moderate amount of untreated stands (3,418 acres), compared with Alternative 3 (high end) and Alternative 4 (low end), which equates to moderately higher densities across the landscape, making the residual trees more susceptible to spruce budworm and other insects (as compared with Alternative 4).

Table 3.2-13. Alternative 2 – Acres of commercial and noncommercial treatment by Potential Vegetation Group (PVG) in grass/forb/shrub/seedling (GFSS), sapling, small, medium, and large tree size classes (LTSCs).

PVG	GFSS	Sapling	Small	Medium	Large	Total Treatment[a] (PVG)
2	88	437	403	1,195	332	**2,455**
5	25	56	436	1,006	1,282	**2,805**
6	52	431	1,179	1,736	5,337	**8,735**
7			53	305	771	**1,128**
9		1		27	77	**104**
10			13	164	N/A	**177**
11				16	93	**109**
Other PVGs	59	15	1	162	73	**309**
Total Treatment[a] (Size Class)	**224**	**941**	**2,084**	**4,610**	**7,964**	**15,823**

[a]Nonforested Treatment, Wet Meadow Treatment, and Shaded Fuelbreak treatments not included in size class analysis.
There are slight differences (i.e., 1–11 acres) from Table 2.2-18 due to rounding differences.
References to PVG 10 in the above table are to be applied to medium tree size class (overstory tree average diameter ranges from 12.0 to 19.9 inches DBH [diameter at breast height]). The overstory trees in PVG 10 stands (persistent lodgepole) generally do not attain an average diameter within the LTSC (DBH) even though individual trees may equal or exceed 20 inches DBH.

In stands mechanically treated prior to burning, additional trees would be retained or the timing of the burn would be altered to account for the increased mortality and to aid in meeting treatment objectives.

Alternative 2 would treat portions of the analysis area that are more susceptible (specifically, PVGs 7, 9, 10 and 11) and less resistant and resilient to insects and wildfire. Following implementation of Alternative 2, it is expected that treated acres in PVGs 7, 9, 10, and 11 (i.e., 30%) would potentially experience a mosaic disturbance of fire and/or insect/disease outbreak instead of a landscape-level disturbance (Franklin et al. 2013; Hood et al. 2016; Aresenault et al. 2011; Youngblood et al. 2009; North et al. 2008; Franklin et al. 2007). Agee (2003) described that in higher elevation areas, late successional patches are likely to move around throughout the landscape, as one patch is burned by high-severity fire but elsewhere another is developing, thus creating a continuous mosaic. Therefore, increasing landscape mosaic (e.g., heterogeneity) could, in turn, lead to positive effects on tree size class objectives, especially in light of climate change and associated predictions regarding wildfire and insect outbreaks (Stark et al. 2013; Kliejunas 2011; National Resource Council 2011). Specifically, following disturbance (insect or fire), only portions of these PVGs would move into GFSS, creating multiple age-class cohorts moving through time, which would perpetuate the differentiation between size classes. This would, in the long term, meet desired conditions.

Compared with Alternative 3, Alternatives 2, 4, and 5 treat less acres in PVGs 5 and 6; which is primarily due to not including the SFB treatment in the size class analysis. Alternative 2 treats 36 and 129 acres in PVGs 5 and 6, respectively which equates to slightly more acres treated in these PVGs than under Alternative 3 (which has no SFB treatment).

In summary, the immediate effect of all mechanical and hand vegetative treatments (15,823 acres) would be to retain stands in their current size classes. In the short term, vegetation treatment (excluding NFT and SFB) stands would promote the growth of residual trees. This expedited growth would accelerate movement of GFSS, sapling, and small and medium tree size

class stands into the next larger tree size class. Alternative 2 would treat 224, 941, 2,084, 4,610, and 7,964 acres of GFSS, sapling, small, medium, and large tree stands, respectively; overall Alternative 2 treats more acres than Alternative 3 and fewer acres than Alternative 4 and Alternative 5.

Alternative 3

The effects of Alternative 3 on tree size class would be similar to those described for Alternative 2, except that fewer acres would be considered for treatment (fewer than in any of the other action alternatives, Table 3.2-14). Specifically, there would be no SFB or FR-RCA treatments, and PVGs 7, 8, 9, 10, and 11 would not be treated under Alternative 3. As is the case with all of the alternatives, there would be no immediate post-treatment effect on tree size class.

Table 3.2-14. Alternative 3 – Acres of commercial and noncommercial treatment by Potential Vegetation Group (PVG) in grass/forb/shrub/seedling (GFSS) sapling, small, medium, and large tree size classes (LTSCs).

PVG	GFSS	Sapling	Small	Medium	Large	Total Treatment[a] (PVG)
2	88	437	403	1,195	332	**2,470**
5	25	56	436	1,036	1,287	**2,856**
6	52	431	1,185	1,744	5,442	**8,884**
7						**0**
9						**0**
10					N/A	**0**
11						**0**
Other PVGs	51	15	1	164	57	**288**
Total Treatment[a] (Size Class)	**216**	**939**	**2,024**	**4,139**	**7,118**	**14,436**

[a]Nonforested Treatment, Wet Meadow Treatment, and Shaded Fuelbreak treatments not included in the size class analysis.
There are slight differences (i.e., 1–11 acres) from Table 2.2-18 due to rounding differences.
References to PVG 10 in the above table are to be applied to medium tree size class (overstory tree average diameter ranges from 12.0 to 19.9 inches DBH [diameter at breast height]). The overstory trees in PVG 10 stands (persistent lodgepole) generally do not attain an average diameter within the LTSC (DBH) even though individual trees may equal or exceed 20 inches DBH.

Alternative 3 proposes the least mechanized and hand vegetation treatment (14,436 acres, which is 1,387, 3,587, and 1,830 acres less than Alternatives 2, 4, and 5, respectively), thus having the least beneficial effect on increasing tree size class in the short to long term when compared with all other action alternatives. This alternative would also leave portions of the analysis area (specifically, PVGs 7, 9, 10, and 11) more susceptible, less resistant, and less resilient to insects, and also less resilient to wildfire, than any of the other action alternatives (Lowery et. al. 2015). This could lead to undesirable effects on tree size class objectives, especially in light of climate change and associated predictions regarding wildfire and insects (Klienjunas 2011; National Resource Council 2011). Specifically, following disturbances large expanses of these PVGs could shift into GFSS, which would not meet desired conditions. These stands would be expected to move as a single cohort through time and, with the continued fire exclusion, small-scale fire disturbance would still be limited, further perpetuating the limited differentiation between size classes. It is unclear whether the analysis area would attain desired conditions in the long term under Alternative 3.

Overall, Alternative 3 would treat 216, 939, 2,024, 4,139, and 7,118 acres of GFSS, sapling, small, medium, and large tree stands, respectively, which is less (in every size class, although the

biggest differences occur in the medium and large size classes) than all other action alternatives (Table 3.2-14).

Alternative 4

The effects of Alternative 4 on tree size class would be similar to those described for Alternative 2, except that more acres would be considered for treatment. Alternative 4 represents the most acres of vegetative commercial treatments (CT-ASP, CT-FT, CT-MP, LSQ, and FT-PC-MSw), equating to 12,455 acres, and it also would represent the largest amount of acres destined for mechanical treatment (Table 3.2-15). Alternative 4 would aid in moving sapling, small, and medium tree size stands (approximately 941, 2,118, and 5,335 acres, respectively, Table 3.2-15) toward the small, medium, and large tree size classes, while maintaining 9,316 acres of existing large tree stands in that tree size class (Table 3.2-12 and Table 3.2-15).

Table 3.2-15. Alternative 4 – Acres of commercial and noncommercial treatment type by Potential Vegetation Group (PVG) in small, medium, and large tree size classes.

PVG	GFSS	Sapling	Small	Medium	Large	Total Treatment[a] (PVG)
2	88	437	403	1,195	332	**2,455**
5	25	56	436	1,006	1,283	**2,805**
6	52	431	1,179	1,736	5,347	**8,745**
7			70	467	1,828	**2,365**
9		1		63	77	**141**
10			29	576	N/A	**605**
11				56	282	**339**
Other PVGs	148	15	1	236	167	**568**
Total Treatment[a] (Size Class)	**313**	**941**	**2,118**	**5,335**	**9,316**	**18,023**

[a]Nonforested Treatment, Wet Meadow Treatment, and Shaded Fuelbreak treatments not included in size class analysis.
There are slight differences (i.e., 1–11 acres) from Table 2.2-18 due to rounding differences.
References to PVG 10 in the above table are to be applied to medium tree size class (overstory tree average diameter ranges from 12.0 to 19.9 inches DBH [diameter at breast height]). The overstory trees in PVG 10 stands (persistent lodgepole) generally do not attain an average diameter within the LTSC (DBH) even though individual trees may equal or exceed 20 inches DBH.

The effect of this alternative on tree size class, at the stand level, is expected to be similar to those effects described under Alternatives 2, 3, and 5, except that more acres (18,023 acres of combined commercial and noncommercial treatment [Table 3.2-15] would be affected; therefore, Alternative 4 would have the largest landscape-scale impact. Alternative 4 is the most beneficial action alternative for tree size class in the short to long term when compared with other action alternatives. With respect to the other action alternatives, Alternative 4 would also treat more portions of the analysis area (specifically, PVGs 7, 9, 10, and 11) that are more susceptible, less resistant, and less resilient to insects, and also less resilient to wildfire.

Compared with Alternative 3, Alternatives 2, 4, and 5 treat less acres in PVGs 5 and 6; which is primarily due to not including the SFB treatment in the size class analysis. Alternative 4 treats 36 and 131 acres in PVGs 5, and 6, respectively, which equates to slightly more acres treated in these PVGs than under Alternative 3 (which includes no SFB treatment).

When compared with the No Action alternative and other action alternatives, Alternative 4 would create conditions in treated stands and across the landscape that would result in lower

susceptibility when confronted with large areas of high-intensity/severity, landscape-scale disturbances (e.g., wildfire or insects) (Klienjunas 2011; National Resource Council 2011; Jorgensen 2013). Specifically, following a disturbance (insect or fire), only portions of these PVGs would likely shift into GFSS, creating multiple age-class cohorts moving through time and perpetuating the differentiation between size classes. This would, in the long term, meet desired conditions.

Table 3.2-15 displays, for Alternative 4, acres treated by tree size class by PVG. Overall, Alternative 4 would treat 313, 941, 2,118, 5,335, and 9,316 acres of GFSS, sapling, small, medium, and large tree stands, which is greater (in every size class (excluding sapling in Alternative 5), although the biggest differences occur in the medium and large size classes) than all other action alternatives (Table 3.2-15).

Alternative 5

Alternative 5 represents the second most acres of vegetative commercial treatments (CT-ASP, CT-FT, CT-MP, LSQ, and FT-PC-MSw), equating to 11,350 acres, and would represent the second largest amount of acres proposed for commercial treatment (second only to Alternative 4, which has approximately 1,105 more acres of commercial treatments) (Table 2.2-15).

Similar to Alternatives 2 and 4, Alternative 5 treats less acres in PVGs 5 and 6 than are treated under Alternative 3, which is primarily due to not including the SFB treatment in the size class analysis. Alternative 5 treats 36 and 137 acres in PVGs 5 and 6, respectively, which equates to slightly more acres treated in these PVGs than under Alternative 3 (which has no SFB treatment). Additionally, Alternative 5 has less treatments than Alternative 2 in PVGs 7 and 9, which is due to increased SFB treatment (not included in the size class analysis) and prioritizing whitebark pine treatments in PVG 11.

The effect of this alternative on tree size class is expected to be similar to those effects described under Alternatives 2, 3, and 4, except that acres treated would be slightly less than under Alternative 4 and greater than under both Alternatives 2 and 3. Therefore, in the short to long term (5–30 years), Alternative 5 is the most beneficial action alternative for tree size class in without making more than 30% of modeled habitat for Canada lynx unsuitable. With respect to Alternatives 2 and 3, Alternative 5 would treat more portions of the analysis area (specifically, PVGs 7, 9, 10, and 11) that are more susceptible, less resistant, and less resilient to insects, and also less resilient to wildfire.

Alternative 5 has the second highest amount of commercial and noncommercial treatments (16,266, Table 3.2-16); therefore, in the short to long term (5–30 years) Alternative 5 would aid in moving the second most sapling, small, and medium tree size stands (approximately 941, 2,103, and 4,711 acres, respectively) toward the small, medium, and large tree size classes, while maintaining the existing large tree stands in that tree size class (8,203 acres, Table 3.2-16). Similar to Alternative 4, Alternative 5 would create conditions in treated stands and across the landscape that would result in lower susceptibility when confronted with large areas of high-intensity/severity, landscape-scale disturbances (e.g., wildfire or insects; Klienjunas 2011; National Resource Council 2011; Jorgensen 2013). Specifically, following a disturbance (insect or fire), only portions of these PVGs would likely shift into GFSS and create multiple age–class cohorts moving through time, which would perpetuate the differentiation between size classes. This would, in the long term, meet desired conditions.

Table 3.2-16. Alternative 5 – Acres of commercial and noncommercial treatment by Potential Vegetation Group (PVG) in GFSS, sapling, small, medium, and large tree size classes.

PVG	GFSS	Sapling	Small	Medium	Large	Total Treatment[a] (PVG)
2	88	436	403	1,196	332	**2,455**
5	25	56	436	1006	1282	**2,805**
6	52	431	1177	1736	5332	**8,728**
7			46	315	721	**1,082**
9		1		32	65	**99**
10			41	155	N/A	**196**
11				56	280	**336**
Other PVGs	142	17	1	216	191	**567**
Total Treatment[a] (Size Class)	**307**	**941**	**2,103**	**4,711**	**8,201**	**16,266**

[a]Nonforested Treatment, Wet Meadow Treatment, and Shaded Fuelbreak treatments not included in size class analysis.
References to PVG 10 in the above table are to be applied to medium tree size class (overstory tree average diameter ranges from 12.0 to 19.9 inches DBH [diameter at breast height]). The overstory trees in PVG 10 stands (persistent lodgepole) generally do not attain an average diameter within the LTSC (DBH) even though individual trees may equal or exceed 20 inches DBH.

Summary of Tree Size Class

Currently, the landscape is less resilient to disturbance from wildfire and more susceptible to disturbance from insects such as western spruce budworm, balsam woolly adelgid, Douglas-fir beetle, and western pine beetle. Under Alternative 1, PVGs 2 and 5 would continue to have increased understory/overstory grand fir and Douglas-fir densities, leading to more ladder fuels. Densities in PVGs 6, 7, 9, 10, and 11 would continue to increase, which could lead to increased mortality, decreased growth, and increased ladder fuels. Without treatment, susceptibility of undesired effects on the landscape from disturbance would continue to increase. If a landscape-level disturbance were to occur, large expanses of mature forests could be converted to GFSS, creating a single, large cohort of GFSS instead of multiple smaller cohorts (i.e., GFSS, seedling, sapling, and small); this scenario would not perpetuate size class differentiation. Conversely, if no disturbance were to occur, the size class distribution would continue to not meet desired conditions. Therefore, we do not expect that Alternative 1 would reach desired conditions, not even in the long term.

By reducing competition, all action alternatives would help move medium tree size class stands toward the next larger tree size class, with other desired vegetative characteristics (e.g., canopy cover, species compositions, spatial patterns). Alternatives 4 and 5 would treat the most acres across the landscape. Additionally, all action alternatives would retain existing acres in the LTSC, with Alternative 4 and Alternative 5 treating the most acres to maintain these stands with other desired vegetative characteristics. In the long term, trees in all treated stands would likely grow enough to shift these stands into the next larger size; in other words, all action alternatives would perpetuate LTSCs.

Under all action alternatives, PVGs 2 and 5 would move closer to desired conditions for LTSC, while an overabundance in the LTSC would be perpetuated in PVGs 6, 7, 9, 10, and 11 in the short and long term. The continued overabundance in LTSCs in the higher PVGs and, consequently, the deficit in GFSS, would neither meet desired conditions in the short term nor in the long term. It should also be noted that this would not preclude future management actions/decision from moving the LTSC closer to the desired conditions. In the long term

(without future management and/or natural disturbance and at the stand level), seedling, sapling, and small tree size classes for PVGs 6, 7, 9, 10, and 11 would remain below the desired range for all action alternatives (see Table 3.2-8 and Table 3.2-9). However, the additional treatments for Alternatives 2, 4, and 5 (i.e., in PVGs 7–11), would create a mosaic of openings (mimicking disturbance) that would allow regeneration and differentiation of size classes (just not at the stand level).

Of the action alternatives, Alternative 3 would treat the fewest acres commercially and noncommercially (1,387, 3,587, and 1,830 acres less than Alternatives 2, 4, and 5, respectively). Therefore, the benefits of increased tree growth and the duration of benefits on treated acres would be less than those found under the other action alternatives; however, Alternative 3 would still be more beneficial to individual tree growth than Alternative 1. Alternative 3 contains the largest amount of untreated acres, which would leave more acres at higher risk of crown fire (especially PVGs 6, 7, 9, 10, and 11) and insect activity that could adversely affect tree size class.

Alternative 4 would have the greatest overall effect on shifting stands toward the next larger size classes with other desired vegetative characteristics because, with respect to Alternatives 2, 3, and 5, it would treat more acres intensively (e.g., CT-ASP [Alternative 3 only], LSQ restoration, and FT-PC-MSw), which would reduce competition and increase the growth rates of residual trees. Alternative 4 would contain the least amount of untreated acres.

Canopy Cover Class

Canopy cover class would be affected by all the alternatives. Desired conditions and current conditions for canopy cover class are displayed, by PVG in Table 3.2-8. The desired conditions for canopy cover class apply only to stands in the LTSC.

Measurement: Percentage of area (acres) in each canopy cover class in the LTSC

Alternative 1

The immediate effect of Alternative 1 would be that stands remain in their current canopy cover classes (Figure 3.2-2). Specifically, PVGs 2, 5, 6, 7, 10, and 11 would continue to exhibit an excess of high canopy cover class. The PVG 2 would exhibit a continued excess of high and moderate canopy cover classes and a deficit of the low canopy cover class. In PVGs 6 and 7, an excess of the high canopy cover class would continue, along with a deficit in the moderate canopy cover class. The low canopy cover class in PVG 6 would remain at the bottom end of the desired range, while PVG 7's low canopy cover class would remain at the high end of the range. In PVGs 10 and 11, an excess of the low and high canopy cover classes would continue, along with a deficit of the moderate canopy cover class. In PVG 9 an excess of the low canopy cover class would continue, and the deficits of high and moderate canopy cover classes would remain at the low ends of their desired ranges.

In the long term, increased tree densities from natural regeneration and growth of crown diameters in the more vigorous trees would cause stands with low and moderate canopy covers to eventually become stands with moderate and high canopy covers, moving further from the desired conditions. Additionally, since most of the analysis area is within MPCs 5.1 and 5.2, there would be a full range of fire suppression strategies implemented to minimize the impacts to habitats, developments and investments (USDA Forest Service 2003a). Continued implementation of fire suppression strategies within the analysis area is anticipated to lead to continued increased canopy cover, thus moving some PVGs further from desired conditions (excluding PVGs 9 and 10 in the low canopy cover class). As less light reaches the forest floor,

favoring shade-tolerant species, an increased susceptibility to uncharacteristic disturbance events exists in PVGs with historically nonlethal and mixed1 fire regimes (i.e., PVGs 2, 5, and 6). Increased susceptibility of PVGs 6, 7, 9, 10, and 11 to disturbance events is especially undesirable given the PVGs' proximities to private land (including the Tamarack Resort). Alternative 1 would increase the likelihood of continued departures from desired vegetative conditions and, if continued over the long term, would perpetuate scenarios that would make it difficult to restore PVGs to those desired conditions.

Alternative 2

The effects of the treatments proposed in Alternative 2 (mechanical vegetative treatments and prescribed burning) on canopy cover classes are shown in Figure 3.2-6 and Table 3.2-17.

The immediate post-treatment effect of Alternative 2 in PVGs 2, 5, 6, 7, 9, and 10 would be a reduction in acres of the moderate and high canopy cover classes and an increase in acres of the low canopy cover class. The use of prescribed burning following treatment would be a priority in PVGs 2 and 5 and is expected to help maintain these stands near desired conditions (i.e., low to moderate canopy cover) for a longer period.

The overabundance of the low canopy cover class in PVGs 5, 6, 7, 9, and 11 is anticipated to be a short-term effect, as much of the treatment proposed for these PVGs would leave stand canopy cover toward the high end of the low canopy cover class (for instance, much of the CT-FT treatment would retain greater than 25% canopy cover). However, these treatments are needed in the moderate canopy cover class to accomplish one or more of the following: (1) alter species composition, (2) alter spatial arrangement of residual trees, (3) maintain the moderate canopy cover in the long term, and (4) maintain old forest.

The PVG 10 also exhibits an increase in low canopy cover and a reduction in high canopy cover, while there would be only a slight reduction in moderate canopy cover; this is due to limited treatment of PVGs 7–11 (due to Canada lynx management) under this alternative. Although initially moving away from desired condition, PVG 10 could maintain the moderate canopy cover in the long term.

Within all PVGs, the residual tree crowns and natural regeneration are projected to add 1%–2% of canopy cover per year in thinned stands (Halpren and Lutz 2013). Canopy expansion is expected to last approximately 25 years; then it would taper off (Moeur 1985). Therefore, in the short term many stands in the low canopy cover class would likely move into the moderate canopy cover class (i.e., moving toward desired conditions). Specifically, in units where canopy cover is reduced below 30% (i.e., CT-FT, CT-ASP, and FT-PC-MSw units would be reduced to approximately 20%–40% canopy cover in all PVGs), canopy cover is expected to remain in the low to moderate canopy cover class for the long term, especially where prescribed burning is proposed to maintain desired conditions. For example, if the canopy cover was reduced to 20% in an aspen treatment, in 15 years the expectation (based on the assumption of a 1%–3% increase in canopy cover per year [Hapren and Lutz 2013] with estimated an average canopy cover at 1.6% per year) is that the resulting canopy cover would be between 35% and 50% (i.e., low to moderate canopy cover).

Portions of LTSC stands in PVGs 2, 5, 6, 7, 10, and 11 that would remain in the high canopy cover class have been deferred from treatment for various reasons including IRA/RNA management objectives (minor contribution), RCA protection, wildlife concerns (primarily northern goshawk nest stands and Canada lynx restrictions in higher PVGs 7–11), inaccessibility, and non-Federal land ownership.

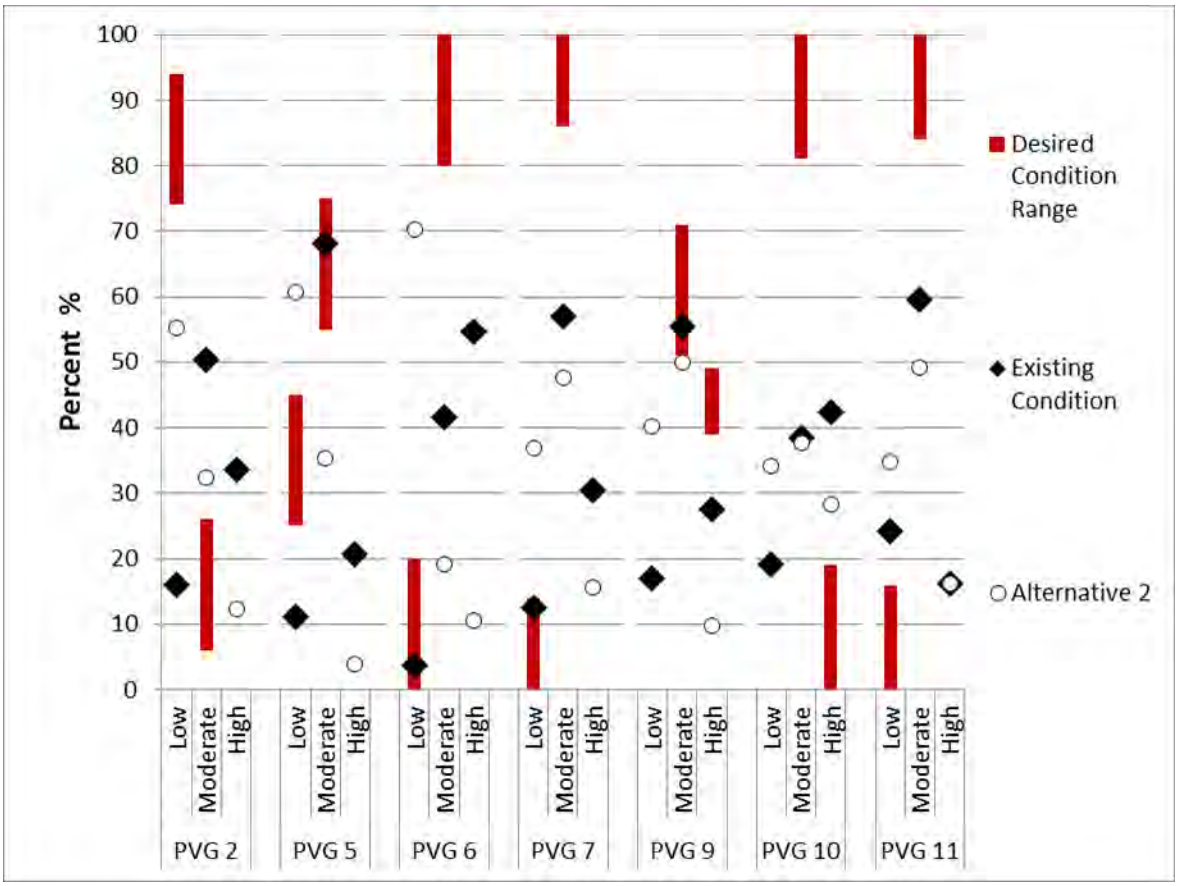


Figure 3.2-6. Large tree size class (LTSC) (medium tree class in PVG 10) canopy cover by Potential Vegetation Group (PVG): comparison of desired and existing conditions under Alternative 2. The desired condition range in the high canopy cover class for PVGS 2, 5, 6, 7, and 11 are 0%. The desired condition range in the low canopy cover class for PVGs 9 and 10 are 0%. The PVG 10 includes both medium and large tree size classes.

Alternative 2 does not address the overabundance of high canopy cover in PVG 11; it swaps acres (moving them from moderate to low), an action resulting from a Canada lynx management goal (i.e., remaining below 30% unsuitable habitat in the Canada lynx management unit). In PVG 11, treatments essentially move stands further away from desired conditions and the only potential is to move the stands back to current condition. However, in PVG 11 a reduction in canopy cover of subalpine fir, where whitebark pine is present, is expected. Essentially, this alternative does not move PVG 11 closer to desired canopy cover conditions, but it does reduce the impacts of subalpine fir competition with whitebark pine. Without management or fire, most seral whitebark pine forests would be successionally replaced by subalpine fir or other shade-tolerant, high-elevation species (Keane et al. 2012).

In the short term, Alternative 2 moves PVG 9 further away from desired conditions, as compared with Alternative 3. It is, however, expected that in the long term, canopy cover would increase in the moderate and high canopy cover classes and decrease in the low class, thus moving this PVG closer to desired conditions. Additionally, with treatment, species composition would be modified (e.g., reductions of grand fir, subalpine fir, and Douglas-fir). In the long term PVGs 2, 5, 6 and 9 would move closer to desired conditions while PVGs 7, 10, and 11 would maintain less acres in moderate canopy cover due to more untreated acres (Figure 3.2-6).

Table 3.2-17. Percent cover in the large tree size class (LTSC) (medium for Potential Vegetation Group [PVG] 10) by PVG and alternative.

	Alternative 1 (Current Condition)	Alternative 2	Alternative 3	Alternative 4	Alternative 5
PVG 2					
Low	16	55	55	55	55
Moderate	50	32	32	32	32
High	34	12	12	12	12
PVG 5					
Low	11	61	57	61	59
Moderate	68	35	37	35	35
High	21	4	5	4	6
PVG 6					
Low	4	70	69	71	71
Moderate	42	19	19	19	22
High	55	11	12	10	8
PVG 7					
Low	13	37	13	57	46
Moderate	57	48	57	39	49
High	30	16	30	4	5
PVG 9					
Low	17	40	17	40	39
Moderate	55	50	55	50	51
High	28	10	28	10	10
PVG 10					
Low	19	34	19	76	61
Moderate	38	38	38	12	24
High	42	28	42	12	14
PVG 11					
Low	24	35	24	92	91
Moderate	60	49	60	8	9
High	16	16	16	0	0

Without treatment, it is expected that stands within the moderate canopy cover class would move into the high canopy cover class within the short term (assuming no disturbance). Therefore, by reducing canopy cover to 20%–39% (the low canopy cover class) via thinning, it is expected that stands would move into the moderate canopy cover class in the short term and maintain moderate canopy cover in the long term (Figure 3.2-6). Compared with Alternatives 4 and 5, Alternative 2 treats less acres both vegetation or prescribed burning, in PVGs 7, 9, 10, and 11. Therefore, this alternative does not create enough acres of low canopy cover with the ability to transition into moderate/high canopy cover over the long term. Specifically, there are not enough acres treated (including both vegetation treatments and/or prescribed burning) in PVGs 7, 9, 10,

and 11 to maintain moderate canopy cover in the LTSCs (i.e., more acres converting from moderate to high canopy cover than being converted from low to moderate canopy cover).

Additionally, an overabundance in the low canopy cover class would be created in order to move toward and/or maintain the desired conditions in the short to long term for the following other vegetative characteristics: (1) species composition, (2) spatial arrangement, (3) canopy cover in the long-term, and (4) old forest. Tradeoffs in the achievement of species compositions and/or spatial arrangement versus canopy cover desired conditions exist under Alternative 2, which is consistent with Forest Plan direction (VEGU01).

Alternative 3

Alternative 3 would retain the largest amount of moderate and high canopy cover of any of the action alternatives in all PVGs (except PVG 2 which is the same as under Alternatives 2, 4, and 5). No immediate effects on canopy cover class in PVGs 7–11 would take place because they would not be treated under this alternative (Figure 3.2-7).

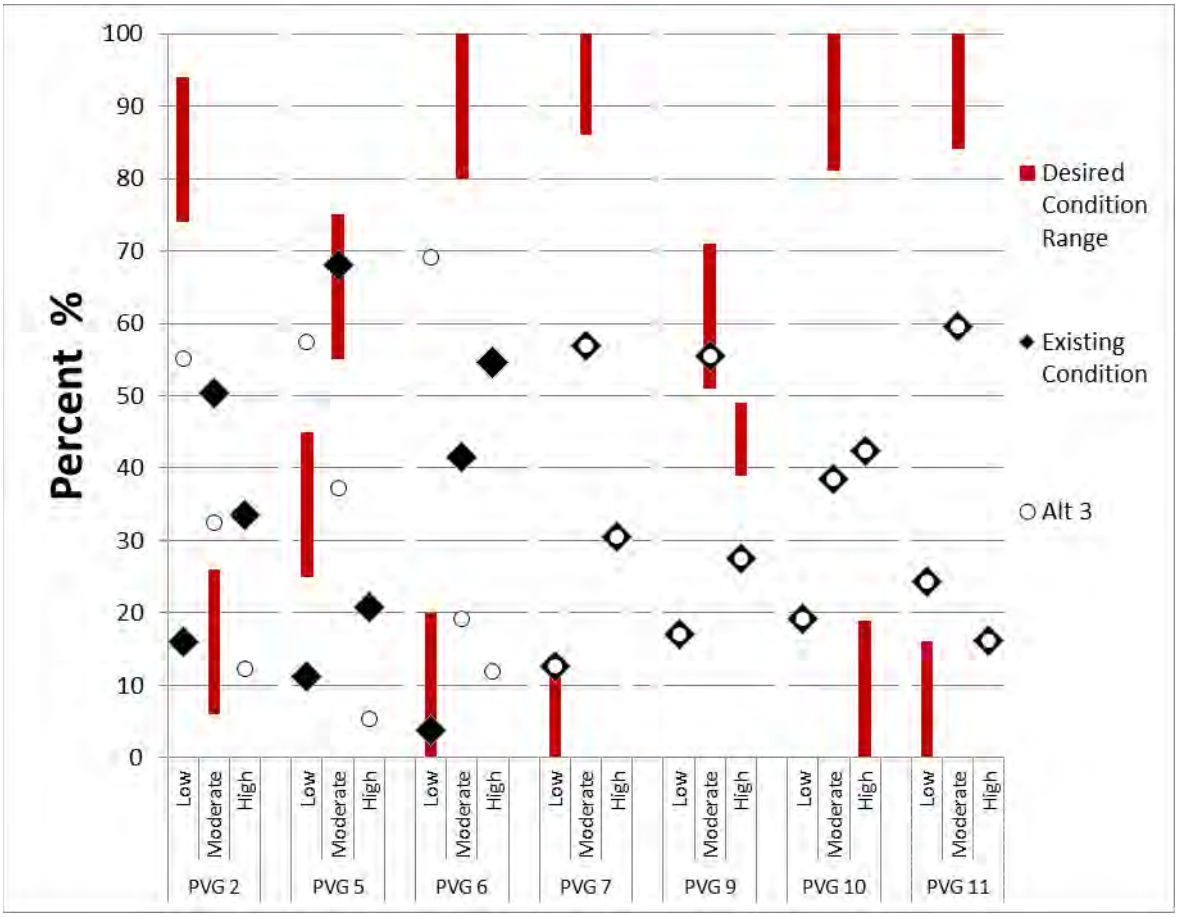


Figure 3.2-7. Large tree size class (LTSC) (medium size class for Potential Vegetation Group [PVG] 10) canopy cover by PVG: comparison of desired and existing conditions under Alternative 3. The desired condition range in the high canopy cover class for PVGS 2, 5, 6, 7, and 11 is 0%. The desired condition range in the low canopy cover class for PVGs 9 and 10 is 0%. The PVG 10 includes both medium and large tree size classes.

The PVG 2 has the same responses to treatment as Alternatives 2, 4, and 5. The PVGs 5 and 6 (LTSC) have slightly less treatment intensity as those found under Alternatives 2, 4, and 5 (e.g., between 2 and 4% less area moved towards low canopy cover, Table 3.2-17). The lower intensity of treatment is due to Alternative 3 not having any fuelbreak treatments; instead these areas were treated with other or no treatments.

Overall, Alternative 3 results in the least movement of any of the action alternatives toward desired canopy cover conditions (excluding PVGs 9 and 10), for all temporal scales, especially in PVGs 7 and 11(Figure 3.2-7). The lower achievement of desired canopy cover conditions in the temporary and short-term time scales is due to not treating PVGs 7–11. Specifically, the abundance of low canopy cover stands are expected to continue to decrease while moderate and high canopy cover stands are expected to increase. In the long term it is expected that, without disturbance (e.g., fire, blowdown, or insect/disease outbreak), PVGs 7 and 11 would move further from their desired conditions because of an increased overabundance of high canopy cover.

In the short term, PVG 9 is the only vegetation group in the higher PVGs that would move toward a desired condition, whereas PVG 10 would only maintain desired condition in the short-term and would likely move away from desired condition in the long-term. Essentially, PVG 10 is currently above desired condition in the high and low canopy cover classes and below desired condition in the moderate canopy cover class. Stands of low canopy cover are expected to move toward moderate, but this essentially replaces the outflow of moderate to high canopy cover; thus, in the long term low canopy cover would be expected to decrease, moderate would maintain (till a point), and high canopy cover would continue to increase.

Like all action alternatives, portions of LTSC stands in PVGs 2, 5, and 6 would remain in the high canopy cover class. Overall, Alternative 3 would leave the greatest amount of high canopy cover class in these PVGs of any of the action alternatives. These portions have been deferred from treatment due to public comments regarding retention of habitat for species that utilize dense forest habitat types (e.g., as regards elk security, northern goshawk nest stands, and pileated woodpecker). Since no treatments are proposed in PVGs 7–11 under this alternative, these PVGs would continue to accrue LTSC in a high canopy cover until disturbance occurs. These PVGs are generally more susceptible to stand-replacing fire and/or insect and disease outbreaks (Lowery et al. 2015); therefore, instead of affecting canopy cover in the LTSC, disturbance could affect the size class (e.g., to GFSS). In the long term PVGs 2, 5, and 6 would likely move closer to desired conditions while PVGs 7, 10, and 11 would likely maintain less acres in moderate canopy cover due to more untreated acres within these PVGs (Figure 3.2-7).

Unlike Alternatives 2, 4 and 5, in PVG 11 Alternative 3 would not reduce canopy cover of subalpine fir where whitebark pine are present.

Alternative 4

The effects of the treatments proposed under Alternative 4 (mechanical vegetative treatments and prescribed burning) on canopy cover classes are shown in Figure 3.2-8 and Table 3.2-17.

The PVG 2 would respond similarly under all other action alternatives. Although similar to Alternatives 2, 3, and 5, Alternative 4 has the most intensive treatments in PVG 5. This is due to the slight changes in vegetation and prescribed burning treatments between alternatives.

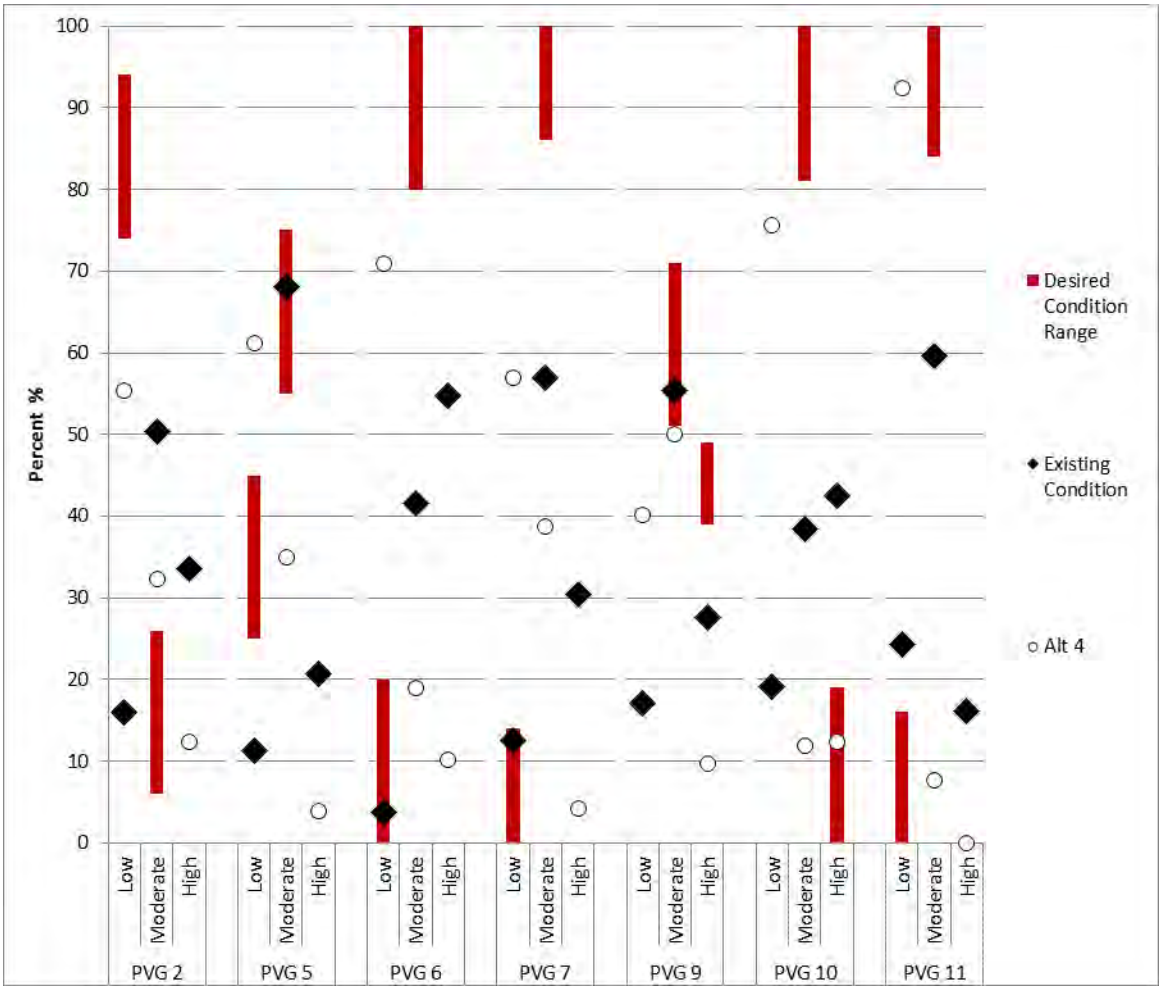


Figure 3.2-8. Large tree size class (LTSC) (medium size class for Potential Vegetation Group [PVG] 10) canopy cover by PVG: comparison of desired and existing conditions under Alternative 4. The desired condition range in the high canopy cover class for PVGS 2, 5, 6, 7, and 11 is 0%. The desired condition range in the low canopy cover class for PVGs 9 and 10 is 0%. The PVG 10 includes both medium and large tree size classes.

Unlike Alternatives 2, 3, and 5, under Alternative 4 there would be more acres of high canopy cover treated in PVGs 7–10, as treatments would not be limited to less than 30% of the Canada lynx analysis unit. In the short term, Alternative 4 would move PVGs 7, 9, and 10 further from desired conditions than Alternative 5 by creating an overabundance of the low and moderate canopy cover classes; however, in the long term it is expected that Alternative 4 would move/maintain these PVGs closer to desired conditions as canopy covers are anticipated to increase over time due to ingrowth and canopy growth. Alternatives 4 and 5 would have similar reductions (acres treated) of subalpine fir competition with whitebark pine, thereby improving whitebark pine probability of survival (Keane et al. 2012). In the short term Alternative 4 would move PVG 9 the furthest from desired conditions of any of the alternatives. Under this alternative, PVGs 7, 9, 10, and 11 would exhibit a short-term shift of canopy cover away from desired conditions (i.e., an overabundance of low canopy cover would result [Figure 3.2-8]). Specifically, treatments would shift moderate and high canopy cover to low canopy cover, which moves the landscape away from desired canopy cover conditions in the temporary to short term. However, these treatments are needed in the moderate canopy cover class to (1) alter species

composition, (2) alter spatial arrangement of residual trees, (3) maintain the moderate canopy cover in the long term, and (4) maintain old forest.

Without treatment, stands within the moderate canopy cover class would move into the high canopy cover class within the short term (assuming no disturbance). Therefore, by reducing canopy cover to 20%–39%, after treatment it is expected that, in the short term, stands would move into moderate cover size class and maintain moderate canopy cover in the long term.

Additionally, the creation of the overabundance in the low canopy cover class would be performed in order to move toward and/or maintain the desired conditions in the short to long term for the following other vegetative characteristics: (1) species composition, (2) spatial arrangement, and (3) canopy cover. Tradeoffs in achievement of species compositions and/or spatial arrangement versus canopy cover desired conditions exist under Alternative 4, which is consistent with Forest Plan direction (VEGU01).

Alternative 5

The effects of the treatments proposed under Alternative 5 (mechanical vegetative treatments and prescribed burning) on canopy cover classes are shown in Figure 3.2-9 and Table 3.2-17.

Depending on PVG treatment intensity, Alternative 5 treatments would be between or similar to treatments under Alternatives 2 and 4, except in PVG 6 where Alternative 5 treatments would be the most intense of all action alternative treatments. In all PVGs (excluding PVG 2 where intensities would be equal) Alternative 5 would have greater treatment intensities than Alternative 3.

Compared with Alternatives 2 and 4, Alternative 5 would have less intense treatment in PVG 5 (3 % less converted to low canopy cover, Table 3.2-17). Alternative 5 would have greater treatment intensity in PVG 6 compared with all action alternatives. Differences within PVGs 5 and 6 when comparing Alternative 5 to the other action alternatives are due to slight changes in vegetation treatments (e.g., more SFB treatment in Alternative 5), combined with alterations in prescribed burning treatments between alternatives.

Under Alternative 5 there would be fewer acres treated than under Alternative 4 in PVGs 7, 9, 10, and 11 (very slightly less); this is because treatments in higher PVGs, which were identified as modeled Canada lynx source habitat, were limited to less than 30% of the Canada lynx analysis unit. Alternative 5 emphasizes treatments in wet meadows, aspen, and whitebark pine habitats; therefore, effects in PVGs 7, 10, and 11 would be most similar to those under Alternative 4. However, treatment intensity in these PVGs would be lower than under Alternative 4. Similar to Alternative 4, Alternative 5 would move PVG 11 further from desired conditions in the short term and closer to desired canopy cover conditions in the long term.

Summary of Canopy Cover Class

The canopy cover class discussion considers LTSC stands only. No change in canopy cover class would occur under the temporary time frame for Alternative 1. This alternative would move stands further from the desired conditions for canopy cover class in the short to long term for all PVGs (except PVG 9). The short term effect of Alternative 1 would be to maintain some canopy cover classes in desired conditions (PVGs 5 and 9 moderate, PVGs 6 and 7 low), while other cover classes would not meet desired conditions. Alternative 1 would continue to increase canopy cover, thus moving PVGs 2, 5, 6, 7, and 11) further from desired conditions in the long term (or until disturbance occurs).

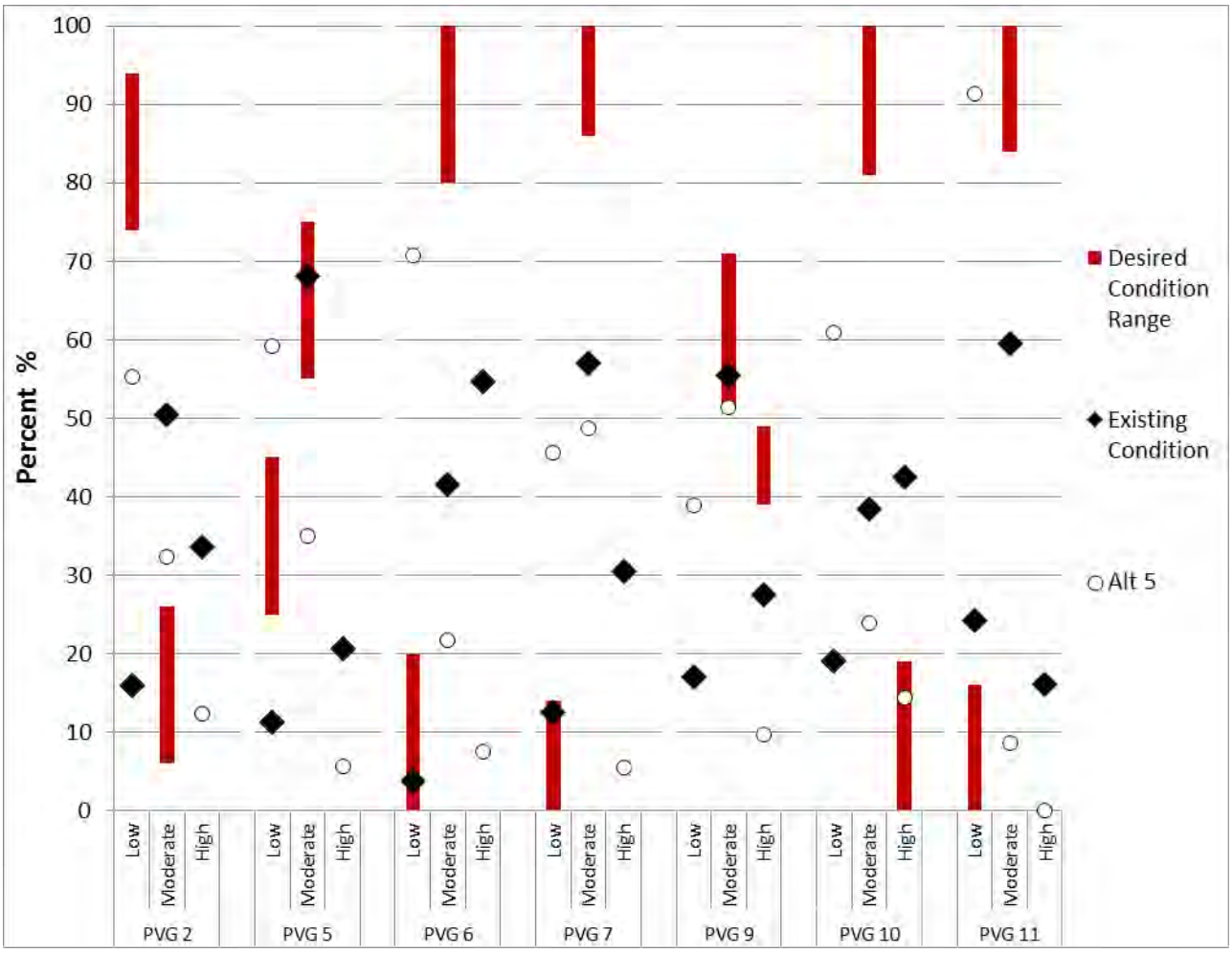


Figure 3.2-9. Large tree size class (LTSC) (medium size class for Potential Vegetation Group [PVG] 10) canopy cover by PVG: comparison of desired and existing conditions under Alternative 5. The desired condition range in the high canopy cover class for PVGS 2, 5, 6, 7, and 11 is 0%. The desired condition range in the low canopy cover class for PVGs 9 and 10 is 0%. The PVG 10 includes both medium and large tree size classes.

The immediate post-treatment effect of all action alternatives in PVG 2 would be a reduction in acres of the moderate and high canopy cover classes and an increase in acres of the low canopy cover class. Treatments in PVG 2 would not convert enough moderate/high canopy cover to low canopy cover to meet desired conditions under any of the action alternatives. Use of prescribed burning would be a priority in this PVG across all alternatives and is expected to help maintain these stands near desired conditions in the long term.

In PVGs 5 and 6, all action alternatives would move canopy cover away from the desired conditions in the short to long term (10–25 years post-treatment) by creating an overabundance of the low canopy cover class. In PVGs 7, 9, 10, and 11, Alternative 4 would shift the most acres of high and moderate canopy cover into low canopy cover than any of the other action alternatives in the short to long term. Alternatives 2, 4, and 5 (Alternative 4 being the most intensive) would create an excess of low canopy cover and move PVG 9 further from desired conditions in the short term. Both Alternatives 4 and 5 would move PVGs 10 and 11 in the high canopy cover class toward desired conditions in the short term. Without maintenance thinning or

burning, these stands are expected to move into moderate and high canopy cover classes over the long term. In the next 15 to 25 years, it is expected that treated stands in all PVGs would move closer to the canopy cover desired conditions (including PVG 9), as anticipated crown growth and ingrowth would shift the low canopy cover class stands into moderate canopy cover class stands (average 1.6% per year [Halpren and Lutz 2013]). Alternatives 2 and 5 would cause the same effects as Alternative 4 but to a lesser degree, while canopy classes would have the lowest possibility of meeting desired condition (excluding PVG 2) in the long term under Alternative 3 (of all action alternatives).

Post-treatment, under all action alternatives, the residual trees in treated stands would respond to increased growing space and resources (Alternative 4 would be the most intensive while Alternative 3 would be the least intensive). Additionally, the increased sunlight and exposed seedbeds would result in the establishment and growth of understory trees. These conditions would likely stabilize for 10–30 years, depending on the site, the vigor of residual trees, and a variety of other factors (e.g., climate conditions, insect activity, and disease activity). This overabundance in the low canopy cover class would be created in order to move toward and/or maintain the desired conditions in the short to long term for the following other vegetative characteristics: (1) species composition, (2) spatial arrangement, (3) canopy cover in the long-term, and (4) old forest. Tradeoffs in achievement of species compositions and spatial arrangement versus canopy cover desired conditions exist among the alternatives, which is consistent with Forest Plan direction.

For all PVGs, future maintenance underburning and/or thinning treatments (especially in CT-FT and CT-ASP, which would take priority) would likely be necessary every 10–30 years in order to maintain desired conditions.

3.1.1.1 Species Composition

Table 3.2-18 displays the acres of treatment, per alternative, that would improve species composition.

Table 3.2-18. Acres of treatment proposed to benefit species composition.

Alternative	Acres of Treatment[a] Proposed to Benefit Species Composition							
	NCT	CT-FT	FT-PC-MSw	CT-MP	CT-ASP	LSQ	BA/PL	Total
1	0	0	0	0	0	0	0	0
2	1,279	2,875	5,343	1,080	1,087	850	3,240	15,754
3	921	2,697	4,946	1,039	900	715	3,178	14,396
4	2,039	2,999	6,076	1,090	1,087	1,203	3,244	17,738
5	1,369	2,879	5,367	1,070	1,087	947	3,229	15,948

Note: Only forested acres identified as targeted (with the exception of targeted burn) are included in these estimations.
[a]NCT=noncommercial thinning, CT-FT=commercial thin-free thin, FT-PC-MSw=free thin–patch cut-modified Shelterwood, CT-MP= commercial thin-mature plantations, LSQ=low site quality, BA/PL=burned areas/plantations.

Alternative 1

Because no treatments would be implemented, Alternative 1 would result in vegetative conditions continuing to move away from desired conditions for species composition. Species

composition would continue to trend toward shade-tolerant climax species, primarily grand fir (PVGs 5 and 6), Douglas-fir (PVG 2), subalpine fir (PVGs 7, 9, 10, and 11) and to some extent Engelmann spruce (PVGs 7, 9, 10, and 11) as stand densities increase (Table 3.2-8, Fiedler et. al. 2010). This alternative would cause long-term departure from the desired conditions. This long-term departure would create conditions (e.g., continued mortality of early seral species and or potential for large-scale wildfire susceptibility), making it difficult to restore to desired conditions in the future. Under Alternative 1, PVGs 2 and 5 would continue to exhibit increased understory/overstory grand fir and Douglas-fir densities, leading to more ladder fuels. Subalpine fir in PVGs 7–11 would continue to increase; whitebark pine would continue to decrease in PVG 11. Based on Keane et al. (2012), whitebark pine is declining across most of its range due to blister rust, mountain pine beetle, fire exclusion, and climate change. Specifically, in the mesic, warmer portions of its range, whitebark pines are experiencing the greatest mortality from beetles and rust (Kendall and Keane 2001), although even the driest, coldest parts of the range now experience blister rust infections (Bockino 2008; Resler and Tomback 2008). With no reduction in subalpine fir or planting of rust-resistant seedlings, whitebark pine populations are expected to further decline. It can take 50–250 years for subalpine fir to replace whitebark pine in the overstory, depending on the local environment and previous fire history (Arno and Hoff 1990; Keane 2000).

Recorded fire history in the area began in approximately 1956 (i.e., 61 years ago); no large (i.e., greater than 100 acres) fires have been recorded since that time within PVG 11. Research within the Rocky Mountains has determined that fire exclusion has had a cascading effect on population decline throughout whitebark pine ecosystems (Keane et al. 2002). Observations during field data collection for this Project were consistent with these research findings. Whitebark pine is in decline in the analysis area, and further declines are anticipated under Alternative 1, primarily due to blister rust and competition with later successional species (primarily subalpine fir). Bark beetles also pose concerns, due to existing density (Perkins et al. 2016).

Aspen would continue to decrease across all PVGs as it is an early seral species and competition with coniferous species that are more shade tolerant is anticipated to continue to reduce amounts of aspen within the analysis area.

It is expected that under the No Action alternative, mortality in western larch, Douglas-fir (PVGs 6 and 7), and ponderosa pine would not only continue but increase. Additionally, mortality in grand fir, lodgepole pine, subalpine fir, whitebark pine, and Engelmann spruce is also expected to increase, creating potential for increased fuel loading throughout the analysis area. The increase in mortality is expected given the current trends in dense, multilayered stand conditions and recent insect activity (e.g., western pine beetle, western spruce budworm, spruce beetle, and Douglas-fir beetle; see Jorgenson [2013]) across all PVGs in the analysis area.

All Action Alternatives

Treatments that would to improve species composition under all action alternatives include: (1) NCT, (2) CT-FT, (3) CT-ASP, (4) LSQ, (5) BA/PL, (6) CT-MP, and (7) FT-PC-MSw.

Since emphasis in PVG 11 would be to retain and promote whitebark pine, all mechanical and hand treatment types (excluding prescribed burning only) were included in the total acreage.

Alternative 2

This alternative would treat up to 15,754 acres in the analysis area and would move species compositions toward desired conditions.

Noncommercial thinning, commercial harvest, understory thinning following commercial harvest, and burn treatments would improve species compositions by reducing the abundance of climax species (such as grand fir and subalpine fir). Anywhere aspen is present (in all PVGs), these thin-and-burn treatments would aid in aspen regeneration by increasing the amount of light that reaches the forest floor, creating a seed bed, and stimulating aspen suckers (Seager et al. 2013). Prescribed burning and associated NCT would also favor desired species compositions. For example, in PVGs 5 and 6, ponderosa pine, western larch and, to some extent, Douglas-fir would be the preferred species because they are generally more fire resistant and resilient to low-intensity fire. An example of species preference in PVG 11 would be the thinning of subalpine fir to favor retention of whitebark pine.

The regeneration treatments proposed in this alternative are patch cuts with reserves and modified Shelterwoods; these could occur portions of the 5,343 acres treated with FT-PC-MSw. Regeneration treatments (such as the patch cuts and modified Shelterwood treatments included in FT-PC-MSw areas) would move stands dominated by climax species to conditions that contribute to the desired species compositions by regenerating early seral species (which would contribute to the desired conditions). The free-thin portion of these FT-PC-MSw treatments would also favor the retention of desired species and contribute to improvement of desired species compositions. Although the regeneration treatments would be effective at reestablishing the desired species compositions in portions of stands, research and past experience indicate that tree growth rates would not reach full potential in comparison with other regeneration methods (e.g., Shelterwood, seed tree, clearcut; [York et al. 2004]). The light intensity due to retention of reserve trees and the small size (<10 acres) of the patch cuts are anticipated to reduce the growth rates of regenerated trees relative to the more intensive regeneration methods that are not proposed. While the PC and MSw treatments would not maximize individual tree growth (in comparison with other more intensive regeneration methods), the retention of reserve trees in these PC and MSw treatments has been proposed to maintain attributes that are important to the achievement of other resource objectives (e.g., heterogeneous within stand structure, snags, and legacy trees, all of which are important for a variety of other resources such as wildlife habitat and achievement of desired conditions for spatial patterns).

In large tree stands treated with CT-FT, CT-ASP, LSQ, and FT-PC-MSw (FT portions), all PVGs would retain 25–45% canopy cover. Because canopy cover is based on total nonoverlapping canopy cover, small openings within each stand require that excess canopy cover be left in forested areas. Therefore, basal areas in excess of 100–120 square feet in forested portions of each stand would also be retained, especially when post-treatment average canopy cover in excess of 35% is desired. Deficit species, by PVG, would generally comprise the preferred leave trees across all PVGs.

The NCT and, to a lesser extent, prescribed burning, would also favor desired species compositions by PVG. Specifically, desired species would be retained following NCT and openings created by fire would allow more light to the forest floor, thus allowing for potential regeneration of desired species. An example of species preference in PVG 11 would be the thinning of subalpine fir in favor of whitebark pine (as well as planting rust-resistant trees); this treatment would improve the probability of whitebark pine survival by reducing competition for resources and planting potentially rust-resistant trees.

Western larch

Of the action alternatives, Alternative 2 proposes a moderate amount of forested treatment acres; thus, it has a moderate potential to maintain and promote western larch in the analysis area. All treatments would emphasize western larch retention where they are present and healthy. Western

larch regeneration would also be emphasized in areas that naturally support the species. Occasional felling of healthy, vigorous western larch may be completed to collect cones/seed for use in regeneration treatments, as climbing of larch can be extremely hazardous due to the brittle nature of the branches.

Whitebark pine

Alternative 2 proposes 113 acres of treatments in PVG 11, thus providing a moderate potential to maintain and promote whitebark pine in the analysis area. All treatments would emphasize whitebark pine restoration where they are present and would involve, specifically, reducing subalpine fir densities, collecting cones, and planting rust-resistant seedlings.

Alternative 3

This alternative would treat up to 14,396 acres that would move species composition toward desired conditions.

The NCT, commercial harvest, understory thinning following commercial harvest, and burn treatments would improve species compositions by reducing the abundance of climax species (such as grand fir and subalpine fir). Anywhere aspen is present and in PVGs 2, 5, and 6, thin-and-burn treatments would aid in aspen regeneration by increasing light to the forest floor, creating a seed bed, and stimulating aspen suckers. These benefits to aspen would not be realized in PVGs 7, 9, or 10, as no mechanized or prescribed fire treatments are proposed under this alternative. Alternative 3 has the least amount of aspen treatment potential of all the action alternatives.

The regeneration treatments would have the same effect for PVG 6 as those under Alternatives 2 and 4; PVGs 7–11 would not be treated.

Prescribed burning and associated NCT would also favor the desired species compositions. For example, in PVGs 5 and 6, ponderosa pine, western larch, and, to some extent, Douglas-fir would be the preferred species because they are generally more fire resistant and resilient to low-intensity fire. Under Alternative 3, however, PVGs 7–11 would not be treated; therefore, subalpine fir would continue to increase while early seral species, such as Douglas-fir, aspen, and whitebark pine, would continue to decrease in prevalence. Similar to Alternative 1, Alternative 3 would implement no treatments in stands containing whitebark pine; therefore, the probability of whitebark pine survival would not improve.

Western larch

Alternative 3 proposes the least forested treatment acres of all action alternatives, thus it has the least potential to maintain and promote western larch in the analysis area. Similar to Alternatives 2, 4, and 5, all treatments would emphasize western larch restoration where they are present and healthy.

Whitebark pine

Alternative 3 proposes no acres of treatment in PVG 11, thus having the least potential of all the action alternatives to maintain and promote whitebark pine in the analysis area. Whitebark pine would continue to decline under this alternative.

Alternative 4

The effects of Alternative 4 would be similar to those under Alternatives 2 and 5. The difference is that more acres would be treated, specifically in PVGs 7–11. Alternative 4 has the most

potential, of all alternatives, to move species composition toward desired conditions on 17,738 acres. Not only would this alternative treat the most acres, but the treatments would be more intensive (e.g., more FT-PC-MSw treatments) and have greater immediate benefits to changing species composition. The longevity of these benefits would also be greater than under any of the other action alternatives, due to creating more openings that are favorable for regeneration of early seral species and stand resilience.

Western larch

Alternative 4 has the most forested treatment acres of all action alternatives; thus, it has the most potential to maintain and promote western larch in the analysis area. All treatments would emphasize western larch retention where they are present and healthy. Western larch regeneration would also be emphasized in areas that naturally support the species. Occasional felling of healthy, vigorous western larch may be completed to collect cones/seed for use in regeneration treatments, as climbing of larch can be extremely hazardous due to the brittle nature of the branches.

Whitebark pine

Alternative 4 proposes 357 acres of potential treatments in PVG 11 and thus has the most potential to maintain and promote whitebark pine in the analysis area. All treatments would emphasize whitebark pine restoration where they are present and would involve, specifically, reducing subalpine fir densities, collecting cones, and planting rust-resistant seedlings.

The overall effect of this alternative is that species compositions would shift further toward the desired conditions than under any of the other alternatives, as more of the grand and subalpine firs would be removed and some stands with high percentages of grand fir and Douglas-fir would be regenerated. Western larch and ponderosa pine would be the species favored to regenerate.

Alternative 5

Alternative 5 treats 15,948 acres, which is most similar to Alternative 2 (i.e., approximately 194 acres greater). In PVGs 2–6, Alternative 5 has similar potential to all action alternatives to move species composition toward desired conditions. Conversely, in PVGs 7–11 Alternative 5 has moderate potential to move species compositions toward desired conditions (i.e., slightly greater than under Alternative 2 [predominately in PVG 11] and less than Alternative 4 [predominately in PVGs 7 and 10]). Additionally, treatment intensities are lower under Alternative 5 than Alternative 4 (e.g., less FT-PC-MSw treatments; approximately 709 acres) and would have less immediate benefits to changing species composition. However, Alternative 5 would have greater intermediate benefits and duration of benefits than Alternative 3.

Western larch

Although not as intensive as Alternative 4, Alternative 5 proposes a high amount of forested treatment acre; thus, it has a high potential to maintain and promote western larch in the analysis area. Like all action alternatives, treatments under Alternative 5 would emphasize western larch retention where they are present and healthy. Western larch regeneration would also be emphasized in areas that naturally support the species. Occasional felling of healthy, vigorous western larch may be completed to collect cones/seed for use in regeneration treatments, as climbing of larch can be extremely hazardous due to the brittle nature of the branches.

Whitebark pine

Alternative 5 proposes 352 acres of potential treatments in PVG 11. Effects would essentially be the same as under Alternative 4.

Summary of Species Composition

All action alternatives would have similar effects on species composition in PVGs 2, 5, and 6; the primary differences in alternatives would occur in PVGs 7–11. Overall, Alternative 4 would move species composition furthest toward the desired conditions in the fastest time frame, as the treatments proposed are more intensive and would restore the most acreage. The intensity of the treatments in Alternative 4 would benefit the species composition objectives for a longer duration, primarily due to reduction in competition. Alternative 3 would aid in moving species composition toward the desired conditions but, with respect to all other action alternatives, the movement would not be as great nor would the treatments be as effective because PVGs 7, 9, 10, and 11 would not be treated under Alternative 3. Alternatives 4 and 5 would have the greatest probability of improving/maintaining whitebark pine survival, while Alternatives 1 and 3 would not. Alternative 2 would have moderate potential to improve/maintain probability of whitebark pine survival. In PVGs 7, 9, and 10, Alternatives 2 and 5 would have a moderate impact on species composition and duration compared with Alternative 4. Alternative 1 would continue to move species compositions further from the desired conditions in the long term.

All action alternatives are consistent with the Forest Plan direction for vegetation and timberland resources. Forestwide Guideline VEGU01 acknowledges that tradeoffs in the achievement of desired conditions may need to be considered at different time scales. This analysis identifies areas where tradeoffs exist (e.g., Alternatives 2, 4, and 5 would move more stands into the low canopy cover class in the short term while better achieving desired canopy cover and species compositions in the mid to long term).

This overabundance in the low canopy cover class would be created in order to move toward and/or maintain the desired conditions in the short to long term for the following other vegetative characteristics: (1) species composition, (2) spatial arrangement, (3) canopy cover in the long-term, and (4) old forest.

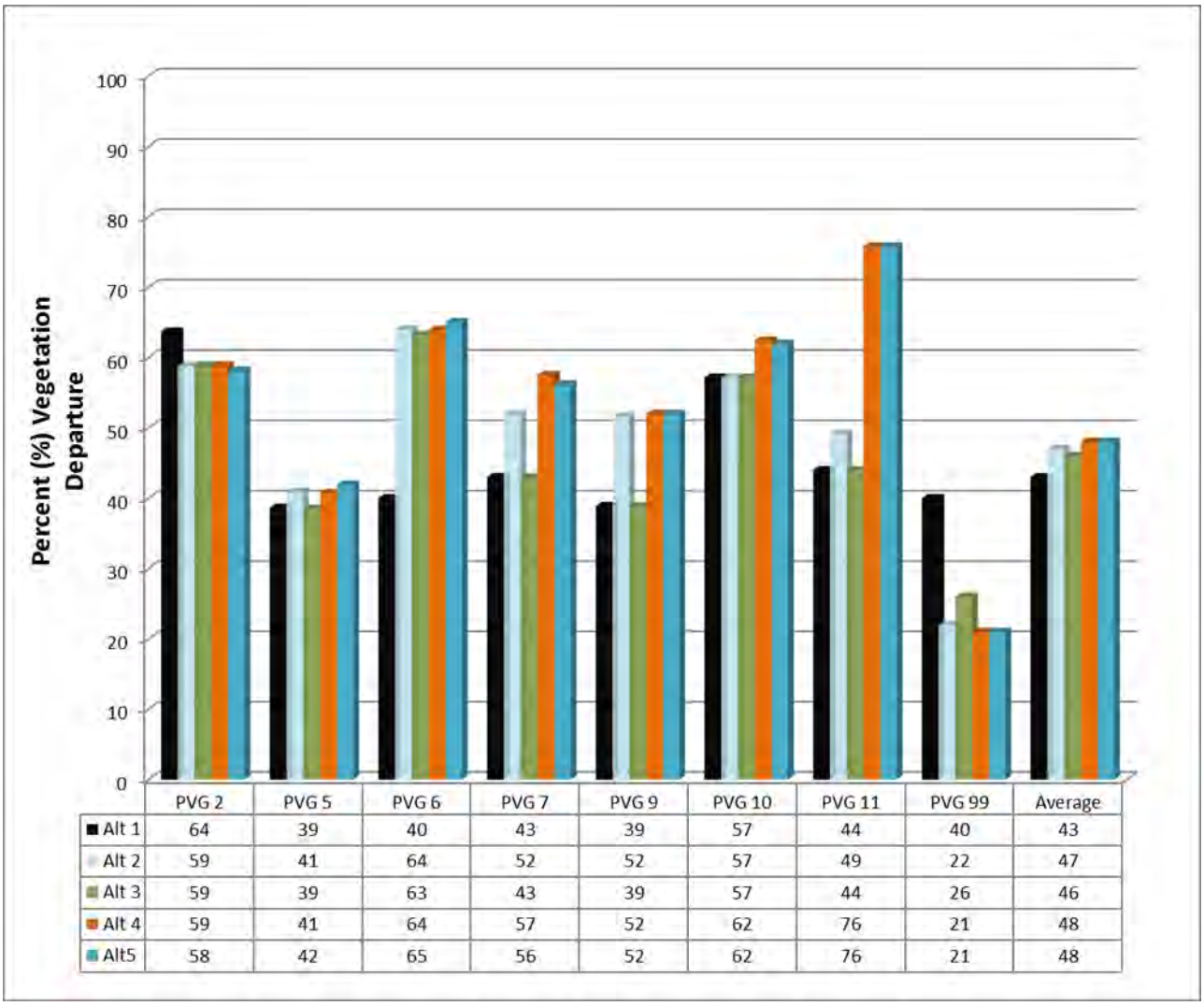
The intent of treatments and, consequently, their tradeoffs is to mimic a nonlethal to mixed fire regime, which is in concert with PVGs 2, 5, 6, 7, and 11. The PVGs 9 and 10 are considered lethal fire regimes; however, with the above mentioned tradeoff, in combination with the dispersal of these vegetation groups across the landscape and average patch size within PVGs 9 and 10 (21 and 15 acres, respectively), it is expected that the FT-PC-MSw will also meet restoration goals for these PVGs.

3.2.5.2. Spatial Pattern

Alternative 1

Overall, Alternative 1 would, in the short term, have slightly (3%–5%) lower vegetation departure than under all of the action alternatives (Figure 3.2-10). However, in the long term (without disturbance), the vegetation departure increases to 68% (Figure 3.2-11). The reason for this increase in departure is due to the continuation of increasing canopy covers and no size class differentiation. This alternative would cause the landscape to move away from desired conditions in the long term.

Alternative 1 is the only alternative that would move further from the desired conditions in the long term (Figure 3.2-11).

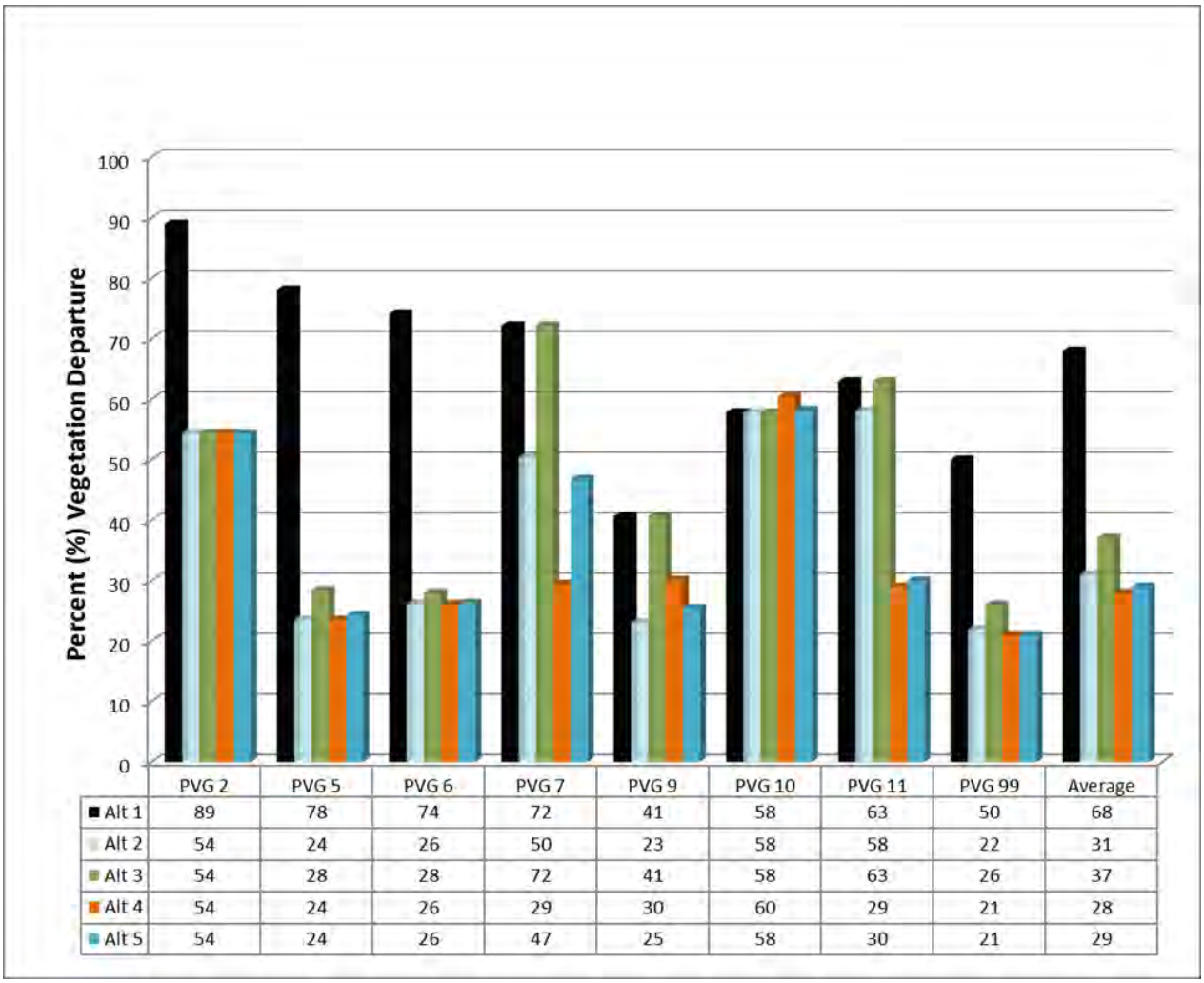


	PVG 2	PVG 5	PVG 6	PVG 7	PVG 9	PVG 10	PVG 11	PVG 99	Average
Alt 1	64	39	40	43	39	57	44	40	43
Alt 2	59	41	64	52	52	57	49	22	47
Alt 3	59	39	63	43	39	57	44	26	46
Alt 4	59	41	64	57	52	62	76	21	48
Alt5	58	42	65	56	52	62	76	21	48

Figure 3.2-10. Immediate post-treatment vegetation departure by Potential Vegetation Group (PVG) and alternative (Note: PVG 99 is nonforested [grassland/shrubland].). Average departure is based on weighted departure average of all PVGs.

Effects Common to All Action Alternatives

Commercial free thin treatments proposed under all alternatives would create more open, large tree stands in the short term. Regeneration treatments (e.g., FT-PC-MSw) would create a mosaic of skips, open patches, and thinned areas similar to those created where fire was more intense in the mixed1 and mixed2 fire regimes. Aspen treatments would create more open patches near aspen clones designed to promote aspen regeneration, emphasizing the mid -elevation aspen belt throughout the analysis area. The burn-only stands would reduce fuels and help prevent uncharacteristic wildfires. The combination of these treatment types is designed to create a heterogeneous spatial mosaic that would break up fuel continuity across the landscape in the analysis area, thus reducing the percentage of vegetation departure rating in the long term.



	PVG 2	PVG 5	PVG 6	PVG 7	PVG 9	PVG 10	PVG 11	PVG 99	Average
Alt 1	89	78	74	72	41	58	63	50	68
Alt 2	54	24	26	50	23	58	58	22	31
Alt 3	54	28	28	72	41	58	63	26	37
Alt 4	54	24	26	29	30	60	29	21	28
Alt 5	54	24	26	47	25	58	30	21	29

Figure 3.2-11. Twenty-five years post-treatment vegetation departure by Potential Vegetation Group (PVG) and alternative (Note: PVG 99 is nonforested [grassland/shrubland].). Average departure is based on weighted departure average of all PVGs.

The immediate responses under Alternatives 4 and 5 would constitute the highest overall vegetation departure of all alternatives, which is due to intensity of treatment and more acreage of treatments in PVGs 7–11. Alternative 5 would have a slightly lower departure in PVG 2 (1% lower than other action alternatives) due to slight variations in vegetation (e.g., larger SFB treatment) and prescribed burning treatments. Alternative 3 would exhibit lower percent departure in PVGs 5 and 6 (more medium and large size class stands moving to low canopy, difference is due to no SFB treatment), while PVGs 7, 9, 10, and 11 would reflect Alternative 1 responses. Alternatives 4 and 5 would have the greatest departure in PVG 11 because these alternatives emphasize whitebark pine restoration. Within PVG 11, Alternatives 1, 2, and 3 would exhibit lower percent departure compared with Alternatives 4 and 5.

Additionally, all the action alternatives are designed to maintain LTSC stands by managing densities to enhance the resiliency and resistance of the stands to disturbance events such as wildfire and insects. These alternatives would also promote the development of medium tree size class stands by promoting the growth of desired trees to accelerate development of the LTSC with desired tree species compositions. The consequence is that none of the action alternatives

would move toward the desired GFSS and sapling tree size class objectives, and the larger tree size classes would be moved to the lower canopy cover class. Although regeneration treatments have been proposed under all action alternatives, these treatments would retain too much canopy cover in the large and medium tree size classes to qualify as GFSS stands. The PVGs 7, 9, 10, and 11 would have the least amount of GFSS and mid seral size classes; without creation of these size classes reduction of percent departure would eventually stagnate.

Additionally, most treatments would reduce the canopy cover class to low, in both the mid and late seral size classes, which meets desired conditions for PVGs 2 and 99 but not PVGs 5, 6, 7, 9, 10, and 11. In PVGs 9 and 10, low canopy cover is considered uncharacteristic. This would lead to larger departure ratings under Alternatives 2, 4, and 5, since most treatments would move high canopy cover to low in these PVGs.

Due to the combination of not reducing the size class under any PVG and converting all of the canopy cover to low at the stand level (especially in PVG 6), the overall percent vegetation departure rating for all action alternatives would be 3–5% higher than that seen under Alternative 1; however, this is a short-term effect. Specifically, prescribed burns in PVGs 2 and 99 are expected to maintain low canopy cover, while—depending on treatment type—PVGs 5, 6, 7, 9, 10, and 11 are expected to increase canopy cover approximately 1–2% per year. Specifically, in PVGs 5, 6, 7, 9, 10, and 11 it is expected that priority treatment types for prescribed maintenance burning would include CT-FT, CT, ASP, WMT, and SFB. All other treatments would potentially increase canopy cover over time.

The long-term results of Alternatives 2, 4, and 5 would be a lower percentage of vegetation departure in all PVGs (except PVG 10) compared with Alternative 1. Compared with the No Action alternative, Alternative 3 would have a lower percent departure in PVGs 2, 5, and 6, while PVGs 7, 9, 10, and 11 would be the same. Overall, Alternative 3 would have the second highest departure rating of all action alternatives. Under Alternative 3, as under Alternative 1, PVGs 7–11 would experience no changes (neither alternative would treat those PVGs).

Of all alternatives, Alternative 4 would have the lowest percent departure in PVGs 7 and 11. Alternative 2 would have the lowest departure rating in PVG 9 (less acres moved into low canopy cover [considered uncharacteristic] through treatment) and higher departure ratings in PVGs 7 and 11 due to less treatment acres and intensity within these PVGs compared with both Alternatives 4 and 5. The PVG 10 would not vary between Alternatives 1, 2, 3, and 5, which is due to not enough early to mid-successional stages. Compared with all other alternatives, Alternative 4 would have greater departure in PVG 10 since more acres would be treated with higher intensities (due to allowing treatments within Canada Lynx habitats to go above 30% unsuitable).

In the long term, the stand spatial pattern heterogeneity within Alternatives 4 and 5 (and to a lesser degree Alternative 2) would increase. Increases in spatial pattern heterogeneity are due to the varying types of regeneration treatments implemented, which create a mosaic of openings, thinned areas, and untreated clumps, variable spacing, and variable species composition within each stand (Youngblood et al. 2008). Additionally, treatments focusing on aspen regeneration, nonforested vegetation, and wet meadow restoration add another component to the improvement of the spatial and temporal heterogeneity. Considering all factors listed, Alternatives 4 and 5 would be expected to have the greatest increase in spatial and temporal heterogeneity, which would consequently improve resilience (at multiple scales; e.g., from patch to landscape levels). Alternatives 2 and 3 would have moderate and low effects on both spatial and temporal heterogeneity, respectively. Additionally, Alternatives 4, 5, and, to a lesser degree, Alternative 2 would treat the vegetation from the patch to landscape level. In the long term, Alternative 3

would have higher percent departure rates than Alternatives 2, 4, and 5 because (1) it does not have as many acres of FT-PC-MSw, aspen, wet meadow, and dry nonforested treatments that increase spatial pattern heterogeneity, and (2) it does not treat any acres in PVGs 7–11. Although under Alternatives 4 and 5 the long-term percent vegetation departure is less than under Alternative 1, to effectively reduce/maintain the spatial homogeneity and reduce the vegetative departure rating at the landscape level, more intensive treatments (e.g., converting stands to GFSS) are needed in PVGs 5, 6, 7, 9, 10, and 11. The PDF that limits reducing the tree size class of any stands limits the stand's ability to move closer to the desired conditions in both the long and short term (for tree size class [and hence spatial patterns]) under all action alternatives.

3.2.5.3. Acres of Aspen Treatment

Aspen

Alternative 1

Alternative 1 would, in the short to long term, continue to be above the desired canopy cover until a disturbance (e.g., wildfire or future management activities) occurs. There are three potential outcomes with a natural disturbance: (1) uncharacteristic landscape-level fires (currently aspen [mixed1 severity], approximately 2.7 missed fire return intervals), (2) a characteristic mosaic fire that does not effectively reduce canopy cover (e.g., conifer encroachment), and (3) a characteristic fire that burns in a mosaic and effectively reduces canopy cover. The probability that the aspen would burn with a mixed1 severity diminishes with time.

Effects Common to All Action Alternatives

Many aspen stands throughout the analysis area have been negatively impacted by conifer competition and lack of grove/landscape disturbance factors such as wildfire. Conifer species tend to draw a significant amount of water away from aspen stands, thereby affecting riparian, meadow, and aspen communities, which ultimately changes the structure and composition of the forest. Under all action alternatives there would be a reestablishment of aspen stands where they have departed from desired conditions, as described in Campbell and Bartos (2000). Specifically, all action alternatives would reduce conifer canopy cover in the short term to approximately 25% or less; prescribed burning would maintain a mosaic canopy cover in the long term (Table 3.2-19). All action alternatives would promote aspen stands that vary by patch sizes, size classes, and densities. The primary difference is that Alternatives 2, 4, and 5 would have the same aspen treatment acres, and Alternative 3 would have less because PVGs 7–11 would not be treated. Restoration of aspen ecosystems is also expected to support vegetation diversity and increase habitat quality for terrestrial wildlife species.

Table 3.2-19. Acres of treatment aspen and post-treatment canopy cover (CC).

Canopy Cover Class	No Action Alternative	Alternatives 2, 4, and 5	Alternative 3
Acres Treated	**0**	**1,087**	**921**
Post-treatment Condition	0–25% CC	0–25% CC	0–25% CC

Unlike under Alternative 1, all action alternatives allow treatments that would reduce conifer encroachment and probability for uncharacteristic wildfire within aspen stands. All treatment types would emphasize aspen restoration where they are present. Additionally, maintaining these stands with fire would further promote aspen within the analysis area for the long term.

Alternative 2

Aspen in both climax stands and as a seral component of coniferous stands

Alternative 2 has 1,087 acres of aspen treatments (CT-ASP) in PVGs 2, 5, 6, 7, 10, and 11. Other treatments (e.g., CT-FT, NCT, WMT, and FT-PC-MSw) would also enhance incidental aspen in areas where densities of aspen are not high enough to justify aspen enhancement as the primary purpose of treatment. Alternative 2 has less aspen treatment compared with Alternatives 4 and 5, since it treats fewer acres of PVGs 7, 10, and 11.

Alternative 3

Aspen in both climax stands and as a seral component of coniferous stands

Alternative 3 has 900 acres of aspen treatments (CT-ASP) in PVGs 2, 5, and 6. Alternative 3 has the least potential to treat incidental aspen, since it does not treat PVGs 7, 10, and 11.

Alternative 4

Aspen in both climax stands and as a seral component of coniferous stands

Like Alternatives 2 and 5, Alternative 4 has 1,087 acres of aspen treatments (CT-ASP) in PVGs 2, 5, 6, 7, 10, and 11. Alternative 4 has the most treatment potential of incidental or unknown aspen clones compared with Alternatives 2, 3, and 5.

Alternative 5

Aspen in both climax stands and as a seral component of coniferous stands

Like Alternatives 2 and 4, Alternative 5 has 1,087 acres of aspen treatments (CT-ASP). Alternative 5 emphasizes treatments in PVGs 7, 10, and 11 where known aspen clones are located; specifically focusing on stands in PVGs 7, 10, and 11 where aspen clone locations were documented in field reconnaissance but were not thought of as large enough to broker aspen treatment as intent. Therefore, treatment potential of incidental aspen under Alternative 5 is greater than under Alternative 2 and less than under Alternative 4. All treatment types would emphasize aspen restoration where they are present.

3.2.5.4. Acres of Nonforested Vegetation (NFT) and Wet Meadow Treatment (WMT)

Nonforested Vegetation

Alternative 1

In the long term, Alternative 1 would continue to move nonforested areas further from the desired conditions until disturbance changes the successional path. There are three potential outcomes with a natural disturbance: (1) uncharacteristic landscape-level fire creating a single cohort, (2) a characteristic mosaic fire that does not effectively reduce canopy cover (e.g., conifer encroachment), and (3) a characteristic fire that burns in a mosaic and effectively reduces canopy cover. The probability that nonforested vegetation types would burn with a mixed1/mixed2 severity diminishes with time.

Effects Common to All Action Alternatives

The NFT areas include grasslands, sagebrush, scablands, and dry meadows. Fire exclusion has led to expansion of young conifers along the edges, as well as a decadency of upland shrubs,

grasses, and forbs. For all action alternatives, the post-treatment canopy cover would be at desired condition range (e.g., <10% conifer cover). It is expected that all action alternatives would enhance upland meadow species, increase meadow acreage, improve plant diversity and vigor, and provide habitat for native species. Additionally, treatments would move the analysis area toward a pre-fire suppression vegetative condition related to stand density, tree size class, and species composition to enable the reintroduction of fire into a fire-adapted ecosystem. The only difference between action alternatives is the amount of acres treated. Alternative 4 treats the most nonforested vegetation, whereas Alternative 3 treats the least (Table 3.2-20).

Unlike Alternative 1, all action alternatives allow treatments that would promote grass, forb, and shrub regeneration while reducing conifer encroachment, shrub decadence, and probability for uncharacteristic wildfire within nonforested areas. Additionally, maintaining low canopy cover with prescribed burning would further promote nonforested vegetation within the analysis area for the long term.

Table 3.2-20. Acres of treatment of nonforested vegetation and post-treatment canopy cover (CC).

Canopy Cover Class	No Action	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Acres Treated	0	4,519	3,592	4,999	4,943
Post-treatment Condition	N/A	10% CC	10% CC	10% CC	10% CC

Alternative 2

Native herbaceous understory in shrub communities

Compared with other action alternatives, Alternative 2 has a moderate amount of nonforested treatment acres, thus it has a moderate potential to maintain and promote herbaceous and shrub components in the analysis area. All treatments would emphasize reducing conifer encroachment and reintroducing fire into the ecosystem.

Alternative 3

Native herbaceous understory in shrub communities

Alternative 3 has the least nonforested treatment acres of all the action alternatives, thus it has the least potential to maintain and promote herbaceous and shrub components in the analysis area. Similar to all action alternatives, all treatments would emphasize reducing conifer encroachment and reintroducing fire into the ecosystem.

Alternative 4

Native herbaceous understory in shrub communities

Alternative 4 has the most nonforested treatment acres of all action alternatives, thus it has the most potential to maintain and promote herbaceous and shrub components in the analysis area. All treatments would emphasize reducing conifer encroachment and reintroducing fire into the ecosystem.

Alternative 5

Native herbaceous understory in shrub communities

Alternative 5 has only slightly less nonforested treatment acres than Alternative 4 (i.e., 56 acres), thus it has a relatively similar potential to maintain and promote herbaceous and shrub

components in the analysis area. All treatments would emphasize reducing conifer encroachment and reintroducing fire into the ecosystem.

Wet Meadow

Table 3.2-21 displays how each alternative responds to the measurement of wet meadows.

Table 3.2-21. Acres of treatment proposed to benefit wet meadow and post-treatment canopy cover (CC).

Canopy Cover Class	No Action	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Acres Treated	0	55	43	271	315
Post-treatment Condition	N/A	10% CC	10% CC	10% CC	10% CC

Alternative 1

Canopy cover under Alternative 1 would, in the short to long term, continue to be above the desired condition until a disturbance. A disturbance (e.g., wildfire or insect outbreak) in a wet meadow would have the potential to reduce the canopy cover to 10% or less in the short term; conifer encroachment would occur in the short to long term.

Effects Common to All Action Alternatives

For all action alternatives, the post-treatment canopy cover would move toward desired conditions (e.g., <10%). Alternative 5 treats the most wet meadow acres. Alternative 3 treats the least amount of wet meadow acres.

It is expected that conifer encroachment would be reduced under all action alternatives, thus promoting native grasses, forbs, shrubs, and trees. Additionally, prescribed fire is expected to burn in a mosaic pattern that creates diversity in forest structure and species composition. Restoration of wet meadow ecosystems is also expected to support and increase habitat quality for terrestrial wildlife species.

Unlike Alternative 1, all action alternatives allow treatments that would reduce conifer encroachment within wet meadows. Additionally, maintaining conifer encroachment with fire would further promote wet meadows within the analysis area for the long term.

Alternative 2

<u>Woody riparian species</u>

Compared with the other action alternatives, Alternative 2 has a moderate amount of wet meadow treatment acres, thus it has a moderate potential to maintain and promote herbaceous and shrub components in the analysis area. All treatments would emphasize reducing conifer encroachment and reintroducing fire into the ecosystem.

Alternative 3

<u>Woody riparian species</u>

Alternative 3 has the least wet meadow treatment acres of all action alternatives, thus it has the least potential to maintain and promote herbaceous and shrub components in the analysis area. Similar to Alternative 2, all treatments would emphasize reducing conifer encroachment and reintroducing fire into the ecosystem.

Alternative 4

Woody riparian species

Alternative 4 has only slightly less wet meadow treatment acres than Alternative 5 (i.e., 44 acres), thus it has a relatively similar potential to maintain and promote herbaceous and shrub components in the analysis area. All treatments would emphasize reducing conifer encroachment and reintroducing fire into the ecosystem.

Alternative 5

Woody riparian species

Alternative 5 has the most wet meadow treatment acres, thus it has the greatest potential to maintain and promote herbaceous and shrub components in the analysis area. All treatments would emphasize reducing conifer encroachment and reintroducing fire into the ecosystem.

Summary of Wet Meadow

Overall, Alternative 5 would shift more acres toward the desired conditions in the analysis area. Alternatives 2, 3, and 4 would also move acres toward desired conditions, but the movement would not be as great because less acres would be treated. Alternative 1 would continue to move wet meadows further from the desired conditions until disturbance changes the successional path (this could be a short- to long-term time scale).

3.2.6. Minimum Road System

3.2.6.1. Alternative 1

Alternative 1 would not include designation of a MRS for the Project area.

3.2.6.2. Effects Common to All Action Alternatives

The MRS was analyzed for all action alternatives. Table 2.2-18 shows metrics for the MRS analyzed for future Forest vegetation management.

3.2.6.3. Alternative 2

Due to less miles of road decommissioning, the amount of LTC for both Alternatives 2 and 4 would be greater than under Alternative 3 and less than under Alternative 5. The MRS analyzed for Alternative 2 was developed with the understanding that, instead of utilizing decommissioning, more roads would be placed into LTC, which reduces the maintenance responsibilities and maintains access to more of the Project area for future management activities. Due to differences in LTC, realignment, reconstruction, and Add to System, the road system under Alternative 2 would have a 7.1% reduction of suited timber lands within 0.25 mile of an NFS road (includes closed roads); therefore, this alternative would require less temporary roads for future management than Alternative 3 but more than both Alternatives 4 and 5.

3.2.6.4. Alternative 3

Alternative 3 would have the greatest amount of decommissioning of system roads and the least amount of LTC. Compared with all other action alternatives, there would be less road realignment/reconstruction and no Add to System roads. The MRS analyzed under Alternative 3

was developed with the understanding that future management within the Middle Fork drainage would require building more temporary roads for access, compared with all other action alternatives. Due to differences in LTC, realignment, reconstruction, and Add to System roads, the road system under Alternative 3 would have a 12.2% reduction of suited timber lands within 0.25 mile of an NFS road (including closed roads); therefore, this alternative would require the most temporary road construction for future vegetation management access.

3.2.6.5. Alternative 4

Alternative 4 would have more decommissioning of system roads than Alternative 5 and less than Alternative 3. Alternative 4 has greater road realignment/reconstruction and Add to System roads than both Alternatives 2 and 5. As with Alternatives 2 and 5, the MRS was developed with the understanding that instead of decommissioning more roads they would be placed into LTC, which reduces the maintenance responsibilities and maintains access to more of the Project area when considering future management activities. Due to differences in LTC, realignment, reconstruction, and Add to System roads, the road system analyzed under Alternative 4 would have a 1.9% reduction of suited timber lands within 0.25 mile of an NFS road (including closed roads); therefore, this alternative would require the least amount of temporary road construction for future vegetation management.

3.2.6.6. Alternative 5

Similar to Alternative 4, the MRS analyzed under Alternative 5 would add roads to the road system to maintain future access; however, Alternative 5 places more roads into LTC than any other alternative. Due to differences in LTC, realignment, reconstruction, and Add to System roads, the road system under Alternative 5 would have a 2.2% reduction of suited timber lands within 0.25 mile of an NFS road (including closed roads); therefore, this alternative would require slightly more temporary road construction to meet future vegetation management needs than Alternative 4.

3.2.7. Cumulative Effects

The analysis area for cumulative effects is the Project area. Cumulative effects combine the effects of the proposed action with conditions in, and in the vicinity of, the Project area, as created by past, present, and reasonably foreseeable actions. A more detailed list and descriptions of other projects and actions that may contribute to cumulative effects can be found in Appendix 3 of this document.

3.2.7.1. Past Actions

Past Fire Suppression

Federal fire suppression activities began as early as 1900, and significant improvements in funding and organization occurred as early as the 1920s (Bean et al. 2000). Fire suppression effectiveness increased throughout the 1920s and 1930s and has resulted in increased regeneration of fire-prone species, creating a landscape that is not within the desired range for species composition or tree density. The percentage of grand fir and the number of trees per acre of other climax species are increasing.

Past Wildfire

Recent records indicate that one large wildfire occurred in the Project area, the Grays Creek Fire (approximately 24,000 acres), in 2007. Prior to fire suppression efforts, wildfire was the primary disturbance agent responsible for stand development and succession.

Past Timber Harvest

The Project area has been intensively managed for timber production. Available data sets indicate that timber harvest has occurred on approximately 12,021 acres within the Project area; this is 31% of the forested area. This number is likely low because the utilized data set only recorded relatively intense treatments occurring in the past 40–50 years. Field examinations of stands classified as unmanaged indicate that some harvest did occur in many of the accessible areas classified as unmanaged prior to this time. Although harvests in these unmanaged areas were not as intensive as in areas where the data indicate management has occurred, evidence shows that scattered harvests (typically of the large-diameter ponderosa pine, Douglas-fir, and western larch) did occur within some of these stands. Further general discussion of timber management practices on the Forest and in the Project area can be found in Rinehart (1994) and Hockaday (1968).

Timber harvest has included regeneration treatments (primarily clearcuts and some Shelterwood with reserve and clearcut with reserve) on approximately 3,627 acres and intermediate treatments (primarily improvement cutting and thinning with some sanitation and salvage) on the remaining 8,394 acres.

The majority of the regeneration treatments were completed prior to 1990. Records indicate that the regeneration treatments were initiated during the following time periods: approximately 38% prior to 1980, 26% from 1981 to 1990, and 36% from 1991 to 2000. The remaining 1% of the regeneration treatments were initiated after 2001. These regeneration treatments were typically planted with natural regeneration occurring on a relatively small percentage of the area and resulted in a variety of conditions ranging from stands with a variety of structure (25,005 acres are considered medium and large tree stands) to stands in the small tree size class (2,368 acres) to stands in the GFSS and sapling stages (1,527 acres). In the older clearcuts (primarily the small tree stands), limited/no remnant overstory or other biological legacies occur. In more recently regenerated areas, objectives to retain biological legacies (i.e., snags, legacy trees, CWD) were often included and more structure and beginning in late 1980s regenerated stands were more diverse, with varying degrees of retention of remnant trees, snags, and coarse wood.

The intermediate treatments caused a range of results, including that where the forest canopy was sufficiently opened, early seral species (ponderosa pine, Douglas-fir, and western larch) are now growing in even-aged and multicohort stands. In more dense areas, and in habitat types where more light is required to successfully regenerate early seral species, grand fir and other climax species have often successfully regenerated.

Recent projects that have harvested timber within the Project area include the Middle Fork Blowdown 2001 (approximately 146 acres). The Mill Creek-Council Mountain projects also harvested timber adjacent to the Project area in the recent past. Numerous older sales were completed prior to those listed above that affected the landscape through harvest; the effects of these sales have been captured in the description of the existing conditions.

Past timber harvests on private ground (formally potlatch lands) occurred primarily in 1990 and 2008 (4,797 and 3,698 acres, respectively). All acres were tractor logged.

Past Vegetation Management

A number of vegetation management activities besides timber harvest have occurred in the Project area. These include prescribed burning and timber stand improvement (NCT). Past activities have been included in the development of the alternatives and in the analysis of effects.

Past Road Management

Road construction, maintenance, and decommissioning have occurred in the Project area. The effect of these activities on the ability to manage vegetation with traditional equipment is analyzed in the Transportation section of this document.

3.2.7.2. Present Actions

Current Projects

There are no current Forest Service contracts or projects in the Project area. DF Development LLC, who purchased all of the formally Potlach lands, has ceased all commercial logging operations for the foreseeable future.

Numerous prescribed burning projects have also been planned in the Project area. The Prescribed Fire and Fuels section of this document explains ongoing prescribed fire activities.

Future Actions

DF Development LLC. (Formally Potlatch)

Due to the cessation of current commercial timber sales on DF Development LLC lands and the relatively recent purchase of Potlach lands, it is difficult to determine the timber sale potential on these lands.

Fire Suppression and Wildfire

Continued fire suppression in the Project area is likely to occur. Although the success of initial attack activities is high, the probability that a large wildfire would affect the Project area is difficult to predict.

Continued fire suppression is anticipated to result in the continued growth and establishment of climax tree species and increased tree densities.

Summary

The effects of all past, present, and reasonably foreseeable actions were considered in disclosing the current conditions and direct and indirect effects in this analysis. The alternatives, along with past and future actions, would cumulatively affect the forested vegetation component by either maintaining or moving it toward the desired conditions, as described in the direct and indirect effects portion of this analysis.

3.2.8. Irreversible and Irretrievable Commitments

Regarding forested vegetation, there are no irreversible or irretrievable commitments with any of the action alternatives.

3.2.9. Forest Plan Consistency

3.2.9.1. Timberland Resources

Alternative 1

Alternative 1 would not be consistent with Forest Plan direction for timberland resources because no treatments are proposed and stands would not contribute to Timberland Resources Goals TRGO01 or TRGO02.

3.2.9.2. Common to All Action Alternatives

Desired Vegetative Conditions for this Project

The desired vegetative conditions (USDA Forest Service 2003a, Appendix A) for outside of MPC 5.2 – Commodity Production Emphasis within Forested Landscapes have been utilized for the Project area in order to incorporate recent science regarding the importance of managing within the desired conditions for conservation of wildlife species of the greatest concern and to address climate change considerations (Mellen-McLean et al. 2013; Millar et al. 2007; Dale et al. 2001; Morgan and Parsons 2001; ICMEBP 1999). The modification of desired vegetative conditions is consistent with Forest Plan direction and affects approximately 20,517 acres within the analysis area.

3.2.9.3. Vegetation Resources

Alternative 1

Alternative 1 is not consistent with Forest Plan direction for vegetation resources because no treatments are proposed and stands would continue to move away from the desired conditions in the short to long term. No treatments would occur that would maintain and/or promote aspen, nonforested vegetation, wet meadow vegetation, western larch, or whitebark pine.

All Action Alternatives

It should also be mentioned that the tradeoffs in achievement of desired vegetative conditions have been disclosed in this analysis, which is consistent with vegetation Guideline VEGU01 (Forest Plan, page III-31).

3.2.9.4. National Forest Management Act of 1976

The *Forest Service Manual and Handbook* direction describes *National Forest Management Act of 1976* consistency requirements. Specifically, FSM 1921.12 and FSH 1909.12, Chapter 20–Section 29, and Chapter 60–Section 61 identify direction.

The following findings are required to be made when making project-level decisions involving timber harvest:

Suitability for Timber Production (16 USC 1604(k)): No timber harvest, other than salvage sales or sales to protect other multiple-use values, shall occur on lands not suited for timber production.

FS Response: Proposed timber harvest within PVGs 1 and 11 (USDA Forest Service 2003b, Appendix E) and in RCAs (USDA Forest Service 2003, pp. II-28 to II-30, TRST04, pp. III-43) are outside lands designated as suitable for timber production. Timber harvest in these areas under all action alternatives has been proposed to manage vegetation within the desired conditions specified in the Forest Plan for these areas. The action alternatives are designed to minimize potential impacts to other resources in these areas, and PDFs were developed to mitigate potentially damaging actions. Although NCT and commercial treatments would occur in PVGs 1 and 11, no salvage harvest or even-aged regeneration treatments would occur in lands not suited for timber production (e.g., in RCAs or in PVG 1).

Timber Harvest on National Forest Lands (16 USC 1604(g) (3) (E)): A Responsible Official may authorize site-specific projects and activities to harvest timber on NFS lands only where:

FS Response: Mitigation measures have been provided in the soil, watershed, and fisheries analyses and would be incorporated into the project implementation design to ensure that soil, slope, and watershed conditions would be adequately protected.

- There is assurance that the lands can be adequately restocked within 5 years after final regeneration harvest (16 USC 1604(g) (3) (E) (ii)).

FS Response: According to local studies and Forest records, natural regeneration of ponderosa pine, western larch, and Douglas-fir is variable depending upon the timing of activities and available cone crops. For this reason, artificial regeneration has been proposed as an option for any regeneration treatments. The desired reforestation goals for areas treated with regeneration treatments (e.g., patch cut or Shelterwood) are consistent with TRST01 on page III-42 of the Forest Plan (USDA Forest Service 2003a). Monitoring of regeneration success would begin 1 year after all proposed actions have been implemented (generally late summer, early fall). Monitoring would continue on a schedule of Year 1, Year 3, and Year 5. If natural regeneration is attempted, if exams indicate that natural regeneration is not progressing toward the desired seedling-per-acre goal and species composition by exam Year 3, planting of trees suitable for the site (such as ponderosa pine, western larch, and/or Douglas-fir) would be considered. In some units planting of ponderosa pine and/or western larch, regardless of natural regeneration success, is planned to ensure that the desired mix of species occurs. In units where regeneration treatment occurs, if initial surveys indicate that advanced regeneration is present in levels to meet DFCs, a post-harvest evaluation would be done to ensure minimum reforestation stocking levels (per TRST01) are retained after salvage harvest.

FS Response: Protection from detrimental changes is provided for streams, stream banks, wetlands, and other bodies of water. Disclosure regarding the protection of stream, riparian, and fish habitats is contained in the soil, hydrology, and fisheries analyses, by alternative. All action alternatives are consistent with the Forest Plan and would provide protection of stream, riparian, and fish habitat.

- The harvesting system to be used is not selected primarily because it would give the best dollar return of the greatest output of timber (16 USC 1604(g) (3) (E) (iv)).

FS Response: The harvesting system proposed is the system determined to meet the purpose and need most effectively. The economic feasibility of this Project was not the reason for developing the alternatives; some of the more expensive treatment units (i.e., units with helicopter logging systems and mature plantations) were dropped due to concerns identified by the public regarding the overall cost of the Project.

Clearcutting and Even-aged Management (16 USC 1604(G)(3)(F)): Ensure that clearcutting, seed tree cutting, Shelterwood cutting, and other cuts designed to regenerate an even-aged stand of timber would be used as a cutting method on NFS lands only where applicable.

- (i) for clearcutting, it is determined to be the optimum method, and for other such cuts it is determined to be appropriate, to meet the objectives and requirements of the relevant land management plan;
- (ii) the interdisciplinary review as determined by the Secretary has been completed and the potential environmental, biological, esthetic, engineering, and economic impacts on each advertised sale area have been assessed, as well as the consistency of the sale with the multiple use of the general area;
- (iii) cut blocks, patches, or strips are shaped and blended to the extent practicable with the natural terrain;
- (iv) there are established according to geographic areas, forest types, or other suitable classifications the maximum size limits for areas to be cut in one harvest operation, including provision to exceed the established limits after appropriate public notice and review by the responsible Forest Service officer one level above the Forest Service officer who normally would approve the harvest proposal: Provided, that such limits shall not apply to the size of areas harvested as a result of natural catastrophic conditions such as fire, insect and disease attack, or windstorm; and
- (v) such cuts are carried out in a manner consistent with the protection of soil, watershed, fish, wildlife, recreation, and esthetic resources, and the regeneration of the timber resource.

FS Response: The patch clearcuts and Shelterwood regeneration methods proposed are designed to be consistent with Forest Plan direction and the desired conditions for the Project. These treatments have been proposed in lands determined to be suitable for timber production. Due to these stands' current conditions, they no longer contribute to the desired conditions for vegetation in at least one aspect.

- Protection is provided for streams, stream banks, shorelines, lakes, wetlands, and other bodies of water from detrimental changes in water temperatures, blockages of water courses, and deposits of sediment, where harvests are likely to seriously and adversely affect water conditions or fish habitat (16 USC 1604(g)(3)(E)(iii)) The harvesting system to be used is not selected primarily because it would give the best dollar return of the greatest output of timber (16 USC 1604(g) (3) (E) (iv)).

To meet the Forest Plan Standard for vegetation management (USDA Forest Service 2003a, pp. III-29 and III-41), even-aged harvesting (patch cuts and/or Shelterwood) would occur on lands suitable for timber production, as it is the appropriate and optimum method for the timber type and would contribute to meeting vegetative objectives for the site. Such harvest would be consistent with the protection of soil, watershed, fish, wildlife, recreation, and aesthetic resources. Harvest areas would be blended to the extent practicable with the natural terrain and would retain reserve trees to meet wildlife, ecological, soil, visual, and other resource objectives. In addition, the regeneration treatments proposed would not technically qualify as openings due to reserve trees and clumps retained for purposes other than vegetation management in regenerated stands that would retain greater than 10% canopy cover. The maximum size of openings created by one regeneration harvest operation would not exceed 40 acres. A PDF has

been incorporated to limit regeneration treatments to less than 40 acres in size; therefore, no regeneration harvest (or opening) larger than 40 acres is proposed.

Establishment of standards to ensure culmination of mean annual increment of growth; silvicultural practices; salvage harvesting; exceptions (16 USC 1604(G)(3)(m)).

The Secretary shall establish—

- (1) standards to insure that, prior to harvest, stands of trees throughout the NFS shall generally have reached the culmination of mean annual increment of growth (calculated on the basis of cubic measurement or other methods of calculation at the discretion of the Secretary): Provided, That these standards shall not preclude the use of sound silvicultural practices, such as thinning or other stand improvement measures: Provided further, That these standards shall not preclude the Secretary from salvage or sanitation harvesting of timber stands which are substantially damaged by fire, windthrow or other catastrophe, or which are in imminent danger from insect or disease attack; and
- (2) exceptions to these standards for the harvest of particular species of trees in management units after consideration has been given to the multiple uses of the forest including, but not limited to, recreation, wildlife habitat, and range and after completion of public participation processes utilizing the procedures of subsection (d) of this section.

FS Response: Silvicultural prescriptions would be developed to ensure consistency with this requirement. The proposed regeneration treatments would occur in overmature stands. Intermediate treatments that would harvest trees are proposed in stands that have not yet reached the culmination of mean annual increment, but these treatments are consistent with the above exceptions and have considered the desired conditions and potential effects on recreation, wildlife, range, soils, water, economic, and fisheries resources.

3.2.10. Project Record

This FEIS hereby incorporates by reference the Forested Vegetation specialist report in the Project record (40 CFR 1502.21). The report is located in the Forested Vegetation section of the Project record and contains the data, methodologies, analysis, maps, references, and technical documentation that the specialist relied on to reach the conclusions in this FEIS.

3.3. Fire and Fuels

3.3.1. Analysis Scale, Data Sources, and Methodology

3.3.1.1. Analysis Scale

Direct and Indirect Effects Analysis Area

The scope of the direct and indirect effects analysis for fire and fuels (forested and nonforested) is the Project area, outside the East Fork Weiser River subwatershed and the IRAs, on NFS lands. This analysis area comprises approximately 76,304 acres; it was chosen because it is large enough to represent differences in vegetative characteristics affected both by environmental factors (e.g., historical fire regimes) and past management activities. The East Fork Weiser River subwatershed portion and the IRAs were not analyzed in the Vegetation section because no fuels treatments are proposed in these areas.

Cumulative Effects Area

The cumulative effects analysis area for fire and fuels is all lands within a 1-mile radius of the Project area (including private lands and IRAs).

3.3.1.2. Temporal Scale of Analysis

Time frames as defined in the Forest Plan are used for this analysis of effects: temporary (1–3 years), short term (3–15 years), and long term (15 or more years) (USDA Forest Service 2003a). The temporal scale of this analysis is 20–30 years post treatment, which is considered an appropriate time scale for analysis because maintenance and future management will need to determine the appropriate objectives for management within the next 15–30 years for this Project area. In addition, this time period is within the historical disturbance regime for much of the Project area—in other words, some disturbance, whether natural or human induced, is needed to maintain desired conditions within the next 10–30 years.

3.3.1.3. Data Sources and Methodology

Walk-Through Surveys

Current stand conditions are based on walk-though surveys. Field crews performed the walk-through surveys on most forested stands on NFS lands (excluding the IRAs) within the Project area during the 2013 and 2014 field seasons. Additionally, in 2014 some stands designated as nonforested (predominately high-elevation meadows) were also visited.

The walk-through surveys categorized stands into restoration, burn only, reserve/regeneration, PCT needed, PCT not needed, and not sure. The restoration category includes stands primarily composed of vigorous seral species at densities higher than desired conditions. The reserve/regeneration stands are stands primarily composed of climax species, low-vigor serals, and stands with severe insect and/or disease infections. Burn-only stands are similar to restoration stands but have been thinned or underburned in the past; their densities are within range of desired conditions.

3.3.2. Analysis Process and Objectives

3.3.2.1. Design of Treatment Areas

Fuels treatments include prescribed fire, SFBs, and associated actions.

Prescribed fire treatments are needed to reduce fuel loading and restore fire regimes. In some portions of the Project area, the vegetation conditions are outside of desired conditions in regard to tree size class distributions, species composition, and canopy cover distributions (USDA Forest Service 2014).

The SFBs are needed to improve firefighter and public safety, improve the defensible space adjacent to private lands, and provide protection to infrastructure to the east of the Project area.

Additional commercial and noncommercial harvests include combinations of nonforested treatments, wet meadow treatments, and vegetation treatments in stands with LSQ, SFBs, and fuel reduction within an RCA.

3.3.2.2. Objectives and Measurements

The objectives and associated measurements below will be used to compare alternatives, ascertain achievement of treatment objectives, and determine compliance with design features and the 2003 Forest Plan Standards and Guidelines (USDA Forest Service 2003a).

Objective 3: Restore and maintain desirable fuel levels, fire regimes, and ecological processes.

Measurement: Amount of departure from historical fire regimes

Objective 4: Establish and maintain strategically placed SFBs to improve firefighter and public safety, improve the defensible space adjacent to private lands, and provide protection to infrastructure to the east of the Project area.

Measurement: Acres of SFBs

3.3.3. Affected Environment

3.3.3.1. Current Conditions

The analysis area is dominated by forested vegetation. In addition, much of the grassland/shrubland contains scattered trees; however, these lands do not contain the minimum canopy coverage to be considered forest. The Project area is dominated by forest types and fire regimes that were historically open ponderosa pine forest with a mosaic of mixed conifer (primarily grand fir, Douglas-fir, and western larch) forest types. The distribution of forest types and historical vegetation in the Project area is driven primarily by subtle changes in elevation, aspect, and topography. Prior to European settlement, fire was the principal disturbance process shaping vegetation distribution, development, and succession on the landscape; insects and other disturbance processes also played minor roles (Mehl et al. 1998; Morgan and Parsons 2001).

Fire History

Aggressive suppression directives constituted the past fire management actions within and adjacent to the Project area. Historically, wildfire disturbances helped shape forested landscapes across the Project area. Decades of fire exclusion, forest management, wildfires, insect outbreaks, and other factors have substantially altered forest structures, especially in the low- to

mid-elevation ponderosa pine forests comprising about 53% of the forested acres in the Project area.

Due to suppression efforts, the Project area has not experienced many significant wildfires in the last decade. The largest wildfire on record, the Grays Creek Fire, occurred in 2007 (Table 3.3-1). The fire began adjacent to the Forest and grew to 24,900 acres; 12,685 acres were within the Project area. Only one other large fire (>100 acres, in 2006) has occurred within the Project area since the start of fire suppression (Table 3.3-1). Records indicate that the Project area experienced 142 fire starts from 1956 to 2013, an average of 2.5 fire starts per year. The majority of these fires were contained to 1.0 acre or less.

Table 3.3-1. Significant recorded wildfires (>100 acres) within the Project area.

Fire Name	Year	Acres
Grays Creek	2007	12,685
Messenger	2006	262

Many starts have been recorded adjacent to the Project area but were also suppressed. The primary natural disturbance process has been excluded for approximately the last century.

No fire history studies have been performed in the Project area; however, fire history studies on the Forest have been performed in the nearby Bear/Indian Creek drainages and the Rapid River drainage. The results of Barrett's (1987, 1994a, 1994b) studies are summarized below.

Bear and Indian Creek Drainages

The Bear Creek drainage is 30 miles to the northwest of the Project area. Barrett (1994a) was able to produce a relatively continuous 4-century record of fire history in these drainages. Within the dry ponderosa pine stands, the pre-1919 fire interval was 14–30 years. As of 1993, these stands had not burned for the past 74–115 years (i.e., 95–135 years as measured from 2013). Within the ponderosa pine/Douglas-fir/grand fir vegetation type, the historical fire interval was 25–40 years; as of 1993, the mean fire-free interval was 107 years, or 127 as measured from 2013 (Barrett 1994a).

Rapid River Drainage

In his paper on the Rapid River drainage, Barrett (1987) concludes that (with the exception of the ponderosa pine cover type) fire suppression has not yet markedly affected succession within most stands, which is the result of relatively long-past fire cycles in stands comprised primarily of Douglas-fir and grand fir and between 4,000 and 7,000 feet in elevation. Barrett (1987) states the most vulnerable stands, from the standpoint of succession, are the moist ponderosa pine stands within the mid-elevation grand fir habitat types. In the Rapid River drainage, these sites have not experienced fire in 74 years or more, while the historical natural frequency range was from 43 to 69 years.

Drier south-facing aspects have a mean fire interval of approximately 55 years; Barrett (1987) states that the minimum fire interval is 10 years. This particular study site sits 40 miles northwest of the Project area.

In summary, although no specific data exist with respect to the Project area, nearby fire history studies indicate that, before the start of aggressive fire suppression in the early 1900s, primarily low-severity, high-frequency fires (14–40 year intervals) occurred in the drier habitat types (ponderosa pine/Douglas-fir forests), and less frequent mixed-severity fires (43–69 year intervals) occurred in stands dominated by Douglas-fir and grand fir. It is important to note that

tree ring research of historical fire frequency is generally conservative, as very-low-severity fires do not consistently produce fire scars.

Current Conditions

The current condition in each stand is characterized by assigning PVG, strata, and working group (USDA Forest Service 2004) to describe the existing forested vegetation. For this analysis, strata and PVG assignments were updated using the 2013 and 2014 walk-through survey data. Strata are groups of stands that are relatively homogeneous in age, productivity, and density (USDA Forest Service 2004) that can be used to assess landscape and stand-level conditions of forested and nonforested vegetation. Strata are combined into working groups sharing similar species composition and productivity. The strata and working group classifications comprise a snapshot of existing vegetative conditions and account for past management activities (such as timber harvest), as well as for natural disturbance events (such as wildfires). The PVG, strata, and working group data are compiled for the Project area and used to compare existing conditions with desired conditions (Table 3.2-5).

Nonlethal to Mixed-Severity Fire Regimes

Decades of commercial timber harvests have removed the larger and more fire-resilient tree species (such as ponderosa pine, Douglas-fir, and western larch), favoring species that are less fire resilient (grand fir). Fire suppression has led to a buildup of ground, surface, and canopy fuels and favored the maturation of less fire-resilient species. Recurrent commercial harvests, fire suppression, and grazing have led to:

- An increase in canopy densities
- A decrease in canopy base heights (height to live crown)
- A change in species composition, from a majority of more fire-resilient to less fire-resilient tree species
- An increase in ground and surface fuels

As a result, vegetation and fuel conditions are outside the historical range of natural conditions. Historically, the Project area's drier forest types (PVGs 1 and 2 and drier sites in PVG 5) have consisted of a diverse understory of grasses, forbs, and low shrubs, with a large-diameter, fire-resilient overstory; this condition has been maintained over time by frequent, low-intensity fires. The mixed-severity fire regimes of PVGs 3, 4, 5, 6, 7, and 11 have occurred in the Douglas-fir, grand fir, and whitebark pine communities.

The nonlethal areas of the Grays Creek Fire are now 7 years into the range of the historical fire return interval and in the next 5–7 years will have missed one interval (Table 3.3-2).

Lethal and Mixed 2 Severity

The PVGs historically experiencing stand replacement fires exhibit the least departure from historical conditions. Due to the long fire-return interval (an average of 221 years), these areas have not been significantly altered by modern fire suppression.

Table 3.3-2. Departure from historical fire return interval in the Project area excluding East Fork Weiser River subwatershed.

Historical Fire Regimes	Acres	Range of Historical Fire Return Intervals (years)	Average Historical Fire Return Intervals (years)	Missed Intervals
Nonlethal	5,423	5–25	15	6.8
Mixed Severity I	16,239	5–70	37.5	2.7
Mixed Severity II	14,822	70–300	185	0.6
Lethal	589	100–400	250	0

Notes:
These data assume aggressive suppression efforts since 1911; only 2 significant fire events are recorded within the Project area (i.e., 102 years of fire exclusion).
Potential vegetation groups (PVGs) falling into multiple regimes are split evenly between the regimes.

Approximately 21,662 acres of the Project area have missed two or more fire-return intervals. The extent to which a system has departed from historical conditions influences the extent to which key ecosystem components, critical to the integrity of the ecosystem, are altered. Within the Project area, many of the nonlethal and mixed-severity I fire regime acres have transitioned to mixed-severity II and lethal. This finding is consistent with the research performed on the Forest by Sanders (1998) and Barrett (1987, 1994a), which indicates a shift in the fire regimes.

This shift in fire regimes indicates that a higher percentage of Project area acreage would likely burn at higher severities, as well as in larger patch sizes, given a wildfire event. Table 3.3-3 displays the departure from historical fire return intervals and displays the current fire potential within the Project area. Uncharacteristic fire effects threaten desirable plant communities, ecological processes, and the ability to protect life, investments, and other valuable resources (Barrett et al. 2010).

Table 3.3-3. Current fire potential within the Project area.

Fire Regime	Fire Type	Flame Lengths (feet)		Rate of Spread (chains[a]/hour)	
		Surface	Canopy	Surface	Canopy
Nonlethal	Active Crown	11	44	108	90
Mixed Severity I	Conditional Crown	2/5[b]	45	5	90
Mixed Severity II	Conditional Crown	2/5[b]	37	5	85
Lethal	Conditional Crown	2	36	6	80

Source: Table results modeled via NEXUS 2.0.
[a] Chain equals 66 feet.
[b] Indicates professional opinion.

Weiser River Drainage, Management Area 3

Due to lack of disturbance, succession is moving the Weiser River drainage's stands outside their HRV. In the shrubland and grassland groups (mountain big sagebrush [*Artemisia tridentata vaseyana*] and bitterbrush), past fire exclusion and grazing impacts have contributed to old, decadent stand conditions that are less resilient to fire and other disturbances (USDA Forest Service 2003a, p. III-124).

3.3.4. Desired Condition

According to the Forest Plan (USDA Forest Service 2003a, p. III-38), the desired condition for fire management in the forest is as follows:

> Fire—both prescribed and wildland—is used as a tool to achieve and maintain vegetative conditions and desired fuel levels. Fire plays a natural role where appropriate and desirable, but is actively suppressed where necessary to protect life, investments, and valuable resources. Fire operates within historical fire regimes appropriate to the vegetation type and management objectives.

"Historical fire regime" represents a general classification of the role fire plays across a landscape in the absence of modern human mechanical intervention but including the influence of aboriginal burning (Agee 1993). Coarse-scale definitions for historical fire regimes have been developed by Hardy et al. (2001) and interpreted for fire and fuels management by Hann and Bunnell (2001). The four historical fire regimes recognized on the Forest are classified based on the average number of years between fires (fire frequency) and the effects on the dominant overstory vegetation (Table 3.3-3).

Because fire exclusion is the primary factor resulting in significant change in landscape condition, the desired condition can best be depicted via the historical fire regimes of each PVG within the Project area (Table 3.3-4). Historically, 49% of the Project area has experienced frequent fires (low severity, high frequency), 48% of the Project area has experienced less frequent fires of mixed severities, and only 3% of the Project area has experienced very infrequent fires of high severity (percentages only include vegetated acres within the Project area).

Table 3.3-4. Vegetation Groups (PVGs) within the Project area (acres and percent).

PVG	Acres within Project Area (National Forest System Lands Only)	Percent of Project Area
PVG 1—Dry Ponderosa Pine/Xeric Douglas Fir	254	<1%
PVG 2—Warm Dry Douglas Fir/Moist Ponderosa Pine	3,300	9%
PVG 3—Cool Moist Douglas Fir	0	0%
PVG 4—Cool Dry Douglas Fir	138	<1%
PVG 5—Dry Grand Fir	4,246	11%
PVG 6—Cool Moist Grand Fir	12,426	33%
PVG 7—Warm Dry Subalpine Fir	4,702	13%
PVG 8—Warm Moist Subalpine Fir	56	<1%
PVG 9—Hydric Subalpine Fir	576	2%
PVG 10—Persistent Lodgepole Pine	903	2%
PVG 11—High-Elevation Subalpine Fir	419	1%
Total Forested Vegetation	**27,020**	**73%**
Grassland/Shrubland	10,061	27%
Analysis Area Total (NFS Lands)	**37,081**	

Note: Acres represent all National Forest Lands within the Middle Fork Weiser River in the Project area excluding lands within the East Fork Weiser River subwatershed.

The PVGs were classified into fire regimes according to the Forest Plan and based on local knowledge of conditions in this Project area. Frequent fires in adjacent areas most likely spread into this landscape more frequently than they might have in other areas of the Forest.

3.3.5. Environmental Effects

3.3.5.1. Direct and Indirect Effects

Fuel Levels, Fire Regimes, and Ecological Processes and Shaded Fuelbreaks (SFB)

Alternative 1

The No-Action alternative would move conditions in the Project area further from desired conditions, primarily due to continued exclusion of fire from the ecosystem. Natural ignitions would not be capable of restoring fire, given multiple values at risk that are adjacent to the Project area. Without prescribed burning, fire frequencies will continue to decrease, severities will continue to increase, and fire regimes will continue to move away from historical conditions (Table 3.3-2). Additionally, risk to the public, private property, fire suppression crews, and other values within and adjacent to the Project area will continue to increase.

Alternative 2

Alternative 2 would significantly improve and maintain fire-regime conditions across approximately 24,236 acres where vegetation and fuels treatments, along with prescribed burning, are proposed (Table 3.3-5). Additional improvements in fire regime conditions would occur among the following:

- 24,236 acres of total prescribed burning (approximately 20% of these acres are nonforested grasslands). Types of prescribed burning proposed are:
  - 17,354 of mechanical and nonmechanical vegetation treatments followed by prescribed burning
  - 6,882 acres of prescribed burn only

Table 3.3-5. Acres of movement toward historical fire regimes within Middle Fork Weiser River, by alternative.

Historical Fire Regime	Vegetated Project Area Acres	Percent of Each Fire Regime Improved by Alternative (%)			
		Alternative 2	Alternative 3	Alternative 4	Alternative 5
Nonlethal	5,677	84	73	84	84
Mixed Severity I	16,152	65	42	73	73
Mixed Severity II	14,626	60	49	72	71
Stand Replacement	617	25	0	63	62
TOTAL/Percent of Project Area Improved	37,081	6	50	74	73

Note: We assume that stand treatments consisting of both thinning and burning would have the greatest impact in restoring fire regimes. Additionally, grasslands proposed for burning are included in these acres of improvement.

Treatments that only thin vegetation without the application of fire would aid in restoring historical fire regimes. The potential for sustained crown fire spread would be significantly reduced, but individual tree torching and uncharacteristically high severities remain as surface fuels and individual crown base heights remain low (Graham et al. 2004; Agee and Skinner

2005). Additionally, the ecological function of fire within this fire-dependent system would not be restored.

In areas where fire is the only treatment prescribed, fire regimes would move toward historical conditions, but changes in vegetative conditions within forested areas would occur at a slower rate than in areas thinned prior to the application of fire (Brown et al. 2004). In many of the drier habitat types that remain dominated by seral tree species, fire alone would sufficiently move current conditions toward desired conditions.

Where stand structure and species composition would be altered mechanically or by hand to restore desired conditions and where fire is reintroduced, fire regimes would move toward historical conditions at the greatest rate (Brown et al. 2004; Stephens and Moghaddas 2005; Agee and Skinner 2005).

Restoring vegetative structure and composition, as well as the primary disturbance process (fire), would improve the integrity of the landscape and its resilience to wildland fires; however, "ecosystem restoration treatment and fuel treatment are not synonymous" (Reinhardt et al. 2008). In some stand conditions, opening stands would increase the rates of spread and increase the average number of days that a stand would carry fire (due to reduction in both shading from the sun and sheltering from the wind). Restoring fire regimes within the Project area would alter predicted fire types from conditional to active crown fires, to primarily surface fires with passive crown fires.

Restoring historical fire regimes in fire-adapted systems leads to a multitude of desirable stand and landscape-scale effects (Keane et al. 2002), for example:

- Decreases in shade-tolerant tree species, increases in forage quality, increases in plant vigor and stand productivity, decreases in canopy cover, increases in early seral communities, decreases in landscape homogeneity, decreases in dominance of single patch type, and increases in patch diversity
- Decreases in vertical fuel ladders and their continuities, reduction in ground and surface fuel loadings, and increases in decomposition rates
- Decreases in fire intensities and severities, reduction in potential for crown fires (pre- and 1-year post-treatment fire behavior modeled using NEXUS version 2.0 and assuming stands are both thinned and burned):
    - Fire types would move from active or conditional crown fires to surface fires under historically representative weather and fuel conditions (see Table 3.3-6)
    - Surface flame lengths in the
        - historically nonlethal fire regimes would decrease from 11 to 3 feet
        - historically mixed-severity and stand-replacement fire regimes would decrease from 5 and 2 feet, respectively, to 1 foot
    - Rates of spread in the
        - historically nonlethal fire regimes would decrease from 108 to 21 chains per hour (1 chain equals 66 feet)
        - historically mixed-severity and stand-replacement fire regimes would decrease from 85 to 1 chain per hour

- Decreases in risk to the public, private property, suppression crew, and other values within and adjacent to the Project area

Table 3.3-6. Comparison of critical thresholds initiating crown fire conditions within units proposed for both treated and prescribed fires.

Fire Regime	Critical Fire Indices[a]	Current Conditions	Post Treatment Conditions
Nonlethal	Torching Index	0	61
	Crowning Index	18	25
	Flame Length Initiation	3	7
Mixed Severity I	Torching Index	29	100+
	Crowning Index	16	22
	Flame Length Initiation	3	7
Mixed Severity II	Torching Index	21	100+
	Crowning Index	19	32
	Flame Length Initiation	2	9
Stand Replacement	Torching Index	30	100+
	Crowning Index	20	34
	Flame Length Initiation	2	9

[a] Torching Index=the 20-foot wind speed at which some kind of crown fire (passive or active) is expected (miles/hour), Crowning Index=the 20-foot wind speed at which active crown fire is possible (miles/hour), Flame Length Initiation=the minimum surface fire flame length required to initiate some kind of crown fire (feet).

Alternative 3

Alternative 3 would significantly improve fire regime conditions across approximately 16,618 acres where vegetation and fuels treatments, along with prescribed burning, are proposed (Table 3.3-5). Additional improvements in fire regime conditions would occur among the following:

- 16,618 acres of total prescribed burning (approximately 18% of these acres are nonforested grasslands). Types of prescribed burning proposed are:
  - 10,909 of mechanical and nonmechanical vegetation treatments followed by prescribed burning
  - 5,658 acres of prescribed burn only

Additionally, 3,942 acres of mechanical and nonmechanical treatment with no prescribed burning is proposed, which will aid in restoring historical fire regimes. Hand and/or machine piling, followed by pile burning, would occur in areas of heavy fuel loading. The reduction of prescribed burning compared with the proposed action is due to economics, fire fighter safety, and the ability to keep fire out of the higher PVGs.

Direct and indirect effects of Alternative 3 on the indicator (acres moved toward the historical fire regime) are consistent with those found under Alternative 2, except in the amount of total acres improved. Changes in predicted fire type, flame length, and rates of spread remain constant between the action alternatives.

Alternative 4

Alternative 4 would significantly improve fire-regime conditions across approximately 27,435 acres where vegetation and fuels treatments, along with prescribed burning, are proposed (Table 3.3-5). Additional improvements in fire regime conditions would occur among the following:

- 27,435 acres of total prescribed burning (approximately 20% of these acres are nonforested grasslands). Types of prescribed burning proposed are:
    - 20,083 of mechanical and nonmechanical vegetation treatments followed by prescribed burning
    - 7,352 acres of prescribed burn only

Direct and indirect effects of Alternative 4 on the indicator (acres moved toward the historical fire regime) are consistent with those found under Alternative 2, except in the amount of total acres improved. Changes in predicted fire type, flame length, and rates of spread remain constant between the action alternatives.

Alternative 5

Alternative 5 would significantly improve fire-regime conditions across approximately 27,200 acres where vegetation and fuels treatments, along with prescribed burning, are proposed (Table 3.3-5). Additional improvements in fire regime conditions would occur among the following:

- 27,200 acres of total prescribed burning (approximately 20% of these acres are nonforested grasslands). Types of prescribed burning proposed are:
- 19,778 of mechanical and nonmechanical vegetation treatments followed by prescribed burning
- 7,422 acres of prescribed burn only

Direct and indirect effects of Alternative 5 on the indicator (acres moved toward the historical fire regime) are consistent with those found under Alternative 2, except in the amount of total acres improved. Changes in predicted fire type, flame length, and rates of spread remain constant between the action alternatives.

3.3.6. Minimum Road System

The No Action alternative would not designate a MRS for the Project area. All action alternatives would retain adequate miles of NFS road to access the Project area for fire suppression activities, as well as for use in fuels treatments through prescribed fire. Alternative 3 would provide the fewest miles of road for motorized access for fire suppression. Alternative 4 and Alternative 5 designate similar miles of NFS road and provide the most miles left on the landscape. However, Alternative 4 would provide the most miles of open roads (ML 2) for motorized access while Alternative 5 would put more of the roads into LTC (ML 1).

3.3.7. Cumulative Effects

Cumulative effects were assessed over the last century and the following 3 decades of activities. Greater emphasis has been given to more recent activities. Cumulative effects were analyzed within the Project boundaries and the area adjacent (within 1 mile) to the Project area perimeter. Actions occurring outside this analysis area are not likely to affect the fire and fuels indicators associated with the Project. None of the action alternatives would affect wildfire susceptibility (i.e., fuel loads, ladder fuels, and stand densities) that overlap in time and space with similar effects outside the Project area. These treatments might decrease the likelihood of a fire to spread into untreated areas, but they would not affect how those areas would burn if the fire reached them. Essentially, cumulative effects on the fire and fuels indicator remain constant across all

action alternatives. Differences lie within acres moved towards historical fire regimes and associated effects. These effects are discussed in the direct and indirect effects analyses.

3.3.7.1. Past Fire Suppression

The need for this Project is in part a result of past fire-suppression actions. It is most likely that fires will continue to be managed with a suppression objective due to the immediate values at risk (e.g., adjacent private, State, and Bureau of Land Management-managed lands) and Fire Management Plan direction. Therefore, restoring/maintaining the historical fire regimes within the Project area would be accomplished primarily through management ignitions.

3.3.7.2. Past Timber Harvest

The need for this Project is partly a result of past timber harvests. Past harvests favored the removal of large fire-adapted species and left less fire-tolerant size classes and species. This contributed to the altered fire severities across the Project area, moving primary fire severity from low to mixed and from mixed to high.

3.3.7.3. Timber Stand Improvement/Precommercial Thinning

Current and future thinning activities consistent with the current Forest Plan would aid in moving conditions toward desired/historical conditions because the thinning prescription would support the development of vegetative structure and composition of conditions defined in Appendix A of the Forest Plan (USDA Forest Service 2003a). The current condition of many of these plantations is not conducive to supporting historical fire frequencies and severities (i.e., fire severities are likely to be much higher than those within the historical range).

3.3.7.4. Range Allotment and Historical Livestock Use

Livestock use has led to minor effects on the fire regimes within the Project area, both positive and negative. Grazing decreases the available flashy fuels contributing to fire spread. Therefore, grazing may decrease the amount of fire (natural disturbance) across the landscape, but this may benefit efforts to protect local values at risk.

3.3.7.5. Noxious Weeds and Invasive Plant Management

Noxious weeds have the potential to affect the fire regime, but due to their limited densities and current weed management actions, weeds are not likely to impact the fire regime. Weeds will be inventoried, monitored, and treated accordingly.

3.3.7.6. Past and Ongoing Activities within and Adjacent to the Project Area

A number of vegetation management activities besides timber harvests have occurred in the Project area. These include prescribed burning and timber stand improvement (NCT). Past activities have been included in the development of the alternatives and in the analysis of effects.

No current Forest Service contracts or projects exist in the Project area; however, Potlach had active timber sale contracts in 2016.

3.3.7.7. Private Lands and Other Ownerships

Private lands and lands adjacent to the Project area that are managed by other agencies have led, and will continue to lead, to the suppression of wildland fires within and outside the Project area. This will result in a constant demand for prescribed burning in order to support efforts to restore/maintain the historical fire regime.

3.3.8. Irreversible and Irretrievable Commitments

Regarding fire and fuels management, there are no irreversible or irretrievable commitments under any of the action alternatives.

3.3.9. Forest Plan Consistency

All four action alternatives are consistent with the Forest Plan direction for fire management Standards and Guidelines. These action alternatives would move the current conditions toward desired conditions.

3.3.10. Project Record

This FEIS hereby incorporates by reference the fire and fuels specialist report in the Project record (40 CFR 1502.21). The report is located in the Fire and Fuels section of the Project record and contains the data, methodologies, analysis, maps, references, and technical documentation that the specialist relied on to reach the conclusions in this FEIS.

3.4. Wildlife Resources

This section describes existing conditions of the wildlife resources in the Project area and addresses the effects of three action alternatives and the No Action alternative on wildlife species and habitats, with respect to the indicators and measurements identified in Chapter 1.

3.4.1. Analysis Scale and Data Sources

3.4.1.1. Analysis Area

The wildlife analysis area for baseline conditions and direct and indirect effects is the Project area. The analysis area for Canada lynx is based on LAUs, following the *Canada Lynx Conservation Assessment and Strategy* (Ruediger et al. 2000) and as developed for the Forest Plan (USDA Forest Service 2003a), in consultation with the USDI FWS. The analysis of wolverine habitat is based on a persistent snow model (Copeland et al. 2010) that extends outside the Project area. The cumulative effects wildlife analysis area is the Project area, plus the Council Mountain IRA. The IRA totals 16,568 acres, of which 7,916 acres occur in the Project area.

3.4.1.2. Temporal Scale

Time frames were defined in the Forest Plan as temporary (0–3 years), short-term (3–15 years), and long-term (>15 years). These time frames are used to qualitatively define the effects of management actions on the wildlife resource.

3.4.1.3. Data Sources

Appendix A of the Forest Plan identifies desired conditions for tree size class, canopy cover class, species composition, snags, and CWD, using the HRV as the reference condition (USDA Forest Service 2003a). Effects to these desired conditions are analyzed in Section 3.2 of this FEIS. These same components are used to predict changes in modeled habitat for wildlife species at a landscape scale. Project and site-specific data on patterns of habitat distribution and specific habitat features are used for the wildlife analysis. For many wildlife species, the complexity of habitat structure and juxtaposition with other resources adds a level of fine-scale analysis that is simply not possible to conduct at the landscape scale. Wildlife species of concern analyzed for this Project include ESA-listed species, Region 4 Sensitive species, and MIS.

Expected changes in habitat and potential effects resulting from the proposed alternatives to wildlife species of concern were developed using habitat models designed for the 2003 Forest Plan revision. These wildlife habitat models were created using the best available science, including recent literature, PNF wildlife research data, Rocky Mountain Research Station research data, University of Idaho research data, PNF survey progress reports, and other collaborative survey information. A summary of modeling parameters for habitat for each species analyzed is documented in the Project record. The Project silviculturist (Section 3.2) provided vegetation data for the habitat models; habitat modeling was verified by field review of a representative sample of forested stands in 2014 and 2015, coupled with documented wildlife species observations and numerous field surveys for wildlife species of concern. The baseline data for this analysis were drawn from the following wildlife species records:

- Forest Service corporate database, Natural Resources Inventory System (NRIS) Wildlife

- IDFG database, Idaho Fish and Wildlife Information System (IFWIS)

Wildlife surveys have been conducted in different portions of the Project area for many years, with applicable inventory data documented in the Project record. The Project area contains 14 Forest Plan MIS transects for white-headed and pileated woodpeckers.

3.4.2. Measurements and Indicators

Objective: Project Objective 5 is to improve habitat for Family 1 wildlife species, as represented by the white-headed woodpecker, a Region 4 Sensitive species and Forest MIS, by restoring Forest conditions that contribute to modeled habitat for these species. Forested stands providing these modeled habitats should be restored to desired conditions within, or near, the HRV (Hollenbeck et. al. 2011).

Measurement:

Quantity and quality of Family 1 habitat – white-headed woodpecker modeled habitat restored to conditions within HRV. Quantity is measured by acres of PVGs 2, 5, and portions of PVG 6 in the LTSC and low canopy cover class. Quality is measured by the presence of old forest characteristics (e.g., legacy trees, snags, CWD, canopy gaps, understory patchiness), as described in the Forest Plan (USDA Forest Service 2003a).

The following issues were identified as affecting wildlife in the Project area; the indicators for each issue statement were used to compare alternatives.

Issue Statement:

High open road densities affect all wildlife security (especially elk) and can lead to the removal of important habitat components (e.g., snags).

Indicators:

- Changes in the number, size, and distribution of elk security areas (Hillis et al. 1991)
- Effects of opening closed roads to allow for additional firewood harvest

(Based on the description in Section 2.2.2.1 for "Firewood Availability," it was determined that the effects are adequately addressed on a road-by-road basis, and that this indicator needs no further analysis for wildlife.)

- Estimated effectiveness of road closures and/or road decommissioning
- Miles of NFS roads and unauthorized roads decommissioned by (1) physical closure and (2) obliteration

Issue Statement:

Treatments may adversely affect modeled habitat for wildlife species dependent on mixed-conifer forests with multi-layer structural characteristics. Such forests are associated with mixed to lethal fire regimes and associated processes (larger-scale habitat alterations caused by insect and disease outbreaks and fire effects). Wildlife species of concern include ESA-listed species, Region 4 Sensitive species, and MIS.

Background: A primary need, Forestwide and in the Project area, is to maintain and promote dry, lower-elevation, large-tree and old forest for the associated wildlife species and to reduce habitat fragmentation, which negatively affects wildlife species of concern. The processes,

function, patch size, and diversity of forested habitats must all be considered, in order to properly address wildlife habitat needs.

Indicators:

- Quantity (acres) and distribution of modeled habitat for wildlife species of concern
- Quality (specifically old forest, snags, patch, and pattern) and distribution of modeled habitat for wildlife species of concern

Issue Statement:

Project activities (logging, log haul, prescribed burning, and temporary road construction) may cause disturbance to wildlife species of concern.

Indicators:

- Disturbance effects on wildlife species of concern

3.4.3. Desired Condition and Forest Plan Direction

3.4.3.1. Desired Condition

The desired condition for wildlife resources identified in the Forest Plan (USDA Forest Service 2003a) is that, "the amount, distribution, and characteristics of vegetation are present at levels necessary to maintain viable populations of native and desired non-native species." This desired condition for wildlife ties to the desired vegetation conditions identified in Appendix A of the Forest Plan (USDA Forest Service 2003a, Appendix A), with a goal of supporting diverse wildlife habitats.

3.4.3.2. Forest Plan Direction

Forestwide Goals, Objectives, Standards, and Guidelines for wildlife resources are found in the Forest Plan (USDA Forest Service 2003a, pp. III-8 to III-15 and III-25 to III-28). Forest Plan direction (Standards and Guidelines) specifically applicable to the Project for wildlife resources is listed below; Goals are listed in Section 1.5.1.

Standards

- TEST06—Management actions shall be designed to avoid or minimize adverse effects on listed species and their habitats.
- TEST12—Vegetative management activities within lynx foraging habitat in LAUs shall not degrade, nor retard attainment of, desired habitat for the lynx and its prey.
- TEST15—Unless a broad-scale assessment has been completed that substantiates different historical levels of unsuitable habitat, limit disturbance within each LAU as follows: If more than 30% of lynx habitat within a LAU is currently in unsuitable condition, no additional habitat may be changed to unsuitable habitat as a result of vegetative management projects. Fire use, or fire hazard reduction and associated vegetation management activities within the WUI watersheds, that develop or maintain fuel profiles needed to reduce the risk of wildfire threats to the WUI areas, are NOT bound by this standard. (This standard refers to the requirements for lynx management

presented in the Canada Lynx Conservation Assessment and Strategy [2000 LCAS, Ruediger et al. 2000])

- WIST02—Design and implement projects within occupied habitats of Sensitive wildlife species to help prevent them from becoming [Federally] listed.
- WIST03—Mitigate management actions within known nesting or denning sites of MIS or Sensitive species, if those actions would disrupt the reproductive success of those sites, during the nesting or denning period.
- WIST05—In goshawk territories with known active nest stands, identify alternate and replacement nest stands during project-level planning, when it is determined that the proposed activity is likely to degrade nest stand habitat. (This Standard refers to the requirements for northern goshawk management presented in the Management Recommendations for the Northern Goshawk in the Southwestern United States [Southwest Guidelines, Reynolds et al. 1992)

Guidelines

- WIGU01—Vegetation management should consider the following habitat conditions or features:
  - The amount, quality, and distribution of habitats;
  - Fragmentation within habitats;
  - Juxtaposition and connectivity to other habitats;
  - The influence of road-related degradation; and
  - Ecosystem processes that develop and modify habitat.
- WIGU05—Habitat should be determined for MIS or Sensitive wildlife species within or near the Project area. Surveys to determine presence should be conducted for those species with suitable habitat.
- WIGU07—Use appropriate research to help define active, alternate, and replacement nest stands for goshawks and for configuration of PFAs.
- WIGU08—Big game (Rocky Mountain elk) vulnerability to road-related mortality should be evaluated during mid-, fine-, or site/project-level travel management planning to help assess effects of potential travel management decisions on state population objectives.
- WIGU09—Even-aged regeneration cuts should be considered to provide big game hiding cover when the vegetation conditions in the unit meet the definition of hiding cover in the Glossary.
- WIGU11—Management actions should neither degrade nor retard attainment of winter range desired conditions except where outweighed by demonstrable short- or long-term benefits to winter range or where the Forest Service has limited authority.

- WIGU12—Calving and fawning areas should be protected from project-related disturbance during big game calving or fawning. Calving/fawning areas and periods should be determined during site/project-level planning.
- WIGU13—To address big game (Rocky Mountain elk) vulnerability to mortality, components of habitat security should be identified and managed during project planning and implementation.
- WIGU14—To address big game (Rocky Mountain elk) stress and exposure during critical wintering periods, thermal cover components on winter/spring ranges should be identified and managed during project planning and implementation. Management requirements or mitigation measures needed to maintain these components should be determined during site/project-level planning. As a general guideline, at least 15% thermal cover should be retained on big game winter ranges where this cover presently exists. Cover should be maintained in at least 30-acre patch sizes where available. Thermal and hiding cover may or may not occur on the same acres.

The Project area is in MA 3; additional wildlife management direction pertinent specifically for this MA includes the following Objectives and Guideline (USDA Forest Service 2003a; pp. III-132–133):

Management Area 3 Objectives

- Objective 0333—Improve enforcement of year-long and seasonal road closures through signing and on-the-ground patrols to allow for improved big game security.
- Objective 0334—Coordinate with IDFG to reduce bull elk vulnerability through the use of security areas and reductions in open road density to move toward State herd composition objectives.
- Objective 0335—Maintain or restore the quality and abundance of forage in the Mountain Big Sagebrush and Bitterbrush vegetation groups to improve big game winter/spring range habitat.
- Objective 0337—Increase white-headed woodpecker habitat by managing ponderosa pine stands within the Dry Ponderosa Pine/Xeric Douglas-fir, Warm Dry Douglas-fir/Moist Ponderosa Pine, and Dry Grand Fir vegetation groups toward the desired ranges of size classes, canopy closures, species composition, snags, and CWD, as described in Appendix A [of the Forest Plan]. The ranges of these components may vary by management prescription.
- Objective 0338—Increase flammulated owl habitat by managing ponderosa pine stands within the Warm Dry Douglas-fir/Moist Ponderosa Pine and Dry Grand Fir vegetation groups toward the desired ranges of size classes, canopy closures, species composition, snags, and CWD, as described in Appendix A [of the Forest Plan]. The ranges of these components may vary by MPC.

Management Area 3 Guidelines

- Guideline 0341—An increase in the white-headed woodpecker or flammulated owl habitat may be achieved by the following methods: a) Reducing tree densities and ladder

fuels under and around existing large ponderosa pine trees and snags to reduce the risk of stand replacing fire and to restore more open canopy conditions and b) Managing the firewood program to retain large-diameter ponderosa pine and large snags of other species through signing, public education, size restriction, area closures, or other appropriate methods.

Modeled Habitat

The wildlife analysis developed for the Project compares modeled habitat conditions that existed prior to Euro-American settlement (HRV) (Morgan and Parsons 2001; Morgan et al. 1994), with the level of change in those habitats, as noted in currently existing landscape conditions (Wisdom et al. 2000). Most of the species-specific modeling parameters were developed at the mid-scale level, in this case Forest level, with focus on PVG class, predominant species type, and canopy cover. Qualitative analysis at the Project level, tiered to the predictive modeling results, provides the primary wildlife analyses.

A fundamental concept of the 2003 Forest Plan and the wildlife analysis for this FEIS is that if the amount and structure of modeled habitats across landscapes are within the HRV, wildlife species associated with these habitats would have a greater likelihood of sustainability than if the amount and structure of modeled habitats across landscapes are outside of their HRV. The desired condition for wildlife habitats on the Forest is to be within the HRV.

Habitat Families

Our analysis groups modeled habitats for terrestrial wildlife species. These modeled habitat groups fit into a hierarchical system of four broad Habitat Suites: (1) Forest Only; (2) Combination of Forest and Rangeland; (3) Rangeland Only; and (4) Riverine and Non-riverine Riparian and Wetland. These four Suites are further refined by categorizing similar modeled habitats into 14 Habitat Families: Families 1–4 are within Suite 1, Families 5–9 are within Suite 2, Families 10–12 are within Suite 3, and Families 13 and 14 are within Suite 4. Habitat families are a collection of species that share similarities in modeled habitats, which are arranged along major vegetative themes, such as ecological communities, vegetative structure, and fire regime.

A key finding of the analysis was that wildlife species associated with low- to mid-elevation ponderosa pine forests had experienced the greatest loss of habitat, compared with historical conditions, and that these habitats should have the highest priority for restoration activities. These wildlife species and habitats are grouped into Habitat Family 1. It is understood that managing for species of highest priority for habitat restoration may reduce the availability or quality of habitats for other wildlife species with a lower restoration priority.

The wildlife analysis is structured to reflect the relationship between Project effects on habitat families and Project effects on focal species.

Focal Species

Focal species are selected from habitat families to represent Key Environmental Correlates (KEC) and ecological functions that may be affected by management activities. KEC are the biotic, or abiotic, habitat elements that species use on the landscape, to survive and reproduce. Key Ecological Functions (KEFs) are the set of ecological roles performed by a wildlife species in its ecosystem. These ecological roles are the primary ways organisms use, influence, and alter their biotic and abiotic environments.

Focal species are used in this Project to address expected or potential changes to these ecosystem attributes. The focal species concept is discussed more extensively in the ICBEMP (Wisdom et al. 2000) and in Raphael et al. (2000).

3.4.4. Analysis Methodology

The wildlife analysis addresses forested habitat, or habitat components, for wildlife species in Family 1 (Low Elevation, Old Forest [OF]), Family 2 (Broad Elevation, OF), Family 3 (Forest Mosaic), Family 5 (Forest and Range Mosaic), and Family 12 (Grassland/Open Canopy Sage). Of these five habitat families, 14 wildlife species were identified as focal species for evaluation in this FEIS. These wildlife species include the white-headed woodpecker, pileated woodpecker, flammulated owl, American three-toed woodpecker (*Picoides tridactylus*), black-backed woodpecker (*Picoides arcticus*), boreal owl (*Aegolius funereus*), fisher (*Martes pennanti*), great gray owl (*Strix nebulosa*), northern goshawk, Canada lynx, mountain quail (*Oreortyx pictus*), wolverine (*Gulo gulo luscus*), Rocky Mountain elk (*Cervus elaphus*), and northern Idaho ground squirrel (*Urocitellus brunneus brunneus*).

The remaining species of concern are all Region 4 Sensitive species, but they were not chosen as focal species because either habitat for these excluded species does not exist in the Project area or modeled habitat exists but the wildlife species has not been documented in the Project area. These species were analyzed to the extent necessary to meet disclosure requirements under NEPA, based on their population status. These species are discussed in the Wildlife Specialist Report, located in the Project record.

Wildlife species considered for analysis in the Project area include animals listed under the ESA of 1973, as amended; animals classified as Proposed or Candidate species for listing under ESA; animals classified as Forest Service Region 4 Sensitive species; Forest Species of Special Interest (SOSI); animals designated as MIS; and animals selected as focal species (Table 3.4-1). These species are grouped by Habitat Suite and Family. Although 25 wildlife species are listed in Table 3.4-1, not all of these species are included in the landscape analysis, as noted above. Species occurrence records and survey data are valid through October 2015. A Biological Assessment (BA) will be prepared for ESA-listed wildlife species (Threatened species: Canada lynx and northern Idaho ground squirrel; Proposed species: wolverine) and will be included in the Project record. No Endangered or Candidate wildlife species occur in the Project area.

Except for Canada lynx, northern Idaho ground squirrel, and wolverine, the landscape analysis for wildlife species consists of a comparison of acreages: the acres of PVGs, combined with tree size class and canopy cover, that typically support modeled habitat for a given wildlife species at current conditions, compared with the acres of habitat that would receive restoration treatments for each action alternative. The wildlife maps prepared for the analysis of alternatives show the polygons of modeled habitat by combined PVGs for each species, split between polygons that would receive vegetation treatment and those polygons that would not receive vegetation treatment. Any habitat polygons that would show improvement by the treatment, thus fitting the modeled parameters, would be included with the polygons that were not treated. The wildlife tables for each species show the acres of modeled habitat by PVG that would not receive vegetation treatment or be improved as a result of the treatment.

Table 3.4-1. Wildlife species and habitat considered for analysis in the Project area.

Suite	Habitat Family	Focal Species Considered in this Analysis	Species Status[a]	Status in the Project Area
Forest Only	1—Low Elevation, Old Forest	White-headed Woodpecker	S/MIS	Payette National Forest (PNF) Management Indicator Species (MIS), focal species for Habitat Family 1. Species and habitat occurs in the Project area.
	2—Broad Elevation, Old Forest	American Three-toed Woodpecker	S	Habitat occurs in the Project area. Dependent mostly on disturbance events, such as fire or insect infestation. Species observed in the Project area. Selected focal species.
		Black-backed Woodpecker	SOSI	Habitat occurs in the Project area. Dependent mostly on disturbance events, such as fire or insect infestation. Proposed as focal species for Family 2–disturbance events. Species observed in the Project area. Selected focal species.
		Boreal Owl	S	Habitat occurs mostly at higher elevations in the Project area. No known occurrences. Selected focal species.
		Fisher	S	Habitat occurs in the Project area. No known occurrences. FWS is reviewing this species, to see if warranted for ESA listing. Selected focal species.
		Flammulated Owl	S	Species and habitat occurs in the Project area. Selected focal species.
		Great Gray Owl	S	Species and habitat occurs in the Project area. Selected focal species.
		Northern Goshawk	S	Species and habitat occurs throughout the Project area. Selected focal species.
		Pileated Woodpecker	MIS	Species and habitat occurs throughout the Project area. Selected focal species.
	3—Forest Mosaic	Canada Lynx	T	Endangered Species Act (ESA) listed—Threatened. Middle Fork Weiser Lynx Analysis Unit (LAU) in watershed. No lynx reported in or near the Project area. Selected focal species.
		Mountain Quail	S	Species and habitat (i.e., riparian areas) occurs in the Project area. Selected focal species.
		Wolverine	PT	Habitat present in the Project area. Potential denning habitat (i.e., high-elevation cirques, talus slopes, and forests) present. No known observations in the Project area. Selected focal species.

Suite	Habitat Family	Focal Species Considered in this Analysis	Species Status[a]	Status in the Project Area
Combination of Forest & Rangeland	5—Forest & Range Mosaic	Gray Wolf (Species not analyzed in EIS)	S	Habitat present in the Project area. Relies on appropriate prey species management (see elk discussion). Up to three packs of wolves may occupy the Project area.
		Peregrine Falcon (*Falco peregrinus*) (Species not analyzed in EIS)	S	Extremely limited habitat occurs in the Project area. No known nesting sites in the Project area. No recent observations in the Project area.
		Rocky Mountain Bighorn Sheep (*Ovis canadensis*) (Species not analyzed in EIS)	S	Modeled summer range habitat exists on east and south portions of Project area. No known observations in the Project area.
		Rocky Mountain Elk	SOSI	PNF Species of Special Interest (SOSI) and Idaho Department of Fish and Game (IDFG) species of concern. Habitat present throughout the Project area. Population managed by IDFG; habitat managed by Forest Service. Selected focal species.
	7—Forests, Woodlands, & Sagebrush (Not addressed in the analysis)	Spotted Bat (*Euderma maculatum*) (Species not analyzed in EIS)	S	No suitable roost sites known within approximately 30 miles of the Project area. No known observations in the Project area.
		Townsend's Big-eared Bat (*Corynorhinus townsendii*) (Species not analyzed in EIS)	S	Habitat present in the Project area. No known observations in the Project area.
Rangeland Only	11—Sagebrush (Not addressed in the analysis)	Greater Sage Grouse (*Centrocercus urophasianus*) (Species not analyzed in EIS)	S	ESA status—Removed from Candidate Species List. Remains a R4 Sensitive species. No habitat in the Project area. No known populations on the Forest, but could provide sites for birds moving between occupied sites off-Forest.
	12—Grassland/ Open-Canopy Sagebrush	Columbian Sharp-tailed Grouse (*Tympanuchus phasianellus columbianus)* (Species not analyzed in EIS)	S	No habitat in Project area. No known observations in the Project area.

		Northern Idaho Ground Squirrel	T	ESA listed—Threatened. Modeled habitat present in the Project area. No known observations in the Project area.

Suite	Habitat Family	Focal Species Considered in this Analysis	Species Status[a]	Status in the Project Area
Riverine & Non-riverine Riparian & Wetland	13—Riverine Riparian & Wetland(Not addressed in the analysis)	Bald Eagle (*Haliaeetus leucocephalus*) (Species not analyzed in EIS)	S	Riverine habitat present in the Project area. Species observed in the Project area. No known nests in the Project area.
		Columbia Spotted Frog (*Rana luteiventris*) (Species not analyzed in EIS)	S	Habitat occurs in riparian & wetland areas. Species documented in the Project area.
		Harlequin Duck (*Histrionicus histrionicus*) (Species not analyzed in EIS)	S	Habitat present in some low-gradient sections of the Project area. No known observations in the Project area.
		Yellow-billed Cuckoo (*Coccyzus americanus*) (Species not analyzed in EIS)	S	No modeled habitat in the Project area. No known observations on the PNF, West Zone.

[a]Species Status (USDI FWS 2010): T = ESA Threatened; PT = ESA Proposed Threatened; S = Region 4 Sensitive; MIS = Payette National Forest Management Indicator Species; SOSI = Payette National Forest Species of Special Interest

3.4.5. Affected Environment

Due to the reliance of many terrestrial wildlife species on old forest and snags, this section begins with a discussion of these important habitat components and their presence in the Project area. This important habitat component discussion is followed by descriptions of current conditions of modeled habitats for wildlife species in Habitat Family 1 (white-headed woodpecker); Family 2 (pileated, three-toed, and black-backed woodpeckers, flammulated and boreal owls, and fishers); Family 3 (Canada lynx, mountain quail, and wolverine); Family 5 (Rocky Mountain elk); and Family 12 (northern Idaho ground squirrel).

3.4.5.1. Old Forest

Old forest is an important habitat condition that provides denning, nesting, foraging, and cover habitats for many wildlife species. Old forest is characterized by old trees in the LTSC. Historically, large tree stands (medium tree stands in persistent lodgepole pine) were common in forested landscapes of the Idaho Batholith and were maintained by frequent disturbances, such as wildfire, insect infestation, disease, and windthrow (USDA Forest Service 2003a, page A-21). Stands identified with, or trending toward, old forest may be treated to enhance old forest characteristics or to improve the probability of the stand trending toward old forest. For example, a stand identified as trending toward old forest may be treated by removing a number of smaller-diameter trees in order to promote growth of the larger trees in the stand. Also, “to meet viability for large-tree-dependent terrestrial species,” a threshold was adopted in the Forest Plan that requires 20 percent of the Forest stands to be in the LTSC to provide for the “viability and

biodiversity needs for goshawk and other forest-dependent wildlife species that require one or more components of the large tree size class" (USDA Forest Service 2003a, page A-22).

3.4.5.2. Snag Habitat

For many wildlife species, snags—particularly large-diameter snags—are an important habitat component. In general, snag numbers are higher when away from open roads, in dense stands where competition for resources makes trees less vigorous and less able to resist insect and disease damage, and in areas where wildfires have occurred. The information presented in this EIS is based on recent Forestwide inventories. Across the west side of the Forest (west side), where the Project area is located, snag numbers are generally within the desired condition, but in some areas snags are lacking, due to the influence of roads, stand-replacement wildfires, or previous harvest activities.

Snag numbers are often found to be below historical or desired conditions in roaded areas managed for timber products or in areas accessible to firewood cutters (Thomas 2002; Zarnowitz and Manuwal 1985; Mannan et al. 1980). Road densities are much higher on the west side than the east side of the Forest, and while snag numbers are within the HRV on the west side, a notable difference in snag numbers exists between the two sides of the Forest. Of the seven PVGs with sufficient data from the west side of the Forest, five (PVGs 2, 4, 5, 6, and 10) are within the HRV, and PVGs 7, 8, and 9 are above the high end of the range for the number of snags per acre by tree diameter group. In the Project area, snag levels could be above the desired condition, due to the large number of snags produced by the Grays Creek Fire in 2007.

In timber MAs, an emphasis on spacing to increase growth likely has resulted in unnatural snag distributions, such as isolated snags, rather than snags in clumps. Cavity-nesting birds tend to select snags in clumps rather than those uniformly spaced (Saab and Dudley 1998). Snags in managed areas have also been found to be more homogenous in size and decay class than would be expected under more natural conditions (Spiering and Knight 2005).

Despite these concerns, assuming that the west side inventory data are applicable to the Project area, the anticipated number of snags per acre, at current condition, is within or above the desired range in almost all snag size classes for most PVGs. An exception would be for PVGs 2, 4, and 5 because these forest types have been heavily managed in the past.

Snag numbers should remain at desired levels throughout this Project, because current snags are to be left standing and implementation activities will create additional snags from harvest and prescribed fire tree mortality. The Forest Plan (USDA Forest Service 2003a, page A-8) recognizes that "management actions should result in both short-term and long-term replacement of snags by retaining sufficient number of live trees, including those with broken tops, cavities, lightning scars, dead portions, etc., as future recruitment."

3.4.5.3. Habitat Family 1—Low-Elevation, Old Forest

Family 1 includes wildlife species associated with low elevation, old forest vegetation types and has been identified as a habitat family of greatest conservation concern due to widespread and substantial declines in habitat quantity across their range (Mellen-McLean et al. 2013; Northwest Power and Conservation Council [NPPC] 2004; Ritter 2000; Wisdom et al. 2000).

Family 1 wildlife species depend on single-story and, to a lesser extent, multistory, lower-elevation old forest stands as source habitats (Wisdom et al. 2000). Family 1 source habitat occurs in large tree, low canopy cover conditions in PVGs 1, 2, 3, and 5, and in those habitat

types of each PVG (Wisdom et al. 2000). Historically, these habitat types were maintained in a relatively open condition by frequent, nonlethal fire.

Timber harvest and exclusion of low-intensity frequent fires have altered or removed habitat and changed natural disturbance regimes, contributing to widespread declines in Family 1 source habitat on the Forest and in the Project area. The 2007 Grays Creek Fire (12,685 acres within the Project area) burned uncharacteristically and altered approximately 11,109 acres of Family 1 modeled habitats. Past timber harvest removed large-diameter ponderosa pine and, coupled with fire suppression, resulted in higher ladder fuel levels in the understory and greater proportions of climax tree species (i.e., grand fir) compared with historical conditions. Based on the concepts developed from the ICBEMP (Wisdom et al. 2000), open, large-tree, ponderosa pine modeled habitats are less common than historically occurred in the Project area. Past timber harvest activities also created a road network that persists today and provides access for removal of snags from Family 1 habitat, mostly for firewood harvest by the public.

The landscape occurs in the Middle Fork Weiser River 5th HUC watershed, which is a high priority watershed for Family 1 habitat restoration. These areas are a restoration priority, because they include white-headed woodpecker observations and nesting or remnant patches of low-elevation, late-seral, forest habitat required by white-headed woodpeckers. The amount of modeled habitat for the white-headed woodpecker has decreased from the HRV in this watershed.

White-headed Woodpecker

The white-headed woodpecker is a Region 4 Sensitive species, a PNF MIS, and an IDFG species of greatest conservation need. The white-headed woodpecker is a regional endemic species of the Interior Northwest and may be particularly vulnerable to environmental change because it occurs in limited distribution, with narrow habitat requirements in dry conifer forests. The white-headed woodpecker was selected as a focal species for Habitat Family 1 because it is believed to represent the KEC and KEF of this family. The KECs for the white-headed woodpecker include forested habitats comprised of legacy trees, live trees, and snags ≥15 inches DBH (O'Neil et al. 2001; Marcot 1997). White-headed woodpeckers use the dead parts of live trees, as well as existing tree cavities, despite their status as primary excavators (Mellen-McLean et al. 2013; O'Neil et al. 2001).

The white-headed woodpecker is closely tied to mature ponderosa pine forests with live and dead ponderosa pine trees ≥20 inches DBH in open canopy conditions (Mellen-McLean et al. 2013; Dixon and Wasniewski 1998; Blair and Servheen 1995; Frederick and Moore 1991).To meet their various ecological needs, white-headed woodpeckers also require heterogeneous landscapes characterized by a mosaic of open- and closed-canopied ponderosa pine forest (Wightman et al. 2010; Hollenbeck et al. 2011). Nesting habitat includes an interspersion of open (10-40%) and closed (> 40%) canopy, in burned and unburned forest, with large diameter snags and an average of 14 large pines (>21 inches DBH) at successful nest sites (Hollenbeck et al. 2011; Wightman et al. 2010).

The KEFs are the set of ecological roles performed by a species in its ecosystem. These ecological roles are the main ways organisms use, influence, and alter their biotic or abiotic environments. The KEFs for the white-headed woodpecker are as a primary consumer of ponderosa pine seeds and a secondary consumer of terrestrial invertebrates (O'Neil et al. 2001; Marcot 1997). White-headed woodpeckers forage on insects throughout the summer months. During the fall and early winter, conifer seeds supplement the insect diet. Large diameter, and typically older, ponderosa pine are important because they contain the cones, bark cracks, and

crevices to support insects. Late summer through winter, ponderosa pine seeds are the primary food source for white-headed woodpeckers, but seeds from other tree species may help provide a consistent food supply. White-headed woodpeckers also play an ecological role in excavating cavities and in tree seed dispersal (Garrett et al. 1996).

Current Condition

Modeled habitat for white-headed woodpeckers is defined as occurring in PVGs 1, 2, 3, 5, or 6, with large tree size class and low canopy cover class. Approximately 742 acres of modeled white-headed woodpecker habitat on NFS lands are currently identified in the Project area (Table 3.4-2, Figure 3.4-1). Only 17 acres of white-headed woodpecker modeled habitat occur on private lands in the Project area, likely due largely to extensive past timber harvests that removed large ponderosa pine. As shown in Figure 3.4-1, white-headed woodpecker modeled habitat stands are small, fragmented, and widely distributed, which does not meet the guiding Wildlife Conservation Principles (Thomas et al. 1990) presented at the beginning of Section 3.4.6 Environmental Effects.

Table 3.4-2. Acres of white-headed woodpecker modeled habitat at current condition by tree size/canopy cover classes and Potential Vegetation Group (PVG) in the Project area.

Tree Size/Canopy Cover Class	PVG 1	PVG 2	PVG 3	PVG 5	PVG 6	Totals
Large/Low National Forest System Lands	79	104	0	228	331	742
Large/Low Private Lands	5	12	0	0	0	17
Total All Ownership	**84**	**116**	**0**	**228**	**331**	**759**

In PVGs 2, 5, and 6, less than 15% of large tree stands are currently in the low canopy cover class. This level is far below the desired range of large tree stands for PVG 2 (74–94%) and PVG 5 (25–45%). The PVG 6 LTSC stands are within the desired range (0–20%) in the low canopy cover class. However, the model does not account for microsite habitat components that may influence use patterns by individual birds. For example, research indicates that nest trees for white-headed woodpeckers are usually within 300 feet of a dense stand of trees (Hollenbeck et al. 2011; Hollenbeck, personal communication, 2009), but the model cannot adequately represent that information. Other habitat components that the model does not represent adequately include habitat mosaic; understory plant species composition, height, and density; proximity to water; use of medium tree size class; availability of snags, leaning logs, and CWD; distance to and intensity of human activities in relation to nest location and use; elevation, aspect, etc.

White-headed woodpecker home range sizes were 125 acres in central Oregon (Dixon 1995a) and 245 acres in central Washington (Mellen-McLean et al. 2013). Mellen-McLean et al. (2013) also noted research showing overlap in home ranges of neighboring pairs. Using the total amount of PVGs supporting habitat (759 acres) within the Project area (including private land inholdings) as the base amount of habitat at current conditions, the Project area could support only 3–6 white-headed woodpecker home ranges. The NFS lands alone, with 742 acres of PVGs supporting habitat, could still support only 3–6 white-headed woodpecker home ranges. However, because the current habitat is widely distributed, and because the habitat model does not account for microsite habitat requirements, the number of home ranges supported by current habitat conditions may be lower or higher. Based on 2012–2016 USFS Rocky Mountain Research Station (RMRS) data collected on the PNF, nest placement was consistent with that reported in Oregon, where white-headed woodpeckers tended to place their nests in habitats with relatively low densities of ponderosa pine and adjacent to relatively closed-canopied forests (Latif et al. 2015; Hollenbeck et al. 2011).

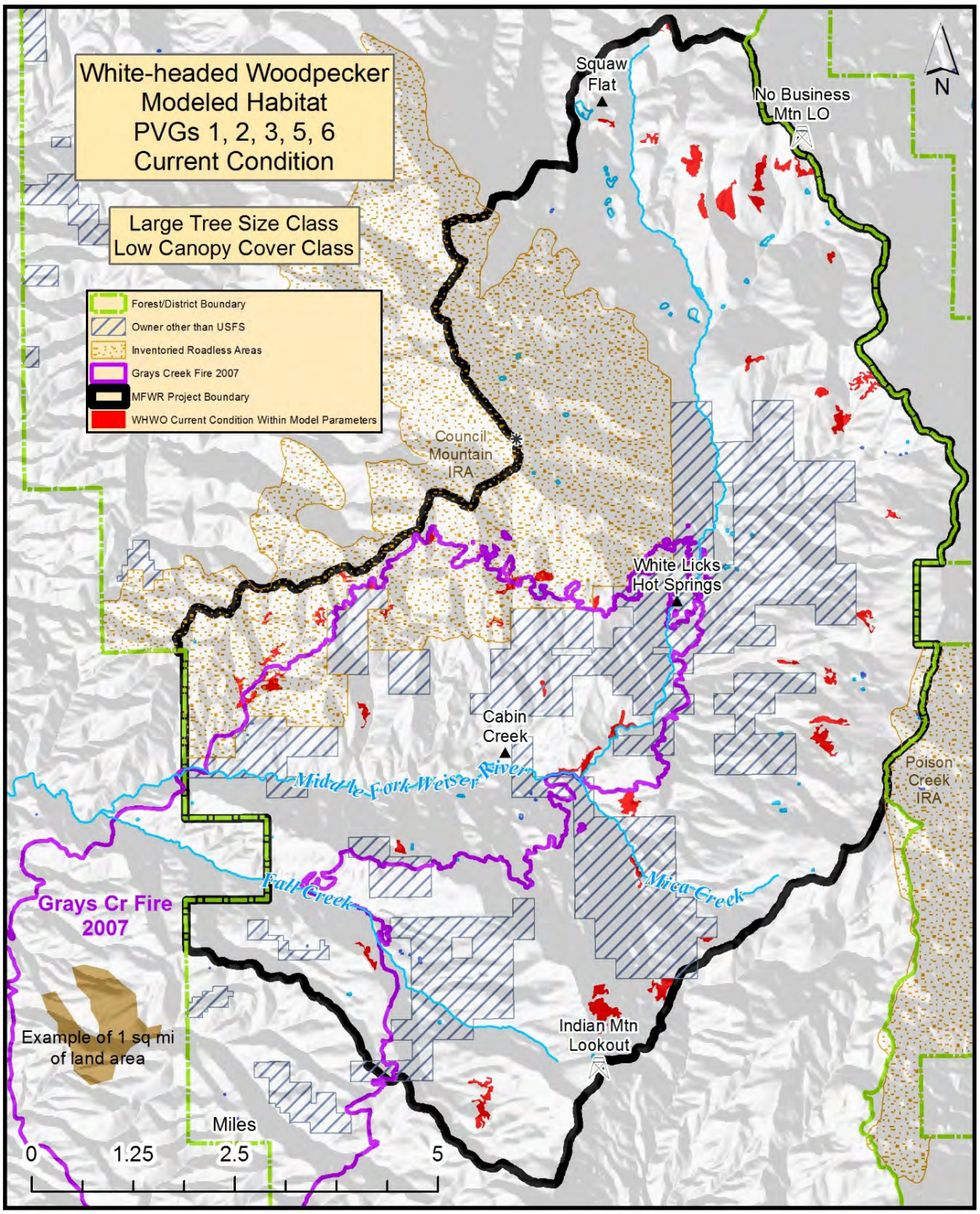


Figure 3.4-1. White-headed woodpecker (WHWO) modeled habitat at current condition, supported by Potential Vegetation Groups (PVGs) 1, 2, 3, 5, and 6, in the Project area.

As of 2016, 23 white-headed woodpecker observations had been recorded within the Project area (IDFG database, IFWIS 2014; Forest Service Wildlife Sightings Database 2012). From 2003 to 2016, white-headed woodpecker surveys were conducted on two transects in the Project area on MIS transects, as part of a Forestwide MIS monitoring program. From 2009 to 2015, only two white-headed woodpecker detections were recorded on those transects; these are in addition to the observations mentioned above from the IFWIS database. The RMRS has conducted nest searches since 2012 in the Cooperative Forest Landscape Restoration (CFLR) project areas on the District. White-headed woodpecker information gleaned from those surveys will be applied to Project activities and implementation in order to protect known nest sites (see PDFs in Chapter 2).

3.4.5.4. Habitat Family 2—Broad-Elevation, Old Forest

Species in Habitat Family 2 use late seral, multi- and single-storied montane forests as modeled habitat (Wisdom et al. 2000). Habitat Family 2 modeled habitats overlap those of Habitat Family 1 but encompass a broader array of cover types and elevations. Special features of Habitat Family 2 habitats are snags, often of larger diameter (>20 inches DBH), and downed logs. Some species that use these habitats depend on the juxtaposition of certain seral stages (shrubfields, tree regeneration patches, dense tree canopy patches), while others exhibit a negative response to older forest structural stages adjacent to younger structural stages. Many species are able to take advantage of departed vegetative conditions, benefitting the species as structural stages develop larger tree size classes and denser conditions. Habitat Family 2 species have acquired habitats that were historically Family 1 habitats. Hence, even though Family 2 habitats, particularly large tree and old forest, have substantially departed from the HRV, Family 2 wildlife species have been able to take advantage of departed habitats historically used by Habitat Family 1 species.

Pileated Woodpecker

The PNF selected the pileated woodpecker as a MIS because it is believed to be functionally linked to a suite of other wildlife species that use source habitats with large trees, snags and logs, and stands with old forest characteristics, in mixed-conifer forests that occur across broad elevations and developed under mixed fire regimes (Aubry and Raley 2003; USDA Forest Service 2003a). This species is also a focal species for the Project area. The pileated woodpecker is considered a resident, nonmigratory, nongame species.

Pileated woodpeckers occupy dense deciduous, coniferous, or mixed-species forests; open woodlands; second growth forests; and parks and wooded residential areas (NatureServe 2008; Bull and Holthausen 1993). The woodpecker prefers habitats with tall, closed canopies and high basal areas. Their preferred nesting habitat includes large diameter trees and snags; multiple canopy layers; decaying wood on the forest floor; and a somewhat moist environment that promotes fungal decay and ant, termite, and beetle foraging (NatureServe 2008). In some cases, pileated woodpeckers use open stands with high densities of large snags and logs and are rarely found in pure ponderosa pine stands (Bull et al. 2007). The association with late seral stages stems from the need for large diameter snags or living trees with some decay for nest sites, roosts, and foraging.

Pileated woodpeckers perform KEFs as secondary consumers of terrestrial invertebrates (e.g., carpenter ants [Camponotus]) and primary cavity excavators of snags and live trees. The KECs for this species include snags and living trees >20 inches DBH, logs, hollow living trees, and dead portions of live trees (Bull et al. 1992). The pileated woodpecker typically uses portions of dying trees and snags in the hard and moderate decay classes (early-to-mid stages of

decomposition). Availability of large diameter snags is considered a limiting factor for pileated woodpeckers.

Current Condition

Habitats for pileated woodpeckers are typically multilayer, late-seral stage montane and subalpine forests in PVGs 2, 3, 5, 6, 8, and 9, with large tree size class and moderate-to-high canopy closure class. Approximately 11,701 acres of PVGs supporting modeled pileated woodpecker habitat currently occur in the Project area, with 10,690 acres occurring on NFS lands (Table 3.4-3, Figure 3.4-2). The connectivity of multiple polygons creates a mosaic of habitats that is widely distributed throughout the Project area, with a variety of forest structure and patch size. However, the model does not account for microsite habitat components that may influence use patterns by individual birds. For example, research indicates that stands comprised of old-growth, grand-fir, no logging, and greater than 60 percent canopy cover were used more by pileated woodpeckers (Bull and Holthausen (1993). Other habitat components that the model does not represent adequately include habitat mosaic; proximity to water; availability of snags, leaning logs, and CWD; distance to and intensity of human activities in relation to nest location and use; elevation, aspect, etc.

Table 3.4-3. Acres of pileated woodpecker modeled habitat at current condition by Potential Vegetation Group (PVG) in the Project area.

Tree Size/Canopy Cover Class	PVG 2	PVG 3	PVG 5	PVG 6	PVG 8	PVG 9	Totals
Large/Moderate NFS Lands	337	0	1,402	3,414	0	228	5,381
Large/High NFS Lands	212	0	421	4,381	13	282	5,309
Total NFS Lands	**549**	**0**	**1,823**	**7,795**	**13**	**510**	**10,690**
Large/Moderate Private Lands	110	0	186	351	0	64	711
Large/High Private Lands	29	0	18	253	0	0	300
Total Private Lands	**139**	**0**	**204**	**604**	**0**	**64**	**1,011**
Total All Ownership	**688**	**0**	**2,027**	**8,399**	**13**	**574**	**11,701**

Pileated woodpecker home ranges for paired birds in northeastern Oregon ranged from 793 to 1556 acres (mean = 1,005 acres) (Bull and Holthausen 1993). Using this mean home range size, NFS lands within the Project area could currently support approximately 10 pileated woodpecker home ranges. Larger home ranges may be expected in the presence of lesser quality pileated woodpecker habitat.

Twenty-five pileated woodpecker observations have been recorded in the Project area (IFWIS 2014; USDA Forest Service 2015b). From 2003 to 2015, pileated woodpecker surveys were conducted on one transect in the Project area as part of a Forestwide MIS monitoring program. From 2009 to 2015, no pileated woodpeckers were detected during broadcast vocal surveys conducted on that transect; however, during that same period, 18 pileated woodpecker detections were recorded on the four white-headed woodpecker transects in the Project area; these detections are in addition to the observations mentioned above from the IFWIS database. The numbers of observations may indicate that the pileated woodpecker is taking advantage of white-headed woodpecker habitat that has departed from historical conditions.

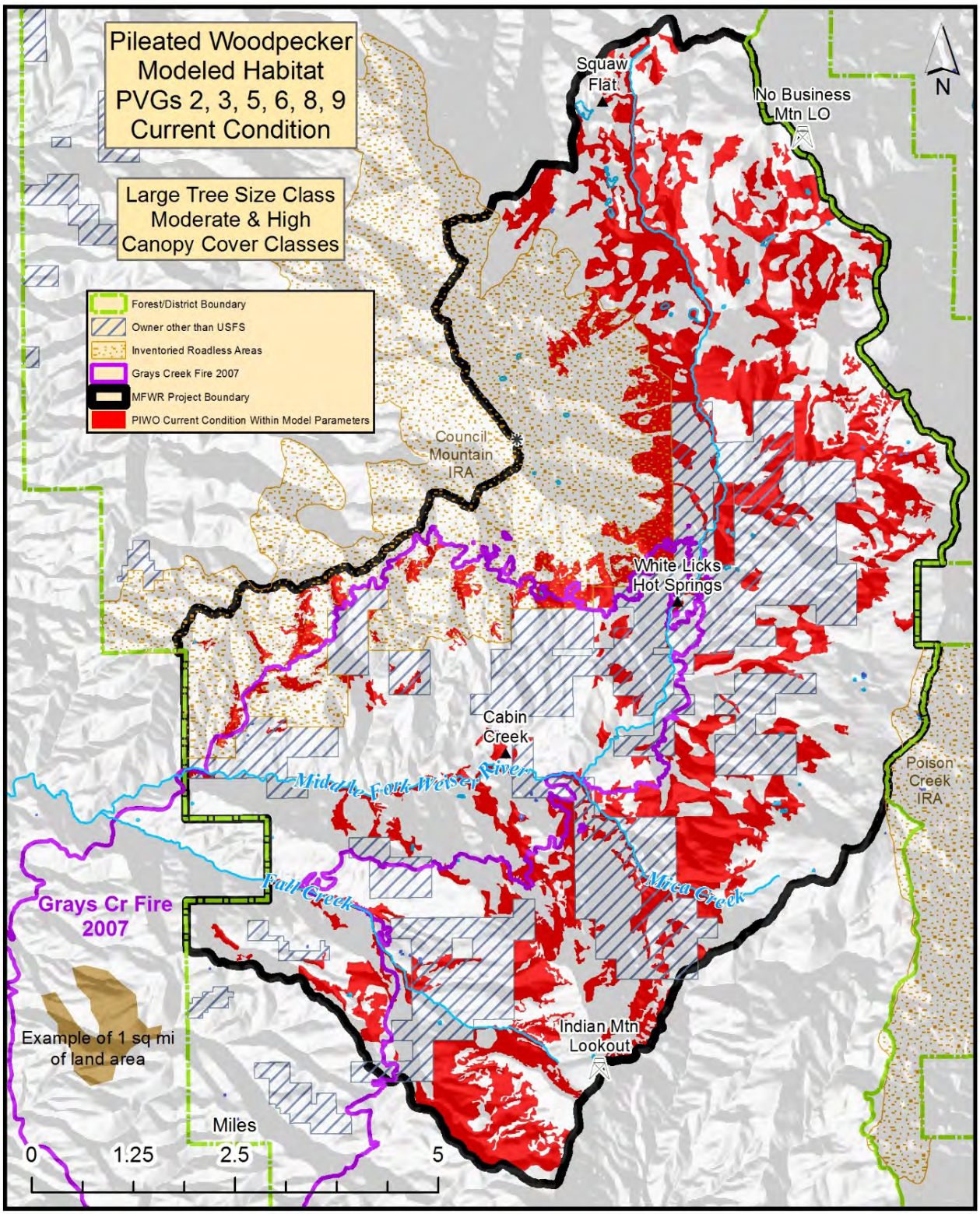


Figure 3.4-2. Pileated woodpecker (PIWO) modeled habitat at current condition supported by Potential Vegetation Groups (PVGs) 2, 3, 5, 6, 8, and 9 in the Project area.

Flammulated Owl

The flammulated owl is a Region 4 Sensitive species and an IDFG species of greatest conservation need. It is selected as a focal species for the Project area because of its association with broad-elevation, old forest habitats. Flammulated owls are neotropical migrants, wintering in Central America. The KEFs of the flammulated owl include being a secondary consumer of terrestrial invertebrates, as well as prey for secondary or tertiary consumers (O'Neil et al. 2001; Marcot 1997). The KECs for this species include an association with forested habitats comprised of live trees and snags >10 inches DBH (O'Neil et al. 2001; Marcot 1997). Flammulated owls are secondary cavity nesters, occupying natural cavities and, more commonly, old woodpecker cavities (Barnes 2007; O'Neil et al. 2001; Marcot 1997).

Breeding habitat for the flammulated owl combines open, mature, montane pine forests for nesting; scattered thickets of saplings or shrubs for roosting and calling; and grassland edge habitat for foraging (Reynolds and Linkhart 1992; Goggans 1986). This bird requires these habitat components across multiple spatial scales (i.e., microhabitat, home range, and landscape) (Wright 1996). In Idaho, flammulated owls have been documented in mid-elevation stands with old forest characteristics and in mature stands of open ponderosa pine and/or Douglas-fir (Groves et al. 1997). Old forest stands of ponderosa pine and Douglas-fir are key habitat components for the flammulated owl (Reynolds and Linkhart 1992), as these forest types support an abundance of favored moth and butterfly (Lepidoptera) prey (McCallum 1994). However, flammulated owls will also use old forest with multilayered canopies in aspen, cottonwood (*Populus* species), and willow. Flammulated owl habitat is strongly associated with the upper slopes of ridges (Barnes 2007; Groves et al. 1997; Bull et al. 1990). Flammulated owls nest in cavities excavated by other bird species in snags and live, large-diameter trees (Bull et al. 1990; McCallum and Gehlback 1988). These owls are obligate cavity nesters and can take advantage of insect irruptions, as from western spruce budworm (O'Neil et al. 2001; Marcot 1997; McCallum 1994).

Current Condition

Modeled habitat for flammulated owls in the Project area is supported by PVGs 1, 2, 3, 5, and 6. These habitats also overlap with several modeled habitats used by Habitat Family 1 wildlife species. These PVGs are most likely to have habitat types that develop late-seral stages of forest, with stands dominated by ponderosa pine and/or Douglas-fir. Historical fire regimes in these PVGs include nonlethal, mixed1, and mixed2. Flammulated owls use the medium and large tree size classes and moderate canopy closure class. Unlike most species in Habitat Family 2, the flammulated owl does not use vegetative conditions outside of its required habitats (McCallum 1994).

Approximately 7,647 acres of PVGs supporting modeled flammulated owl habitat currently occur on NFS lands in the Project area; the majority of the available habitat occurs in PVGs 2, 5, and 6 (Table 3.4-4, Figure 3.4-3). Using an average home range size of 31 acres (based on a range of 25–49 acres), the NFS lands within the Project area could theoretically support approximately 246 flammulated owl home ranges. This home range number is likely artificially inflated because the habitat model cannot account for the availability or juxtaposition of required microsite components such as snags with appropriate nest cavities, saplings and shrubs for roosting and calling, grassland edge habitat for foraging on moths and butterflies, and flammulated owl preference for using habitats on the upper portion of a given slope. These microsite requirements likely restrict the number of flammulated owl home ranges and nests in the Project area.

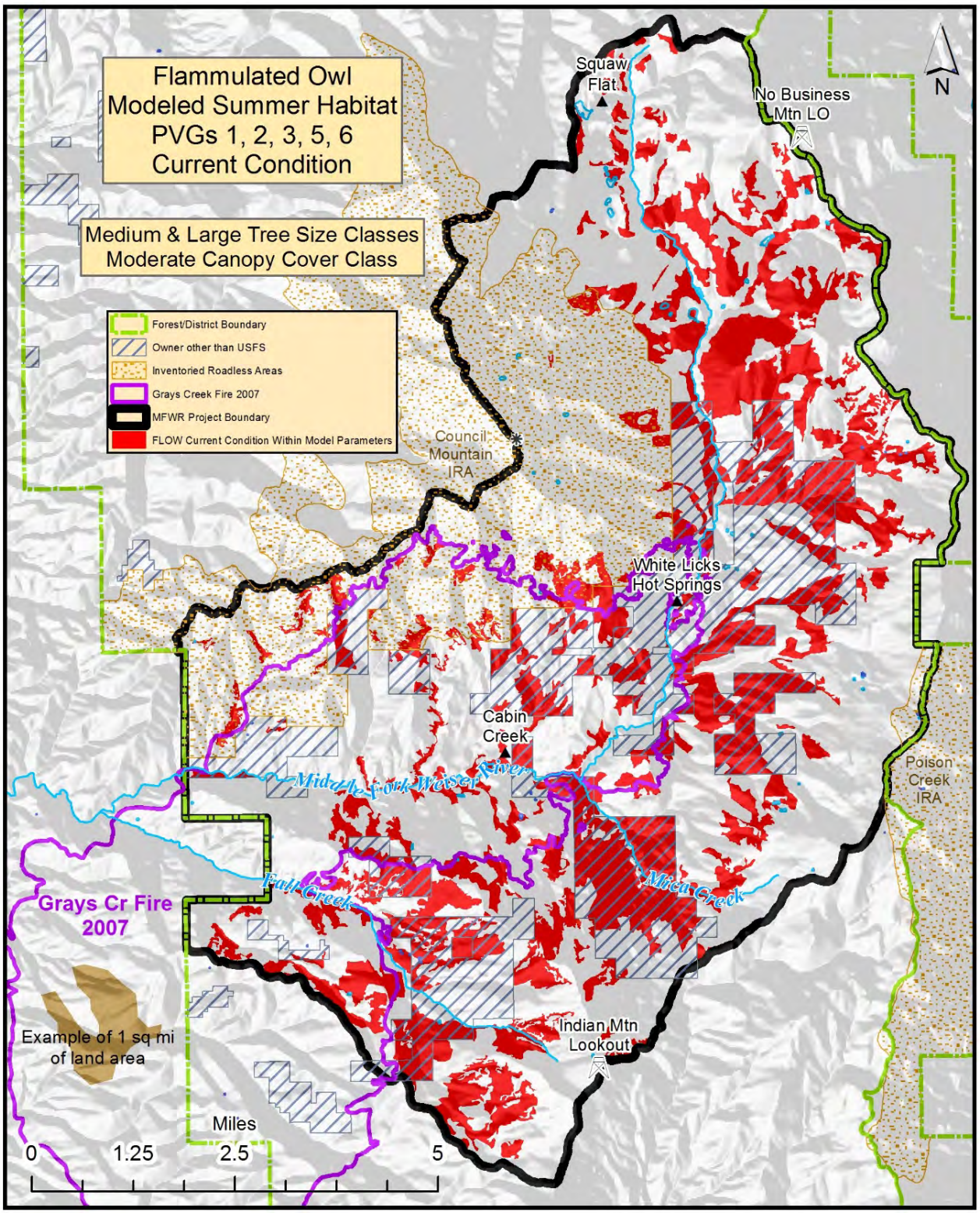


Figure 3.4-3. Flammulated owl (FLOW) modeled summer habitat at current condition, supported by Potential Vegetation Groups (PVGs) 1, 2, 3, 5, and 6 in the Project area

Table 3.4-4. Acres of flammulated owl modeled summer habitat at current condition by Potential Vegetation Group (PVG) in the Project area on private and National Forest System (NFS) lands.

Tree Size/Canopy Cover Class	PVG 1	PVG 2	PVG 3	PVG 5	PVG 6	Totals
Medium/Moderate NFS Lands	0	368	0	678	1,433	2,479
Large/Moderate NFS Lands	15	337	0	1,402	3,414	5,168
Total NFS Lands	**15**	**705**	**0**	**2,080**	**4,847**	**7,647**
Medium/Moderate Private Lands	0	893	0	1,180	2,021	4,094
Large/Moderate Private Lands	4	110	0	186	351	651
Total Private Lands	**4**	**1,003**	**0**	**1,366**	**2,372**	**4,746**
Total All Ownership	**19**	**1,709**	**0**	**3,446**	**7,219**	**12,393**

Note that the PVGs supporting modeled flammulated owl habitat (Figure 3.4-3) occur in polygons with a larger size, tighter distribution, and more connectivity than modeled habitat for white-headed woodpeckers (Figure 3.4-1), but with a smaller size, wider distribution, and less connectivity than modeled habitat polygons for pileated woodpeckers (Figure 3.4-2). An outbreak of western spruce budworm began during the past 2 years, so an increase in microsite habitat quality is expected in the Project area due to the increased presence of flying insect and larval prey.

Seventeen flammulated owl observations have been recorded for the Project area (IFWIS 2014; USDA Forest Service 2015b). Four flammulated owl survey transects are located in the Project area. To date, no vocal responses have been recorded during the spring vocal broadcast surveys on these transects. No nest search has been conducted for flammulated owls in the Project area. Additional flammulated owl transects were established in the Project area during fall 2015; these new transects will be evaluated for future use.

American Three-toed Woodpecker

The American three-toed woodpecker is a Region 4 Sensitive species. This woodpecker performs a number of KEFs; it is a primary excavator of snags and live trees, and its foraging and nesting behavior physically fragments standing and downed wood (O'Neil et al. 2001; Marcot 1997). A sap feeder, the American three-toed woodpecker is a secondary consumer of terrestrial invertebrates (Marcot 1997), and plays a role in regulating timber-damaging beetles (Leonard 2001) and beetle outbreaks (O'Neil et al. 2001; Marcot 1997). American three-toed woodpecker populations typically peak during the first 3–5 years after a fire. The KECs for this species include an association with forested habitats that include snags showing little-to-moderate evidence of decay, as well as partially dead trees, in late-seral forests (O'Neil et al. 2001; Marcot 1997).

American three-toed woodpeckers inhabit mature and over-mature stands containing bark beetles, disease, and heart rot (Goggans et al. 1988), as well as recent stand-replacing burns, with abundant wood-boring insects (Caton 1996; Hutto 1995). Trees with heart rot may be necessary for nest sites (Lester 1980), and the presence of trees affected by insects and diseases is important for a sufficient prey base (Goggans et al. 1988). Foraging has been described in dead trees averaging 9 inches DBH (Bull et al. 1986) and 15.5 inches DBH (Goggans et al. 1989). Although these tree sizes are not the larger-diameter classes typically found in late-seral stands with old forest characteristics, studies have found that use of 9- to 15-inch diameter trees for nesting and foraging does not occur in mid-seral stands where this is a common size range. Rather, nesting and foraging occurs more in late-seral forests, where dead and dying trees in the 9- to 15-inch diameter range occur within a matrix of larger, densely spaced trees. Late-seral stands with old forest characteristics would be expected to have higher incidences of heart rot,

disease, and early stages of decay, compared with mid-seral forests (Goggans et al. 1989; Bull et al. 1986).

Current Condition

On the Forest, vegetative communities that could provide American three-toed woodpecker modeled habitat conditions include PVGs 8, 9, 10, and 11 in the medium and large tree size classes and with moderate and high canopy cover classes (Nutt et al. 2010). The PVGs 5 and 6 can also provide habitat when outside of HRV in a high canopy cover class. Primary American three-toed woodpecker habitat is associated with higher-elevation forests subject to mixed1, mixed2, and lethal fire regimes in PVGs 8, 9, 10, 11. Insect infestations and/or high intensity fire events are primary recycling agents in these PVGs; these disturbances are associated with American three-toed woodpecker habitat and population irruptions.

Approximately 6,045 acres of PVGs supporting modeled American three-toed woodpecker habitat are currently identified across all land ownerships in the Project area. The NFS lands support about 5,699 acres of PVGs supporting habitat (Table 3.4-5, Figure 3.4-4). The PVGs 5 and 6 support 4,802 acres of modeled habitat on the NFS portion of the Project area in the large tree, high canopy cover condition. Given the current departed conditions of PVGs 5 and 6, far more potential habitat likely occurs now than historically. Core American three-toed woodpecker habitat is composed of high-elevation spruce/fir/lodgepole pine stands (Nutt et al. 2010). These stands make up about 900 acres of the American three-toed woodpecker modeled habitat in the Project area.

Table 3.4-5. Acres of American three-toed woodpecker modeled habitat at current condition by Potential Vegetation Group (PVG) in the Project area on private and National Forest System (NFS) lands.

Tree Size/Canopy Cover Class	PVG 5	PVG 6	PVG 8	PVG 9	PVG 10	PVG 11	Totals
Medium/Moderate NFS Lands	0	0	37	41	85	0	163
Large/Moderate NFS Lands	0	0	0	228	285	221	734
Large/High NFS Lands	421	4,381	0	0	0	0	4,802
Total NFS Lands	**421**	**4,381**	**37**	**269**	**369**	**221**	**5,699**
Medium/Moderate Private Lands	0	0	0	0	11	0	11
Large/Moderate Private Lands	0	0	0	64	0	0	64
Large/High Private Lands	18	253	0	0	0	0	271
Total Private Lands	**18**	**253**	**0**	**64**	**11**	**0**	**346**
Total All Ownership	**440**	**4,633**	**37**	**334**	**381**	**221**	**6,045**

Home range size for American three-toed woodpecker is highly variable (Leonard 2001). Home range sizes for three radio-marked birds in central Oregon were 131, 363, and 751 acres (Goggans et al. 1988). An average of these documented home range sizes (415 acres) was used for this analysis. Using this average home range size, about 14 American three-toed woodpecker home ranges may be currently supported on NFS lands in the Project area.

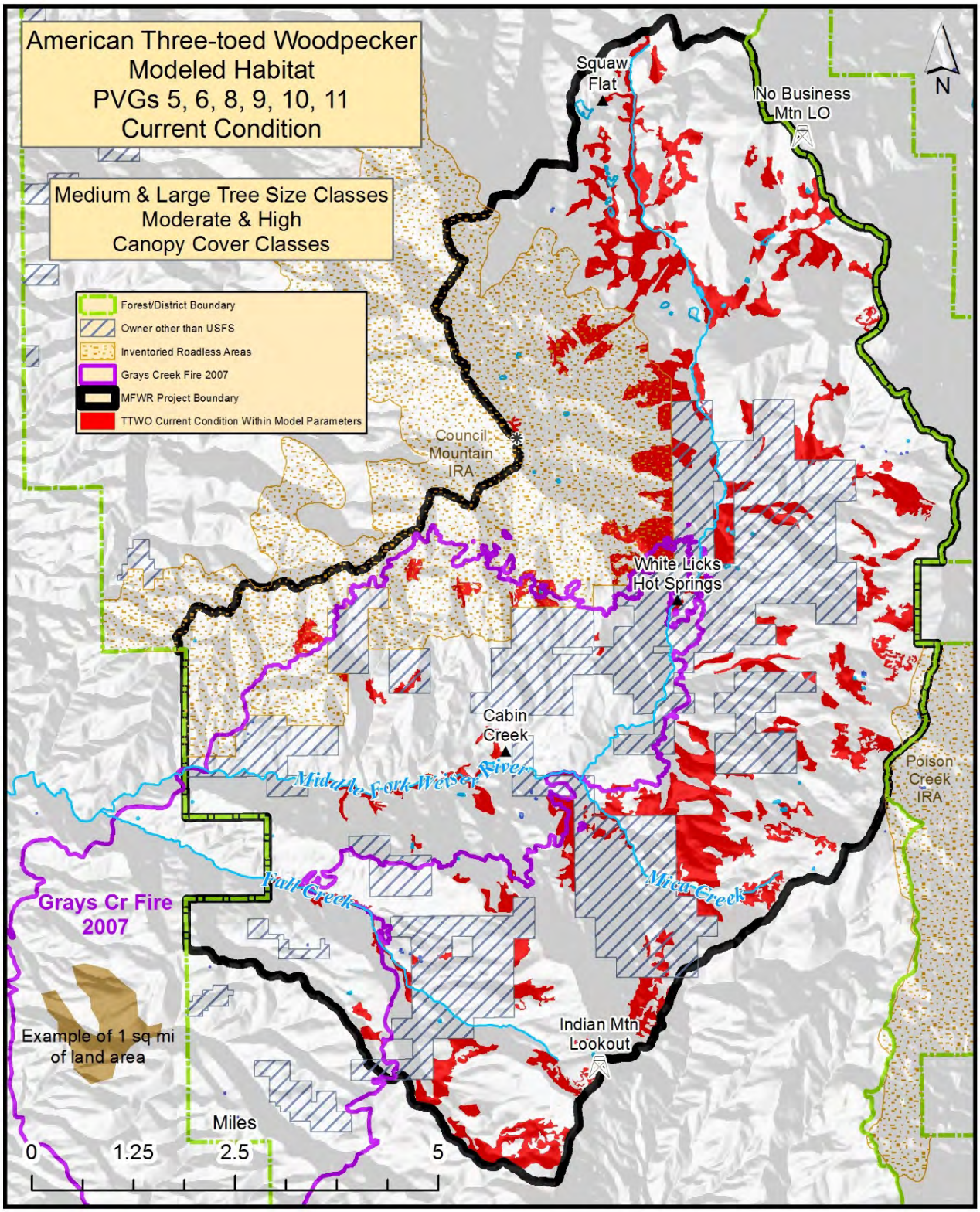


Figure 3.4-4. American three-toed woodpecker (TTWO) modeled habitat at current condition, supported by Potential Vegetation Groups (PVGs) 5, 6, 8, 9, 10, and 11 in the Project area.

No observations of American three-toed woodpecker have been documented within the Project area (IFWIS 2014, USDA Forest Service 2015b). Several unconfirmed observations have been verbally reported for the MFWR drainage, but no written record is available for these reports. No monitoring surveys are conducted on the Forest specifically for American three-toed woodpecker. This species has been included in the analysis, because of its potential occurrence, due to the 2007 Grays Creek Fire and the ongoing infestation of western spruce budworm in the MFWR drainage. Monitoring survey transects are planned for the Project area, starting with mapping in fall 2015 and marking in the field in spring 2016. These new transects will be surveyed in conjunction with black-backed woodpeckers and Lewis' woodpeckers and will be located in stands of snags from the Grays Creek Fire and in stands of dead and dying trees from the ongoing localized insect infestation.

Black-backed Woodpecker

The black-backed woodpecker is a Forest SOSI and a proposed focal species for the Project area because of its association with insect outbreaks. Large portions of the Project area are currently experiencing an outbreak of spruce budworm (*Choristoneura* species). This is the kind of natural habitat change that provides prime feeding in habitat for the black-backed woodpecker. Modeled habitat is found in stands of medium and large tree size classes and moderate to high canopy cover classes.

Black-backed woodpecker KEFs are as a secondary consumer of terrestrial invertebrates. Higher population levels are often synchronous with insect outbreaks and targeted feeding can control or depress such outbreaks. The species is a primary cavity nester and, by the nature of its foraging and nesting behavior, it physically fragments standing and downed wood.

The KECs for black-backed woodpeckers are associated with medium-sized snags and live trees with heart rot. Fire can be beneficial to this species by stimulating outbreaks of bark beetles, an important food source. Black-backed woodpecker populations typically peak in the first 3–5 years after a fire (Marcot et al. 1997).

The black-backed woodpecker is a year-round resident that occurs in various forest types throughout the Interior Columbia Basin (ICB), except in southern Idaho Ecological Reporting Units (ERUs) (Wisdom et al. 2000; Vol. 2, Figure 27). Black-backed woodpecker habitat includes old forest stages of subalpine, montane, and lower montane forests and riparian woodlands (Wisdom et al. 2000; Vol. 3, Appendix 1, Table 1). Both managed and unmanaged young-forest stages of lodgepole pine also provide habitat (Wisdom et al. 2000; Vol. 3, Appendix 1, Table 1). Burned conifer forests (Saab and Dudley 1998; Hoffman 1997; Caton 1996; Hutto 1995; Marshall 1992) and other insect-infested forests (Goggans et al. 1988) provide key conditions necessary for both nesting and foraging. Habitat requirements for nesting include mature and old trees infested with disease or heart rot, or trees in early stages of decay (Goggans et al. 1988).

This species forages almost exclusively on the larvae of bark beetles and wood-boring beetles (Cerambycidae and Buprestridae) (Marshall 1992). Larvae are collected from trees by scaling or flaking bark (Bull et al. 1986) or by excavating logs and tree trunks. Populations of black-backed woodpeckers are irruptive in response to bark beetle outbreaks in recently fire-killed or over-mature forests (Lester 1980). Both live and dead trees are used for foraging. Bark beetle outbreaks decline 2–3 years post-fire, and use by black-backed woodpeckers declines accordingly (Bull 1980). In the northern Rockies, early post-fire conditions (1–5 years post-fire) were critical for supporting black-backed woodpecker populations; abundance was correlated to the number of small snags remaining after fire (Hutto 1995).

Summer home ranges for single birds differ in size from 178 to 810 acres, with an average of 250 acres noted, depending on the quality of habitat (Goggans et al. 1988). Goggans et al. (1988) estimated that a single black-backed woodpecker requires an area of 477 acres, of which 59% should be mature-to-old tree age class conditions. The authors also suggested that a minimum MA for a nesting pair in lodgepole forests should be 956 acres of mature or old tree age class conditions.

Current Condition

Wisdom et al. (2000) identified habitat in the ICB for black-backed woodpeckers using forest cover types and structural stages. That description was cross-walked to PVGs and structural stages (crown closures and tree size classes) to characterize and assess vegetation in the Forest Plan (USDA Forest Service 2003a; Vol. 3, Appendix 6). Under historical disturbance conditions, PVGs 3, 4, 6, 7, 8, 9, and 10, with structural stages of medium or large tree size classes (12–19 inches DBH or >20 inches DBH, respectively), and moderate crown closure (40–69%) could provide habitat for black-backed woodpeckers. When outside the HRV, PVGs 2 and 5 in the medium or large tree size classes with high crown closure (>69%) could also provide habitat. Irrespective of structural stage or crown closure, PVGs 2–10 that have burned within 5 years and are >/=75 acres could also provide habitat.

Approximately 14,461 acres of modeled black-backed woodpecker habitat currently occur on NFS lands in the Project area (Table 3.4-6, Figure 3.4-5). The PVGs 4, 6, and 7 in high canopy cover provide habitat, when in a departed condition, and contribute the bulk amount of modeled habitat. Although the 2007 Grays Creek Fire provided additional habitat for the black-backed woodpecker, the quality of the burned area likely decreased over time and it may no longer contribute to black-backed woodpecker habitat. Given the current departed conditions of PVG 6, far more potential habitat likely occurs than historically.

Table 3.4-6. Acres of black-backed woodpecker modeled habitat at current condition by Potential Vegetation Group (PVG) in the Project area on private and National Forest System (NFS) lands.

Tree Size/Canopy Cover Class	PVG4	PVG 6	PVG 7	PVG 8	PVG 9	PVG 10	Totals
Medium/Moderate NFS Lands	0	1,433	273	37	41	85	1,869
Large/Moderate NFS Lands	13	3,414	2,248	0	228	285	6,188
Large/High NFS Lands	0	4,381	1,437	13	282	291	6,404
Total NFS Lands	**13**	**9,228**	**3,958**	**50**	**551**	**661**	**14,461**
Medium/Moderate Private Lands	0	2,021	164	0	0	11	2,196
Large/Moderate Private Lands	0	351	106	0	64	0	521
Large/High Private Lands	0	253	31	0	0	0	284
Total Private Lands	0	**2,625**	**301**	**0**	**64**	**11**	**3,001**
Total All Ownership	**13**	**11,853**	**4,259**	**50**	**615**	**672**	**17,462**

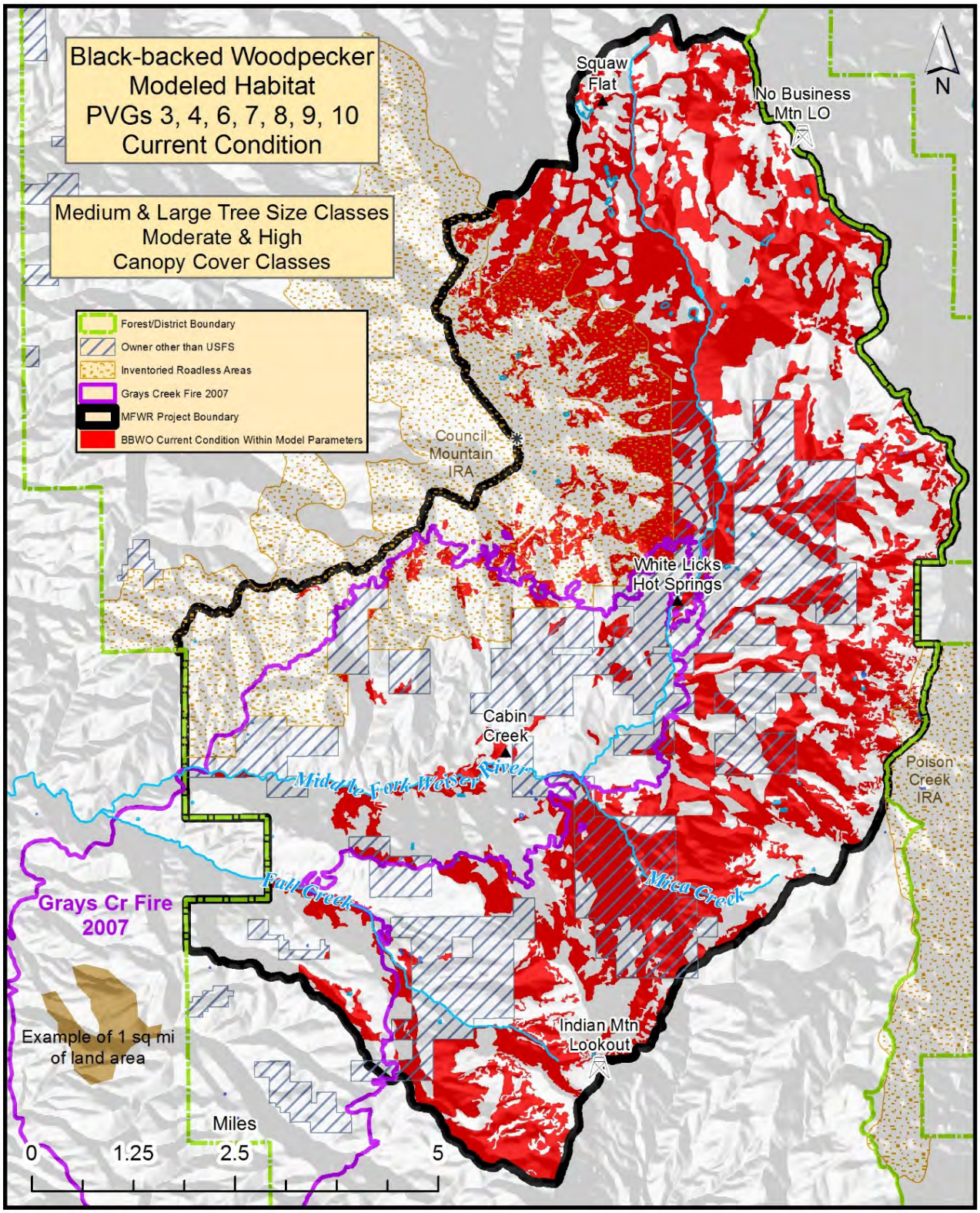


Figure 3.4-5. Black-backed woodpecker (BBWO) modeled habitat at current condition supported by Potential Vegetation Groups (PVGs) 3, 4, 6, 7, 8, 9, and 10 in the Project area.

The average home range size for the black-backed woodpecker was documented as 178–810 acres, depending on the quality of habitat (Goggans et al. 1988). A study in California (Tingley et al. 2014) noted that in earlier literature, black-backed woodpeckers were documented as having relatively large home ranges, typically 250 acres (Rota et al. 2014; Tremblay et al. 2009; Dudley and Saab 2007; Goggans et al. 1989). The authors noted that home range size appears to vary with habitat type and time since fire (Rota et al. 2014; Dudley and Saab 2007). As populations of wood-boring beetle larvae decrease over time, it is believed that black-backed woodpeckers first expand their home ranges, before eventually abandoning burned areas altogether (Rota et al. 2014; Dudley and Saab 2007). Using an average home range size of about 250 acres, the habitat on NFS lands in the Project area could support approximately 58 black-backed woodpecker home ranges.

Four black-backed woodpecker observations have been documented within the Project area (IFWIS 2014; USDA Forest Service 2015b). All of these observations were within the Grays Creek Fire boundary, in the Fall Creek and Cabin Creek areas. No monitoring surveys are conducted on the Forest specifically for black-backed woodpecker. There are plans to survey new monitoring transects for black-backed woodpecker, American three-toed woodpecker, and Lewis's woodpecker (*Melanerpes lewis*) starting in spring of 2017. This species has been included in the analysis because of its potential for occurrence in the area, due to the 2007 Grays Creek Fire and the ongoing infestation of western spruce budworm in the Project drainage.

Boreal Owl

The boreal owl is a Region 4 Sensitive species and designated as a species of greatest conservation need in Idaho (per the Idaho Comprehensive Wildlife Conservation Strategy, IDFG 2005). The boreal owl KEFs are as secondary consumers of terrestrial vertebrates and secondary cavity nesters (O'Neil et al. 2001; Marcot 1997). The KECs for the boreal owl include an association with forested habitats comprised of live trees and snags in the range of 10–14 inches DBH to >30 inches DBH, cavities, CWD, and edge habitat (O'Neil et al. 2001; Marcot 1997).

Habitat for boreal owls includes old forest and unmanaged, young-forest stages of subalpine and montane forests and riparian woodlands (Wisdom et al. 2000). Specific cover types and structural stages that provide habitat are old forest, multistory stages of Engelmann spruce/subalpine fir, Pacific silver fir (*Abies amabilis*)/mountain hemlock (*Tsuga mertensiana*), and aspen; and the old forest single- and multistory stages of interior Douglas-fir, western larch, and lodgepole pine. Unmanaged young-forest stages of all these cover types and of grand fir/white fir (*Abies concolor*) also serve as habitats if suitable large-diameter snags are present. Habitats typically support abundant lichens and fungal sporocarps (fruiting body), which provide important foods for southern red-backed voles (*Myodes gapperi*), the principal prey of boreal owls (Hayward and Verner 1994). These lichens and fungi are associated with CWD. Boreal owls are secondary cavity nesters and readily use artificial nest boxes and structures. Habitat for this species is generally within the mixed2 and lethal fire regimes, where disturbance intervals may be long (70–300 and 100–400 years, respectively).

Current Condition

On the Forest, vegetative communities that could provide habitat conditions include PVGs 3, 4, 6, 7, 8, 9, and 11, above 5,000 feet (Nutt et al. 2010) (Table 3.4-7, Figure 3.4-6). Like many species in Family 2, the boreal owl can take advantage of departed vegetative conditions. The PVG 6 provides boreal owl habitat when it occurs in the cooler habitat types or is mixed with higher-elevation PVGs. Boreal owls use both the medium and large tree size classes and

moderate and high canopy cover classes. Modeled habitat for the boreal owl is found throughout the higher elevations of the Project area, mostly within PVGs 6 and 7.

Table 3.4-7. Acres of boreal owl modeled habitat at current condition, above 5,000 feet elevation, by Potential Vegetation Groups (PVG) in the Project area on private and National Forest System (NFS) lands.

Tree Size/Canopy Cover Class	PVG 3	PVG 4	PVG 6	PVG 7	PVG 8	PVG 9	PVG 11	Totals
Medium/Moderate NFS Lands	0	0	1,433	273	37	41	0	1,784
Large/Moderate NFS Lands	0	13	3,414	2,248	0	228	221	6,124
Large/High NFS Lands	0	0	4,381	1,437	13	282	47	6,160
Total NFS Lands	**0**	**13**	**9,228**	**3,958**	**50**	**552**	**268**	**14,068**
Medium/Moderate Private Lands	0	0	2,021	164	0	0	0	2,185
Large/Moderate Private Lands	0	0	351	106	0	64	0	521
Large/High Private Lands	0	0	253	31	0	0	0	284
Total Private Lands	**0**	**0**	**2,625**	**301**	**0**	**64**	**0**	**2,990**
Total All Ownership	**0**	**13**	**11,852**	**4,258**	**50**	**616**	**268**	**17,057**

Past timber harvest has occurred in some modeled habitat for boreal owls, mainly in PVG 6. This PVG is not always associated with boreal owls. The PVG 6 was included in the habitat model for the Forest based on studies of boreal owls conducted on the Forest in the 1980s (Hayward et al. 1993). In the past, the Forest Service acknowledged that including PVG 6 may overestimate modeled habitat for this species, but recent surveys on the Forest have found boreal owls in PVGs 5 and 6 and at elevations below 5,000 feet.

Home range size of boreal owls is variable in the literature; a study in central Idaho reported home ranges of 3,585 acres in winter and 2,921 acres in summer (Hayward et al. 1993). Given an estimated 14,068 acres of modeled habitat on Forest Service lands and an average home range of 3,253 acres (based on the central Idaho ranges), the Project area could provide habitat for four boreal owl home ranges.

While no observations of boreal owls have been documented within the Project area, (IFWIS 2014; USDA Forest Service 2015b), numerous occurrences of boreal owls have been documented on the east side of the Forest (Hayward et al. 1993). The lack of boreal owl observations does not imply low population numbers but could be caused by the small amount of sampling conducted for the species on the west side of the Forest. Two monitoring survey transects were established in conjunction with great gray owl surveys in the Project area in 2015. No vocal responses were detected during broadcast vocal surveys in 2015 and 2016; however, several boreal owl vocal responses were recorded on great gray owl/boreal owl transects in other locations on the District at elevations below 5,000 feet and in drier habitats. Four additional great gray owl/boreal owl transects were established in fall 2015 for future spring sampling (April through June). Transects specifically for boreal owls will also be established for winter/spring sampling (February through April). If observations or vocal responses occur during future surveys, nest searches will be initiated to identify nest stands for protection from adverse structural alteration from vegetation treatments.

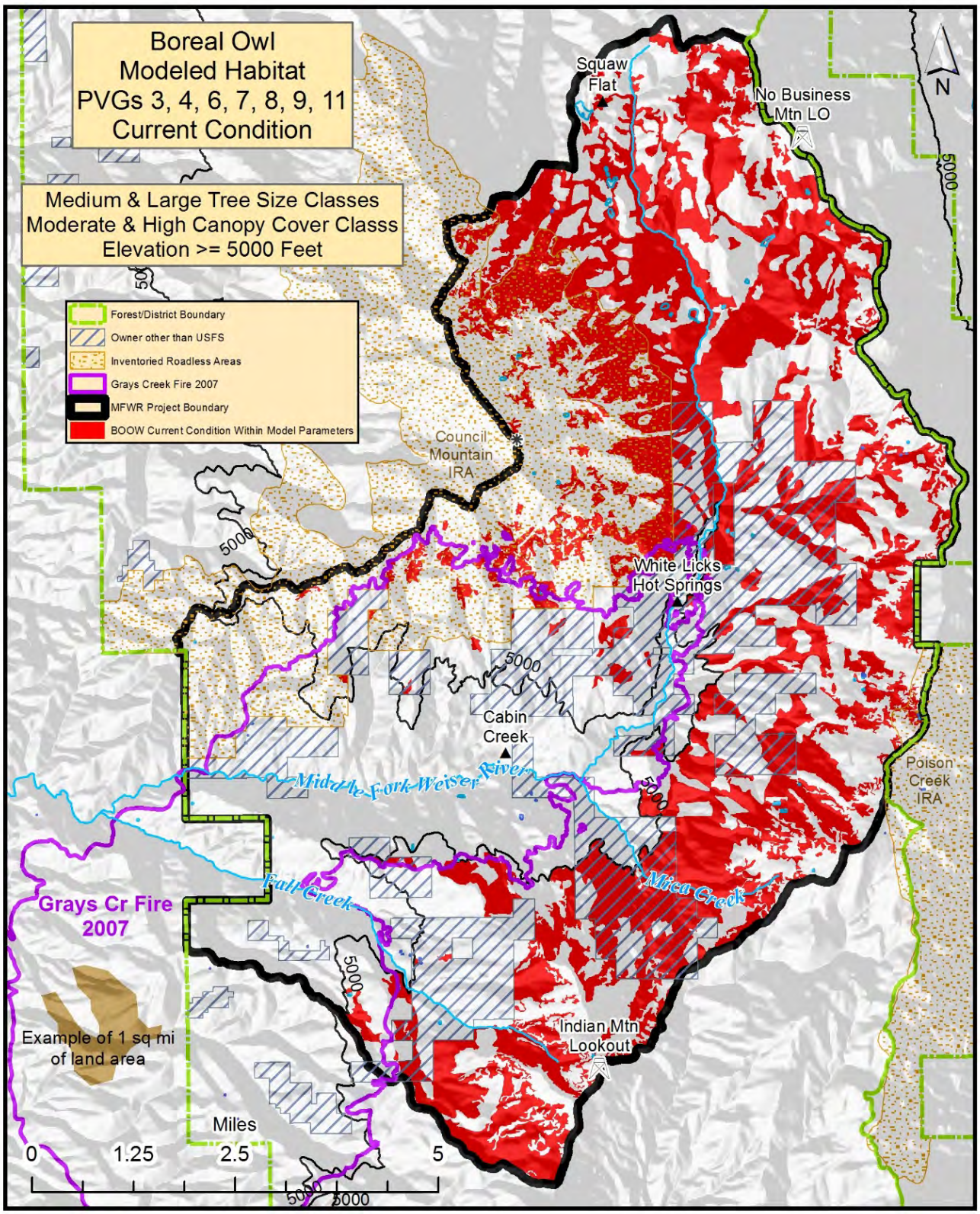


Figure 3.4-6. Boreal owl (BOOW) modeled habitat at current condition supported by Potential Vegetation Groups (PVGs) 3, 4, 6, 7, 8, 9, and 11 in the Project area.

Fisher

The fisher is a Region 4 Sensitive species and a State of Idaho species of greatest conservation concern. In January 2016, the FWS began a species review for the fisher to provide background information that would help determine whether ESA listing of the species was warranted. Fisher KEFs are as a secondary consumer of terrestrial vertebrates and a consumer of eggs and carrion (O'Neil et al. 2001; Marcot 1997). Fishers help disperse seeds and fruits and control vertebrate populations through predation or displacement. Fishers can also be prey for other carnivores. The KECs of the fisher include an association with forested habitats that include snags and live trees in large (20–29 inches DBH) and very large (≥30 inches DBH) size classes, logs in riparian and upland habitats, and legacy trees (O'Neil et al. 2001; Marcot 1997). Fishers are secondary cavity users and use large live tree branches, mistletoe brooms, and dead parts of live trees for den sites. A shrub layer is important for snow interception (O'Neil et al. 2001).

The diverse diet of the fisher probably requires a mix of forest habitat types to provide optimal foraging conditions (Arthur et al. 1989). In the Rocky Mountains, fishers show a preference for late-seral coniferous forests (Jones and Garton 1994). Late-seral forests are used preferentially during summer, while early or late-seral forests may be used in winter (Jones 1991). Deep snow accumulation appears to limit fisher movements and distribution (Heinemeyer 1993; Aubry and Houston 1992; Arthur et al. 1989). Fishers tend to select forests with relatively high canopy cover, although tree cover may be discontinuous (Buskirk and Powell 1994; Aubry and Houston 1992). Riparian corridors provide important travel routes and the structural complexity of riparian habitat supports relatively abundant and diverse populations of prey (small mammals and birds).

The fisher may benefit from management that conserves forested riparian habitats. High canopy cover class conditions, snags, and logs are important habitat features for the fisher. These habitat characteristics have been retained along streams Forestwide to meet habitat needs for aquatic species and maintain riparian functions and processes. The fisher benefits from these riparian conservation measures.

Current Condition

Modeled habitat for the fisher is found throughout most of the Forest with the possible exception of the southwestern portion (including the Project area), which may be outside its range (Nutt et al. 2010). Vegetative communities that could provide modeled habitat conditions include PVGs 3, 6, 8, 9, and 10, in medium and large tree size classes and moderate or high canopy cover classes. These PVGs have the capability to develop mesic, old forest, multilayer conditions with moderate and high canopy closures that would provide for the structural diversity characteristic of fisher habitat.

Male and female fisher home ranges vary widely, depending on local habitat conditions and seasonal movement associated with breeding (Ruggiero et al. 1994). Males have larger home ranges than females, and their ranges overlap to some degree. In Idaho, Jones (1991) estimated male fisher home ranges at approximately 20,000 acres; female home ranges were estimated at approximately 10,000 acres. The average dispersal distance for central Idaho fishers was estimated by Jones (1991) at 24 miles. Similar or slightly larger home ranges and dispersal distances could be expected on the Forest because its available habitat may provide less connectivity than habitat in the Jones (1991) study area.

Currently, approximately 10,489 acres of modeled habitat for fishers occur on NFS lands in the Project area (Table 3.4-8, Figure 3.4-7). Using the male home range size of 20,000 acres, NFS

lands in the Project area could support only one-half of a home range for a male fisher. However, coupled with the adjacent landscape restoration project area to the north (Mill Creek – Council Mountain CFLRP), at least one fisher home range could be supported.

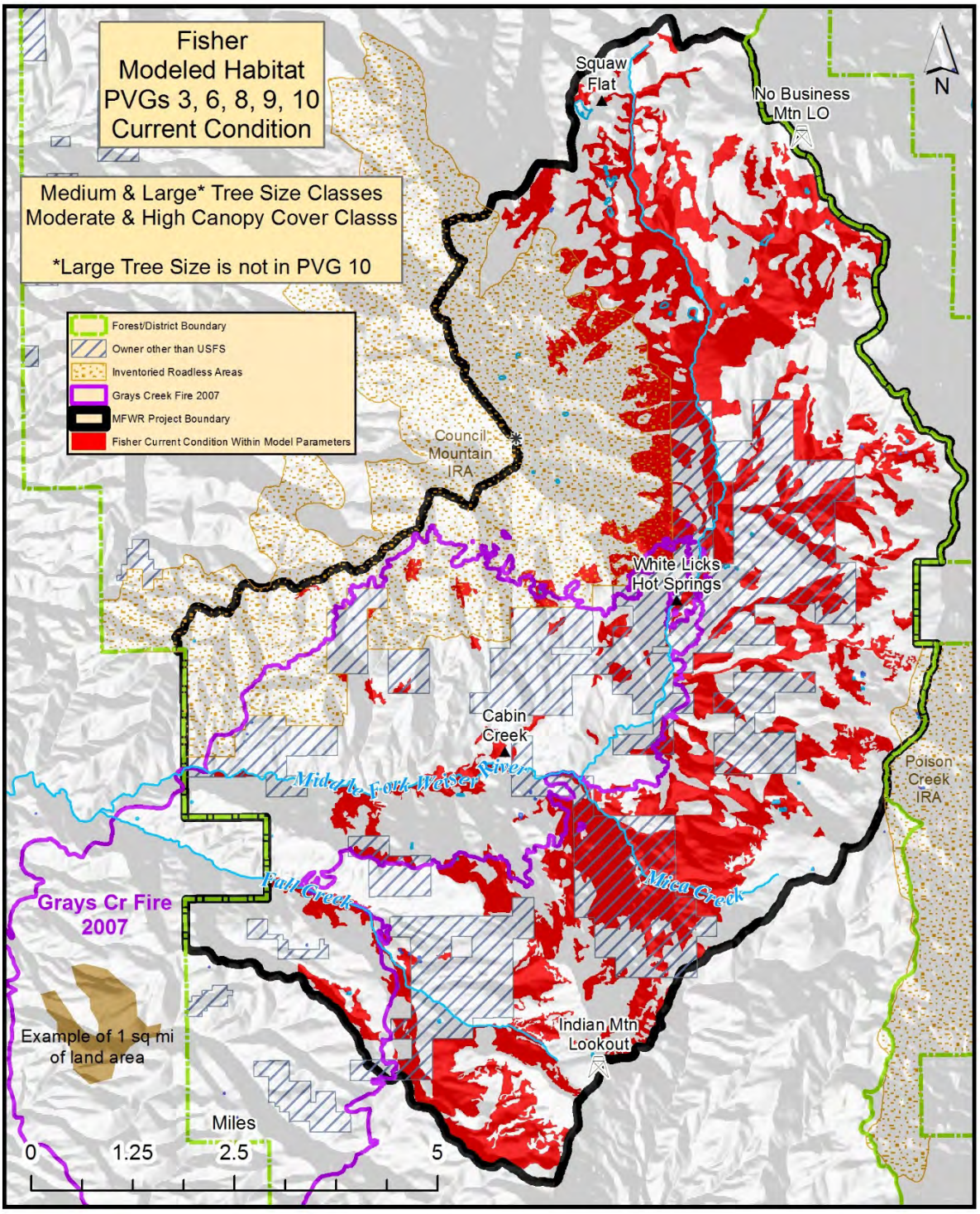


Figure 3.4-7. Fisher modeled habitat at current condition, supported by Potential Vegetation Groups (PVGs) 3, 6, 8, 9, and 10 in the Project area.

Table 3.4-8. Acres of fisher modeled habitat at current condition by Potential Vegetation Group (PVG) in the Project area on private and National Forest System (NFS) lands.

Tree Size/Canopy Cover Class	PVG 3	PVG 6	PVG 8	PVG 9	PVG 10	Total
Medium/Moderate NFS Lands	0	1,433	37	41	85	1,596
Large/Moderate NFS Lands	0	3,414	0	228	285	3,927
Large/High NFS Lands	0	4,381	13	282	291	4,967
Total NFS Lands	**0**	**9,228**	**50**	**552**	**661**	**10,489**
Medium/Moderate Private Lands	0	2,021	0	0	11	2,032
Large/Moderate Private Lands	0	351	0	64	0	415
Large/High Private Lands	0	253	0	0	0	253
Total Private Lands	**0**	**2,625**	**0**	**64**	**11**	**2,700**
Total All Ownership	**0**	**11,852**	**50**	**616**	**672**	**13,190**

Past timber harvest has occurred in the PVGs with modeled habitat capacity for fisher. Large trees and snags were often selectively removed during harvest treatments, effectively reducing the recruitment potential for snags and eventually CWD, which are used by fisher for denning and resting structures. Roads originally built for timber harvest continue to contribute to loss of snags by providing access for cutting firewood. Because special habitat features, such as snags, cannot be factored into the fisher habitat model, the modeled numbers likely overestimate the amount of habitat available.

No fishers have been documented within the Project area (IFWIS 2014; USDA Forest Service 2015b). Trail cameras have been deployed in the Project area since 2008 and no fishers have been detected. In August 2015 two fisher hair snag devices were deployed at separate trail camera stations in dense canopy stands on the west slope of West Mountain, with the hope of confirming fisher presence by DNA and/or photograph. No fisher detections were noted from the hair snag devices or the cameras. The hair snag devices were removed in October 2015; however, the cameras were left in place for the winter and no fisher photos were recorded.

Great Gray Owl

The great gray owl is a Region 4 Sensitive species. The Forest is on the southern periphery of the North American geographical distribution for this species. The KEFs for the great gray owl include its role as a secondary consumer of terrestrial vertebrates (O'Neil et al. 2001, Marcot 1997). The species depresses or controls prey species populations and uses aerial structures built by other species for nesting (O'Neil et al. 2001; Marcot 1997). The KECs for the great gray owl include an association with forested habitats close to meadows, marshes, bogs, open forests, and herbaceous habitats (Duncan and Hayward 1994). Key forested features include remnant, very large- to medium-sized trees and snags (15–30 inches DBH) (O'Neil et al. 2001; Wisdom et al. 2000; Marcot 1997). Great gray owls rely on existing stick nests built by other large birds, natural platforms formed by dwarf mistletoe brooms, broken-topped snags, stumps, and supplemental boxes for nesting (O'Neil et al. 2001; Marcot 1997; Duncan and Hayward 1994). Live, remnant, legacy trees and hollow, living trees are KECs for this species. Wildfires and prescribed burns help maintain meadows and open areas used by this species.

Great gray owl habitat includes old forests (multi- and single-story); unharvested, young, multistory forests; and stand-initiation stages of subalpine and montane forests (Wisdom et al. 2000). The habitat components considered most important for great gray owl are suitable nesting sites in mature or older forest, and suitable foraging areas in nonstocked and seedling forests, meadows, and open riparian habitats adjacent to meadows. Large diameter trees or snags are special habitat features for the great gray owl.

Great gray owls hunt from perches and capture their prey (usually small rodents) on the ground (Groves et al. 1997). They do not build their own nests; instead, they use nests built by other species, debris platforms, or broken-topped trees and snags (O'Neil et al. 2001; Bull et al. 1997; Marcot 1997; Duncan and Hayward 1994; Hayward and Verner 1994). Nests are typically in mature stands with large-diameter, decadent trees and snags present, often within 200 feet of a meadow or forest opening.

Juvenile great gray owls are flightless and depend on leaning and deformed trees to navigate from the forest floor to tree canopies (Bull et al. 1988; Franklin 1988). Dense cover near nests is important for fledgling protection from predators. After leaving the nest, fledglings generally stay within forested stands with >60% canopy cover (Bull et al. 1988).

Current Conditions

Vegetative communities capable of providing great gray owl modeled habitat conditions include PVGs 3, 6, 7, 8, 9, and 11 (Table 3.4-9, Figure 3.4-8). Many of these PVGs historically had mixed2 and lethal fire regimes, which can create the juxtaposition of open and forested habitats used by the owls. The model likely greatly overestimates the amount of habitat because it does not account for forest stands proximate to open meadows or other foraging habitats.

Table 3.4-9. Acres of great gray owl modeled habitat at current condition by Potential Vegetation Group (PVG) in the Project area on private and National Forest System (NFS) lands.

Tree Size/Canopy Cover Class	PVG 6	PVG 7	PVG 8	PVG 9	PVG 11	Totals
Medium/Low NFS Lands	0	897	6	139	72	1,114
Medium/Moderate NFS Lands	1,433	273	37	41	0	1,784
Large/Low NFS Lands	0	501	0	70	79	650
Large/Moderate NFS Lands	3,414	2,248	0	228	221	6,111
Large/High NFS Lands	4,381	1,437	13	282	47	6,160
Total NFS Lands	**9,228**	**5,356**	**56**	**760**	**419**	**15,819**
Medium/Low Private Lands	0	84	0	0	0	84
Medium/Moderate Private Lands	2,021	164	0	0	0	2,185
Large/Low Private Lands	0	0	0	0	0	0
Large/Moderate Private Lands	351	106	0	64	0	521
Large/High Private Lands	253	31	0	0	0	284
Total Private Lands	**2,625**	**385**	**0**	**64**	**0**	**3,074**
Total All Ownership	**11,852**	**5,741**	**56**	**825**	**419**	**18,893**

For example, although the model estimates that 15,819 acres of NFS lands in the Project area exhibit correct habitat conditions, most of these acres are likely unsuitable for great gray owls because they do not occur in juxtaposition to meadows or other foraging habitats. Risk factors for this species include loss of potential nest sites due to removal of large trees, diseased trees, snags, and leaning trees (used by juveniles); fire exclusion; loss of residual trees or snags in foraging habitat; high road densities; and rodent poisoning (not currently occurring on the West Zone of the Forest). Changes in patch dynamics also may have affected the size and juxtaposition of stands with large diameter trees and high crown closures (which great gray owls use for nest sites), relative to stands with variable seral stages and crown closures (which they use for foraging).

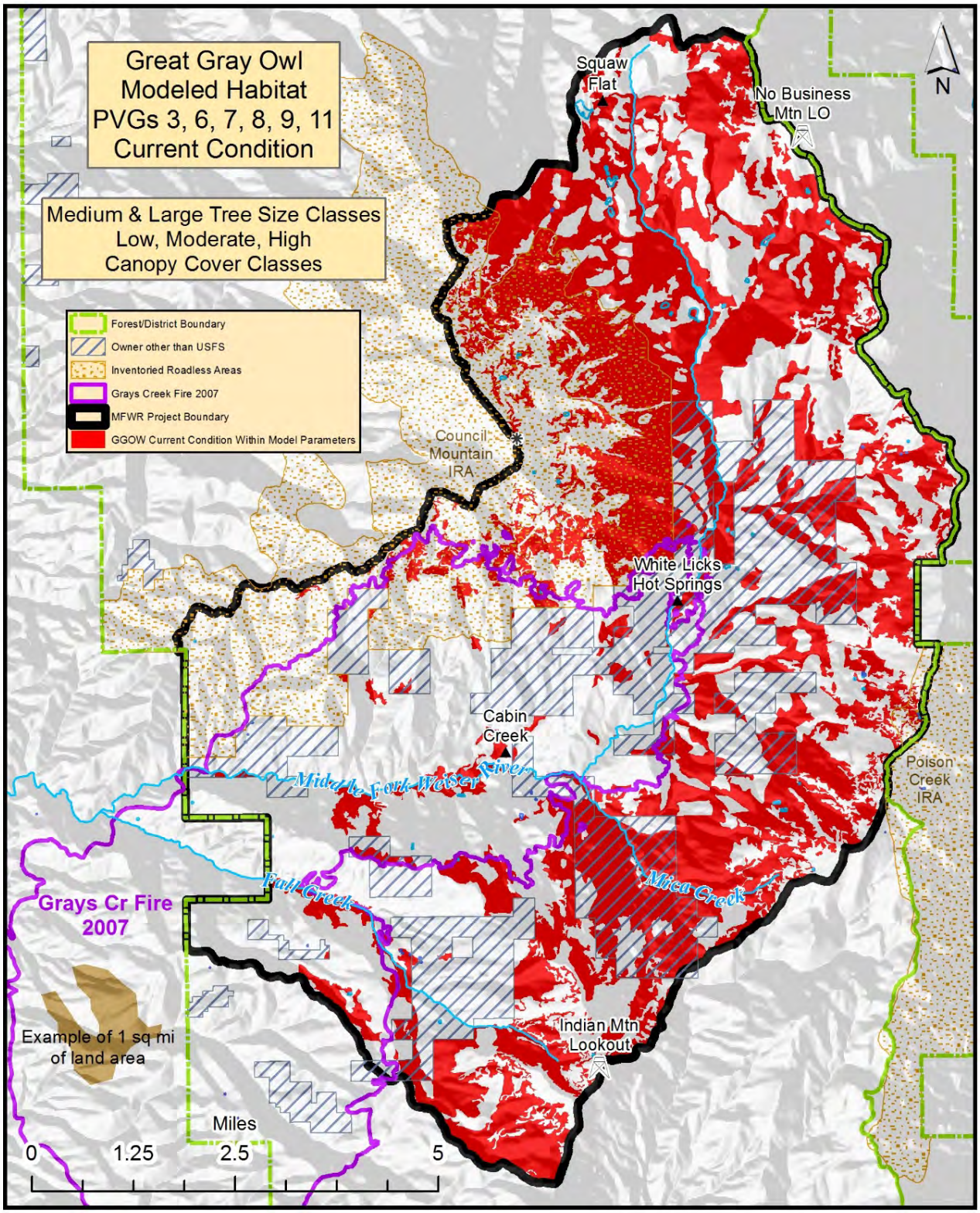


Figure 3-4.8. Great gray owl (GGOW) modeled habitat at current condition, supported by Potential Vegetation Groups (PVGs) 3, 6, 7, 8, 9, and 11 in the Project area.

The average home range size reported for great gray owls ranged from 1,112 to 16,630 acres for first-year dispersing birds and 1,483 to 5,436 acres for adults (Bull and Henjum 1990). Using the larger adult home range size in the evaluation, habitat on NFS lands in the Project area could support approximately three great gray owl home ranges.

Six great gray owl observations have been recorded in the Project area (IFWIS 2014; USDA Forest Service 2015b). However, spring-broadcast vocal surveys for great gray owl in 2013 and 2014 did not document the species in the Project area. Great gray owls were not detected on additional great gray owl/boreal owl transects established in 2015. Additionally, no great gray owls were detected during early summer walk-though nest searches conducted in areas of historical great gray owl observations and in areas near meadows and large forest openings.

Four new great gray owl/boreal owl transects were established in the Project area in fall 2015. All of these transects were sampled in spring 2016 (with no great gray owls documented). All of these transects will be sampled for an additional 5 years after completion of the Project. Early summer walk-through surveys will also be conducted during this time frame. If great gray owls are detected during transect or walk-through surveys, the area will be evaluated for retaining a forested buffer around meadows, protecting potential nest sites, and restricting activities in the area if an active nest is found (as per PDFs).

Northern Goshawk

The northern goshawk is a Region 4 Sensitive species. Northern goshawk management follows the Southwest Guidelines (Reynolds et al. 1992), as directed by the Forest Plan. The KEFs include the goshawk's role as a secondary and tertiary consumer of terrestrial herbivores and predators (O'Neil et al. 2001; Marcot 1997). According to Kennedy (2003), northern goshawks are prey generalists. The species affects terrestrial vertebrate populations through predation and/or displacement and builds nests often used by other species (O'Neil et al. 2001; Marcot 1997). Northern goshawks typically move to lower-elevation valleys during winter because prey species migrate out of the upper forests for fall, winter, and very early spring. For this reason, northern goshawk management is centered on summer habitat for the species. The KECs for northern goshawk summer habitat include an association with forested habitats with live trees and large snags, mistletoe brooms, legacy trees, CWD, and edge habitat (O'Neil et al. 2001; Marcot 1997). Deformities (i.e., multiple trunks and brooming from mistletoe, especially in smaller diameter trees, are also used as nest site substrates. A shrub layer is important to support northern goshawk prey habitat (O'Neil et al. 2001).

Northern goshawks use forests of different ages, structural conditions, and successional stages. Riparian zones and mosaics of forested and open areas are equally important, including shrub and grassland habitats. Goshawks prefer transitional zones for hunting. Home range size for northern goshawks is estimated at more than 5,900 acres and includes three components: nesting, foraging, and PFAs (Youtz et al. 2008; Reynolds et al. 1992).Risk factors for this species include nest tree removal and/or habitat modification from timber management activities, alteration of prey base habitats through vegetation management, stand-replacing wildfires as a result of fire-excluded stands, and/or disturbance from human activities during the northern goshawk breeding season (Nutt et al. 2010). The northern goshawk is believed to respond negatively to openings or linear edges created by roads and is known to be sensitive to disturbance, especially during the breeding season and particularly when the female is incubating eggs.

Current Condition

Modeled suitable summer habitat for the northern goshawk is supported by PVGs 3, 4, 6, 7, 8, and 9 within the HRV and PVGs 2, 3, 4, 5, 6, and 7 outside of the HRV (Table 3.4-10, Figure 3.4-9). The PVGs 2 and 5 have the potential to develop medium and large tree sizes in a high canopy class; however, these conditions would not occur under historical disturbance regimes (Hauffler et al. 1996; Hauffler 1994). The literature shows that northern goshawks use open canopy stands (Reynolds et al. 1982; Hargis et al. 1994), likely for foraging. Use of mature forest stands with a high canopy closure (≥70%) is more commonly described (Hayward 1997; Patla 1991; Hayward and Escaño 1989), most likely due to nesting and rearing requirements. The PVGs 2 and 5 have a limited capability to develop suitable nesting habitat for northern goshawks, except when outside historical disturbance regimes. For modeling northern goshawk nesting and foraging habitat, the literature supports selecting the moderate (12–19 inches DBH) and large tree size classes (≥20 inches DBH) with moderate and high canopy closures (Hayward 1997; Patla 1991; Hayward and Escaño 1989).

Table 3.4-10. Acres of northern goshawk (summer) modeled habitat at current condition by Potential Vegetation Group (PVG) in the Project area on private and National Forest System (NFS) lands.

Tree Size/Canopy Cover Class	PVG 2	PVG 4	PVG 5	PVG 6	PVG 7	PVG 8	PVG 9	Totals
Medium/Moderate NFS Lands	0	0	0	1,433	273	37	41	1,784
Large/Moderate NFS Lands	0	13	0	3,414	2,248	0	228	5,903
Large/High NFS Lands	212	0	421	4,381	1,437	13	282	6,746
Total NFS Lands	**212**	**13**	**421**	**9,228**	**3,958**	**50**	**552**	**14,433**
Medium/Moderate Private Lands	0	0	0	2,021	164	0	0	2,185
Large/Moderate Private Lands	0	0	0	351	106	0	64	521
Large/High Private Lands	29	0	18	253	31	0	0	331
Total Private Lands	**29**	**0**	**18**	**2,625**	**301**	**0**	**64**	**3,037**
Total All Ownership	**241**	**13**	**440**	**11,852**	**4,258**	**50**	**616**	**17,469**

While all of the PVGs that contain modeled habitat for goshawks occur in the Project area, PVGs 3, 4, and 8 comprise a negligible area. The PVG 3 area is so miniscule that it was removed from the analysis.

The Forest Plan provides direction for the management of northern goshawk nesting and PFAs (WIST05 and WIGU07). Since northern goshawks are habitat generalists throughout much of their range, this direction covers the more sensitive areas of their habitat. Maintenance of the recommended canopy closure in PFAs is especially important for conservation of goshawk habitat. Northern goshawks also can use moderate and large tree size classes in medium and high canopy closure classes. This flexibility provides a cushion against loss or declines in old forest characteristics. Large-diameter snags are an important habitat component for some northern goshawk prey species and are future sources of large-diameter logs, another important habitat component for other prey species.

Management recommendations for the northern goshawk in the Southwestern United States (Youtz et al. 2008; Reynolds et al. 1992), referred to as the “Southwest Guidelines,” identify

three major components of the northern goshawk home range: six nest areas, measuring at least 30 acres each and totaling about 180 acres, linked to a PFA of approximately 420 acres (for a total of 600 acres associated with the PFA and nest stands), and a territory area of approximately 5,400 acres. Goshawk home range sizes have been documented from 1,409 to 8,649 acres (Squires and Reynolds 1997), with a mean of roughly 5,400 acres. Although northern goshawk nest stands should be at least 30 acres, nest stand size and shape will depend on local forest conditions and structural components which, in turn, dictate the size and shape of the PFA. Eight potential northern goshawk PFAs have been identified for the known active nests in the Project area. Using the average home range size of 5,400 acres, the 14,433 acres of modeled northern goshawk habitat on Forest Service lands within the Project area (Table 3.4-10) could support approximately three northern goshawk home ranges.

Theoretically, each PFA should be associated with a separate northern goshawk territory; however, it is unlikely that all eight PFAs, which were created administratively on a map, actually associate to only one territory for each PFA. The construction of PFAs on a map does not mean that a northern goshawk pair uses that administrative PFA in perpetuity; it is simply a method to provide appropriate nesting and post-fledgling habitat throughout a Project area (Figure 3.4-10).

Goshawk observations and active nests have been recorded throughout the Project area for many years. However, in the past 5 years none of the known nests have been active and no northern goshawks have been detected in the constructed PFAs. Northern goshawk surveys have been conducted each spring and summer since 2006 for nest activity, presence of adults and/or young in the PFA, and presence of adults and/or young in the drainage. Surveys will continue each year to determine current active nests and PFAs in the Project area. Observations of 17 northern goshawks were recorded for the Middle Fork Weiser River drainage during the past 8 years (USDA Forest Service 2015b; J. Almack field notes, Project record).

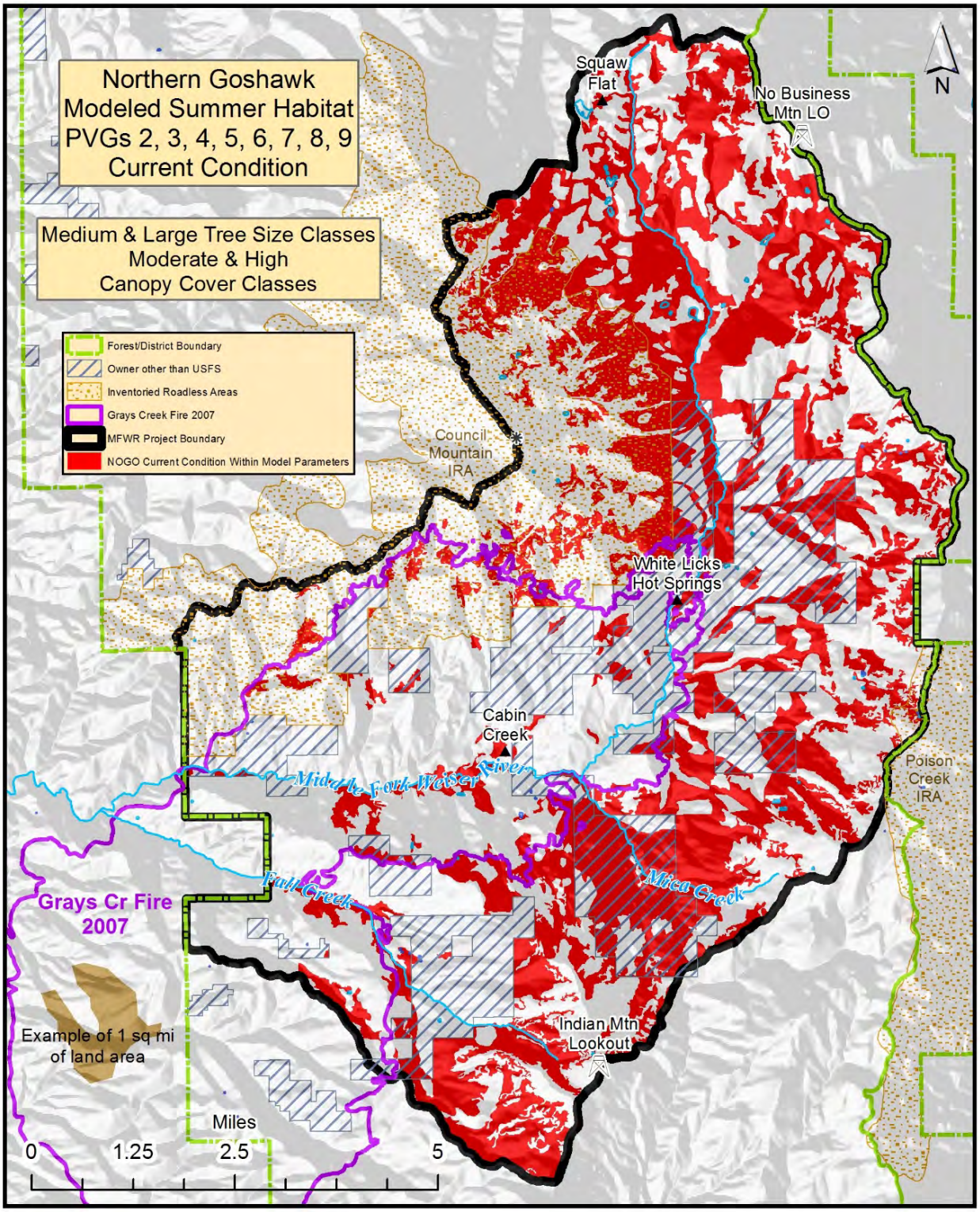


Figure 3.4-9. Northern goshawk (NOGO) summer modeled habitat at current condition, supported by PVGs 2, 3, 4, 5, 6, 7, 8, and 9, including post-fledgling areas (PFAs), in the Project area.

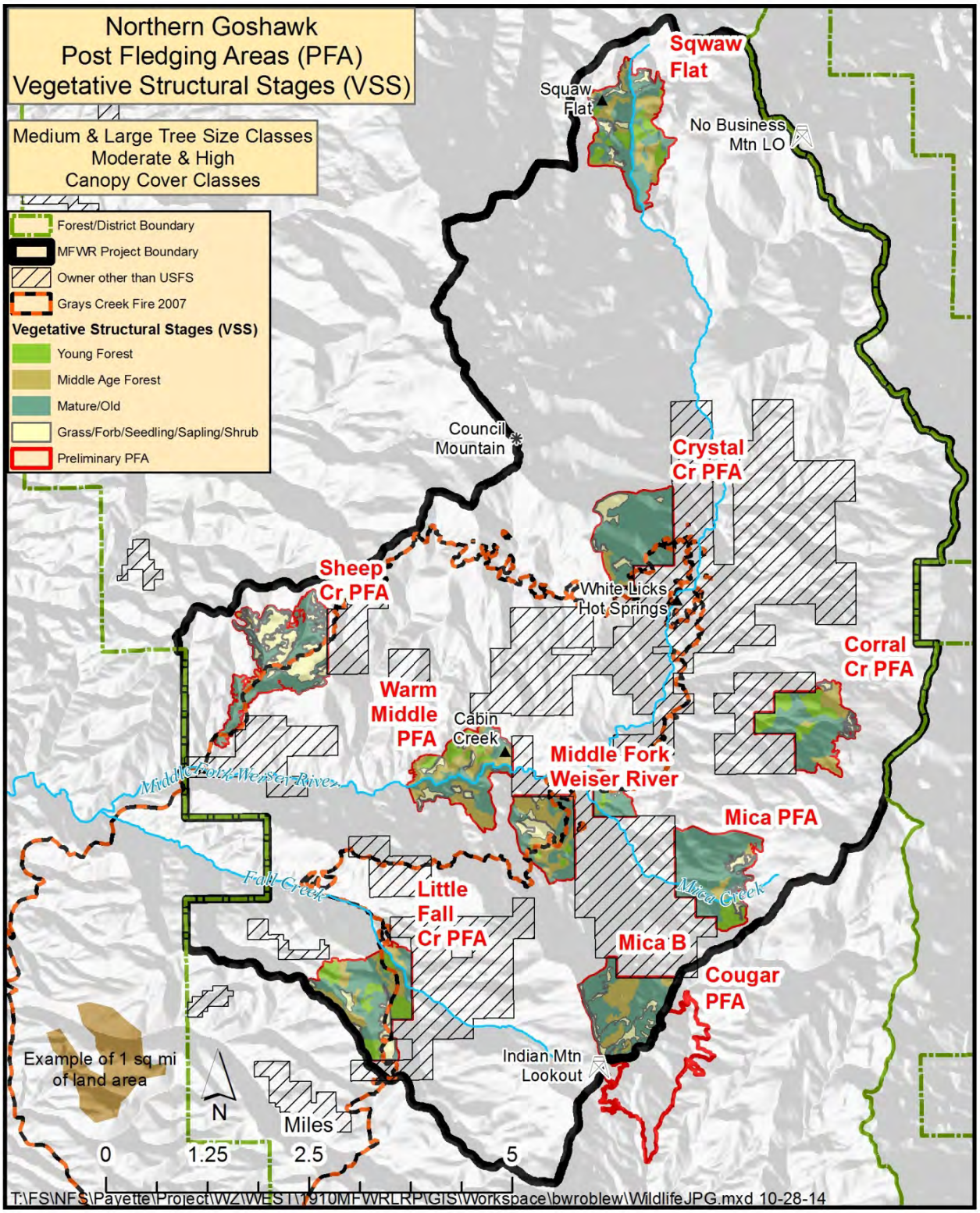


Figure 3.4-10. Potential northern goshawk post-fledging areas (PFAs) in the Project area.

3.4.5.5. Habitat Family 3—Forest Mosaic

Habitats for Habitat Family 3 include the full spectrum of forest communities and structural stages. Wildlife species in Family 3 tend to be habitat generalists, but some (i.e., Canada lynx and wolverine) have low or isolated populations.

Family 3 habitats have exhibited some decline in the large tree size class, but overall no major changes were noted from historical to current times. Modeling indicates that the amount of habitat available to Family 3 wildlife species is currently within the HRV, largely because species in this family tend to be habitat generalists. While modeled habitat quantity does not appear to be a concern, habitat quality changes in the environment may be a limiting factor for this family. The habitat environment is composed of vegetative and nonvegetative factors (e.g., human-caused disturbance) that can influence relative abundance and distribution of the wildlife species throughout available habitats (Wisdom et al. 2000).

Canada Lynx

The Canada lynx is listed as a threatened species under the ESA, as amended. Several documents guide lynx management on Federal lands.

The 2003 Forest Plan (USDA Forest Service 2003a) adopted the 2000 Canada Lynx Conservation Assessment and Strategy (2000 LCAS, Ruediger et al. 2000) by adopting conservation measures dependent on risk factors for lynx and presented as Forest Plan Standards, Guidelines, Goals, or Objectives. The 2000 LCAS conservation measures identified the delineation of LAUs and additional measures, such as the Forest Plan Standard TEST15, for those LAUs (the roughly 6,000 acres of suitable habitat found within LAUs mimics an adult female Canada lynx home range).

Based on the 2000 LCAS, the Forest Plan direction states:

> TEST15—Unless a broad-scale assessment has been completed that substantiates different historical levels of unsuitable habitat, limit disturbance within each LAU as follows: If more than 30% of lynx habitat within a LAU is currently in unsuitable condition, no additional habitat may be changed to unsuitable habitat as a result of vegetative management projects. Fire use, or fire hazard reduction and associated vegetation management activities within the wildland urban interface watersheds, that develop or maintain fuel profiles needed to reduce the risk of wildfire threats to the wildland urban interface areas, are NOT bound by this standard.

The 2000 LCAS identified science limitations for Canada lynx and lynx habitat. Since then, many additional studies have occurred, advancing what is known about Canada lynx and lynx habitat. The LAUs (Figure 3.4-11) and a lynx habitat model (Figure 3.4-11) were identified for the PNF through consultation with the FWS and were used to evaluate Canada lynx habitat and the effects on lynx from agency activities. The modeled lynx habitat (Figure 3.4-11) was produced using habitat classes used by Canada lynx and removing mapped habitat polygons less than 10 acres in size. The model also accounts for habitat polygon distribution, selecting against polygons that are more than 300 feet from another lynx habitat polygon.

Revision of the 2000 LCAS was initiated in September 2010 and completed in 2013. The 2013 LCAS (Interagency Lynx Biology Team 2013) is a full revision of the 2000 LCAS, incorporating all prior amendments and clarifications, substantial new scientific information that has emerged since 2000, including related parts of the Lynx Recovery Outline, as well as drawing on experience gained in implementing the 2000 LCAS. The 2013 LCAS made several major

changes to the 2000 LCAS, including formally stratifying Canada lynx habitat into core areas and secondary/peripheral areas, along with conservation measures for those habitat areas. The 2013 LCAS states that secondary areas (including the Forest's entire Ecogroup, consisting of the Boise, Payette, and Sawtooth National Forests) no longer delineate LAUs. Because LAUs are no longer delineated, management requirements that were based on LAUs are no longer required. Instead, the 2013 LCAS promotes habitat management that is based on providing a mosaic of habitat components (habitat classes and structure that provide denning habitat, foraging habitat, traveling habitat), which would support the presence of Canada lynx moving among core populations. The role of the PNF, therefore, has changed from managing lynx habitat as if there were a core population present to managing for secondary lynx habitat that supports animals moving among core populations. Under the 2013 LCAS, the Forest should actively manage Canada lynx habitat to produce the desired condition of a habitat mosaic. However, until the 2003 Forest Plan is amended, or revised, to incorporate the 2013 LCAS direction, any changes in management should comply with existing Forest Plan Standards, based on the 2000 LCAS, unless a project-specific Forest Plan amendment is adopted.

The Canada lynx is identified as a focal species for Habitat Family 3 on the Forest. The KEF for lynx is as a primary predator of herbivorous vertebrates (O'Neil et al. 2001; Marcot 1997). Key components of Canada lynx habitat include denning habitat, foraging habitat, and travel corridors, provided by a mosaic of forest structures (Ruggiero et al. 1994). In winter, lynx are associated with persistent, deep snow conditions (O'Neil et al. 2001). Roads and/or over-the-snow trails increase the potential for human interactions, disturbance, and vulnerability to trapping (O'Neil et al. 2001; Wisdom et al. 2000).

Canada lynx use late-seral forests for denning, rearing their young, and hunting alternative sources of prey (Ruggiero et al. 1999). Small, forested patches with old forest characteristics, including down wood, provide denning habitat (Wisdom et al. 2000). The common components of denning habitat are large amounts of logs (especially jack-strawed) or root wads, which provide escape and thermal cover for kittens. These late-successional forest stands also may provide refuge from inclement winter weather and summer drought.

Canada lynx foraging habitat supports its primary prey, the snowshoe hare (*Lepus americanus*), and/or important alternate prey, particularly red squirrels (*Tamiasciurus hudsonicus*), but also mice (Murinae) and grouse (especially during summer) (Ruggiero et al. 1994). Lynx primarily forage in early seral forests and in some mid-seral forests that support high numbers of prey. The best quality snowshoe hare habitats support a high density of young trees or shrubs (4,500 stems or branches per acre), especially with branches that protrude above the snow. These conditions may occur in early successional stands, following some type of disturbance, or in older forests with a substantial understory of shrubs and young conifers. Red squirrel densities tend to be highest in mature, cone-bearing forests with high quantities of logs (Ruediger et al. 2000).

Canada lynx are known to move long distances, but open areas are avoided and will disrupt lynx movements (Ruggiero et al. 1994). In general, suitable travel cover consists of coniferous or deciduous vegetation that is 2 feet taller than the average snowfall, with a closed-canopy forest adjacent to foraging habitat. Travel cover allows lynx movement within their home ranges and provides access to denning sites and foraging habitats.

In Idaho, Canada lynx typically use montane and subalpine coniferous forests above 4,000 feet; their primary habitat includes lodgepole pine, subalpine fir, and Engelmann spruce forests, as well as cool, moist Douglas-fir forests interspersed with subalpine fir forests (Ruediger et al. 2000). Most coniferous forest structural stages provide lynx habitats, with the exception of

stands with old forest characteristics and a single canopy. Riparian woodlands and shrubfields also are habitats.

Current Condition

Vegetative communities capable of providing modeled habitat conditions for Canada lynx include PVGs 3, 7, 8, 9, 10, and 11 (Table 3.4-11, Figure 3.4-11). The Project area contains virtually all of the Middle Fork Weiser LAU, which encompasses 50,033 acres. About 1,200 acres of the Middle Fork Weiser LAU, on the eastern Project area boundary, falls outside of the Project area due to a dog leg in the Forest boundary that circumvents a full section of Idaho Department of Lands ownership. The Project area also includes about 4,100 acres of the Northwest Council LAU, due to the inclusion of the upper portion of the East Fork Weiser River as part of the Fisheries analysis; this portion of the Northwest Council LAU is not planned for any restoration treatment. The southeastern portion of the Project area is juxtaposed to the Little Weiser LAU. This portion of the Project area includes small slivers of the Little Weiser LAU; these mapped slivers were created by small differences between the two GIS layers identifying the watershed boundary along the ridge from West Mountain southwest to upper Fall Creek.

Table 3.4-11. Acres of Canada lynx modeled habitat at current condition by Potential Vegetation Groups (PVGs) in the Project area on National Forest System (NFS) lands.

Potential Vegetation Group	PVG 3	PVG 7	PVG 8	PVG 9	PVG 10	PVG 11	Totals
NFS Lands	0	4,178	28	563	770	267	5,806

Currently, the Programmatic BA for the Weiser River Section 7 Watershed identifies approximately 6,156 acres of suitable Canada lynx habitat in the Middle Fork Weiser LAU. Following the lynx habitat model, after removing recent burns, 5,806 acres (90.8% of the original 6,156 acres of suitable lynx habitat) remains in a suitable condition ("modeled habitat") for lynx.

No Canada lynx observations have been documented within the Project area. Incidental track surveys were conducted by snowmobile while conducting trail camera surveys during the winters of 2006 through 2013, along the mountain crest running north-south on the east boundary of the Project area; no lynx tracks or photos were identified. Camera surveys were conducted during summer from 2006 to 2016; no lynx was identified at these camera stations. The PNF is not considered a core area for lynx populations due to the lack of observations, lack of documented reproduction, and habitat that is isolated from core lynx populations. Canada lynx are more likely to occur in the more remote areas of the northwest and northeast parts of the Forest, but even in those areas, no recent, confirmed lynx observations have been reported.

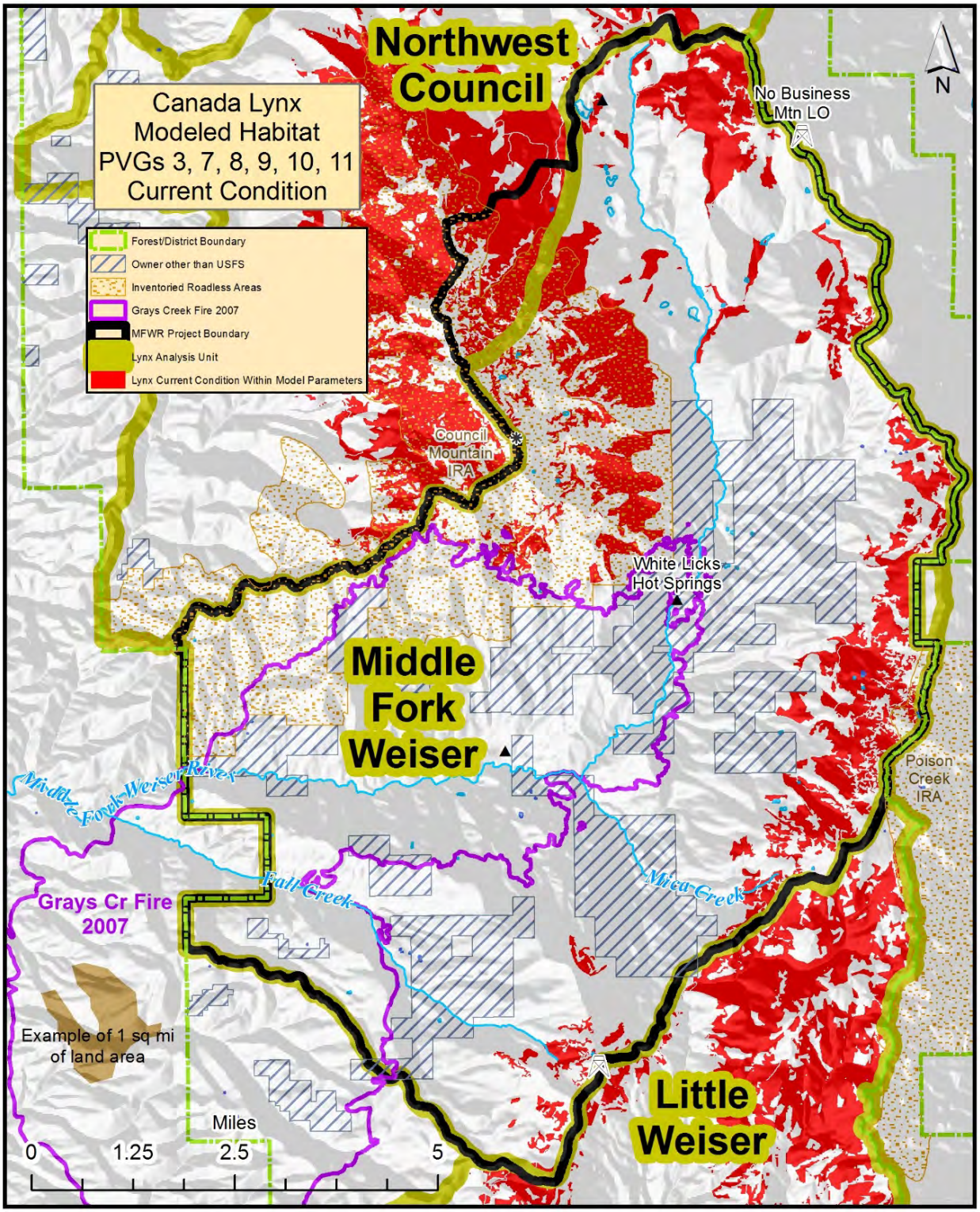


Figure 3.4-11. Canada lynx modeled habitat at current condition, showing 6,894 acres in the Project area, not including modeled lynx habitat outside of the Project area.

Mountain Quail

The mountain quail is a Region 4 Sensitive species and a species of greatest conservation need in Idaho. The mountain quail was selected as a focal species because of its association with transitional mountain and riparian shrubland communities within broader forested habitats.

Mountain quail feed on insects and plants, including seeds, fruit, leaves, bulbs, roots, and tubers, and play an ecological role in seed and fruit dispersal (O'Neil et al. 2001; Marcot 1997). They also are an important prey species for many predators. The KECs for this species include an association with forested habitats and shrub/grassland habitats (O'Neil et al. 2001; Marcot 1997). Mountain quail are typically associated with shrub and herbaceous layers, often in interfaces between upland and riparian environments including seeps and springs. Medium and large shrubs (2.0–16.5 feet tall) with dense cover are generally associated with habitat for mountain quail. Forbs and shrubs provide habitat for invertebrate prey species and produce seeds, fruits, bulbs, and tubers that are important food sources; fire can stimulate growth and development of these conditions, benefitting this species. Human influences on mountain quail and its habitat are both positive and negative. Beneficial effects of human influence include creation of edge habitats, such as those created along power line corridors, supplemental feeding of other bird species, and creation of water developments. Mountain quail are dependent on free water, particularly in arid habitats (Rahm 1938). Negative effects include introduced quail species (there is some food overlap between young mountain quail and adult California quail [*Callipepla californica*]) (Gutierrez and Delehanty 1999), competitive exclusion from introduced California quail and chukar (*Alectoris chukar*), water developments lacking escape ramps (Gutierrez and Delehanty 1999), and water impoundments throughout low-elevation habitats.

Habitats for mountain quail include all structural stages, except stem exclusion, of interior Douglas-fir, interior ponderosa pine, chokecherry (*Prunus virginiana*), western serviceberry (*Amelanchier alnifolia*), and wild rose (*Rosa* species) (Wisdom et al. 2000). Habitat is characterized by shrub-dominated communities ranging from 2,300 to over 9,850 feet elevation. This quail species is most often associated with steep slopes or rugged terrain, but these characteristics are not always present in occupied habitat (Brennan et al. 1987). Mountain quail often breed at high elevations during spring and summer, and they generally migrate to lower elevations prior to snowfall. Mountain quail also use high-elevation aspen stands surrounded by sagebrush and riparian areas in forested habitats with a significant shrub component (Brennan et al. 1987). Fires can have a negative effect on habitat in the short term, but they can promote growth and development of shrub habitats in the long term (Gutierrez and Delehanty 1999).

In Idaho mountain quail distribution appears to be closely associated with riparian shrub habitats (Vogel and Reese 1995). These areas may or may not have an associated forest canopy; they typically occur along waterways and secondary drainages that are within a few hundred yards of water (Vogel and Reese 1995). In the ICB mountain quail are usually found within 328–656 feet of a water source (Brennan et al. 1987). Mountain quail require drinking water in hot weather; chicks must drink soon after hatching to survive (Brennan et al. 1987). South-facing slopes are arid and dominated by grasses, such as bluebunch wheatgrass (*Pseudoroegneria spicata*) and Idaho fescue (*Festuca idahoensis*), together with several species of forbs. In draws or on north-facing slopes, serviceberry, hawthorn (*Crataegus douglasii*), ninebark (*Physocarpus malvaceus*), snowberry (*Symphoricarpos* species), and wild rose are common. Moist sites have elderberry (*Sambucus* species), alder (*Alnus sinuata*), redosier dogwood (*Cornus stolonifera*), and black cottonwood (*Populus trichocarpa*); higher-elevation sites may include ponderosa pine and Douglas-fir (Vogel and Reese 1995).

On the Forest, vegetative communities capable of providing modeled habitat conditions include PVGs 1, 2, 4, 5, 7, and 11 (Nutt et al. 2010). Historical fire regimes are nonlethal in low-elevation types (PVGs 1, 2, and 5) and mixed1 or mixed2 in other PVGs. Riparian shrubland is a special habitat feature for mountain quail.

The Forest likely contributes to year-round habitat, but some fall and all winter habitats are probably below the boundary of the Forest. Modeled habitat on the Forest does not appear to be the limiting factor for this species; however, off-Forest, lower-elevation habitat conditions, or human influences on the species or its habitat may be limiting factors. Brennan (1990) suspected water impoundments have inundated thousands of acres of important low-elevation winter habitat.

The population trend of mountain quail is unknown. Evidence suggests that populations have undergone considerable rangewide declines, particularly in xeric habitat east of the Cascade Mountains and Sierra Nevada Mountains (Vogel and Reese 2002; Gutierrez and Delehanty 1999). Occupied habitat in Idaho declined more than 95% from 1938 to 1989 (Brennan 1990). Remaining populations occur in the lower Salmon and Snake River drainages and the foothill and mountain areas of the Boise River drainage (IDFG 2005).

Current Condition

Mountain quail modeled habitat within the Project area was mapped using PVGs 1, 2, 4, 5, and 7 (all including a crosswalk from Forested Strata 29, 41, 60, and 70), including all tree size classes and a buffer of 650 feet on perennial streams. This 650-foot buffer includes habitat outside of the 240 feet that is considered by the Forest as part of the RCA. Approximately 13,075 acres of modeled habitat were identified in the Project area at current condition (Table 3.4-12, Figure 3.4-12), of which 8,570 acres exist on NFS lands in the Project area. This total acreage includes only the modeled vegetal habitat, even though Figure 3.4-12 also shows the buffered perennial streams. The riparian zones that lack the appropriate vegetative characteristics are not included in this modeled habitat total. Habitat for mountain quail is likely overestimated by this model because current GIS technology does not allow the identification or measurement of the shrub layer under tree canopies nor the identification of shrub species, and the 650-foot buffer does not allow the extraction of nonhabitat sites.

A number of historical records of mountain quail exist from the north-central portion of the Forest, with a total of 19 records since 1994 (Conservation Data Center [CDC] and PNF databases, Project files). One mountain quail observation exists for the Middle Fork Weiser River drainage (J. Almack field notes 2007, available in the Project record). This bird was observed just west of the Project area, along the Middle Fork Weiser River, during the Grays Creek Fire in September 2007.

Table 3.4-12. Acres of mountain quail modeled habitat at current condition in the Project area, on private and National Forest System (NFS) lands, by Potential Vegetation Group (PVG).

Canopy Cover Class	PVG 1	PVG 2	PVG 4	PVG 5	PVG 6	PVG 7	PVG 8	PVG 9	PVG 10	PVG 11	PVG 99	Totals
GFSS <10% NFS Lands	0	42	0	22	43	0	0	0	0	0	279	386
Low NFS Lands	149	825	61	441	652	495	6	139	107	79	0	2,954
Moderate NFS Lands	1	175	7	762	2,586	1,087	19	212	254	109	0	5,213
High NFS Lands	0	15	0	0	10	0	0	0	0	0	0	25
Total NFS Lands	**150**	**1,057**	**67**	**1,225**	**3,290**	**1,583**	**25**	**352**	**361**	**188**	**279**	**8,578**
GFSS,10% Private Lands	0	8	0	2	0	0	0	0	0	0	131	142
Low Private Lands	9	283	0	844	635	39	0	0	0	0	0	1,809
Moderate Private Lands	0	377	0	624	1,388	128	0	27	11	0	0	2,555
High NFS Private Lands	0	0	0	0	0	0	0	0	0	0	0	0
Total Private Lands	**9**	**668**	**0**	**1,470**	**2,023**	**167**	**0**	**27**	**11**	**0**	**131**	**4,506**
Total All Ownership	**159**	**1,725**	**67**	**2,696**	**5,313**	**1,750**	**25**	**378**	**372**	**188**	**410**	**13,084**

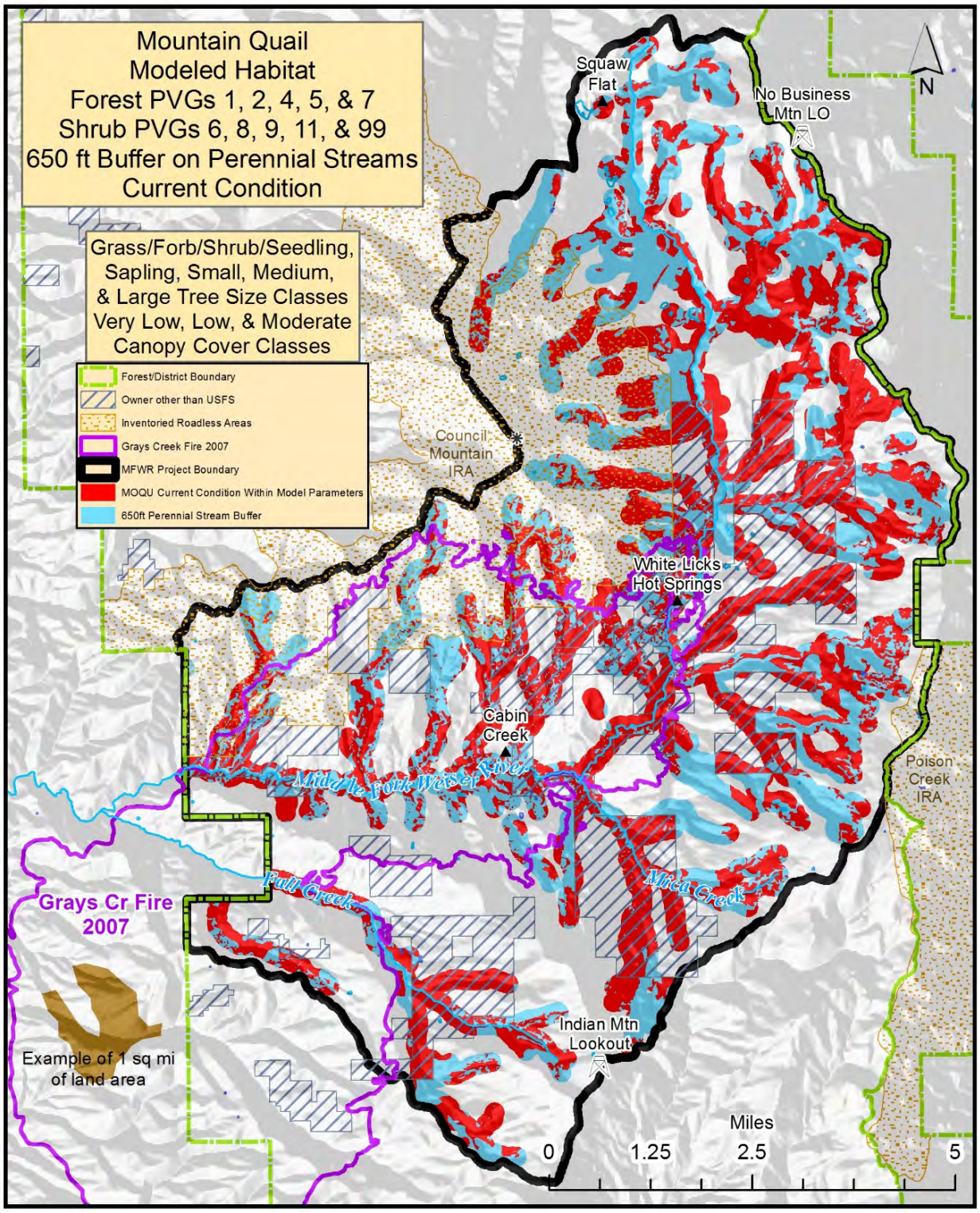


Figure 3.4-12. Mountain quail (MOQU) modeled habitat at current condition, supported by Potential Vegetation Groups (PVGs) 1, 2, 4, 5, and 7 in the Project area (modeled habitat shown in red; blue and red together denote the 650-foot buffer on perennial streams).

Wolverine

The wolverine, a Region 4 Sensitive species, has a circumboreal distribution, occurring in Europe, Asia, and North America. In western North America, the wolverine historically occurred in Alaska, Canada, Washington, Oregon, California, Nevada, Colorado, Utah, Montana, Wyoming, and Idaho. Wolverines occur in the higher elevations of Idaho, including the Forest and the surrounding areas of west-central Idaho. No estimate of population trend occurs for either the Forest or Idaho.

Habitats used by wolverines include alpine tundra and all subalpine and montane forests (Wisdom et al. 2000, Vol. 3). Within the forested habitat classes, all structural stages (except the closed-canopy, stem-exclusion stage) provide habitat. In a central Idaho study (Copeland 1996), wolverines used modestly higher elevations in summer versus winter, and they shifted use of cover types from whitebark pine in summer to lower elevation Douglas-fir and lodgepole pine communities in winter. Wolverine habitat use was explained better by elevation than any other variable in both summer and winter. A persistent snow pack from late winter through late spring is thought to be critical for the reproductive denning success of the wolverine because of the insulating warmth it provides to the newborn kits and for the protection afforded against predators. This dependence on persistent snow would likely force wolverines away from the Project area as drier winter conditions increase in the future due to climate change. As less snow would be present, wolverines would likely move to parts of the Forest that still have a persistent snow pack, such as the high-elevation sites of the wilderness areas on the east side of the Forest.

Wolverines use large home ranges. Female home ranges average 98 square miles (63,000 acres) and male home ranges 588 square miles (376,000 acres) in central Idaho (Copeland et al. 1996). Denning usually occurs in February, typically on north- to east-facing slopes of talus or mixtures of forest and talus.

Wolverines are predominantly scavengers, especially in winter when their diets consist primarily of ungulate carcasses (Banci 1994). In summer they use a wider variety of foods, including small mammals, birds, carrion, and berries (Weaver et al. 1996). Copeland (1996) found that carrion-related food supplied 46% of wolverine diets in Idaho during both summer and winter. Banci (1994) suggested that diversity of habitats and foods is important to wolverines.

Current Condition

Recent studies have provided a strong correlation between wolverine habitat and a persistent snowpack (Copeland et al. 2010). The authors developed a spatial data layer of spring snow cover in the Northern Hemisphere for a 7-year period (from 2000 to 2006) using moderate-resolution imaging spectroradiometer (MODIS)-classified daily snow data (500 meter spatial resolution) from the Terra satellite (Copeland et al. 2010; Hall et al. 2006). Areas that exhibited snow cover in years 6 and 7 showed the strongest correlation with wolverine radio locations (Figure 3.4-13).

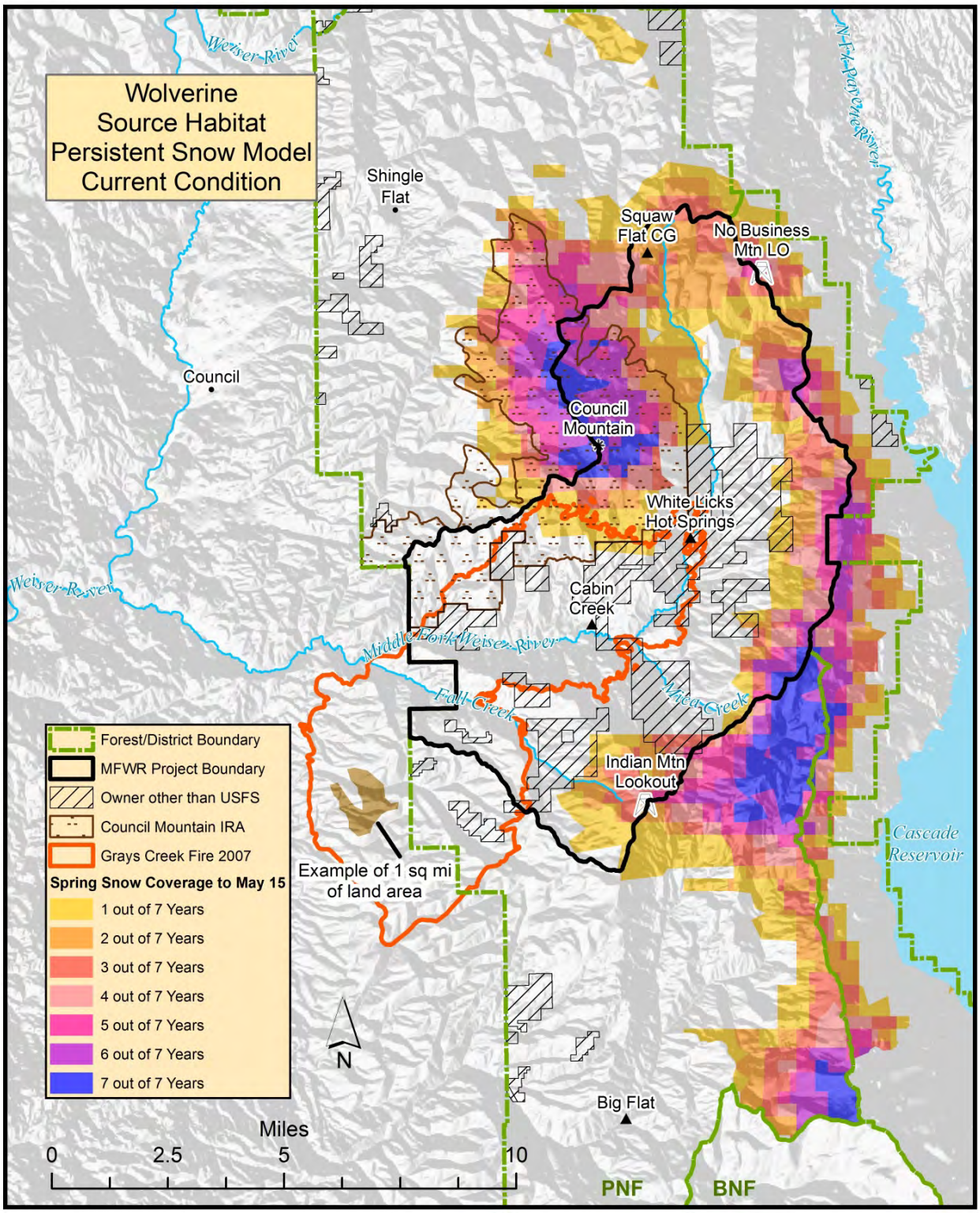


Figure 3.4-13. Wolverine modeled habitat for the Project vicinity using the persistent snow model, as described by Copeland et al. (2010). Wolverines would more likely use the areas classified as "6 out of 7 years" and "7 out of 7 years."

The IDFG recently released a state management plan for the conservation of wolverines in Idaho for the period 2014–2019 (IDFG 2014). This management plan includes life history information, current range distribution, habitat requirements and distribution (using the Copeland et al. [2010] Persistent Snow Model), observation records, and estimated population capacity in Idaho. The management plan suggests that west-central Idaho has appropriate habitat and a small number of confirmed and unconfirmed wolverine observations, as well as potential dispersal corridors from larger populations, such as the Selway-Bitterroot and Yellowstone ecosystems.

The Payette, Boise, and Sawtooth national forests are collaborating with the RMRS, Round River Conservation Studies, IDFG, and other government and non-government organizations, to investigate the wolverine population in western Idaho and to identify potential impacts to wolverines from winter recreation. Research efforts include using a unique combination of approaches to simultaneously and intensively monitor both wolverines and winter recreation, including GPS monitoring of wolverines and winter recreationists. From the winter of 2010-2011 to date, investigators have captured, radio-collared, and monitored nine wolverines on the east side of the Forest. The study area does not include the Project area. No confirmed wolverine observations have been reported within the Project area (USDA Forest Service 2015b, IFWIS 2014). One animal that had been collared on the Sawtooth National Forest as part of the wolverine-recreation study moved to the PNF, indicating the potential for immigration from other occupied areas to the Forest.

3.4.5.6. Habitat Family 5—Forest and Range Mosaic

Modeled habitat for wildlife species in Habitat Family 5 is characterized by habitat requirements for Rocky Mountain elk. No focal species were designated for Family 5; however, elk is included in this analysis because of its importance to local forest management and special interest to local communities.

Rocky Mountain Elk

The Rocky Mountain elk is designated as a SOSI for the Forest, but it is not a focal species (USDA Forest Service 2003a). Elk populations are managed by the IDFG, which uses Hunting Units designed to provide for a controlled harvest during late summer and fall hunting seasons. The Project area is encompassed by IDFG Big Game Hunting Unit 32A.

Elk occur throughout the Forest and use a variety of habitats, ranging from open sagebrush-grasslands for foraging to dense conifer stands for year-round hiding cover and winter thermal regulation. Winter range is a combination of grassland, shrubfields, and forested stands, which provide winter forage, thermal regulation, and hiding cover. Forest Plan direction for elk habitat management requires identifying and protecting calving areas, wallows, travel corridors (if known), mineral licks, security polygons, and winter range. Conifer stringers on open grassland hillsides create a classic elk habitat mosaic, which is used through much of the snow-free season. Dense vegetation plays an important role in reducing vulnerability of elk to hunting mortality. Elk calving areas consist of moderate- to open-density conifer stands on southerly slopes, with a moderate-to-dense shrub layer in the understory.

Road density plays an important role in elk management. Numerous studies consider wildlife habitat to be at risk when road densities exceed 1.0–1.7 miles of open road per square mile (Wisdom 2007; Rowland et al. 2005; Frederick and Moore 1991; Hillis et al. 1991; Lyon 1983). Elk habitat effectiveness and security are influenced by amount and proximity of

forage and cover components, adequacy of hiding and thermal cover, and open road densities. As hiding cover dissipates, the influence of open roads on elk habitat effectiveness is magnified (S. Reinecker, IDFG Comment Letter for the Lost Creek-Boulder Creek Project, dated March 27, 2013 [see Project record]).

Typically, road densities >1.0 mile of drivable road per square mile are considered detrimental to elk use and will likely increase vulnerability to hunting mortality (Hillis et al. 1991; Frederick 1991). Frederick (1991) noted results from several studies that show elk habitat effectiveness declines to 75% at an open road density of 1.0 miles of open road per square mile of land. At road densities of 2.0–3.0 miles of open road per square mile of land, elk habitat effectiveness declines to 25%. Because closed system roads and unauthorized roads typically do not have effective closure barriers in this area, any road that was drivable was considered an open road for the elk analysis.

Current Condition

Current road density on NFS lands in the Project area is 1.2 miles of Forest Travel Plan open and seasonally open NFS roads per square mile of NFS land. When unauthorized roads are added to this mileage, road density on NFS lands in the Project area increases to 3.4 miles/square mile of NFS land. Looking at road densities by subwatershed, there is a range of 2.6–4.2 mile/square mile of NFS land. Considering all land ownerships in the Project area, the road density increases to a range of 2.8–5.1 miles/ square mile. The definition of drivable road can be legal or physical. Legally, the PNF MVUM displays those NFS roads, trails, and areas designated for motor vehicle use. These are authorized “open” routes. Other routes on the landscape may be physically drivable, but public use of those routes is unauthorized. As stated in FSM 7715.78: “If unauthorized routes are not designated, motor vehicle use on these routes is prohibited (36 CFR 261.13).”

Many unauthorized routes occur in the Project area. The following routes occur along the Middle Fork Weiser River road (FS Road 186), which runs 13.3 miles through the center of the entire Project area: 37 unauthorized roads (all driven illegally), originating from Road 186; 5 open roads and 2 gated roads (gates have been breached by ATVs) closed year-round or seasonally; and 35 ATV routes pioneered off of Road 186 (J. Almack, field notes from MFWR Project area). By far, the greatest numbers of roads in the Project area are classified as unauthorized. Many of these unauthorized roads may be physically drivable, even in winter (by snowmobile), adding to the degradation of elk security in the drainage. These road miles illustrate an important opportunity to better manage the NFS road system in the Project area.

Elk Security Area Analysis

Elk Security Areas (SAs) (Hillis et al. 1991) are often used as a measure of the effects of road density on bull elk vulnerability to hunting mortality. An area of 0.5 mile on either side of an open NFS road or motorized trail is considered unsecure. The remaining blocks of suitable habitat outside of this buffer are defined as Elk Security Polygons, if they also have vegetation and/or terrain features that provide appropriate hiding cover for elk and are at least 250 acres in size. The total acreages of the SAs should be at least 30% of the area being analyzed, which, in this case, is the roughly 50,000-acre Project area (USDA Forest Service 2003a; Thomas et al. 1979). Security polygons that did not meet these criteria were dropped from the analysis because they are not SAs. An analysis unit may have large security polygons, but if the requisite hiding cover was not present in a polygon, the polygon was dropped from the security analysis.

Hiding cover was defined by Thomas et al. (1979) as "vegetation capable of hiding 90% of a standing adult deer or elk from the view of a human, at a distance equal to or less than 60 meters (200 feet)." On the Forest, vegetative structure that would typically provide hiding cover is found in Strata 23, 24, 34, and 35. Tree plantations (Stratum 32) may provide hiding cover, but they should be field verified. Plantations are not SAs because they would have to meet the other criteria of size and distance away from roads. Although terrain features do not provide vegetative cover, they may provide a visual block of a deer or elk to the hunter, adding to the hiding cover quality of a particular site. Currently, GIS does not have the capability to appropriately model terrain features for this analysis. The Forest Plan directs two elk sight distances (elk sight distance = 200 feet, so 400 feet) be provided as a buffer around wallows and mineral licks. This buffer is not usually a circle around the site but an uneven line that follows the vegetation and terrain features present.

The following discussion is an example of how the elk security analysis works. Forest Service roads 50166 and 50485 south of Squaw Flat are currently closed to motorized vehicles year-round. When applying the 0.5 mile buffer on open roads, there are three Elk Security Polygons created in this area. One of the polygons lies between Roads 50166 and 50485. Habitat in this location is a mix of untreated, forested stands and multiple blocks of old clear cuts that are now tree plantations. Other than the open areas along these roads, there are sites within this one polygon that likely provide hiding cover for elk; however, the size of this polygon is less than the required 250 acres, so the polygon *does not* meet the criteria to be classified as an SA and is dropped from further analysis, even in the description of current condition. The other two polygons meet the hiding cover and size criteria and are classified as SAs.

The above example illustrates an issue created by the application of the "Hillis Paradigm" (Hillis et al. 1991). The paradigm applies only to a specific time frame: the high-powered rifle hunting season, because this is when adult bull elk are most vulnerable to hunting mortality. However, because of this hunting season window, the quality and quantity of elk habitat that is available outside of the high-powered rifle hunting season is not considered in the elk security analysis. Therefore, the sensitivity of elk to human disturbance during winter foraging and use of thermal cover or spring calving and summer calf rearing is not considered. The polygon that was dropped from the analysis, as noted above, supports a high density of elk and includes areas of habitat that are undisturbed by humans throughout the year, due to the year-round road closures in that location. Changing the status of these roads to seasonally open, following the creation of the OHV loop proposed in Alternatives 2 and 4, would degrade the availability and effectiveness of this area as secure elk habitat (see Elk Security Area Analysis in Section 3.4.6.5 of the Environmental Effects Analysis).

Unauthorized Routes and Closed National Forest System Roads

The EIS analysis addresses open roads but, as discussed above, unauthorized use of closed roads also effects elk security and habitat use. The public has legal access on open NFS or authorized roads, but since many unauthorized roads exist on the landscape, these routes may be used for illegal access (Table 3.4-13). Illegal use of unauthorized roads reduces the effectiveness of SAs, increasing the vulnerability of bull elk to hunting mortality and poaching. Table 3.4-13 illustrates this problem. For example, SA #2 meets all of the criteria for an SA, but note how the size of the area shrinks when the 0.5-mile buffer is applied to all drivable roads. Each of the SAs in the Project area shrinks significantly when all drivable roads are included in the analysis (Figure 3.4-14).

Table 3.4-13. National Forest System (NFS) roads and unauthorized routes in the Project area on NFS lands that may contribute to effects on elk security.

Open Roads (miles)	Closed Roads (miles)	Seasonal Roads (miles)	Unauthorized Routes (miles)
73.3	75.8	27.7	63.8

Elk Winter Range

Relative to other wildlife species, elk are considered habitat generalists. They favor a mix of grassland/shrub and forested landscapes that provide important security cover. Habitat adaptability has allowed for the wide distribution of elk in the west. Generally considered grazing animals, elk feed on grasses, sedges, and forbs all year. They shift to shrubs more in the winter, as nonwoody plants become less available and nutritious. Sagebrush, bitterbrush, western serviceberry, curl-leaf mountain mahogany (*Cercocarpus ledifolius*), and aspen increase in importance as foods for elk in the winter (Kufeld 1973; Wambolt 1998). In search of winter habitat, elk move to areas with less snow depth, typically at relatively low elevations. Areas with little human disturbance often provide elk winter range.

Elk winter range exists in the Project area, primarily depending on snow depths at lower elevations in the lower-elevation sagebrush/grasslands that dominate the western foothills, including the lower areas of the MFWR and Fall Creek drainages (Figure 3.4-14). This habitat abuts large acreages of private land. As a result, substantial winter range habitat exists west of the Project area including much of the Weiser River Valley, which primarily is private land and several small blocks of state land.

Elk Calving

The calving habitat model uses lands at an elevation of 5,000 feet or lower, on less than 35% slope with generally southern aspects. This model likely overestimates the amount of calving habitat, because sufficient hiding cover is also necessary but was not included in the model. At the macrohabitat scale, elk select for cover components in combination with physical landscape characteristics (southern aspect) and forage components associated with deciduous shrub cover (Barbknecht 2010). It is difficult to determine specific areas where elk may calve in the Project area; choice of calving sites by the pregnant cows is a function of adequate hiding cover for the calf, forage for the lactating cow, and elevational limitations due to persistent spring snowpack. Elk calving sites would be identified prior to Project implementation.

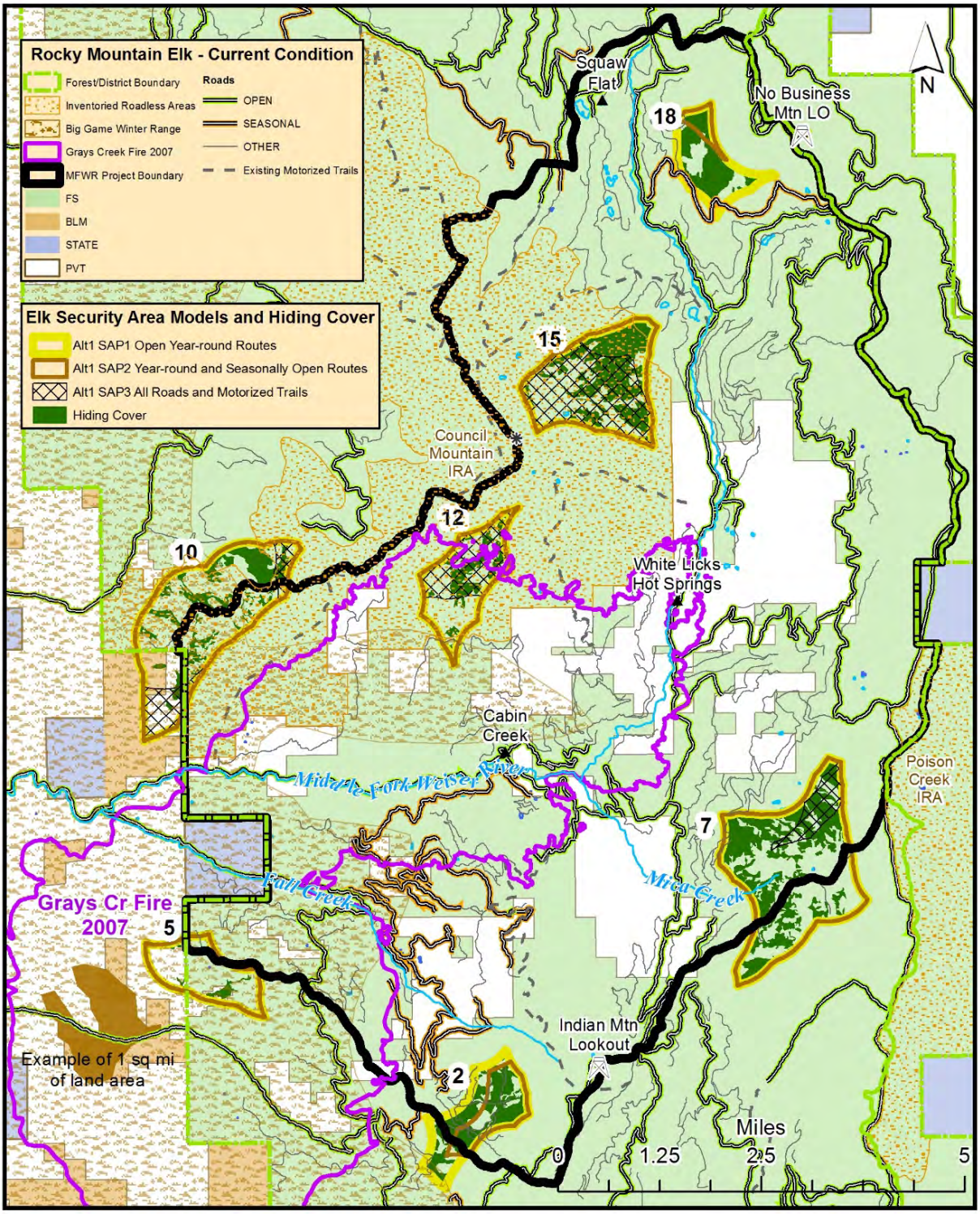


Figure 3.4-14. Elk modeled Security Areas at current condition in the Project area, identified by a 0.5-mile buffer on open roads, unauthorized routes, and motorized trails.

3.4.5.7. Habitat Family 12—Grassland/Open-canopy Sage

Northern Idaho Ground Squirrel

Northern Idaho ground squirrels (NIDGS) have the most restricted geographical range of any ground squirrel species and one of the smallest home ranges among North American land mammals (Gill and Yensen 1992). The historical distribution of NIDGS included parts of west-central Idaho in Adams and Valley counties. Originally considered to be one species, the Idaho ground squirrel is comprised of two subspecies: the northern (previously listed as *Spermophilus brunneus brunneus* but now recognized as *Urocitellus brunneus brunneus*) and southern (*Urocitellus brunneus endemicus*) (Yensen 1991).

The NIDGS is a Threatened species under the ESA (65 FR 17779). The FWS approved a Recovery Plan for this species in 2003 (USDI Fish and Wildlife Service 2003). On the Forest, the NIDGS occurs only on the Council and New Meadows ranger districts.

Habitat loss and fragmentation, caused by wildfire exclusion and forest encroachment into former meadow habitats, were likely the main causes of population decline (USDI Fish and Wildlife Service 2003). Other limiting factors include competition with Columbian ground squirrels (*Urocitellus columbianus*), changes in land use (vegetation altered by fire suppression, road construction, and some logging practices), increased public access (OHV use and recreational shooting), and environmental stochastic events (winter mortality, predation, and disease) (Yensen, personal communication, 2010).

Sagebrush habitats for NIDGS typically include “scab” habitat consisting of bunchgrasses (*Andropogon* species), high desert forbs, sagebrush, basalt boulders or outcrops, and basalt loamy soils. These sites can have an open canopy of conifers, typically ponderosa pine, with a density roughly equivalent to around 50-foot spacing between trees. Trees naturally occur in unevenly distributed clumps, but some restored sites may have more even tree spacing due to vegetation management procedures used in past timber sales. Adjacent stands of denser tree distribution and/or a dense shrub component are generally not used by the NIDGS, although altering sites with appropriate habitat components seems to be successful. Restoring NIDGS habitat in Family 12 sites is a goal in the Recovery Plan for the NIDGS (USDI Fish and Wildlife Service 2003).

The NIDGS emerge in late March or early April and cease aboveground activity in late July or early August (Yensen 1991). Adult (≥2 years old) males emerge first, followed by adult females, then yearlings. Entrance into seasonal torpor is in the same approximate order, with pups active approximately 1 month later than adult males. Hibernation in shallow soils makes NIDGS susceptible to freezing mortality during periods of lower snow depths and colder temperatures, particularly if individuals have an inadequate fat reserve. Ground squirrels are diurnally active (Sherman 1989).

In suitable habitat, NIDGS are usually associated with deeper, well-drained soils generally on south-facing slopes with <30% slope. The NIDGS is primarily granivorous; it ingests large amounts of grass seeds, stems, and herbs, to store energy for the long period it spends in torpor (August through late March) (Yensen 1991). Occupied xeric meadows typically have a shallow (<3 feet to bedrock), reddish-brown to yellowish-red skeletal-loam or clay-loam soil (Yensen 1991). Vegetation in these drier meadows is often dominated by stiff sagebrush (*Artemisia rigida*) or mountain big sagebrush, with *Lomatium* species, worm-leaf stonecrop (*Sedum stenopetalum*), *Allium* species, scarlet gilia (*Gilia aggregate*), largeflower triteleia (*Brodiaea*

douglasii), and various bunchgrasses and other forbs. Figure 3.4-15 shows the current distribution of NIDGS modeled habitat in the Project area.

Current Condition

No NIDGS have been documented in the Forest or IFWIS databases for the Project area, although modeled potential habitat occurs (USDA Forest Service 2015a; IFWIS 2015; USDA Forest Service 2015b) (Figure 3.4-15). The nearest known NIDGS colonies are the Lost Valley Reservoir site, approximately 20 miles northwest of the Project area, and the Mud Creek site, approximately 20 miles northeast of the Project area. A cooperative NIDGS research project is currently investigating food habits, habitat use, population monitoring techniques, use of thinning, and prescribed fire to enhance NIDGS habitat, as well as the occurrence and treatment of plague in the NIDGS population on the Forest. This study does not include the Project area because it is centered on sites occupied by NIDGS. However, information acquired from the study may provide future opportunities to improve NIDGS habitat in areas currently unoccupied, thereby increasing the potential for NIDGS range expansion.

3.4.6. Environmental Effects

Comparisons of effects are organized by species or habitat (e.g, white-headed woodpecker, snags), rather than by alternative. This analysis organization is used for a clearer depiction of habitat changes, by alternative, for each species or habitat component. Direct, indirect, and cumulative effects are discussed for each species or important habitat component.

Effects analyses focus on the indicators described for wildlife resources in Chapter 1 and in Section 3.4.2. In particular, the analyses include discussions of the effects on the forested habitat quantity (acres) and quality (old forest, snags, patch, and pattern) for the following species of concern: white-headed woodpecker, pileated woodpecker, flammulated owl, American three-toed woodpecker, black-backed woodpecker, boreal owl, fisher, great gray owl, northern goshawk, Canada lynx, mountain quail, and wolverine.

Note that the effects analyses are based on the PVGs that support modeled habitat for each wildlife species. These habitat models do not include microsite characteristics, such as understory plant species and structure, terrain features, or juxtaposition to other stand features (water, dense stands of mature trees, forest openings, roads, etc.). Because these microsite data cannot be identified or measured, tabular and map results may cause the reader to misinterpret the effects of Project activities on a particular wildlife species. The effects analyses also consider changes in open and unauthorized road densities and associated effects on snags and elk security, as well as the effects of other Project activities that may cause disturbance or affect nonforested habitats, particularly rangeland habitats used by the northern Idaho ground squirrel. Preliminary effects determinations for ESA-listed and Region 4 Sensitive species are included for each species analyzed. Final effects determinations are documented in the BA for ESA-listed and Region 4 Sensitive wildlife species, which is included in the Project record.

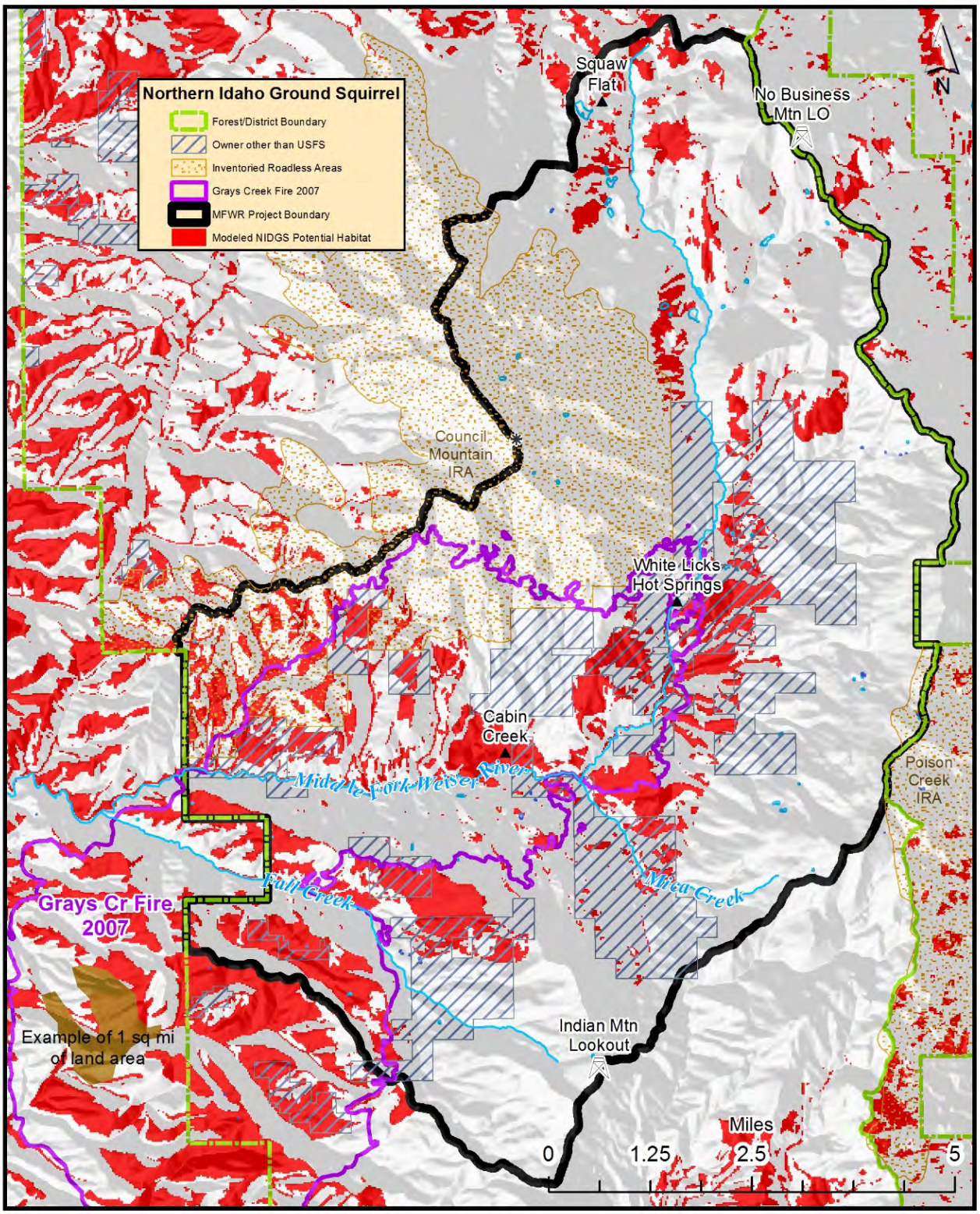


Figure 3.4-15. Northern Idaho ground squirrel (NIDGS) modeled potential habitat at current condition in the Project area.

3.4.6.1. Wildlife Conservation Principles

The wildlife analysis considers six general conservation principles based on those presented by Thomas et al. (1990) and discussed in research literature (Raphael et al. 2000; Wisdom et al. 2000):

- Blocks of habitat close together are better than blocks far apart
- Blocks of habitat that are in areas where the direct or indirect effects of human disturbance are low are more likely to provide all elements of a species' source environments than areas where they are not
- Habitat in contiguous blocks is better than fragmented habitat
- Interconnected blocks of fragmented habitat are better than isolated blocks, and dispersing individuals travel more readily through habitat resembling that preferred by the species in question
- Large blocks of habitat containing large populations of species are superior to small blocks of habitat containing small populations
- Species that are well-distributed across their range are less susceptible to extinction than species confined to small portions of their range

Direct and Indirect Effects

Alternative 1 (No Action Alternative)

No large tree stands with old forest characteristics have been identified in the Project area. Under Alternative 1, no direct effects would occur to old forest because no Project-related activities would occur.

Indirectly, the effects of the No Action alternative on old forest would vary, depending on forest stand conditions and wildfire frequency and intensity. Stands composed of PVGs that are typically denser and with longer fire return intervals (e.g, wetter PVG 6) should naturally develop old forest characteristics in the long term. Conversely, forest vegetation types that typically experience a more frequent fire interval are expected to move away from old forest conditions, due to decreased understory tree and shrub densities and an increased percentage of seral tree species. The lack of prescribed fires in the denser, wetter PVGs would allow for movement toward old forest characteristics. Continued fire suppression and the lack of prescribed burns in the lower-elevation, dry PVGs would ultimately move these stands toward old forest conditions. This is the problem currently faced in the low-elevation ponderosa pine stands in the Project area. Instead of being maintained by wildfires as large tree and open understory stands, these sites have become dense stands of mixed tree species in the overstory and thick ladder fuels in the understory. These stands are outside of HRV and are increasingly vulnerable to uncharacteristic wildfires. Uncharacteristic wildfires have the potential to alter these stands to a successional stage that could further slow the attainment of old forest characteristics for many years.

Effects Common to All Action Alternatives

Restoration treatments are expected to facilitate development of the LTSC than if left untreated. Stands would be composed of a higher percentage of seral tree species, which would be

beneficial for Habitat Family 1. Conversely, the stands would be more open with fewer signs of decay and aging present, which would be less beneficial for most wildlife species in Habitat Family 2.

Cumulative Effects

Cumulatively, all alternatives would contribute to the development of future old forest characteristics on NFS lands. The action alternatives use timber harvest and reintroduction of fire in an attempt to restore desired, large tree stands with old forest characteristics more rapidly than natural processes. Timber harvest activities on State and private lands within the Project area boundary is expected to remove large trees and impede conservation of old forest characteristics within those stands.

3.4.6.2. Habitat Family 1—Low-Elevation, Old Forest.

White-headed Woodpecker

Alternative 1 (No Action Alternative)

Under Alternative 1 there would be no direct effects from restoration treatments because no treatments would occur. Indirectly, white-headed woodpecker modeled habitat would remain on a downward trend, which would prevent the white-headed woodpecker population from increasing and expanding its range in the Project area.

Effects Common to All Action Alternatives

All of the action alternatives would increase modeled habitat for white-headed woodpecker (Table 3.4-14, Table 3.4-15, Table 3.4-16, Table 3.4-17). The Project restoration treatments would lead to a substantial increase in white-headed woodpecker modeled habitat, under all action alternatives, in both the short and long term.

Direct and Indirect Effects from Alternatives 2, 3, 4, and 5

On NFS lands, the 742 acres of currently supported modeled habitat (Table 3.4-2) would increase to 3,985, 4,054, 4,039, and 4,004 acres, respectively, under Alternatives 2, 3, 4, and 5 (Table 3.4-14, Table 3.4-15, Table 3.4-16, Table 3.4-17, Figure 3.4-16, Figure 3.4-17, Figure 3.4-18, Figure 3.4-19). Potential home ranges provided currently for white-headed woodpecker would increase from 3–6 to 16–31 home ranges under Alternative 2 and 16–32 home ranges under Alternatives 3, 4, and 5. Approximately 3,000 acres of forest stands receiving treatments would not meet modeled white-headed woodpecker habitat needs in the short term (0–5 years) because the canopy cover would be reduced below 25%. These forest stands are expected to provide suitable habitat for white-headed woodpecker within 15–20 years and in the long term (>30 years). Considering only white-headed woodpecker habitat management, any of the action alternatives would be an acceptable management option because they all would alter current habitat conditions favoring white-headed woodpecker required habitat structure.

Cumulative Effects

Actions on NFS lands include ongoing fuelwood removal along open NFS roads and short-term decisions to open closed roads specifically for fuelwood access. Some fuelwood cutters pioneer trails off of existing roads and unauthorized routes to access fuelwood. Such actions would continue to negatively impact snag levels. Currently, private and State lands open to timber

harvest are expected to have low levels of large trees and high canopy cover. Alternative 3 would enhance more modeled habitat for white-headed woodpeckers, obliterate more unauthorized roads, and reduce overall road density more than the other action alternatives. Prescribed fire, under all action alternatives, would create snags, thus indirectly benefiting white-headed woodpeckers. The Council Mountain IRA provides small and widely separated patches of modeled habitat under all action alternatives.

Table 3.4-14. Acres of white-headed woodpecker modeled habitat under Alternative 2 by tree size/canopy cover classes and Potential Vegetation Group (PVG) in the Project area, on private and National Forest System (NFS) lands.

Tree Size/Canopy Cover Class	PVG 1	PVG 2	PVG 3	PVG 5	PVG 6	Totals
Large/Low NFS Lands	88	278	0	740	2,879	3,985
Large/Low Private Lands	5	12	0	0	0	18
Total All Ownership	**93**	**290**	**0**	**740**	**2,879**	**4,003**

Table 3.4-15. Acres of white-headed woodpecker modeled habitat under Alternative 3 by tree size/canopy cover classes and Potential Vegetation Group (PVG) in the Project area, on private and National Forest System (NFS) lands.

Tree Size/Canopy Cover Class	PVG 1	PVG 2	PVG 3	PVG 5	PVG 6	Totals
Large/Low NFS Lands	86	278	0	736	2,860	3,960
Large/Low Private Lands	5	12	0	0	0	18
Total All Ownership	**91**	**290**	**0**	**736**	**2,860**	**3,978**

Table 3.4-16. Acres of white-headed woodpecker modeled habitat under Alternative 4 by tree size/canopy cover classes and Potential Vegetation Group (PVG) in the Project area, on private and National Forest System (NFS) lands.

Tree Size/Canopy Cover Class	PVG 1	PVG 2	PVG 3	PVG 5	PVG 6	Totals
Large/Low NFS Lands	88	279	0	749	2,923	4,039
Large/Low Private Lands	5	12	0	0	0	18
Total All Ownership	**93**	**291**	**0**	**749**	**2,923**	**4,057**

Table 3.4-17. Acres of white-headed woodpecker modeled habitat under Alternative 5 by tree size/canopy cover classes and Potential Vegetation Group (PVG) in the Project area, on private and National Forest System (NFS) lands.

Tree Size/Canopy Cover Class	PVG 1	PVG 2	PVG 3	PVG 5	PVG 6	Totals
Large/Low NFS Lands	88	279	0	717	2,921	4,004
Large/Low Private Lands	5	12	0	0	0	18
Total All Ownership	**110**	**328**	**0**	**693**	**2,986**	**4,022**

Determinations

In the short term (0–5 years), Alternatives 2, 3, 4, and 5 *may impact individuals* or habitat, but would not likely contribute to a trend towards Federal listing or cause a loss of viability to the population or species. In the mid-term (5–30 years), Alternatives 2, 3, 4, and 5 would provide beneficial impacts to the species.

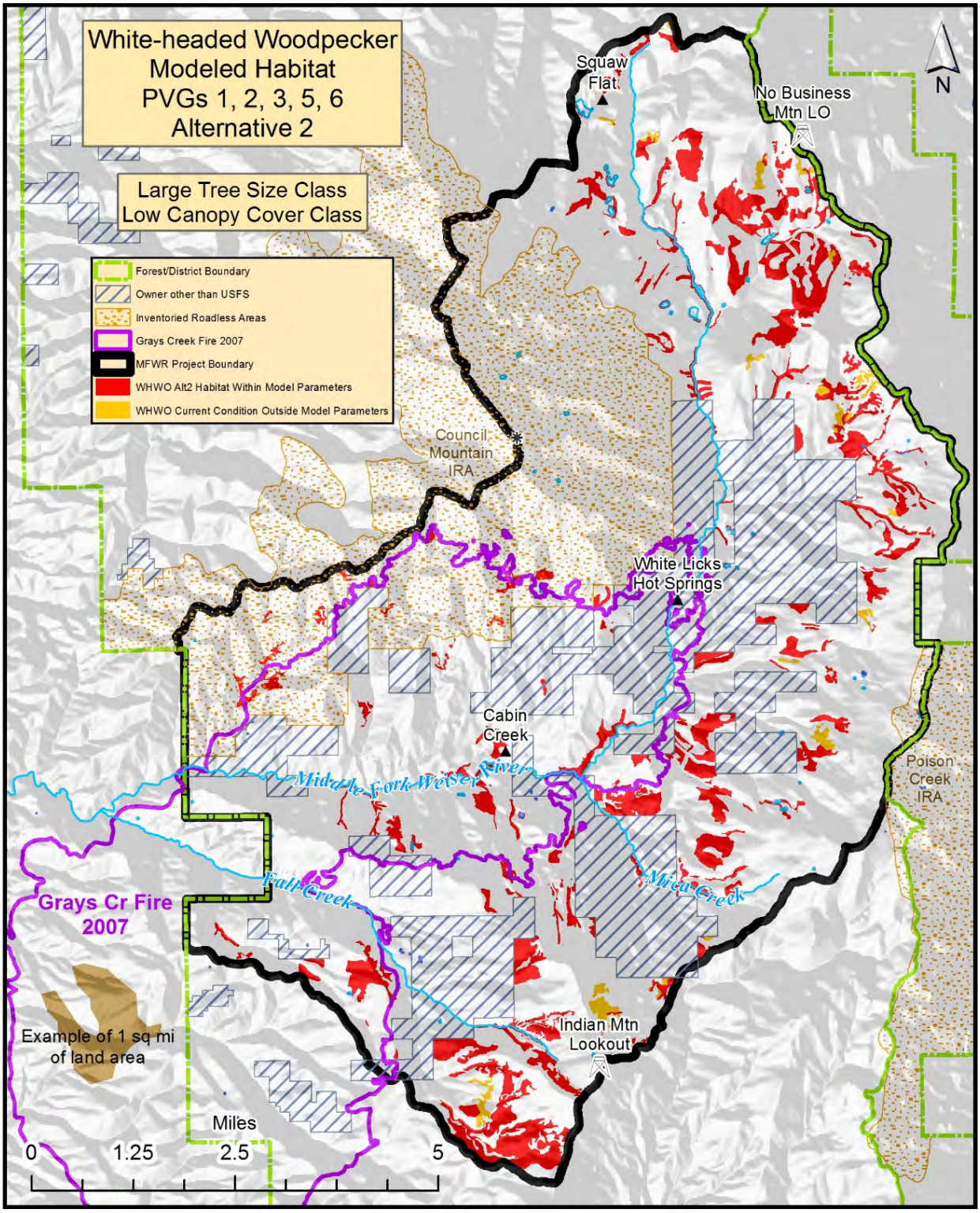


Figure 3.4-16. White-headed woodpecker (WHWO) modeled habitat supported by Potential Vegetation Groups (PVGs) 1, 2, 3, 5, and 6 in the Project area, under Alternative 2.

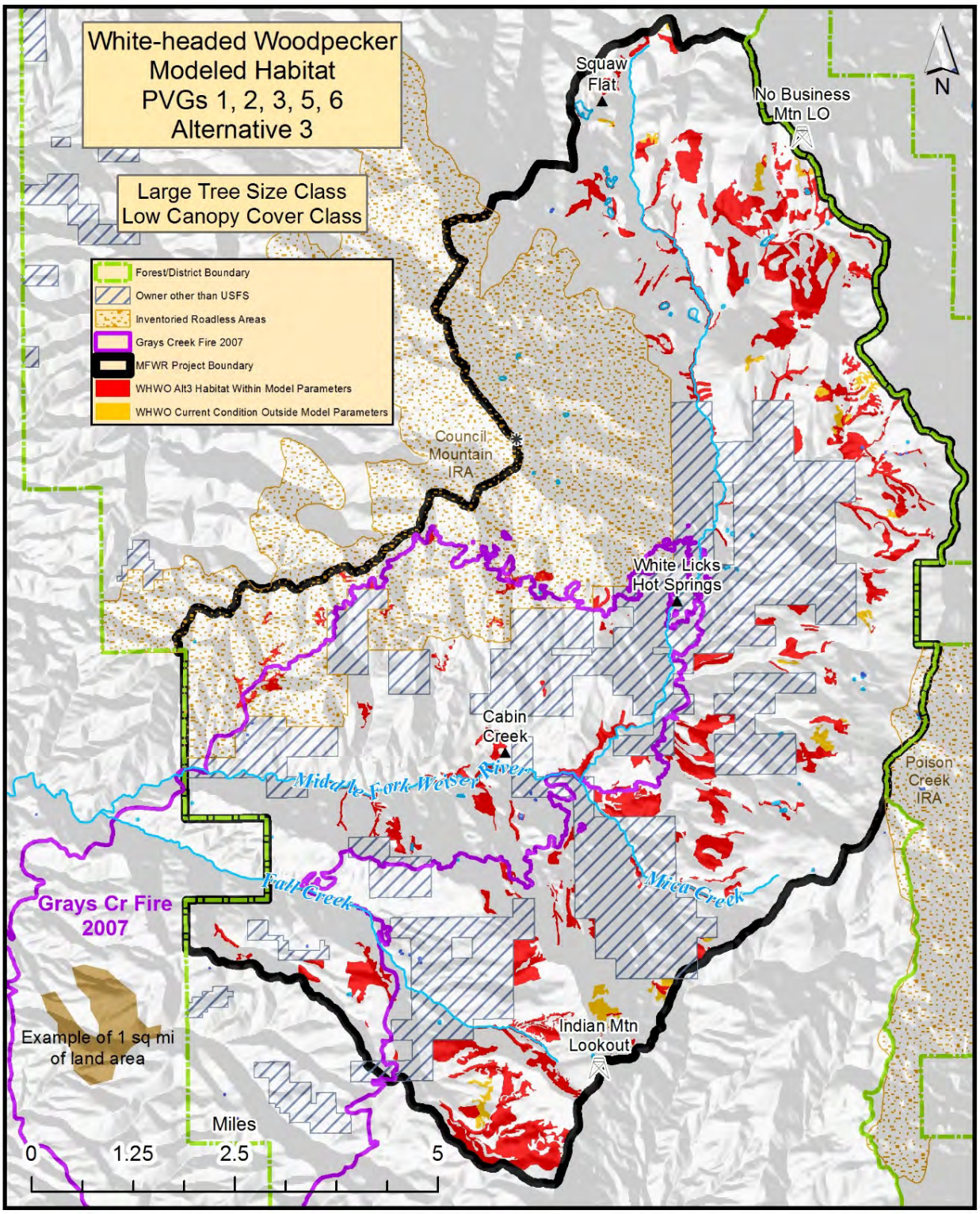


Figure 3.4-17. White-headed woodpecker (WHWO) modeled habitat supported by Potential Vegetation Groups (PVGs) 1, 2, 3, 5, and 6 in the Project area, under Alternative 3.

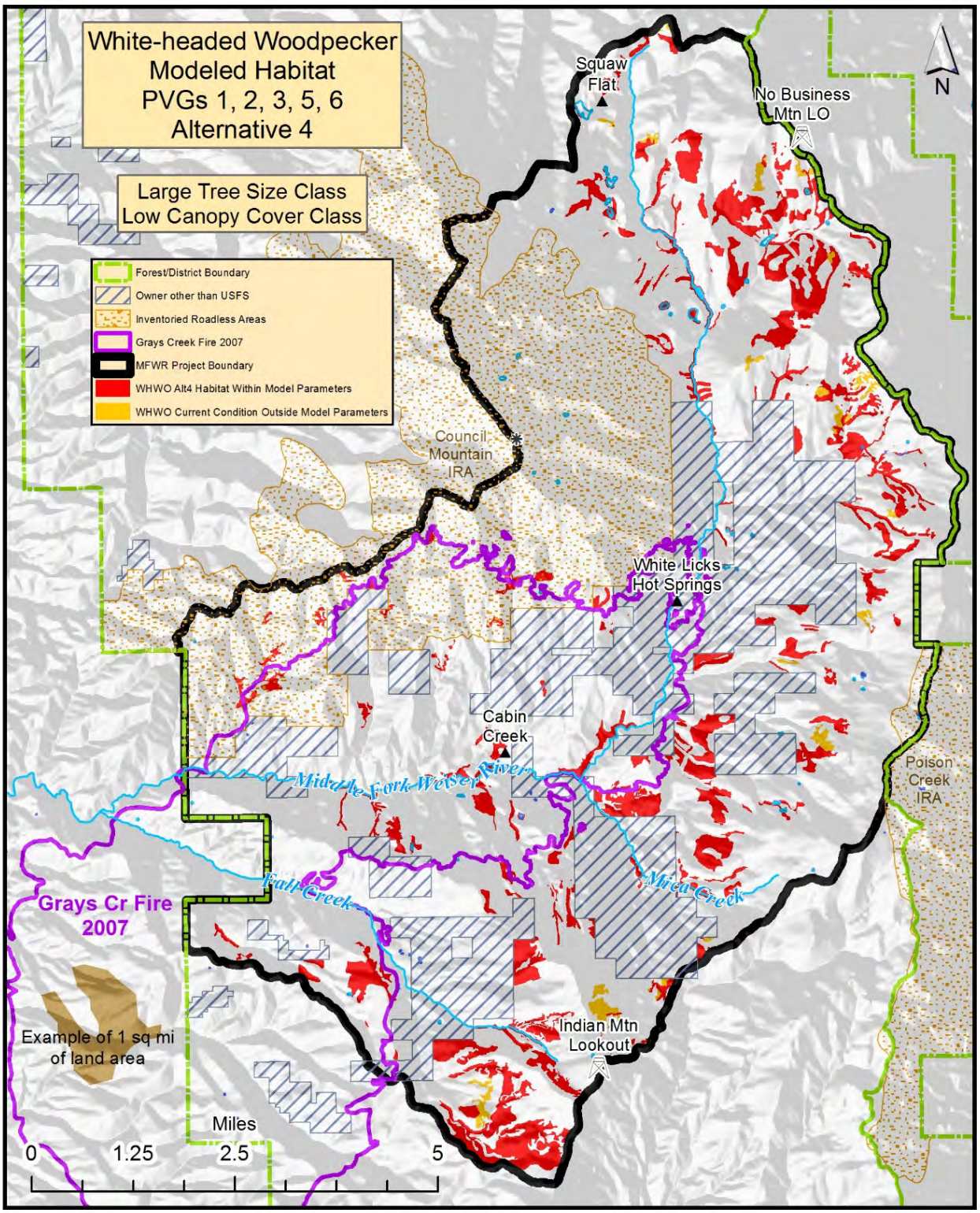


Figure 3.4-18. White-headed woodpecker (WHWO) modeled habitat supported by Potential Vegetation Groups (PVGs) 1, 2, 3, 5, 6 in the Project area, under Alternative 4.

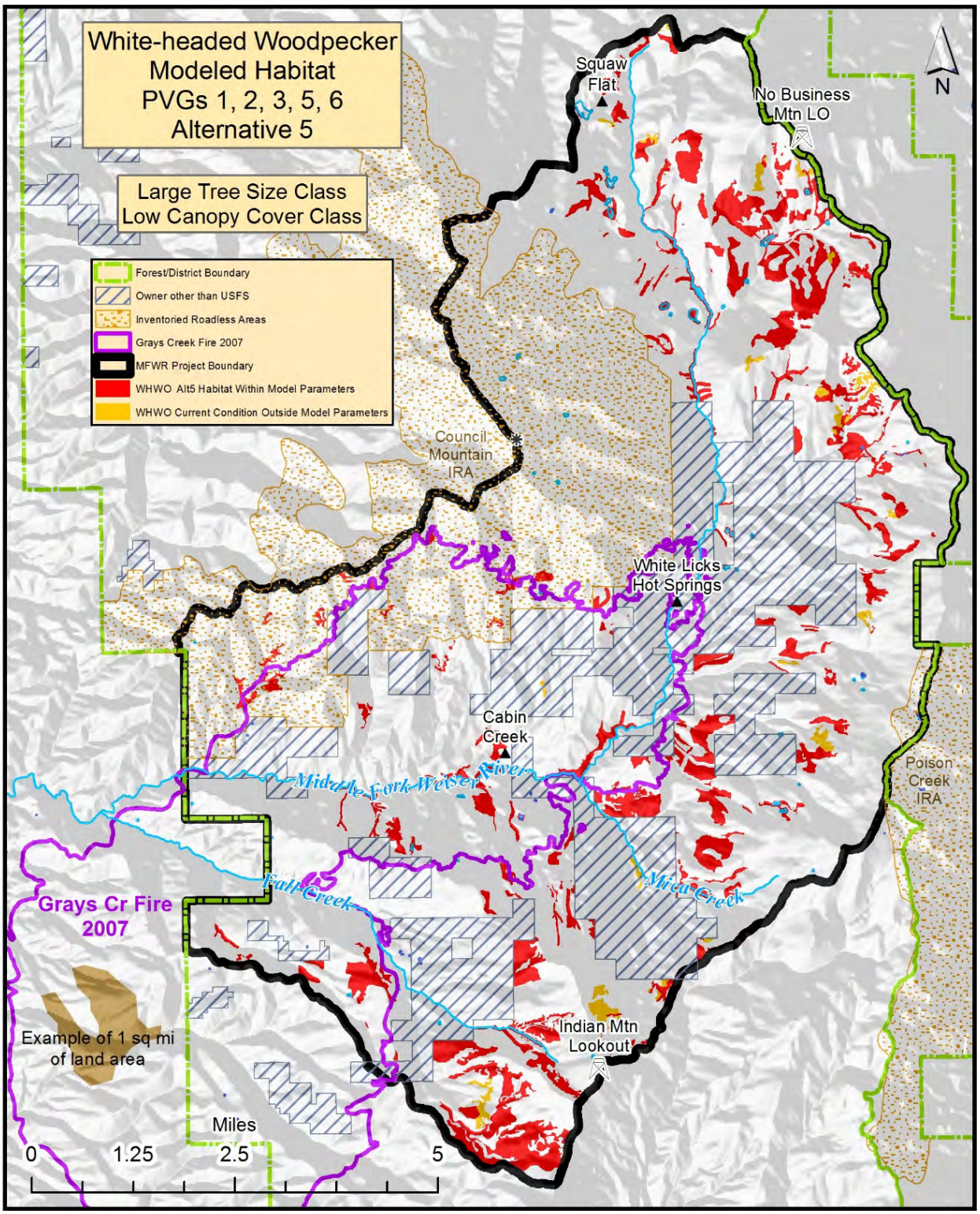


Figure 3.4-19. White-headed woodpecker (WHWO) modeled habitat supported by Potential Vegetation Groups (PVGs) 1, 2, 3, 5, 6 in the Project area, under Alternative 5.

3.4.6.3. Habitat Family 2—Broad-Elevation, Old Forest

Pileated Woodpecker

Alternative 1 (No Action Alternative)

Alternative 1 would not change the quantity or quality of habitat for pileated woodpeckers, as no new management actions would be implemented. Combined with the lack of habitat improvement for Habitat Family 1, the Project area forests would be more susceptible, under the No Action Alternative, to long-term alteration from uncharacteristic, stand-replacement wildfire.

Effects Common to All Action Alternatives

Modeled habitat for pileated woodpeckers would be altered under each action alternative through timber harvest activities. However, because pileated woodpeckers will use habitats outside of HRV, the overall effects of the restoration treatments under all action alternatives may not be as extreme as the tabular and map results appear to show.

Direct and Indirect Effects from Alternatives 2, 3, 4, and 5

Pileated woodpecker modeled habitat on NFS lands in the Project area (10,690 acres) would decrease by 7,252, 7,253, 7,315, and 7,400 acres, respectively, under Alternatives 2, 3, 4, and 5 (Table 3.4-18, Table 3.4-19, Table 3.4-10, Table3.4-21, Figure 3.4-20, Figure 3.4-21, Figure 3.4-22, Figure 3.4-23). The modeled habitat reduction would simply be a function of the amount of harvest activity in PVGs 2, 5, and 6. However, these figures are misleading as the harvested areas would not be denuded, they would simply be altered from the current condition. Using acres as the only measure of effects on species habitats creates a false picture of the changes taking place. The free thin and patch cuts would not remove the stands, but they would change the structure and species composition of those stands. In theory, the restoration treatments used should improve the quality of pileated woodpecker habitat in the Project area, even though the quantity of modeled habitat would decrease for pileated woodpeckers under each action alternative.

Under all action alternatives, the number of potential pileated woodpecker home ranges on NFS lands would decrease from an estimated 23 potential pileated woodpecker home ranges to approximately 7. Because NFS lands in the Project area are departed from HRV, it would be expected that, under any restoration treatment scenario for the Project area, the number of potential pileated woodpecker home ranges would decrease, which would likely lead to a lower pileated woodpecker population over time.

Table 3.4-18. Acres of pileated woodpecker modeled habitat under Alternative 2 by Potential Vegetation Group (PVG) in the Project area, on private and National Forest System (NFS) lands.

Tree Size/Canopy Cover Class	PVG 2	PVG 3	PVG 5	PVG 6	PVG 8	PVG 9	Totals
Large/High NFS Lands	82	0	80	882	0	209	1,254
Large/Moderate NFS Lands	165	0	494	1,320	13	206	2,185
Total NFS Lands	**247**	**0**	**574**	**2,203**	**13**	**415**	**3,438**
Large/High Private Lands	29	0	18	253	0	0	300
Large/Moderate Private Lands	110	0	186	351	0	64	711
Total NFS Private Lands	**139**	**0**	**204**	**604**	**0**	**64**	**1,011**
Total All Ownership	**386**	**0**	**778**	**2,807**	**13**	**479**	**4,449**

Table 3.4-19. Acres of pileated woodpecker modeled habitat under Alternative 3 by Potential Vegetation Group (PVG) in the Project area, on private and National Forest System (NFS) lands.

Tree Size/Canopy Cover Class	PVG 2	PVG 3	PVG 5	PVG 6	PVG 8	PVG 9	Totals
Large/High NFS Lands	82	0	80	884	0	282	1,328
Large/Moderate NFS Lands	165	0	494	1,250	13	200	2,108
Total NFS Lands	**247**	**0**	**574**	**2,133**	**13**	**482**	**3,437**
Large/High Private Lands	29	0	18	253	0	0	300
Large/Moderate Private Lands	110	0	186	351	0	64	711
Total NFS Private Lands	**139**	**0**	**204**	**604**	**0**	**64**	**1,011**
Total All Ownership	**386**	**0**	**778**	**2,737**	**13**	**546**	**4,447**

Table 3.4-20. Acres of pileated woodpecker modeled habitat under Alternative 4 by Potential Vegetation Group (PVG) in the Project area, on private and National Forest System (NFS) lands.

Tree Size/Canopy Cover Class	PVG 2	PVG 3	PVG 5	PVG 6	PVG 8	PVG 9	Totals
Large/High NFS Lands	82	0	78	843	0	209	1,213
Large/Moderate NFS Lands	164	0	486	1,306	13	206	2,162
Total NFS Lands	**246**	**0**	**565**	**2,149**	**13**	**415**	**3,375**
Large/High Private Lands	29	0	18	253	0	0	300
Large/Moderate Private Lands	110	0	186	351	0	64	711
Total NFS Private Lands	**139**	**0**	**204**	**604**	**0**	**64**	**1,011**
Total All Ownership	**385**	**0**	**769**	**2,753**	**13**	**479**	**4,386**

Table 3.4-21. Acres of pileated woodpecker modeled habitat under Alternative 5 by Potential Vegetation Group (PVG) in the Project area, on private and National Forest System (NFS) lands.

Tree Size/Canopy Cover Class	PVG 2	PVG 3	PVG 5	PVG 6	PVG 8	PVG 9	Totals
Large/High NFS Lands	82	0	116	634	0	209	1,042
Large/Moderate NFS Lands	164	0	490	1,528	0	211	2,394
Total NFS Lands	**246**	**0**	**606**	**2,162**	**0**	**420**	**3,435**
Large/High Private Lands	29	0	18	253	0	0	300
Large/Moderate Private Lands	110	0	186	351	0	64	711
Total Private Lands	**139**	**0**	**204**	**604**	**0**	**64**	**1,011**
Total All Ownership	**385**	**0**	**810**	**2,766**	**0**	**485**	**4,446**

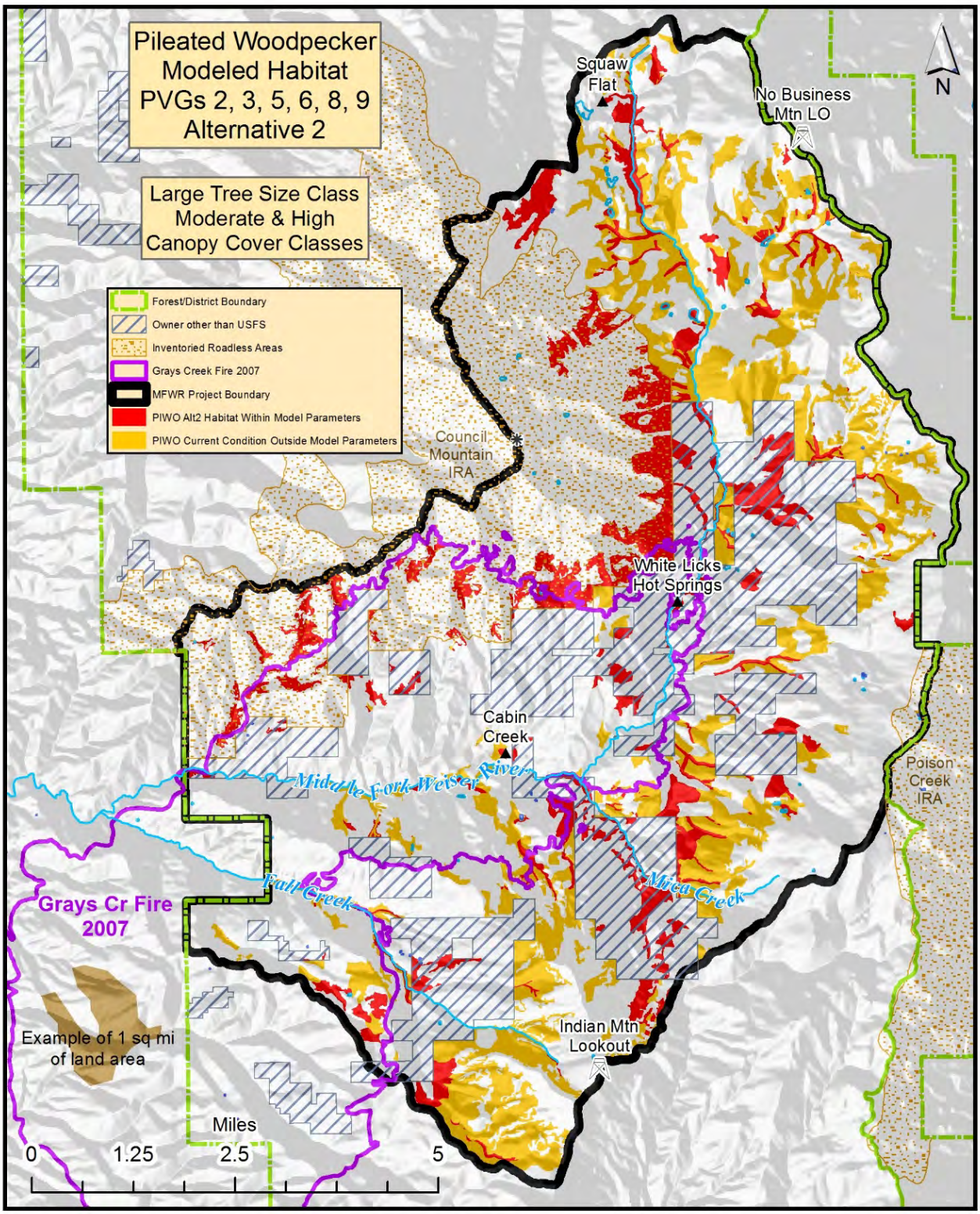


Figure 3.4-20. Pileated woodpecker (PIWO) modeled habitat supported by Potential Vegetation Groups (PVGs) 2, 3, 5, 6, 8, and 9 in the Project area, under Alternative 2.

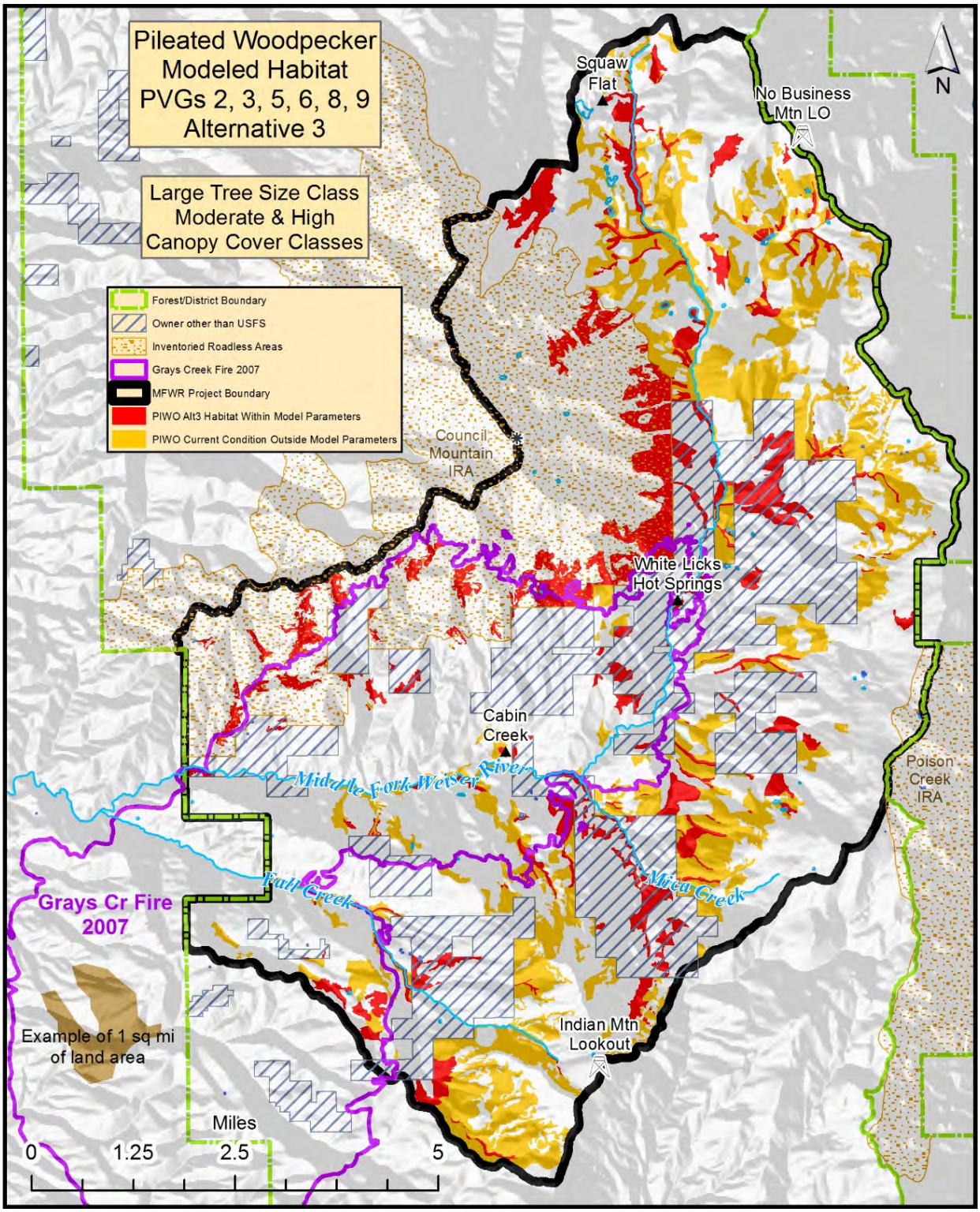


Figure 3.4-21. Pileated woodpecker (PIWO) modeled habitat supported by Potential Vegetation Groups (PVGs) 2, 3, 5, 6, 8, and 9 in the Project area, under Alternative 3.

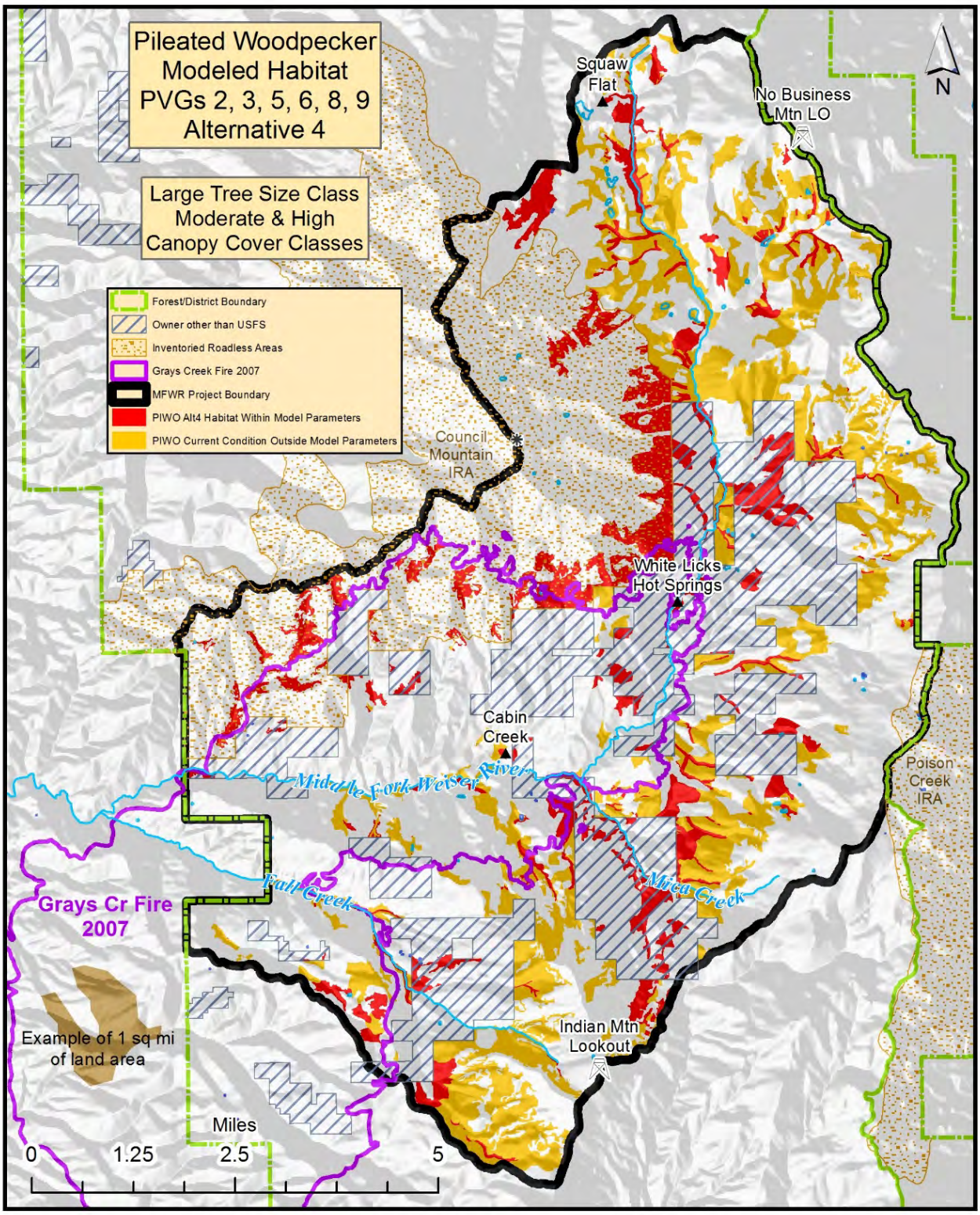


Figure 3.4-22. Pileated woodpecker (PIWO) modeled habitat supported by Potential Vegetation Groups (PVGs) 2, 3, 5, 6, 8, and 9 in the Project area, under Alternative 4.

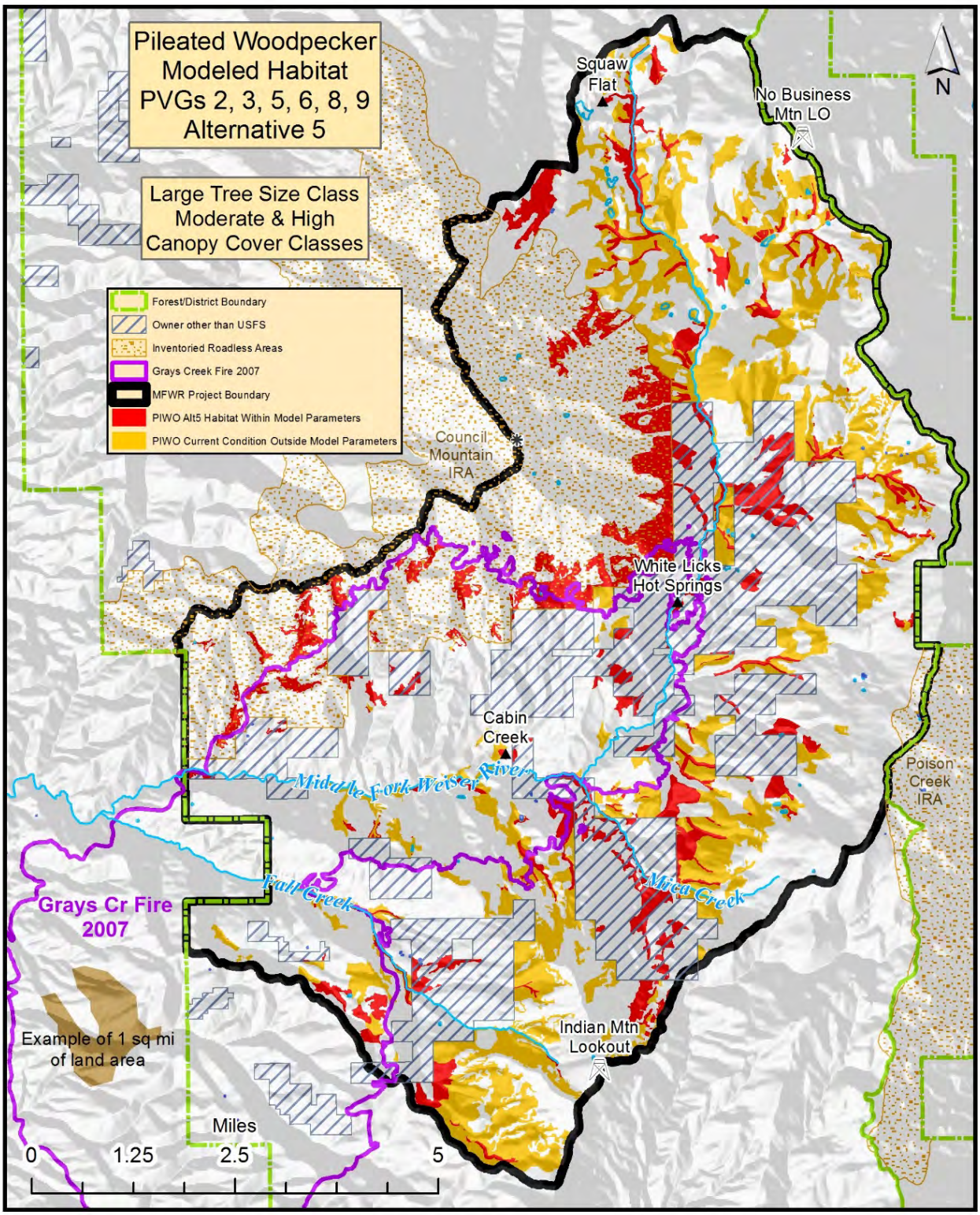


Figure 3.4-23. Pileated woodpecker (PIWO) modeled habitat supported by Potential Vegetation Groups (PVGs) 2, 3, 5, 6, 8, and 9 in the Project area, under Alternative 5.

Cumulative Effects

Actions on NFS lands that could cumulatively impact pileated woodpeckers include ongoing fuelwood removal. Currently, private and State lands open to timber harvest are expected to have low levels of large tree, mixed-species forests, old forest conditions, and snags. Future actions on these lands are expected to further reduce these important habitat components. All action alternatives would decrease pileated woodpecker habitat in the Project area in the short term. While these losses are likely to be cumulative, with other negative effects on pileated woodpecker habitat across the Project area, they are expected to be relatively short term and minor. In addition, the losses in pileated woodpecker habitat would result in corresponding increases in Family 1 habitats and white-headed woodpecker habitat, which are habitats at greater risk. Alternative 3 would obliterate more roads and unauthorized routes than the other alternatives. These road obliterations would benefit pileated woodpecker plus other Habitat Family 2 species by decreasing human access into habitats.

While Forestwide, long-term increases in pileated woodpecker habitat are anticipated (Nutt et al. 2010), temporary and/or short-term negative impacts to habitat quality or distribution may occur when restoring forest conditions departed from the HRV to meet the habitat needs of wildlife species of greater conservation need (e.g., white-headed woodpecker).

Determination

No effects determination is required for the pileated woodpecker, because this species is not a Region 4 Sensitive species.

Flammulated Owl

Alternative 1 (No Action Alternative)

Alternative 1 would not change the quantity or quality of habitat for flammulated owls, as described for pileated woodpeckers.

Effects Common to All Action Alternatives

Restoration treatments designed to improve habitat for Family 1 species and reduce insect infestation would decrease modeled habitat for flammulated owls under all action alternatives. These treatments would lead to more rapid tree growth (large trees), but they would reduce canopy cover classes in the short term (0–5 years). It is likely that many treated stands that would shift canopy cover from moderate to low cover class would still provide some flammulated owl habitat; therefore, actual habitat declines likely would not be as great as indicated by tabular and map results.

Effects to patch and pattern of habitat for flammulated owls would include larger patch size, closer distribution, and increased habitat connectivity. As tree density and size increases in the future, the local flammulated owl population would gradually increase.

Direct and Indirect Effects from Alternatives 2, 3, 4, and 5

Flammulated owl modeled habitat on NFS lands within the Project area would decrease from 15 acres to 6 acres of PVG 1 under each action alternative. In PVG 2 habitat would decrease from 705 acres of to 332 acres under Alternatives 2 and 3, 331 acres under Alternative 4, and 313 acres under Alternative 5. Habitat would decrease from 2,080 acres of PVG 5 to 624 acres under Alternatives 2 and 3, to 610 acres under Alternative 4, and 525 acres under Alternative 5. Habitat

in PVG 6 would decrease from 4,847 acres under PVG 6 to 1,644 acres under Alternative 2; 1,573 acres under Alternative 3, 1,617 acres under Alternative 4, and 1,725 acres under Alternative 5 (Table 3.4-22, Table 3.4-23, Table 3.4-24, Table 3.4-25, Figure 3.4-24, Figure 3.4-25, Figure 3.4-26, Figure 3.4-27). Most of the change in modeled habitat acreage would be from reduction of canopy cover in the medium and large tree size classes in PVGs 5 and 6. These stands are also key stands for application of restoration treatments. Although white-headed woodpeckers would benefit from these treatments, flammulated owls would likely lose habitats. The number of potential flammulated owl home ranges on NFS lands in the Project area would decrease from 246 to 84, 81, 82, and 83, respectively, under Alternatives 2, 3, 4, and 5.

If vocal responses occur during spring monitoring surveys, nest searches will be initiated to identify nest stands for protection from adverse structural alteration from vegetation treatments (see Project Design Features in Chapter 2).

Table 3.4-22. Acres of flammulated owl modeled summer habitat under Alternative 2 by Potential Vegetation Group (PVG) in the Project area, on private and National Forest System (NFS) lands.

Tree Size/Canopy Cover Class	PVG 1	PVG 2	PVG 3	PVG 5	PVG 6	Totals
Medium/Moderate NFS Lands	0	167	0	130	323	620
Large/Moderate NFS Lands	6	165	0	494	1,320	1,985
Total NFS Lands	**6**	**332**	**0**	**624**	**1,644**	**2,606**
Medium/Moderate PVT Lands	0	893	0	1,180	2,021	4,094
Large/Moderate Private Lands	4	110	0	186	351	651
Total Private Lands	**4**	**1,003**	**0**	**1,366**	**2,372**	**4,746**
Total All Ownership	**10**	**1,335**	**0**	**1,990**	**4,016**	**7,351**

Table 3.4-23. Acres of flammulated owl modeled summer habitat under Alternative 3 by Potential Vegetation Group (PVG) in the Project area, on private and National Forest System (NFS) lands.

Tree Size/Canopy Cover Class	PVG 1	PVG 2	PVG 3	PVG 5	PVG 6	Totals
Medium/Moderate NFS Lands	0	167	0	130	323	620
Large/Moderate NFS Lands	6	165	0	494	1,250	1,914
Total NFS Lands	**6**	**332**	**0**	**624**	**1,573**	**2,535**
Medium/Moderate PVT Lands	0	893	0	1,180	2,021	4,094
Large/Moderate Private Lands	4	110	0	186	351	651
Total Private Lands	**4**	**1,003**	**0**	**1,366**	**2,372**	**4,746**
Total All Ownership	**10**	**1,335**	**0**	**1,990**	**3,945**	**7,281**

Table 3.4-24. Acres of flammulated owl modeled summer habitat under Alternative 4 by Potential Vegetation Group (PVG) in the Project area, on private and National Forest System (NFS) lands.

Tree Size/Canopy Cover Class	PVG 1	PVG 2	PVG 3	PVG 5	PVG 6	Totals
Medium/Moderate NFS Lands	0	167	0	123	311	602
Large/Moderate NFS Lands	6	164	0	486	1,306	1,963
Total NFS Lands	**6**	**331**	**0**	**610**	**1,617**	**2,564**
Medium/Moderate PVT Lands	0	893	0	1,180	2,021	4,094
Large/Moderate Private Lands	4	110	0	186	351	651
Total Private Lands	**4**	**1,003**	**0**	**1,366**	**2,372**	**4,746**
Total All Ownership	**10**	**1,334**	**0**	**1,976**	**3,989**	**7,310**

Table 3.4-25. Acres of flammulated owl modeled summer habitat under Alternative 5 by Potential Vegetation Group (PVG) in the Project area, on private and National Forest System (NFS) lands.

Tree Size/Canopy Cover Class	PVG 1	PVG 2	PVG 3	PVG 5	PVG 6	Totals
Medium/Moderate NFS Lands	0	149	0	36	196	381
Large/Moderate NFS Lands	6	164	0	490	1,528	2,188
Total NFS Lands	**6**	**313**	**0**	**525**	**1,725**	**2,569**
Medium/Moderate PVT Lands	0	893	0	1,180	2,021	4,094
Large/Moderate Private Lands	4	110	0	186	351	651
Total Private Lands	**4**	**1,003**	**0**	**1,366**	**2,372**	**4,746**
Total All Ownership	**10**	**1,316**	**0**	**1,891**	**4,097**	**7,315**

Cumulative Effects

Actions on NFS lands that may cumulatively impact flammulated owls include ongoing fuelwood removal, as described for pileated woodpecker. All action alternatives would decrease flammulated owl habitat in the Project area in the short term, as described for pileated woodpecker. However, the analysis model does not identify microsite characteristics; therefore, the tabular and map results may not be as extreme as they appear. Road obliteration would benefit flammulated owl and other Habitat Family 2 species, as described for pileated woodpecker.

The flammulated owl is a neotropical migrant; however, the Forest Service cannot influence management of flammulated owl seasonal habitats outside of the Forest, especially not in the Central American countries where they winter. Changes in habitat availability, quantity, and quality in those countries could ultimately affect the long-term survival of this species.

Determinations

Alternatives 2, 3, 4, and 5 *may impact individuals* or habitat, but they would not likely contribute to a trend towards Federal listing, or cause a loss of viability to the population or species.

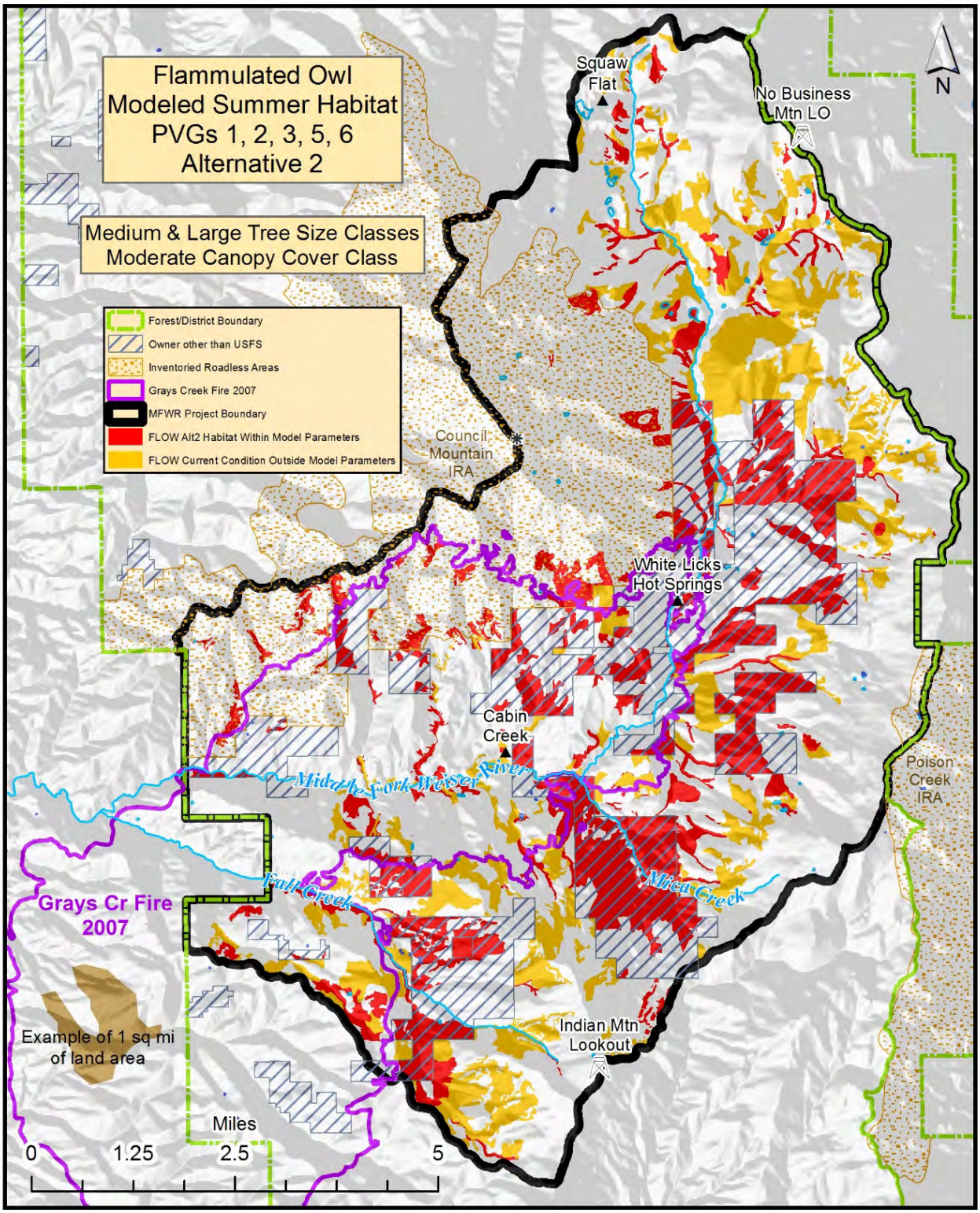


Figure 3.4-24. Flammulated owl (FLOW) modeled summer habitat, supported by Potential Vegetation Groups (PVGs) 1, 2, 3, 5, and 6, in the Project area, under Alternative 2.

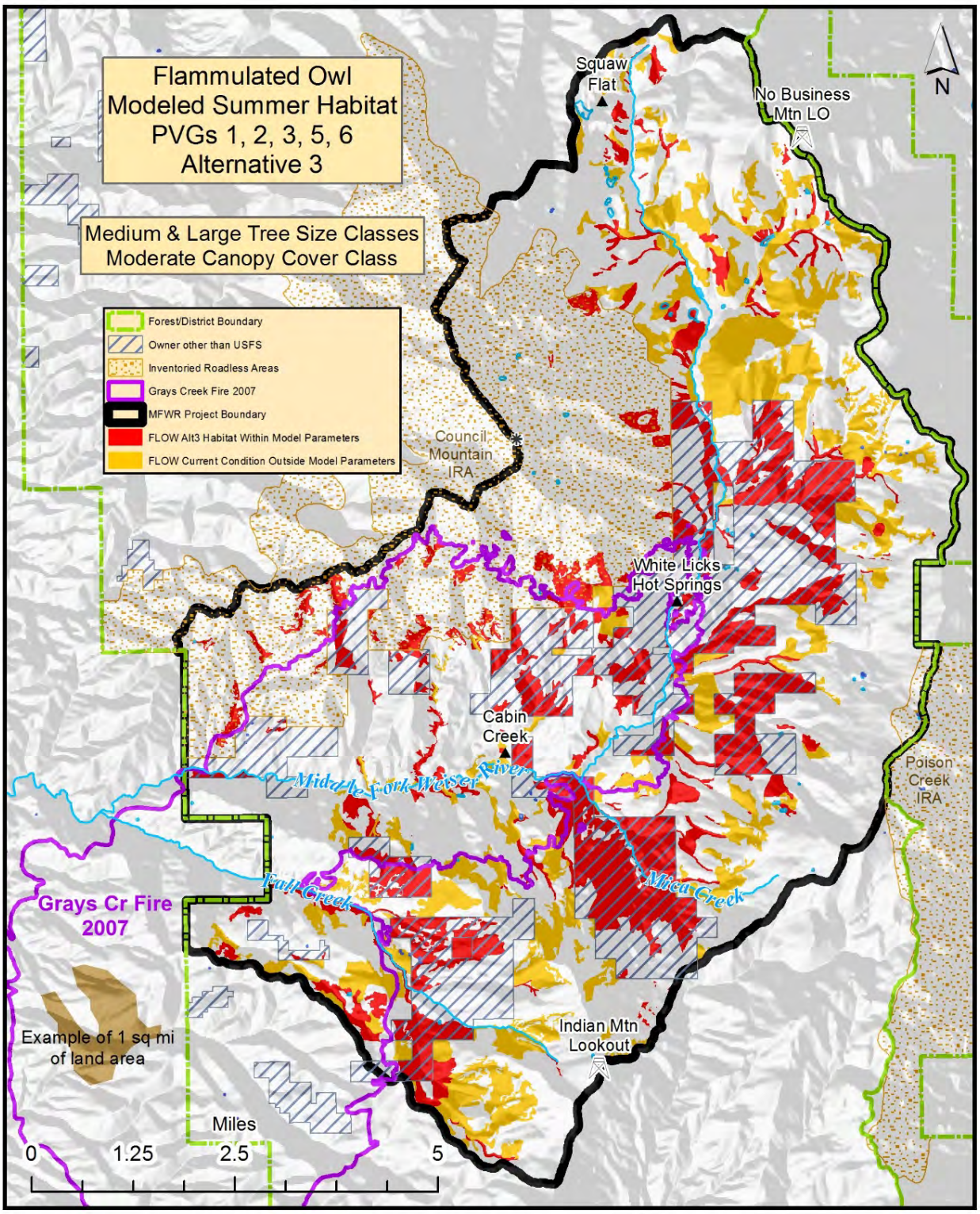


Figure 3.4-25. Flammulated owl (FLOW) modeled summer habitat supported by Potential Vegetation Groups (PVGs) 1, 2, 3, 5, and 6 in the Project area, under Alternative 3.

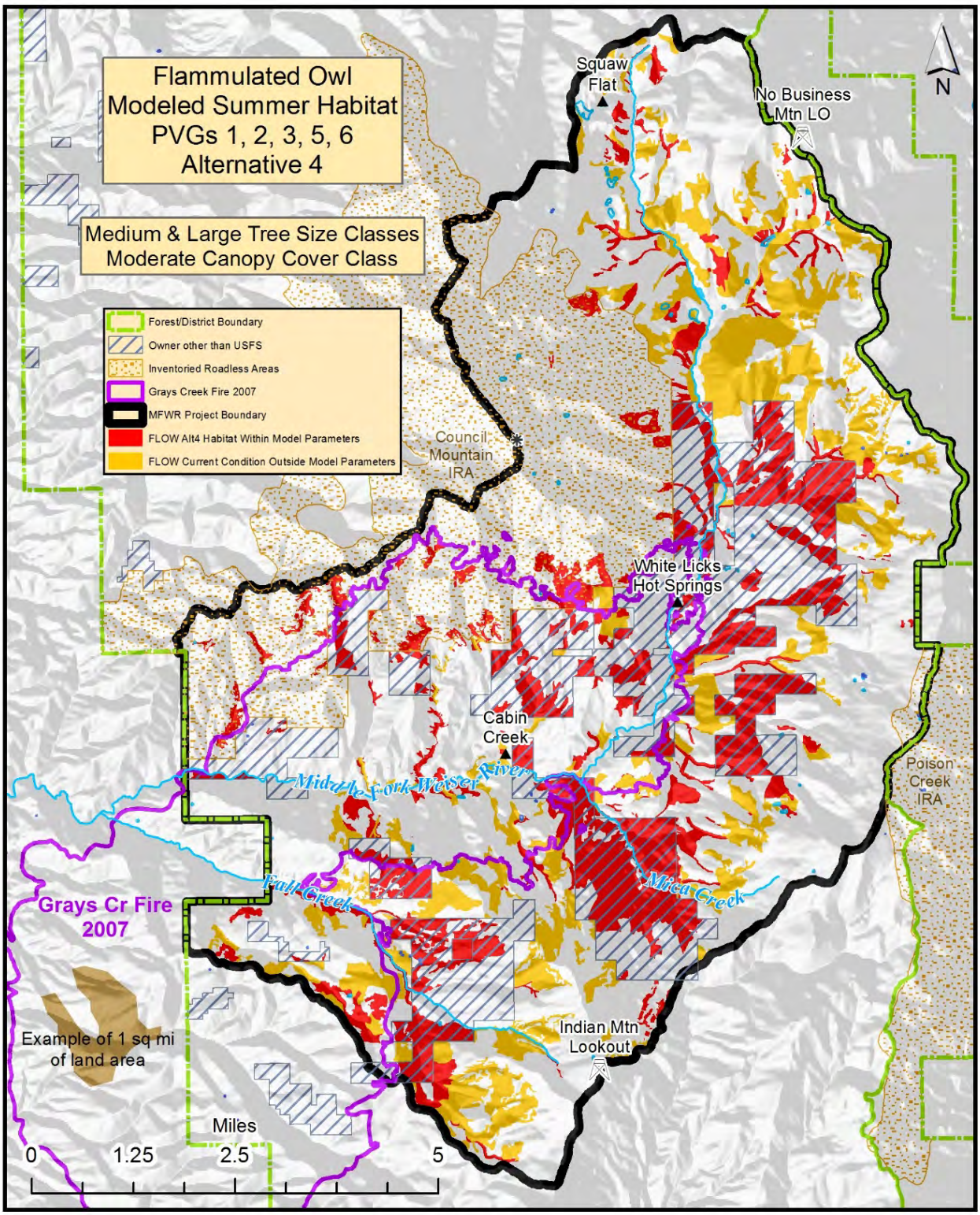


Figure 3.4-26. Flammulated owl (FLOW) modeled summer habitat supported by Potential Vegetation Groups (PVGs) 1, 2, 3, 5, and 6 in the Project area, under Alternative 4.

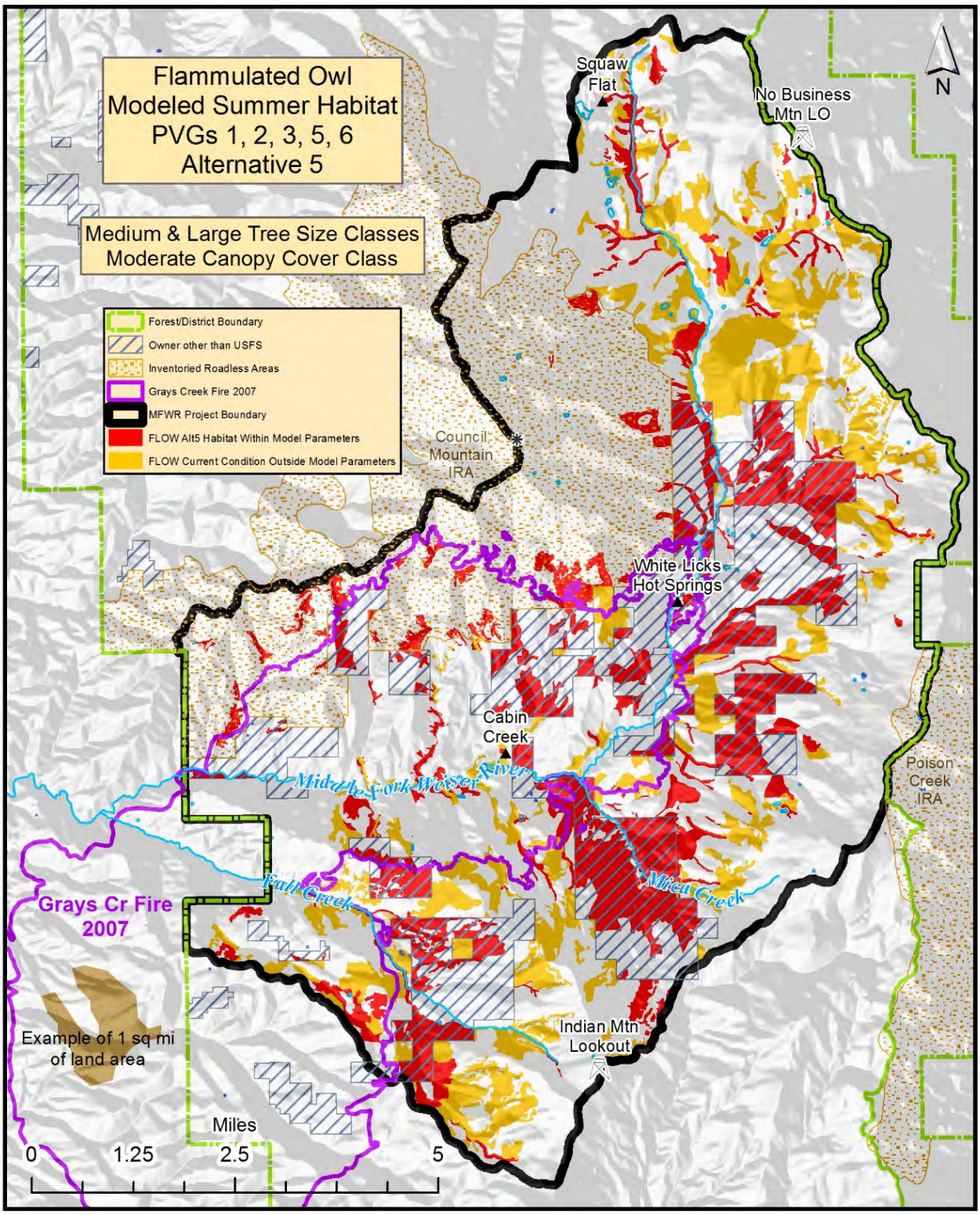


Figure 3.4-27. Flammulated owl (FLOW) modeled summer habitat supported by Potential Vegetation Groups (PVGs) 1, 2, 3, 5, and 6 in the Project area, under Alternative 5.

American Three-toed Woodpecker

Alternative 1 (No Action Alternative)

Alternative 1 would not change the quantity or quality of habitat for American three-toed woodpeckers, as described for pileated woodpeckers. The American three-toed woodpecker would likely benefit under the No Action alternative from the increased susceptibility of forest stands to uncharacteristic wildfires and the resulting provision of snags as feeding sites.

Direct and Indirect Effect from Alternatives 2, 3, 4, and 5

Modeled habitat for American three-toed woodpecker would decrease on NFS lands in the Project area by roughly 4,000 acres under each action alternative (Table 3.4-26, Table 3.4-27, Table 3.4-28, Table 3.4-29, Figure 3.4-28, Figure 3.4-29, Figure 3.4-30, Figure 3.4-31). The action alternatives would differ only by the total acreage of PVGs supporting modeled habitat after restoration treatments, from 1,790 acres (Alternatives 2 and 3), 1,388 acres (Alternative 4), and 1,238 acres (Alternative 5) on NFS lands; hence each action alternative would have similar effects on the species. Most of the change in acreage of PVGs supporting modeled habitat would occur in PVG 6 stands. For example, under Alternative 2 there would be 882 of the current 4,381 acres in PVG 6 available on NFS lands in the Project area supporting American three-toed woodpecker modeled habitat. This reduction in acres under Alternative 2 would be due to the large number of stands that would be treated in the large tree size class/high canopy cover class to move the Project area toward the Forest Plan desired condition. Because the American three-toed woodpeckers use specific microsite characteristics in forest stands, the amount of modeled habitat is likely overestimated under all alternatives. Assuming an increase in tree mortality (due to the western spruce budworm and other insect species infestation), the number of dead and dying trees available for American three-toed woodpecker foraging could increase significantly, but the actual number of acres of modeled habitat would remain the same as that shown in Table 3.4-26, Table 3.4-27, Table 3.4-28, and Table 3.4-29. Again, this illustrates the failure of the model to identify microsite habitat characteristics.

Potential American three-toed woodpecker home ranges remaining in the Project area following restoration treatments would be approximately four for Alternatives 2 and 3 and three for Alternatives 4 and 5, a reduction of roughly 10 potential home ranges from current condition.

Table 3.4-26. Acres of American three-toed woodpecker modeled habitat under Alternative 2 by Potential Vegetation Group (PVG) in the Project area, on private and National Forest System (NFS) lands.

Tree Size/Canopy Cover Class	PVG 5	PVG 6	PVG 8	PVG 9	PVG 10	PVG 11	Totals
Medium/Moderate NFS Lands	0	0	37	41	65	0	143
Large/Moderate NFS Lands	0	0	0	206	288	191	684
Large/High NFS Lands	80	882	0	0	0	0	962
Total NFS Lands	**80**	**882**	**37**	**247**	**353**	**191**	**1,790**
Medium/Moderate Private Lands	0	0	0	0	11	0	11
Large/Moderate Private Lands	0	0	0	64	0	0	64
Large/High Private Lands	18	253	0	0	0	0	271
Total Private Lands	**18**	**253**	**0**	**64**	**11**	**0**	**346**
Total All Ownership	**98**	**1,135**	**37**	**311**	**364**	**191**	**2,136**

Table 3.4-27. Acres of American three-toed woodpecker modeled habitat under Alternative 3 by Potential Vegetation Group (PVG) in the Project area, on private and National Forest System (NFS) lands.

Tree Size/Canopy Cover Class	PVG 5	PVG 6	PVG 8	PVG 9	PVG 10	PVG 11	Totals
Medium/Moderate NFS Lands	0	0	37	41	79	0	157
Large/Moderate NFS Lands	0	0	0	200	278	191	669
Large/High NFS Lands	80	884	0	0	0	0	964
Total NFS Lands	**80**	**884**	**37**	**241**	**357**	**191**	**1,790**
Medium/Moderate Private Lands	0	0	0	0	11	0	11
Large/Moderate Private Lands	0	0	0	64	0	0	64
Large/High Private Lands	18	253	0	0	0	0	271
Total Private Lands	**18**	**253**	**0**	**64**	**11**	**0**	**346**
Total All Ownership	**98**	**1,136**	**37**	**306**	**368**	**191**	**2,136**

Table 3.4-28. Acres of American three-toed woodpecker modeled habitat under Alternative 4 by Potential Vegetation Group (PVG) in the Project area, on private and National Forest System (NFS) lands.

Tree Size/Canopy Cover Class	PVG 5	PVG 6	PVG 8	PVG 9	PVG 10	PVG 11	Totals
Medium/Moderate NFS Lands	0	0	0	39	13	0	52
Large/Moderate NFS Lands	0	0	0	206	139	69	414
Large/High NFS Lands	78	843	0	0	0	0	922
Total NFS Lands	**78**	**843**	**0**	**245**	**152**	**69**	**1,388**
Medium/Moderate Private Lands	0	0	0	0	11	0	11
Large/Moderate Private Lands	0	0	0	64	0	0	64
Large/High Private Lands	18	253	0	0	0	0	271
Total Private Lands	**18**	**253**	**0**	**64**	**11**	**0**	**346**
Total All Ownership	**97**	**1,096**	**0**	**309**	**163**	**69**	**1,734**

Table 3.4-29. Acres of American three-toed woodpecker modeled habitat under Alternative 5 by Potential Vegetation Group (PVG) in the Project area, on private and National Forest System (NFS) lands.

Tree Size/Canopy Cover Class	PVG 5	PVG 6	PVG 8	PVG 9	PVG 10	PVG 11	Totals
Medium/Moderate NFS Lands	0	0	0	39	7	0	46
Large/Moderate NFS Lands	0	0	0	211	157	72	441
Large/High NFS Lands	116	634	0	0	0	0	750
Total NFS Lands	**116**	**634**	**0**	**251**	**164**	**72**	**1,237**
Medium/Moderate Private Lands	0	0	0	0	11	0	11
Large/Moderate Private Lands	0	0	0	64	0	0	64
Large/High Private Lands	18	253	0	0	0	0	271

Tree Size/Canopy Cover Class	PVG 5	PVG 6	PVG 8	PVG 9	PVG 10	PVG 11	Totals
Total Private Lands	**18**	**253**	**0**	**64**	**11**	**0**	**346**
Total All Ownership	**135**	**887**	**0**	**315**	**175**	**72**	**1,584**

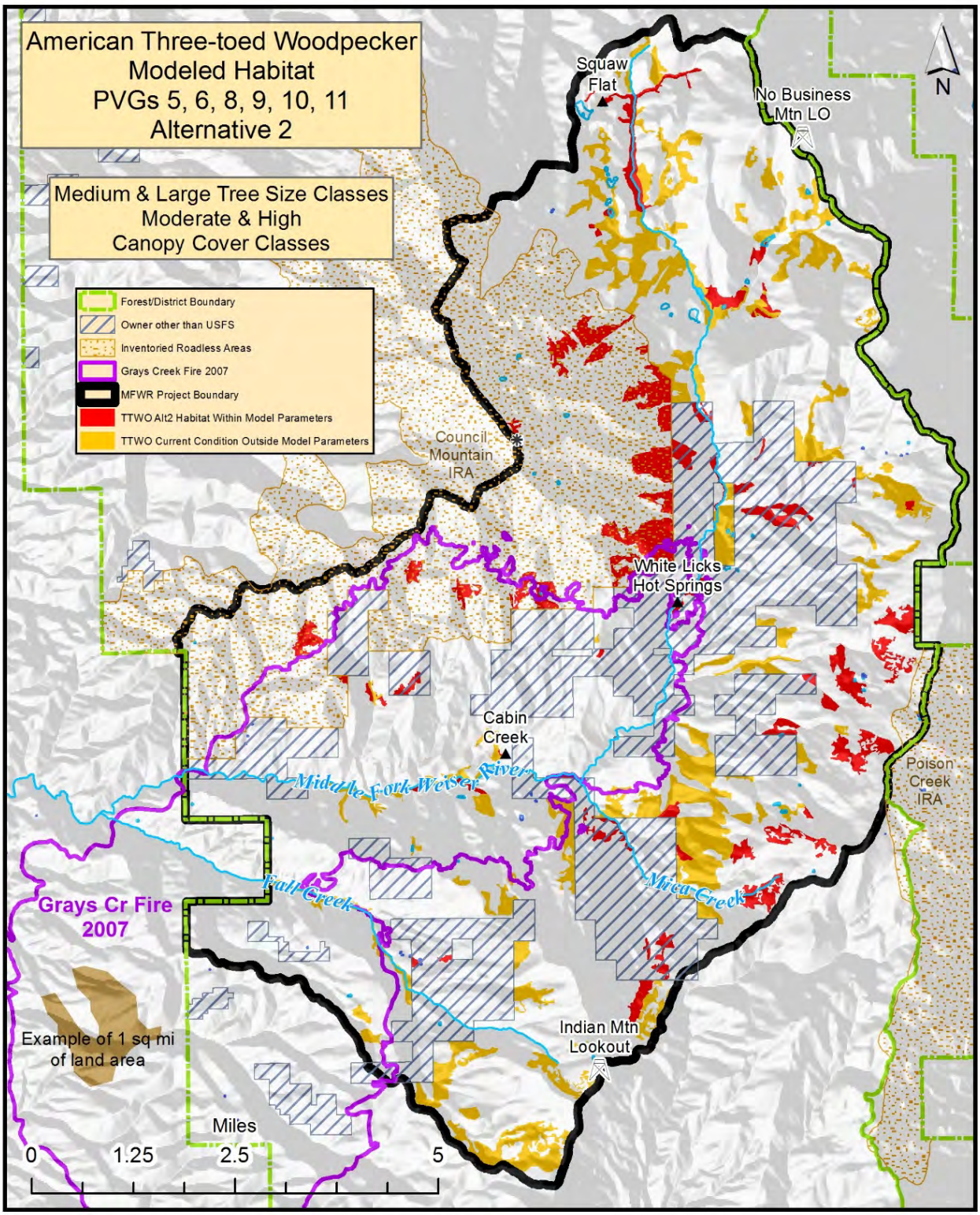


Figure 3.4-28. American three-toed woodpecker (TTWO) modeled habitat supported by Potential Vegetation Groups (PVGs) 5, 6, 8, 9, 10, and 11 in the Project area, under Alternative 2.

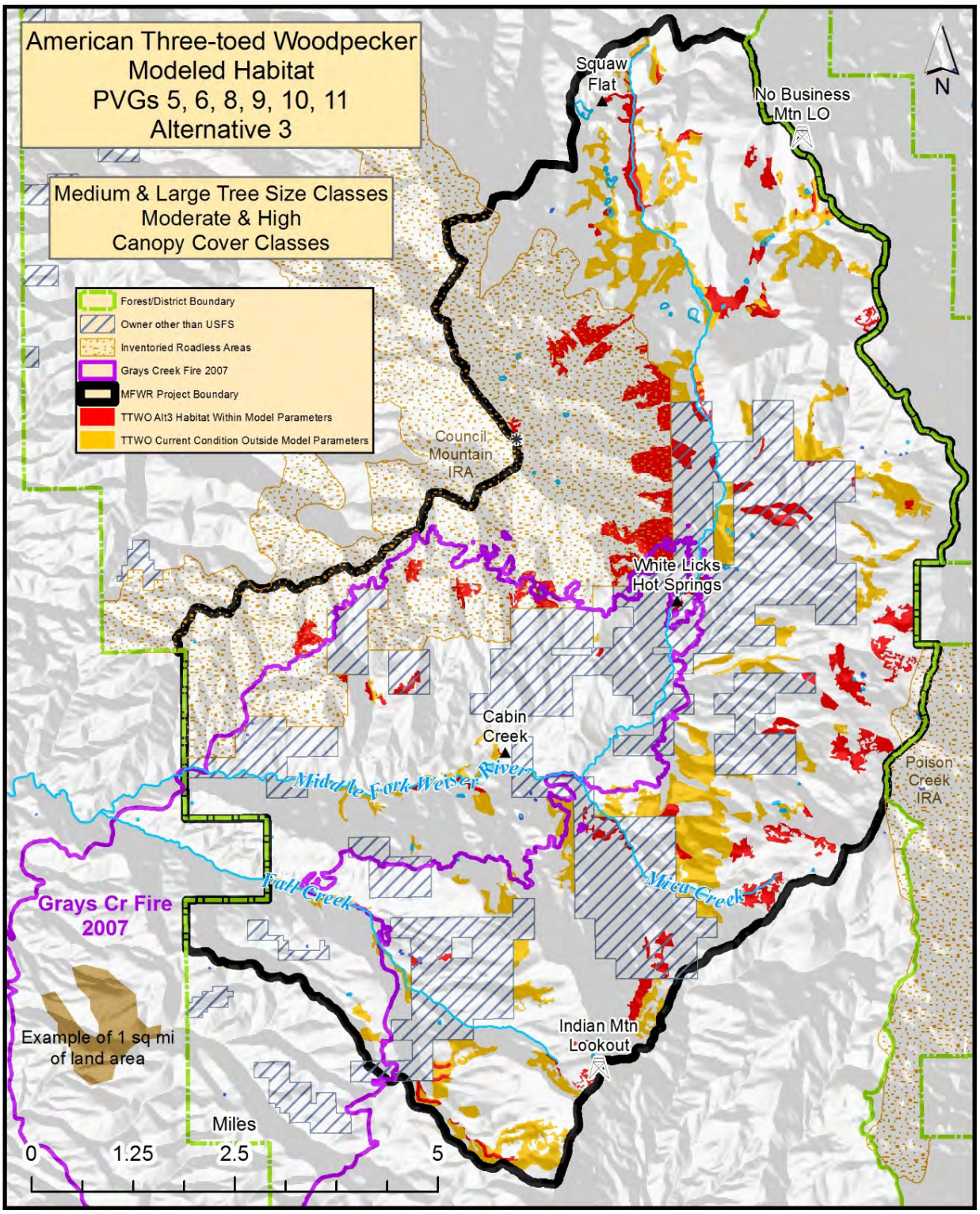


Figure 3.4-29. American three-toed woodpecker (TTWO) modeled habitat supported by Potential Vegetation Groups (PVGs) 5, 6, 8, 9, 10, and 11 in the Project area, under Alternative 3.

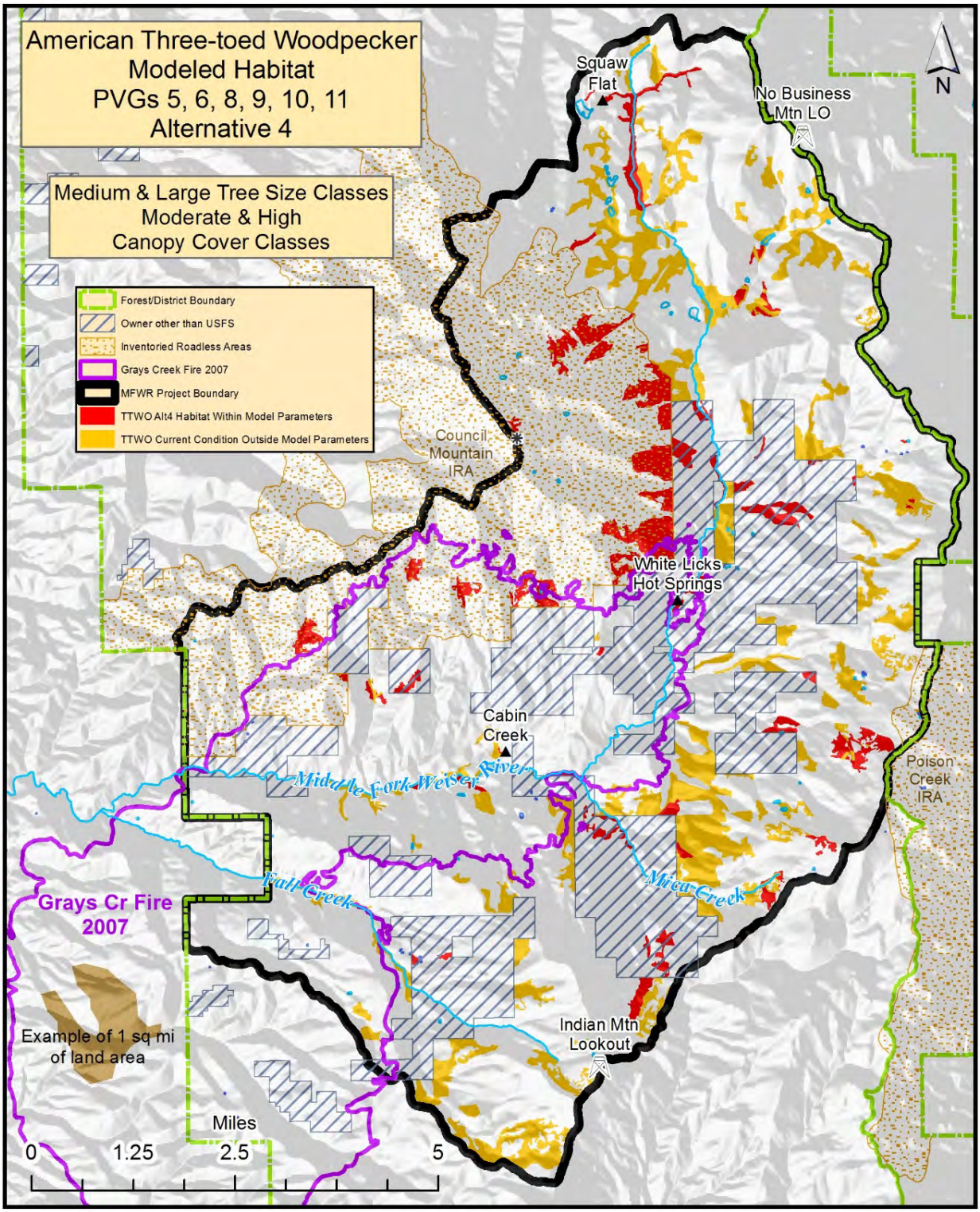


Figure 3.4-30. American three-toed woodpecker (TTWO) modeled habitat supported by Potential Vegetation Groups (PVGs) 5, 6, 8, 9, 10, and 11 in the Project area, under Alternative 4.

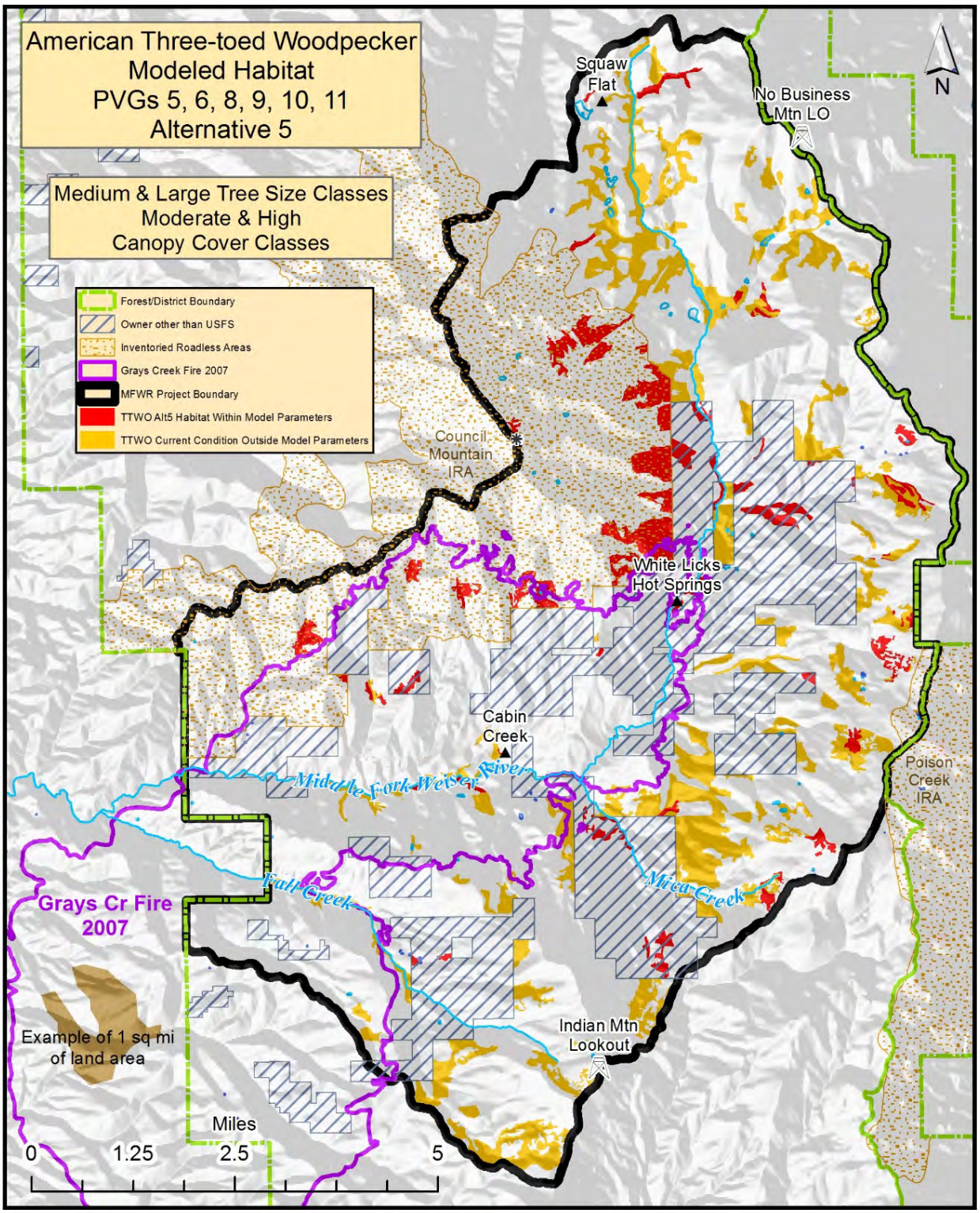


Figure 3.4-31. American three-toed woodpecker (TTWO) modeled habitat supported by Potential Vegetation Groups (PVGs) 5, 6, 8, 9, 10, and 11 in the Project area, under Alternative 5.

Cumulative Effects

Actions on NFS lands that may cumulatively impact American three-toed woodpecker include ongoing fuelwood removal, as described for pileated woodpecker. All action alternatives would decrease American three-toed woodpecker habitat in the Project area in the short term, as described for pileated woodpecker. American three-toed woodpecker modeled habitat currently occurs in small, isolated stands; this habitat distribution would not improve under any of the action alternatives. Road obliteration would benefit American three-toed woodpecker and other Habitat Family 2 species, as described for pileated woodpecker.

Determinations

Alternatives 2, 3, 4, and 5 *may impact individuals* or habitat, but they would not likely contribute to a trend towards Federal listing or cause a loss of viability to the population or species.

Black-backed Woodpecker

Alternative 1 (No Action Alternative)

Alternative 1 would not change the quantity or quality of modeled habitat for black-backed woodpeckers, as described for pileated woodpeckers.

Effects Common to All Action Alternatives

Restoration treatments designed to improve habitat for Family 2 species and to reduce insect infestation would decrease modeled habitat for black-backed woodpeckers under all action alternatives. These treatments would lead more rapid tree growth but reduced canopy cover in the short term, as described for flammulated owl.

Alternatives 2, 3, 4, and 5

Modeled habitat for black-backed woodpecker (13,874 acres) would decrease by approximately 7,600, 7,155, 8,590, and 8,476 acres, respectively, for Alternatives 2, 3, 4, and 5. (Table 3.4-30, Table 3.4-31, Table 3.4-32, Table 3.4-33, Figure 3.4-32, Figure 3.4-33, Figure 3.4-34, Figure 3.4-35). Changes in black-backed woodpecker modeled habitat would differ from changes in American three-toed woodpecker modeled habitat because PVG 7 is included in the black-backed woodpecker habitat model. Most of the habitat decrease would occur in PVG 6 stands. For example, under Alternative 2 in PVG 6 stands, 882 acres of black-backed woodpecker modeled habitat would remain of the current 4,381 acres available. This would be due to the need to reduce the large number of stands in the LTCS to move toward the Forest Plan desired condition. As was noted for American three-toed woodpecker, because the black-backed woodpecker uses specific microsite characteristics in the stand, the modeled habitat acreage changes are likely overestimated for all alternatives. Assuming an increase in tree mortality (due to the western spruce budworm and other insect species infestation), the number of dead and dying trees available for black-backed woodpecker foraging could increase significantly. However, the actual number of acres of modeled habitat would remain the same as that shown for each action alternative because the habitat analysis shows only acres of modeled habitat by PVG, which does not provide the level of microsite measurements required to show use of individual trees. Potential black-backed woodpecker home ranges remaining in the Project area following restoration treatments would be approximately 25, 27, and 21, respectively, for Alternatives 2, 3, 4, and 5, a reduction of roughly 28 to 34 potential home ranges from current condition.

Effects to patch and pattern of modeled habitat for black-backed woodpeckers essentially would not change under Alternative 3, but under Alternatives 2, 4, and 5, patch size and distribution would be reduced because of harvest at higher elevations.

Cumulative Effects

Actions on NFS lands that may cumulatively impact black-backed woodpeckers include ongoing fuelwood removal, as described for pileated woodpecker. All action alternatives would decrease black-backed woodpecker habitat in the Project area in the short term, as described for pileated woodpecker. Road obliteration would benefit black-backed woodpecker and other Habitat Family 2 species, as described for pileated woodpecker.

Table 3.4-30. Acres of black-backed woodpecker modeled habitat under Alternative 2 by Potential Vegetation Group (PVG) in the Project area, on private and National Forest System (NFS) lands.

Tree Size/Canopy Cover Class	PVG3&4	PVG 6	PVG 7	PVG 8	PVG 9	PVG 10	Totals
Medium/Moderate NFS Lands	0	323	161	37	41	65	627
Large/Moderate NFS Lands	0	1,320	1,958	0	206	288	3,772
Large/High NFS Lands	0	882	994	0	209	183	2,268
Total NFS Lands	**0**	**2,525**	**3,113**	**37**	**456**	**536**	**6,667**
Medium/Moderate Private Lands	0	2,021	164	0	0	11	2,196
Large/Moderate Private Lands	0	351	106	0	64	0	521
Large/High Private Lands	0	253	31	0	0	0	284
Total Private Lands	**0**	**2,625**	**301**	**0**	**64**	**11**	**3,001**
Total All Ownership	**0**	**5,150**	**3,414**	**37**	**520**	**547**	**9,668**

Table 3.4-31. Acres of black-backed woodpecker modeled habitat under Alternative 3 by Potential Vegetation Group (PVG) in the Project area, on private and National Forest System (NFS) lands.

Tree Size/Canopy Cover Class	PVG3&4	PVG 6	PVG 7	PVG 8	PVG 9	PVG 10	Totals
Medium/Moderate NFS Lands	0	323	182	37	41	79	662
Large/Moderate NFS Lands	0	1,250	2,108	0	200	278	3,836
Large/High NFS Lands	0	884	1,337	13	282	291	2,807
Total NFS Lands	**0**	**2,457**	**3,627**	**50**	**523**	**648**	**7,305**
Medium/Moderate Private Lands	0	2,021	164	0	0	11	2,196
Large/Moderate Private Lands	0	351	106	0	64	0	521
Large/High Private Lands	0	253	31	0	0	0	284
Total Private Lands	0	**2,625**	**301**	**0**	**64**	**11**	**3,001**
Total All Ownership	**0**	**5,082**	**3,928**	**50**	**587**	**659**	**10,306**

Table 3.4-32. Acres of black-backed woodpecker modeled habitat under Alternative 4 by Potential Vegetation Group (PVG) in the Project area, on private and National Forest System (NFS) lands.

Tree Size/Canopy Cover Class	PVG3&4	PVG 6	PVG 7	PVG 8	PVG 9	PVG 10	Totals
Medium/Moderate NFS Lands	0	311	96	0	39	13	459
Large/Moderate NFS Lands	0	1,306	1,799	0	206	139	3,450
Large/High NFS Lands	0	843	528	0	209	84	1,664
Total NFS Lands	**0**	**2,460**	**2,423**	**0**	**454**	**236**	**5,573**
Medium/Moderate Private Lands	0	2,021	164	0	0	11	2,196
Large/Moderate Private Lands	0	351	106	0	64	0	521
Large/High Private Lands	0	253	31	0	0	0	284
Total Private Lands	**0**	**2,625**	**301**	**0**	**64**	**11**	**3,001**
Total All Ownership	**0**	**5,085**	**2,724**	**0**	**518**	**247**	**8,574**

Table 3.4-33. Acres of black-backed woodpecker modeled habitat under Alternative 5 by Potential Vegetation Group (PVG) in the Project area, on private and National Forest System (NFS) lands.

Tree Size/Canopy Cover Class	PVG3&4	PVG 6	PVG 7	PVG 8	PVG 9	PVG 10	Totals
Medium/Moderate NFS Lands	0	196	96	0	39	7	339
Large/Moderate NFS Lands	0	1,528	1,866	0	211	157	3,763
Large/High NFS Lands	0	634	615	0	209	90	1,548
Total NFS Lands	**0**	**2,359**	**2,578**	**0**	**460**	**254**	**5,650**
Medium/Moderate Private Lands	0	2,021	164	0	0	11	2,196
Large/Moderate Private Lands	0	351	106	0	64	0	521
Large/High Private Lands	0	253	31	0	0	0	284
Total Private Lands	**0**	**2,625**	**301**	**0**	**64**	**11**	**3,001**
Total All Ownership	**0**	**4,984**	**2,878**	**0**	**524**	**265**	**8,651**

Determinations

Alternatives 2, 3, 4, and 5 *may impact individuals or habitat*, but they would not likely contribute to a trend towards Federal listing or cause a loss of viability to the population or species.

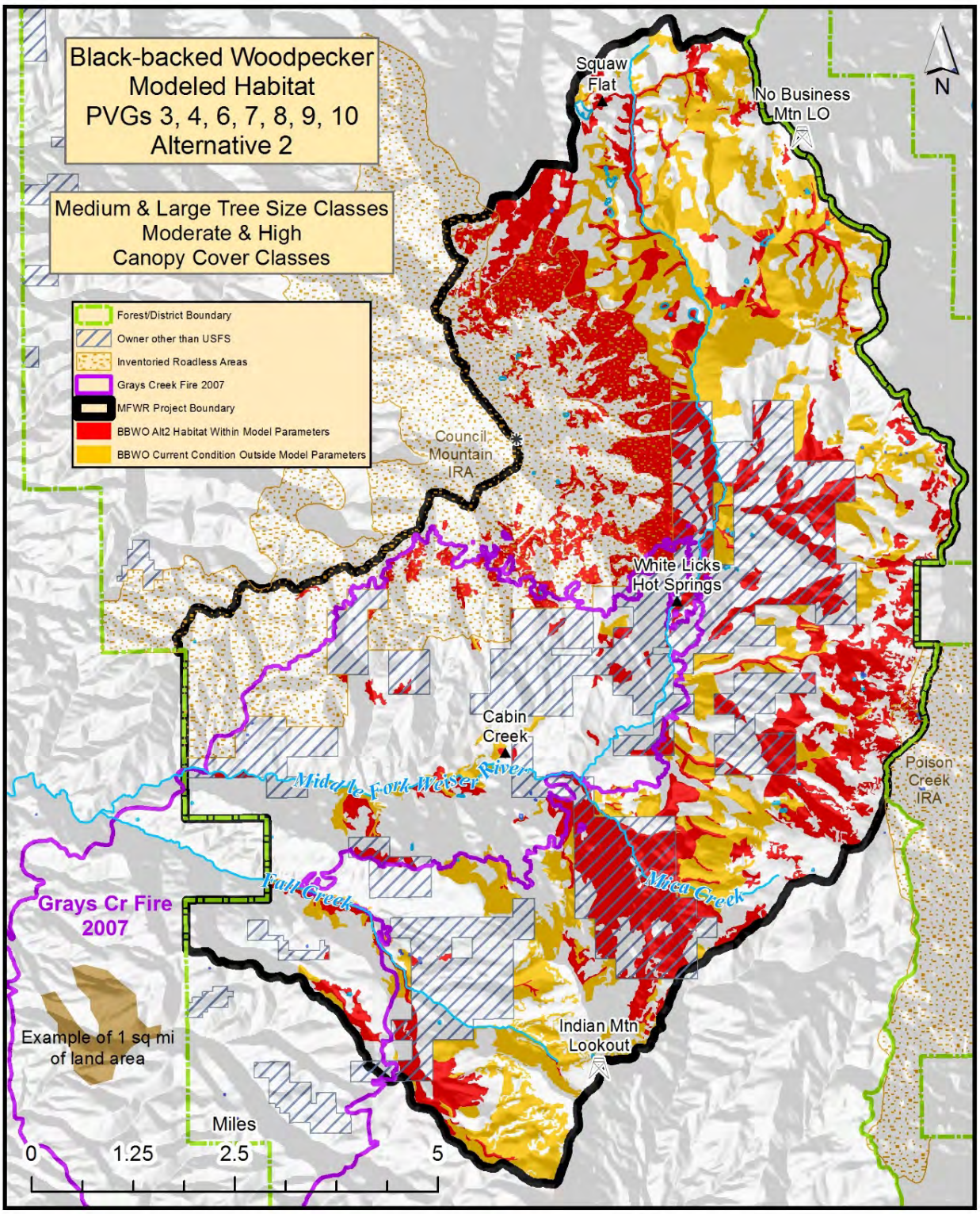


Figure 3.4-32. Black-backed woodpecker (BBWO) modeled habitat supported by Potential Vegetation Groups (PVGs) 3, 4, 6, 7, 8, 9, and 10 in the Project area, under Alternative 2.

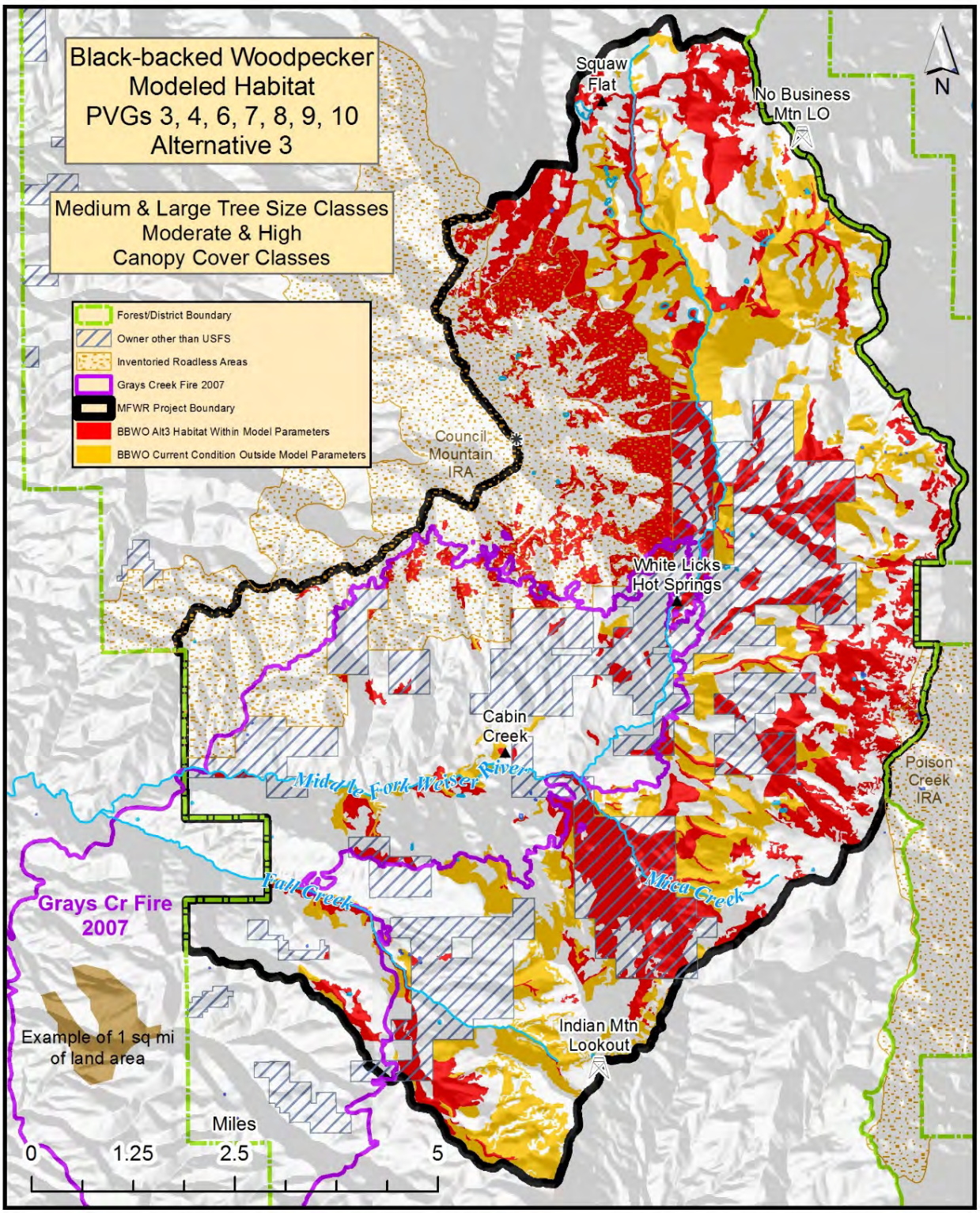


Figure 3.4-33. Black-backed woodpecker (BBWO) modeled habitat supported by Potential Vegetation Groups (PVGs) 3, 4, 6, 7, 8, 9, and 10 in the Project area, under Alternative 3.

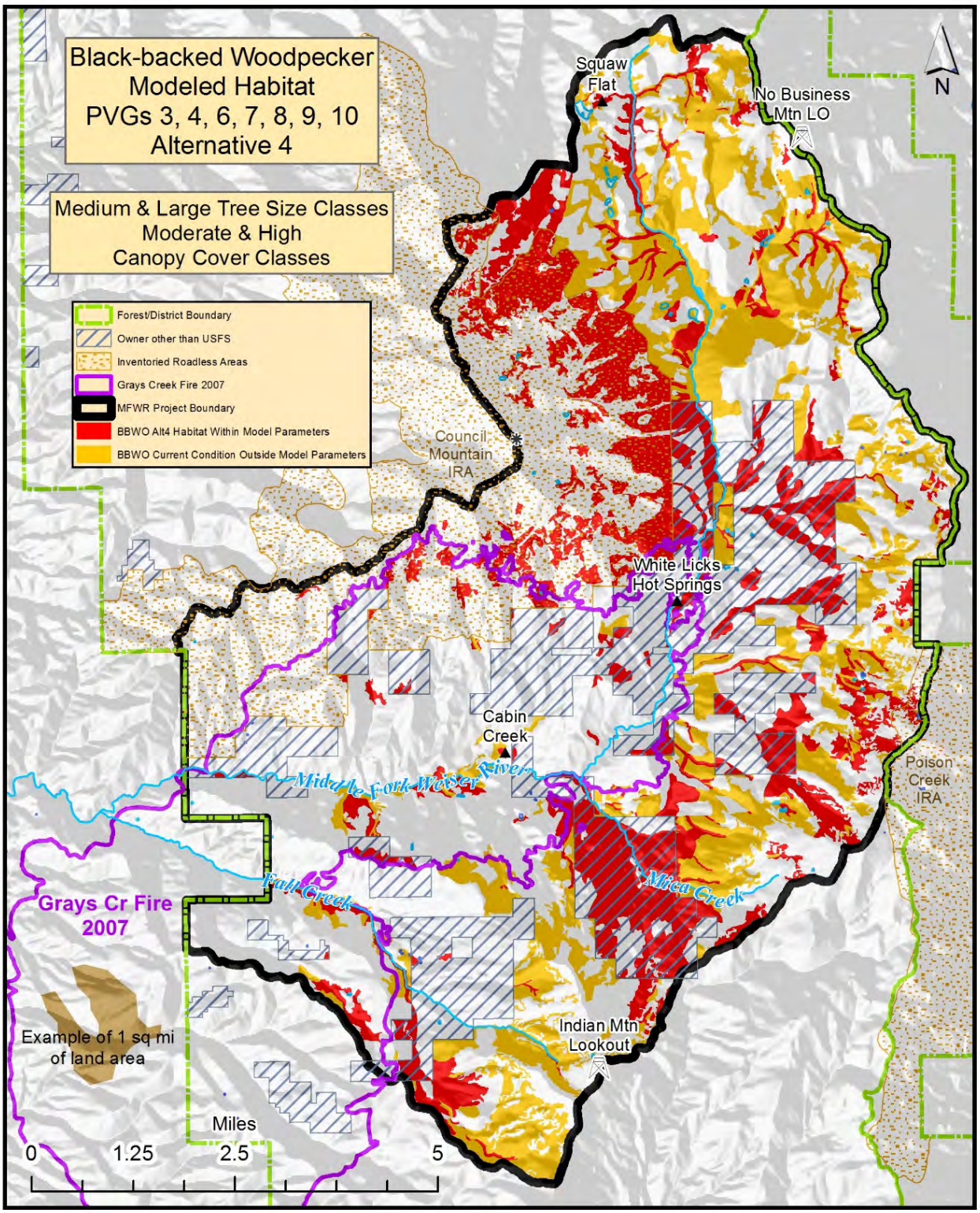


Figure 3.4-34. Black-backed woodpecker (BBWO) modeled habitat supported by Potential Vegetation Groups (PVGs) 3, 4, 6, 7, 8, 9, and 10 in the Project area, under Alternative 4.

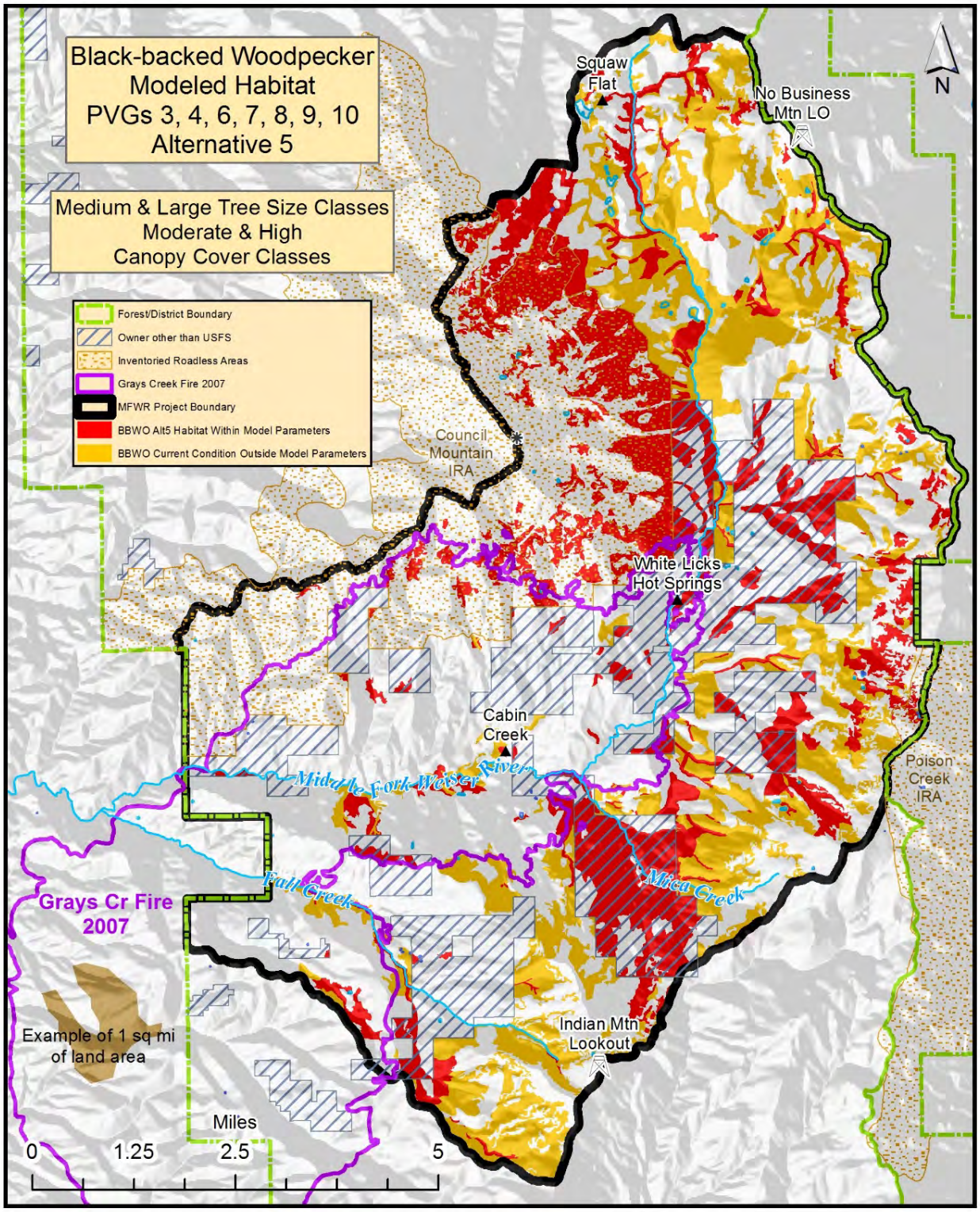


Figure 3.4-35. Black-backed woodpecker (BBWO) modeled habitat supported by Potential Vegetation Groups (PVGs) 3, 4, 6, 7, 8, 9, and 10 in the Project area, under Alternative 5.

Boreal Owl

Alternative 1 (No Action Alternative)

Alternative 1 would not change the quantity or quality of modeled habitat for boreal owls, as described for pileated woodpeckers.

Effects Common to All Action Alternatives

Restoration treatments designed to improve habitat for Family 2 species and to reduce insect infestation would decrease modeled habitat for boreal owls under all action alternatives. These treatments would lead to more rapid tree growth (large trees) but reduced canopy cover in the short term, as described for flammulated owl.

Direct and Indirect Effects from Alternatives 2, 3, 4, and 5

Modeled habitat for boreal owl on NFS lands (14,068 acres) would decrease under all action alternatives. Decreases in habitat following restoration treatments would be similar under Alternative 2 (7,699-acre decrease) and Alternative 3 (7,186-acre decrease), with most changes occurring within PVGs 6 and 7 (Table 3.4-30, Table 3.4-31, Figure 3.4-36, Figure 3.4-37). Larger decreases (8,661-acre decrease) would occur under Alternative 4 (Table 3.4-32, Figure 3.4-34) and Alternative 5 (9,173-acre decrease) (Table 3.4-33, Figure 3.4-35).The number of potential boreal owl home ranges would decrease, under all action alternatives, from four home ranges at current condition to two under Alternatives 2 and 3, and one under Alternatives 4 and 5. Recognizing the current low number (four) of boreal owl potential home ranges, substantial decreases in modeled habitat with associated decreases in potential home ranges could have a large effect on the viability of this species in the Project area. This effect would be due mostly to treatments proposed at higher elevations. However, boreal owl viability would not likely be affected at the Forest level. Most of the boreal owl habitat occurs on the east side of the Forest. The low number of observations of boreal owls in the Project area may reflect this situation. Another reason for the low number of observations in the Project area could be the small number of boreal owl surveys conducted in the area over the past decade, which could lead to a false low number of boreal owl detections.

Effects on patch and pattern of modeled habitat for boreal owls under Alternatives 2 and 4 would be smaller patch size, wider distribution, and decreased habitat connectivity in the short term (0–5 years). As tree density and size increases at higher elevations in the future (>15 years), the local boreal owl population should gradually increase.

Cumulative Effects

Actions on NFS lands that may cumulatively impact boreal owls include ongoing fuelwood removal, as described for pileated woodpecker. All action alternatives would decrease boreal owl habitat in the Project area in the short term. These losses are likely to be cumulative, with other negative effects on boreal owl habitat across the Project area. The losses in boreal owl habitat would be a result of corresponding increases in Family 1 habitats and white-headed woodpecker habitat, which are habitats at greater risk. Alternative 3 would obliterate more roads and unauthorized routes than the other action alternatives; decreased human access into habitats, because of road obliterations, would benefit boreal owl and other Habitat Family 2 species.

Table 3.4-34. Acres of boreal owl modeled habitat under Alternative 2, above 5,000 feet elevation, by Potential Vegetation Group (PVG) in the Project area, on private and National Forest System (NFS) lands.

Tree Size/Canopy Cover Class	PVG 3	PVG 4	PVG 6	PVG 7	PVG 8	PVG 9	PVG 11	Totals
Medium/Moderate NFS Lands	0	0	323	161	37	41	0	562
Large/Moderate NFS Lands	0	0	1,320	1,958	0	206	191	3,675
Large/High NFS Lands	0	0	882	994	0	209	47	2,132
Total NFS Lands	**0**	**0**	**2,526**	**3,112**	**37**	**456**	**238**	**6,369**
Medium/Moderate Private Lands	0	0	2,021	164	0	0	0	2,185
Large/Moderate Private Lands	0	0	351	106	0	64	0	521
Large/High Private Lands	0	0	253	31	0	0	0	284
Total Private Lands	**0**	**0**	**2,625**	**301**	**0**	**64**	**0**	**2,990**
Total All Ownership	**0**	**0**	**5,151**	**3,412**	**37**	**520**	**238**	**9,358**

Table 3.4-35. Acres of boreal owl modeled habitat under Alternative 3, above 5,000 feet elevation, by Potential Vegetation Group (PVG) in the Project area, on private and National Forest System (NFS) lands.

Tree Size/Canopy Cover Class	PVG 3	PVG 4	PVG 6	PVG 7	PVG 8	PVG 9	PVG 11	Totals
Medium/Moderate NFS Lands	0	0	323	182	37	41	0	584
Large/Moderate NFS Lands	0	0	1,250	2,108	0	200	191	3,748
Large/High NFS Lands	0	0	884	1,337	0	282	47	2,550
Total NFS Lands	**0**	**0**	**2,457**	**3,627**	**37**	**524**	**238**	**6,882**
Medium/Moderate Private Lands	0	0	2,021	164	0	0	0	2,185
Large/Moderate Private Lands	0	0	351	106	0	64	0	521
Large/High Private Lands	0	0	253	31	0	0	0	284
Total Private Lands	**0**	**0**	**2,625**	**301**	**0**	**64**	**0**	**2,990**
Total All Ownership	**0**	**0**	**5,082**	**3,928**	**37**	**588**	**238**	**9,872**

Table 3.4-36. Acres of boreal owl modeled habitat under Alternative 4, above 5,000 feet elevation, by Potential Vegetation Group (PVG) in the Project area, on private and National Forest System (NFS) lands.

Tree Size/Canopy Cover Class	PVG 3	PVG 4	PVG 6	PVG 7	PVG 8	PVG 9	PVG 11	Totals
Medium/Moderate NFS Lands	0	0	311	96	0	39	0	447
Large/Moderate NFS Lands	0	0	1,306	1,799	0	206	69	3,380
Large/High NFS Lands	0	0	843	528	0	209	0	1,580
Total NFS Lands	**0**	**0**	**2,460**	**2,424**	**0**	**454**	**69**	**5,407**
Medium/Moderate Private Lands	0	0	2,021	164	0	0	0	2,185
Large/Moderate Private Lands	0	0	351	106	0	64	0	521
Large/High Private Lands	0	0	253	31	0	0	0	284
Total Private Lands	**0**	**0**	**2,625**	**301**	**0**	**64**	**0**	**2,990**
Total All Ownership	**0**	**0**	**5,085**	**2,724**	**0**	**518**	**69**	**8,397**

Table 3.4-37. Acres of boreal owl modeled habitat under Alternative 5, above 5,000 feet elevation, Potential Vegetation Group (PVG) in the Project area, on private and National Forest System (NFS) lands.

Tree Size/Canopy Cover Class	PVG 3	PVG 4	PVG 6	PVG 7	PVG 8	PVG 9	PVG 11	Totals
Medium/Moderate NFS Lands	0	0	88	96	0	39	0	223
Large/Moderate NFS Lands	0	0	1,293	1,866	0	210	72	3,441
Large/High NFS Lands	0	0	598	615	0	209	0	1,422
Total NFS Lands	**0**	**0**	**1,979**	**2,578**	**0**	**458**	**72**	**5,087**
Medium/Moderate Private Lands	0	0	1,696	159	0	0	0	1,855
Large/Moderate Private Lands	0	0	277	106	0	64	0	447
Large/High Private Lands	0	0	189	31	0	0	0	221
Total Private Lands	**0**	**0**	**2,162**	**296**	**0**	**64**	**0**	**2,523**
Total All Ownership	**0**	**0**	**4,142**	**2,874**	**0**	**522**	**72**	**7,610**

Determinations

Alternative 1 would have *no impact* on the boreal owl.

Alternatives 2, 3, 4, and 5 *may impact individuals or habitat*, but they would not likely contribute to a trend towards Federal listing or cause a loss of viability to the population or species.

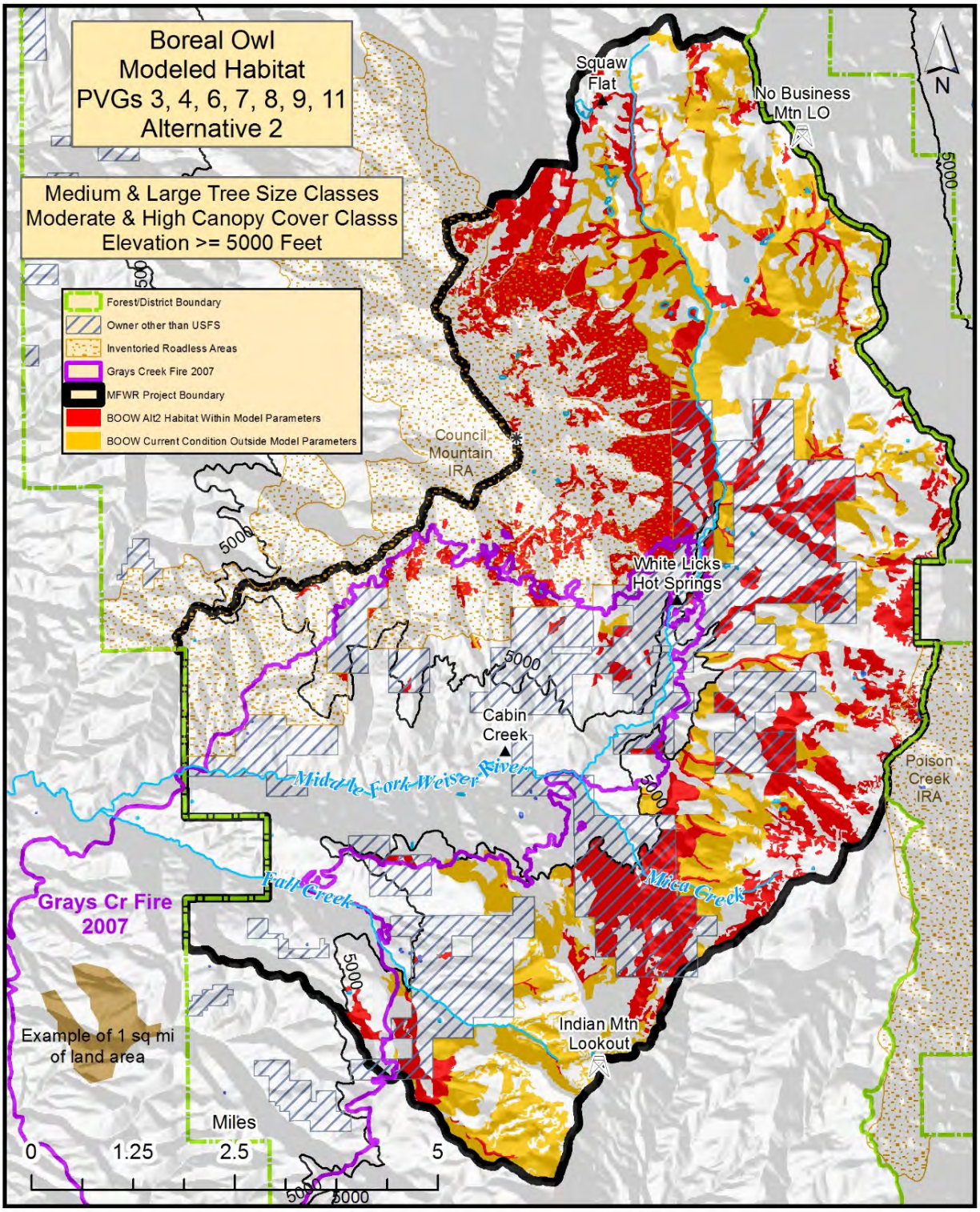


Figure 3.4-36. Boreal owl (BOOW) modeled habitat supported by Potential Vegetation Groups (PVGs) 3, 4, 6, 7, 8, 9, and 11 in the Project area, under Alternative 2.

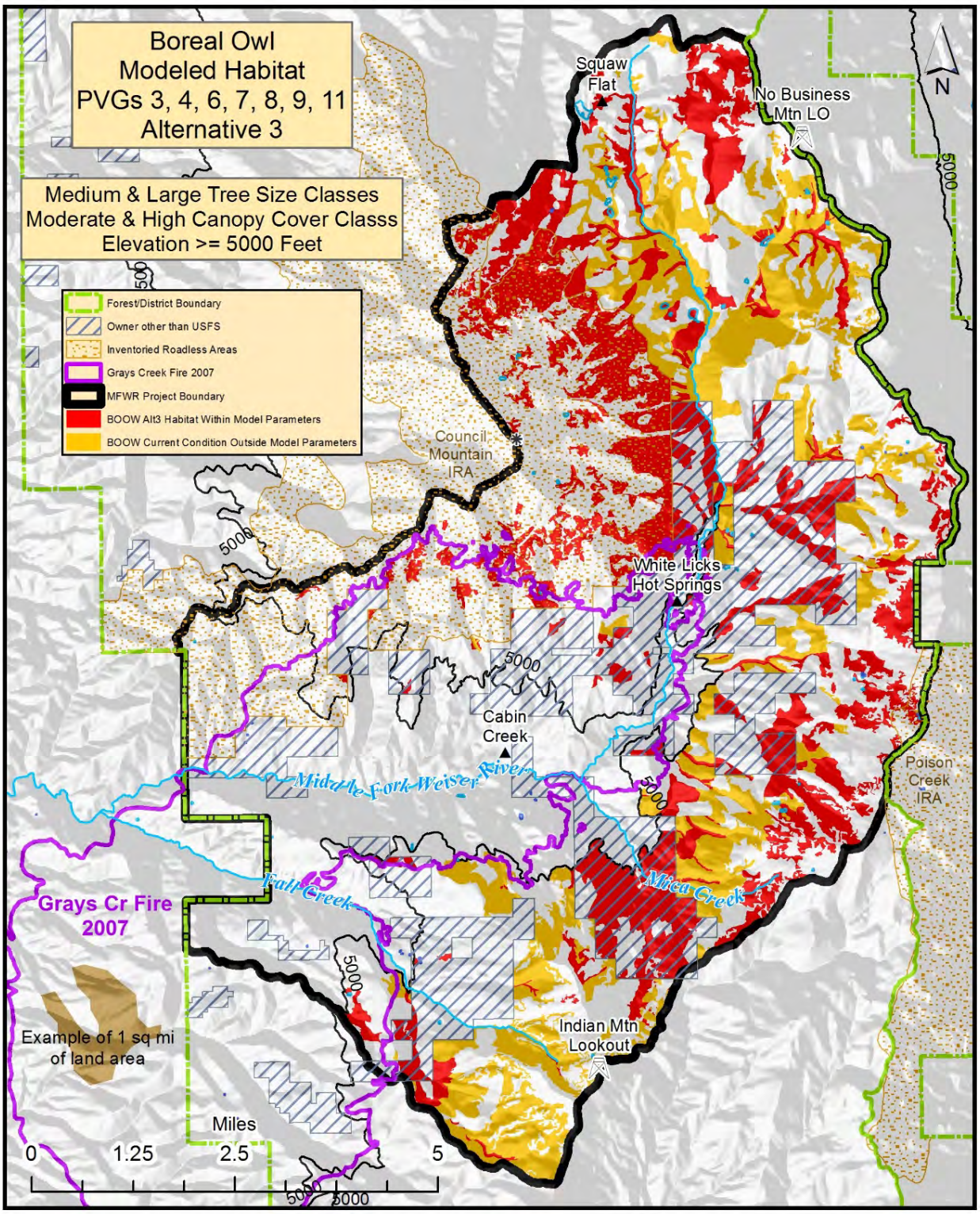


Figure 3.4-37. Boreal owl (BOOW) modeled habitat supported by Potential Vegetation Groups (PVGs) 3, 4, 6, 7, 8, 9, and 11 in the Project area, under Alternative 3.

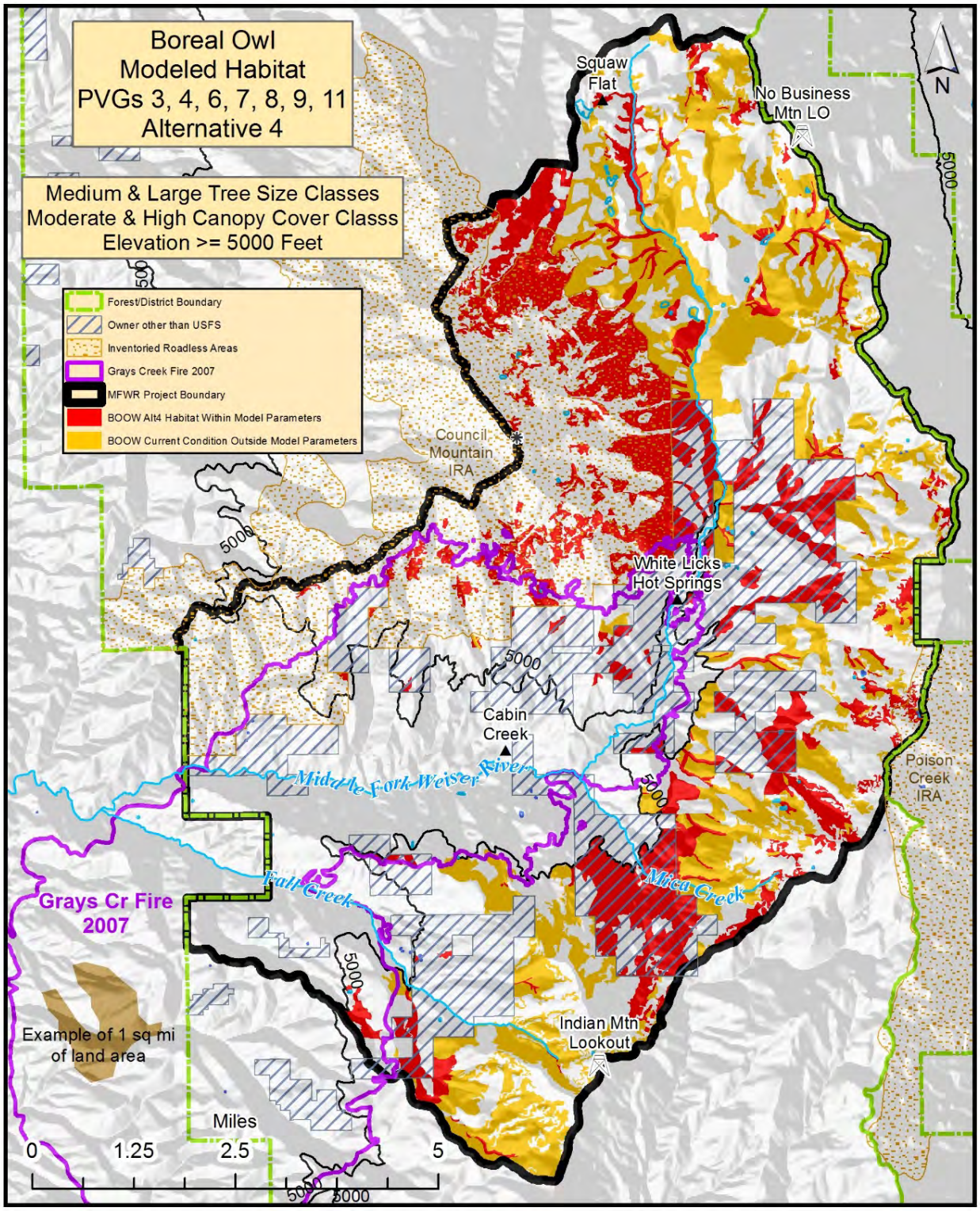


Figure 3.4-38. Boreal owl (BOOW) modeled habitat supported by Potential Vegetation Groups (PVGs) 3, 4, 6, 7, 8, 9, and 11 in the Project area, under Alternative 4.

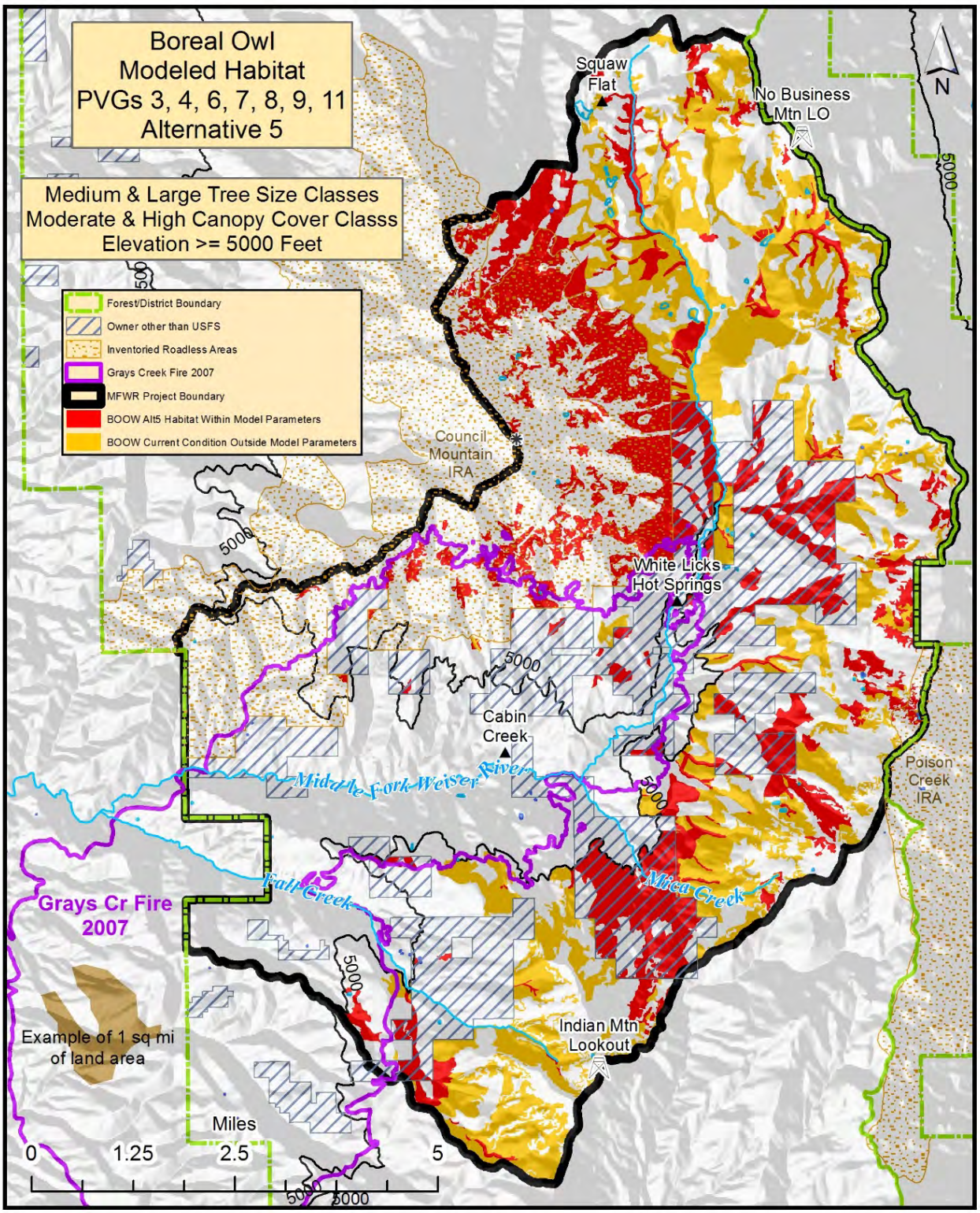


Figure 3.4-39. Boreal owl (BOOW) modeled habitat supported by Potential Vegetation Groups (PVGs) 3, 4, 6, 7, 8, 9, and 11 in the Project area, under Alternative 5.

Fisher

Alternative 1 (No Action Alternative)

Alternative 1 would not change the quantity or quality of modeled habitat for fishers, as no new management actions would be implemented. Combined with the lack of modeled habitat improvement for Habitat Family 1, the Project area forests would be more susceptible under the No Action alternative to long-term alteration from uncharacteristic or even stand-replacement wildfire.

Effects Common to All Action Alternatives

Restoration treatments designed to improve habitat for Family 1 species and reduce insect infestation would decrease modeled habitat for fishers under all action alternatives. These treatments would lead to more rapid tree growth, but they would reduce canopy cover classes in the short term. Effects to patch and pattern of habitat for fishers would include smaller patch size, wider distribution, and decreased habitat connectivity.

Direct and Indirect Effects from Alternatives 2, 3, 4, and 5

Modeled habitat for fishers on NFS lands (10,489 acres) would decrease under all action alternatives by roughly 7,000 acres (Table 3.4-38, Table 3.4-39, Table 3.4-40, Table 3.4-41, Figure 3.4-40, Figure 3.4-41, Figure 3.4-42, Figure 3.4-43). Habitat reductions would be greater under Alternative 4 than for the other action alternatives, with the largest difference noted for PVG 10. Road decommissioning and long-term road closures proposed as watershed improvements for all action alternatives would improve the quality of fisher habitat.

Cumulative Effects

Actions on NFS lands that may cumulatively impact fishers include ongoing fuelwood removal, as described for pileated woodpecker. All action alternatives would decrease fisher habitat in the Project area in the short term (0–5 years). These losses are likely to be cumulative, with other negative effects on fisher habitat across the Project area. The modeled losses in fisher habitat would result from corresponding increases in Family 1 habitats and white-headed woodpecker modeled habitat, which are habitats at greater risk. Alternative 3 would obliterate more roads and unauthorized routes than the other action alternatives; decreased human access into habitats because of road obliterations would benefit fisher and other Habitat Family 2 species.

Table 3.4-38. Acres of fisher modeled habitat under Alternative 2 by Potential Vegetation Group (PVG) in the Project area, on private and National Forest System (NFS) lands.

Tree Size/Canopy Cover Class	PVG 3	PVG 6	PVG 8	PVG 9	PVG 10	Total
Medium/Moderate NFS Lands	0	323	37	41	65	466
Large/Moderate NFS Lands	0	1,320	0	206	288	1,814
Large/High NFS Lands	0	882	0	209	183	1,274
Total NFS Lands	**0**	**2,526**	**37**	**456**	**536**	**3,555**
Medium/Moderate Private Lands	0	2,021	0	0	11	2,032
Large/Moderate Private Lands	0	351	0	64	0	415
Large/High Private Lands	0	253	0	0	0	253
Total Private Lands	**0**	**2,625**	**0**	**64**	**11**	**2,700**
Total All Ownership	**0**	**5,151**	**37**	**520**	**547**	**6,255**

Table 3.4-39. Acres of fisher modeled habitat under Alternative 3 by Potential Vegetation Group (PVG), in the Project area, on private and National Forest System (NFS) lands.

Tree Size/Canopy Cover Class	PVG 3	PVG 6	PVG 8	PVG 9	PVG 10	Total
Medium/Moderate NFS Lands	0	323	37	41	79	480
Large/Moderate NFS Lands	0	1,250	0	200	278	1,727
Large/High NFS Lands	0	884	0	282	250	1,416
Total NFS Lands	**0**	**2,457**	**37**	**524**	**607**	**3,624**
Medium/Moderate Private Lands	0	2,021	0		11	2,032
Large/Moderate Private Lands	0	351	0	64	0	415
Large/High Private Lands	0	253	0	0	0	253
Total Private Lands	**0**	**2,625**	**0**	**64**	**11**	**2,700**
Total All Ownership	**0**	**5,082**	**37**	**588**	**618**	**6,324**

Table 3.4-40. Acres of fisher modeled habitat under Alternative 4, by Potential Vegetation Group (PVG), in the Project area, on private and National Forest System (NFS) lands.

Tree Size/Canopy Cover Class	PVG 3	PVG 6	PVG 8	PVG 9	PVG 10	Total
Medium/Moderate NFS Lands	0	311	0	39	13	363
Large/Moderate NFS Lands	0	1,306	0	206	139	1,651
Large/High NFS Lands	0	843	0	209	84	1,136
Total NFS Lands	**0**	**2,460**	**0**	**454**	**236**	**3,150**
Medium/Moderate Private Lands	0	2,021	0	0	11	2,032
Large/Moderate Private Lands	0	351	0	64	0	415
Large/High Private Lands	0	253	0	0	0	253
Total Private Lands	**0**	**2,625**	**0**	**64**	**11**	**2,700**
Total All Ownership	**0**	**5,085**	**0**	**518**	**247**	**5,851**

Table 3.4-41. Acres of fisher modeled habitat under Alternative 5 by Potential Vegetation Group (PVG) in the Project area, on private and National Forest System (NFS) lands.

Tree Size/Canopy Cover Class	PVG 3	PVG 6	PVG 8	PVG 9	PVG 10	Total
Medium/Moderate NFS Lands	0	196	0	39	7	243
Large/Moderate NFS Lands	0	1,528	0	211	157	1,897
Large/High NFS Lands	0	634	0	209	90	933
Total NFS Lands	**0**	**2,359**	**0**	**459**	**254**	**3,073**
Medium/Moderate Private Lands	0	2,021	0	0	11	2,032
Large/Moderate Private Lands	0	351	0	64	0	415
Large/High Private Lands	0	253	0	0	0	253
Total Private Lands	**0**	**2,625**	**0**	**64**	**11**	**2,700**
Total All Ownership	**0**	**4,984**	**0**	**524**	**266**	**5,773**

Determinations

Alternatives 2, 3, 4, and 5 *may impact individuals or habitat*, but they would not likely contribute to a trend towards Federal listing or cause a loss of viability to the population or species.

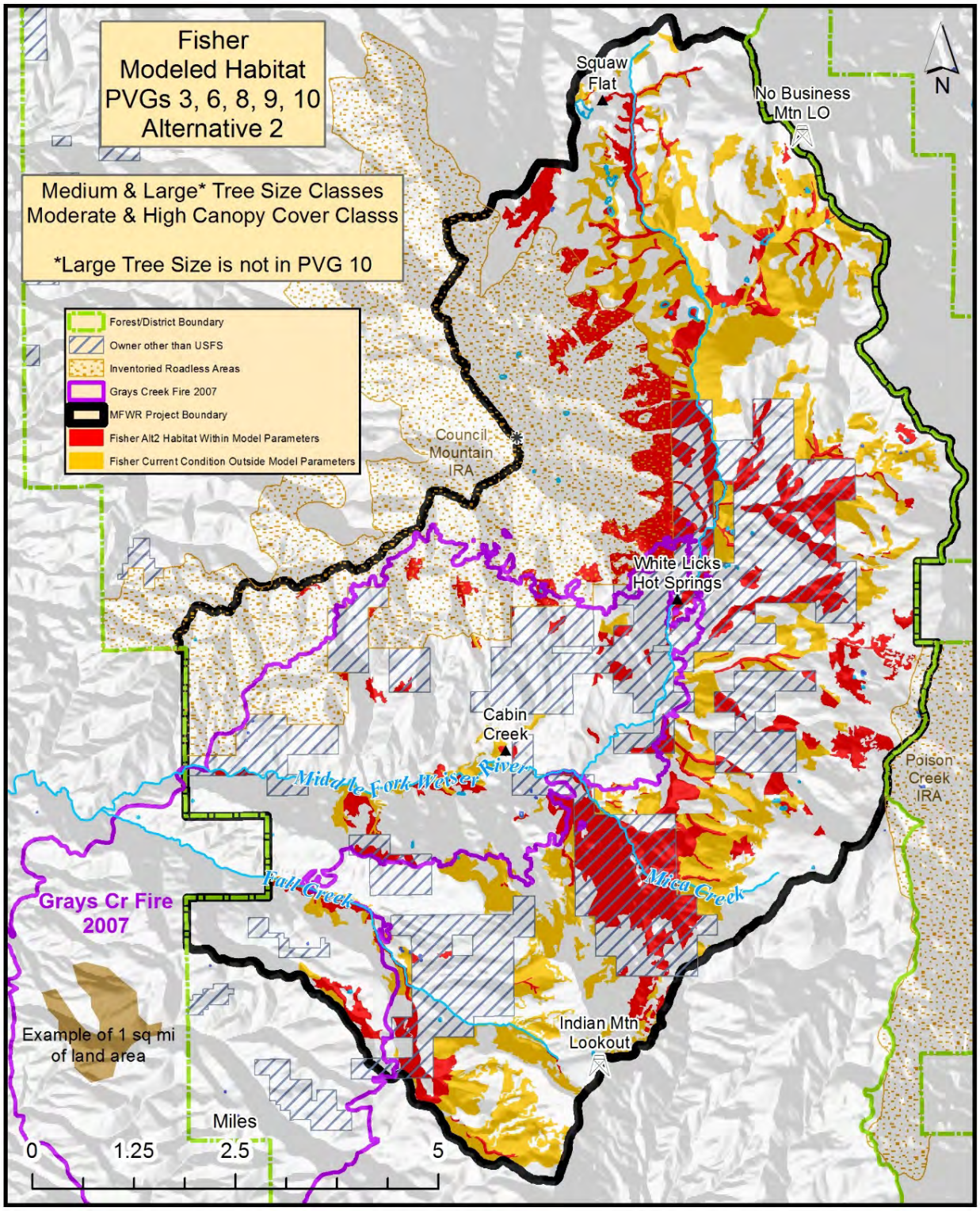


Figure 3.4-40. Fisher modeled habitat supported by Potential Vegetation Groups (PVGs) 3, 6, 8, 9, and 10 in the Project area, under Alternative 2.

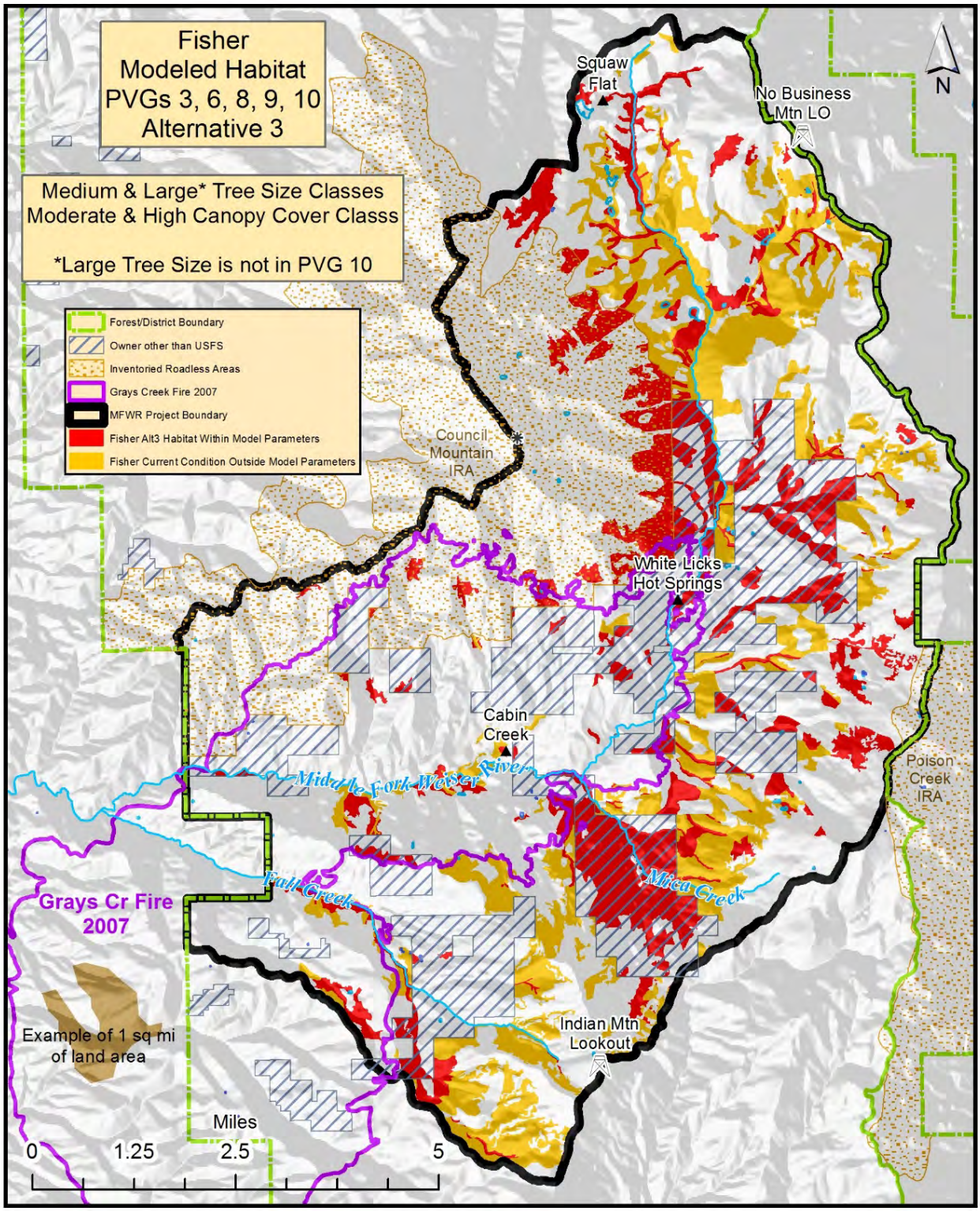


Figure 3.4-41. Fisher modeled habitat supported by Potential Vegetation Groups (PVGs) 3, 6, 8, 9, and 10 in the Project area, under Alternative 3.

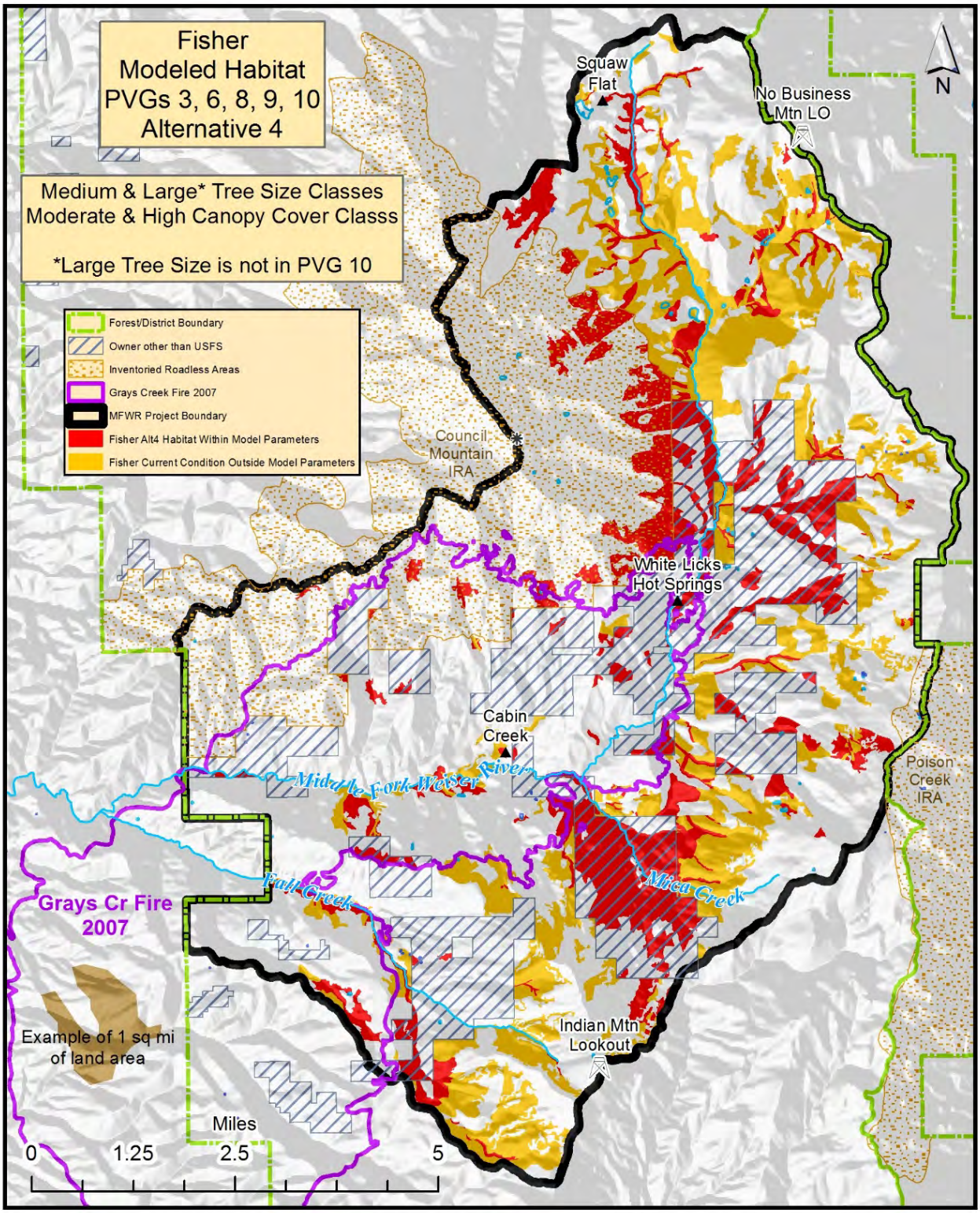


Figure 3.4-42. Fisher modeled habitat supported by Potential Vegetation Groups (PVGs) 3, 6, 8, 9, and 10 in the Project area, under Alternative 4.

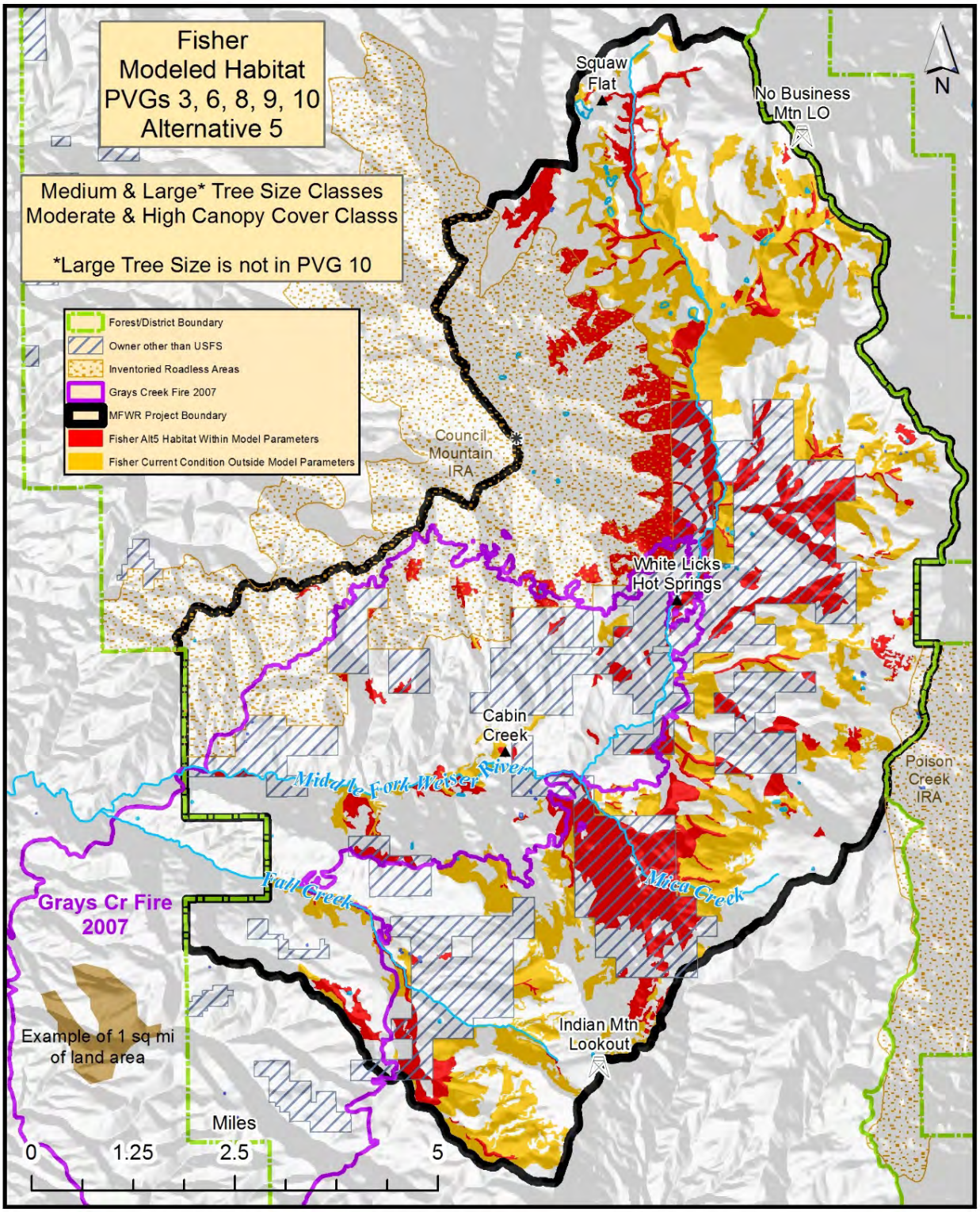


Figure 3.4-43. Fisher modeled habitat supported by Potential Vegetation Groups (PVGs) 3, 6, 8, 9, and 10 in the Project area, under Alternative 5.

Great Gray Owl

Alternative 1 (No Action Alternative)

Alternative 1 would not change the quantity or quality of habitat for great gray owls, as described for pileated woodpeckers.

Effects Common to All Action Alternatives

Restoration treatments designed to improve habitat for Family 1 species and reduce insect infestation would decrease modeled habitat for great gray owls under all action alternatives. These treatments would lead to more rapid tree growth (large trees), but they would reduce canopy cover in the short term. It is likely that many treated stands that move canopy cover from moderate to low cover class would still provide some great gray owl habitat, and that actual habitat declines would not be as great as indicated by the habitat model.

Effects to patch and pattern of modeled habitat for great gray owls would be smaller patch size, wider distribution, and decreased habitat connectivity. As tree density and size increases in the future, the local great gray owl population should gradually increase.

Direct and Indirect Effects from Alternatives 2, 3, 4, and 5

Modeled habitat for great gray owl on NFS lands (15,819 acres) would decrease under all action alternatives, with reductions ranging from approximately 6,770 acres to 7,770 acres. The majority of modeled habitat would be reduced in PVG 6 (6,702- to 6,771-acre decreases), followed to a lesser extent, by PVG 7 (0- to 827-acre reductions) (Table 3.4-42, Table 3.4-43, Table 3.4-44, Table 3.4-45, Figure 3.4-44, Figure 3.4-45, Figure 3.4-46, Figure 3.4-47).The decrease in modeled habitat may be overestimated by the model because of the microsite requirements of juxtaposition of meadows with forested stands. Changes in patch dynamics also may have affected the size and juxtaposition of stands with large diameter trees and high crown closures, which great gray owls use for nest sites, foraging, and roosting. After implementing any of the action alternatives, remaining great gray owl modeled habitat would support approximately one and one-half great gray owl home ranges, a decrease from three home ranges at current conditions. Road decommissioning and long-term road closures proposed for all action alternatives would improve the quality of great gray owl habitat by decreasing the amount of human disturbance to great gray owls; beneficial effects would be greatest under Alternative 3, due to the increase in miles of roads

Cumulative Effects

Actions on NFS lands that may cumulatively impact great gray owls include ongoing fuelwood removal, as described for pileated woodpecker. All action alternatives would decrease great gray owl habitat in the Project area in the short term, as described for pileated woodpecker. Road obliteration would benefit great gray owl and other Family 2 species, as described for pileated woodpecker.

Determinations

Alternatives 2, 3, 4, and 5 *may impact individuals or habitat*, but they would not likely contribute to a trend towards Federal listing or cause a loss of viability to the population or species.

Table 3.4-42. Acres of great gray owl modeled habitat under Alternative 2 by Potential Vegetation Group (PVG) in the Project area, on private and National Forest System (NFS) lands.

Tree Size/Canopy Cover Class	PVG 6	PVG 7	PVG 8	PVG 9	PVG 11	Totals
Medium/Low NFS Lands	0	953	6	139	72	1,170
Medium/Moderate NFS Lands	323	161	37	41	0	562
Large/Low NFS Lands	0	901	13	130	68	1,111
Large/Moderate NFS Lands	1,320	1,958	0	206	191	3,675
Large/High NFS Lands	882	994	0	209	47	2,132
Total NFS Lands	**2,526**	**4,965**	**56**	**725**	**378**	**8,650**
Medium/Low Private Lands	0	84	0	0	0	84
Medium/Moderate Private Lands	2,021	164	0	0	0	2,185
Large/Low Private Lands	0	0	0	0	0	0
Large/Moderate Private Lands	351	106	0	64	0	521
Large/High Private Lands	253	31	0	0	0	284
Total Private Lands	**2,625**	**385**	**0**	**64**	**0**	**3,074**
Total All Ownership	**5,151**	**5,350**	**56**	**789**	**378**	**11,724**

Table 3.4-43. Acres of great gray owl modeled habitat under Alternative 3 by Potential Vegetation Group (PVG) in the Project area, on private and National Forest System (NFS) lands.

Tree Size/Canopy Cover Class	PVG 6	PVG 7	PVG 8	PVG 9	PVG 11	Totals
Medium/Low NFS Lands	0	988	6	139	72	1,205
Medium/Moderate NFS Lands	323	182	37	41	0	584
Large/Low NFS Lands	0	741	13	98	110	961
Large/Moderate NFS Lands	1,250	2,108	0	200	191	3,748
Large/High NFS Lands	884	1,337	0	282	47	2,550
Total NFS Lands	**2,457**	**5,356**	**56**	**760**	**419**	**9,048**
Medium/Low Private Lands	0	84	0	0	0	84
Medium/Moderate Private Lands	2,021	164	0	0	0	2,185
Large/Low Private Lands	0	0	0	0	0	0
Large/Moderate Private Lands	351	106	0	64	0	521
Large/High Private Lands	253	31	0	0	0	284
Total Private Lands	**2,625**	**385**	**0**	**64**	**0**	**3,074**
Total All Ownership	**5,082**	**5,741**	**56**	**825**	**419**	**12,122**

Table 3.4-44. Acres of great gray owl modeled habitat under Alternative 4 by Potential Vegetation Group (PVG) in the Project area, on private and National Forest System (NFS) lands.

Tree Size/Canopy Cover Class	PVG 6	PVG 7	PVG 8	PVG 9	PVG 11	Totals
Medium/Low NFS Lands	0	1,005	16	139	72	1,232
Medium/Moderate NFS Lands	311	96	0	39		447
Large/Low NFS Lands	0	1,100	13	130	161	1,405
Large/Moderate NFS Lands	1,306	1,799	0	206	69	3,380
Large/High NFS Lands	843	528	0	209	0	1,580
Total NFS Lands	**2,460**	**4,529**	**29**	**723**	**302**	**8,044**
Medium/Low Private Lands	0	84	0	0	0	84
Medium/Moderate Private Lands	2,021	164	0	0	0	2,185
Large/Low Private Lands	0	0	0	0	0	0
Large/Moderate Private Lands	351	106	0	64	0	521
Large/High Private Lands	253	31	0	0	0	284
Total Private Lands	**2,625**	**385**	**0**	**64**	**0**	**3,074**
Total All Ownership	**5,085**	**4,914**	**29**	**787**	**302**	**11,118**

Table 3.4-45. Acres of great gray owl modeled habitat under Alternative 5 by Potential Vegetation Group (PVG) in the Project area, on private and National Forest System (NFS) lands.

Tree Size/Canopy Cover Class	PVG 6	PVG 7	PVG 8	PVG 9	PVG 11	Totals
Medium/Low NFS Lands	0	1,025	43	140	72	1,280
Medium/Moderate NFS Lands	196	96	0	39	0	332
Large/Low NFS Lands	0	1,414	13	136	163	1,726
Large/Moderate NFS Lands	1,528	1,866	0	211	72	3,678
Large/High NFS Lands	634	615	0	209	0	1,458
Total NFS Lands	**2,359**	**5,017**	**56**	**735**	**307**	**8,474**
Medium/Low Private Lands	0	84	0	0	0	84
Medium/Moderate Private Lands	2,021	164	0	0	0	2,185
Large/Low Private Lands	0	0	0	0	0	0
Large/Moderate Private Lands	351	106	0	64	0	521
Large/High Private Lands	253	31	0	0	0	284
Total Private Lands	**2,625**	**385**	**0**	**64**	**0**	**3,074**
Total All Ownership	**4,984**	**5,402**	**56**	**800**	**307**	**11,548**

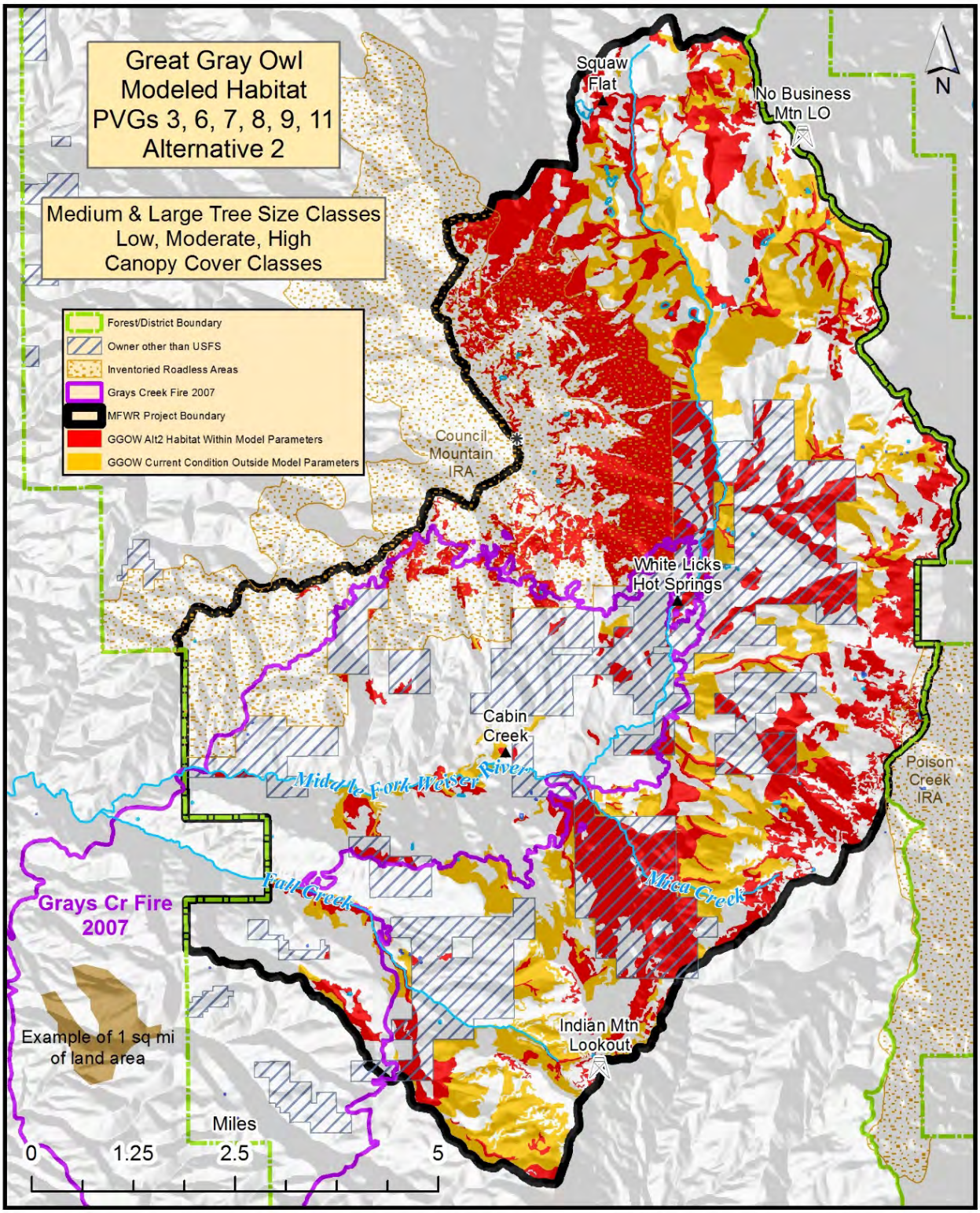


Figure 3.4-44. Great gray owl (GGOW) modeled habitat supported by Potential Vegetation Groups (PVGs) 3, 6, 7, 8, 9, and 11 in the Project area, under Alternative 2.

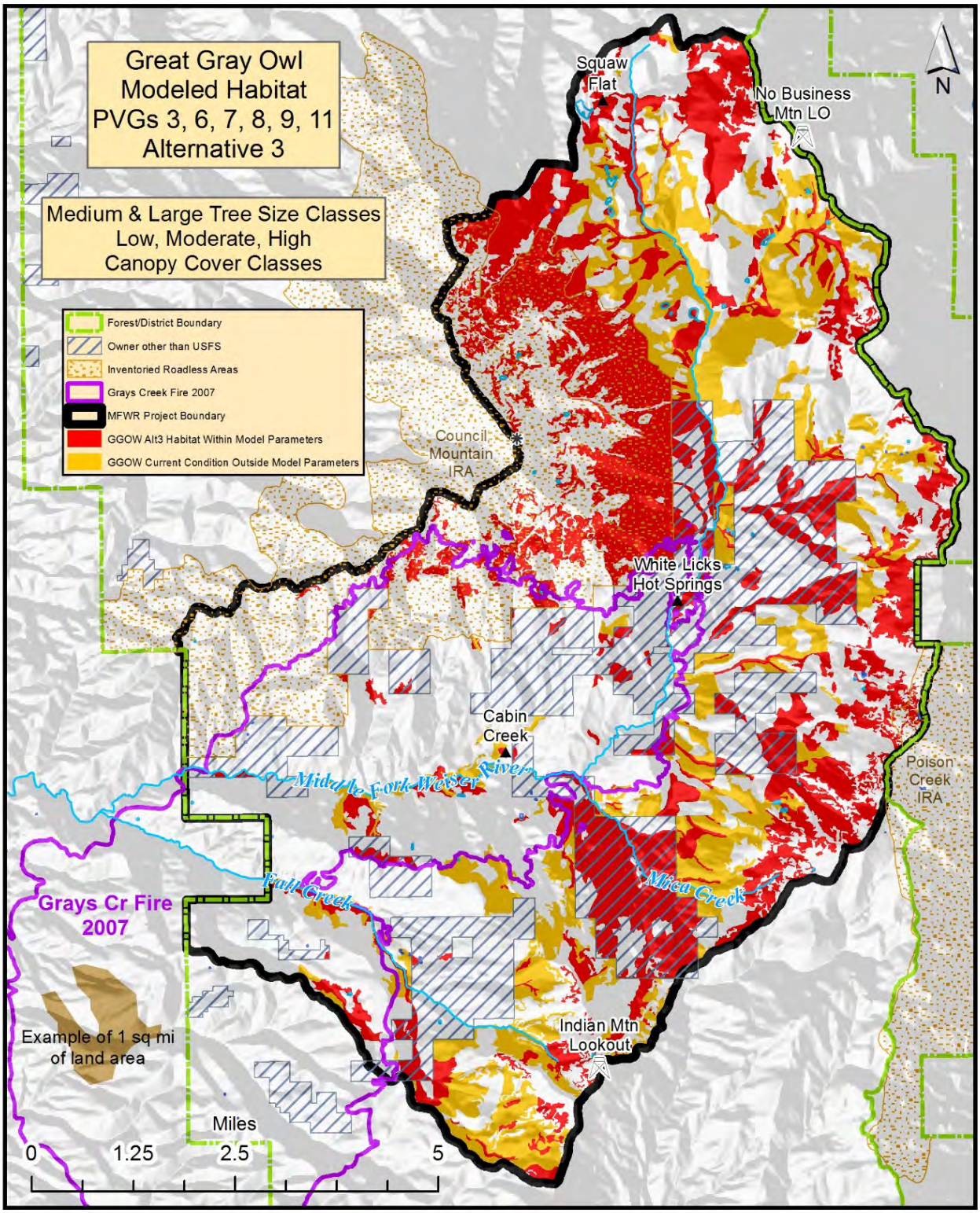


Figure 3.4-45. Great gray owl (GGOW) modeled habitat supported by Potential Vegetation Groups (PVGs) 3, 6, 7, 8, 9, and 11 in the Project area, under Alternative 3.

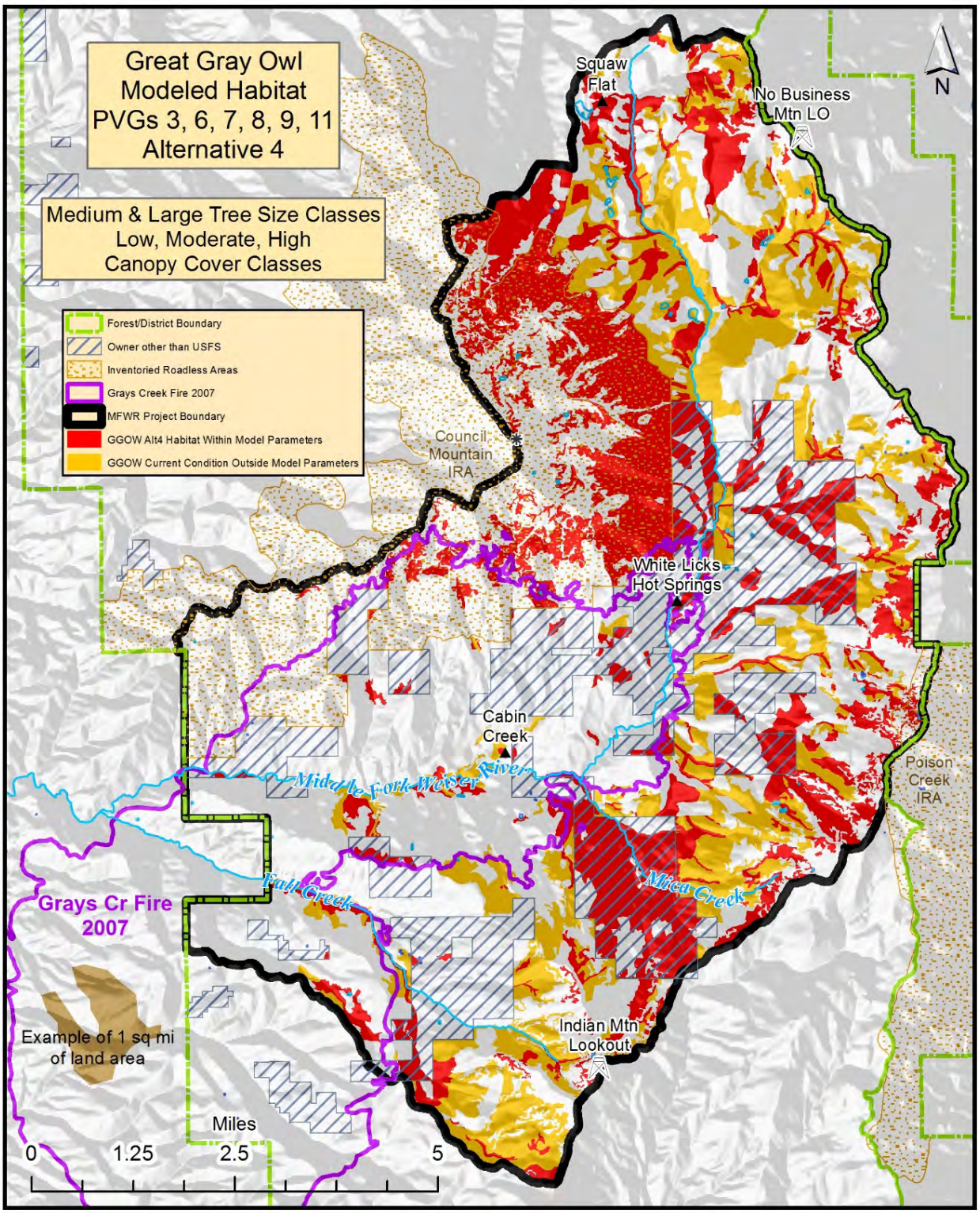


Figure 3.4-46. Great gray owl (GGOW) modeled habitat supported by Potential Vegetation Groups (PVGs) 3, 6, 7, 8, 9, and 11 in the Project area, under Alternative 4.

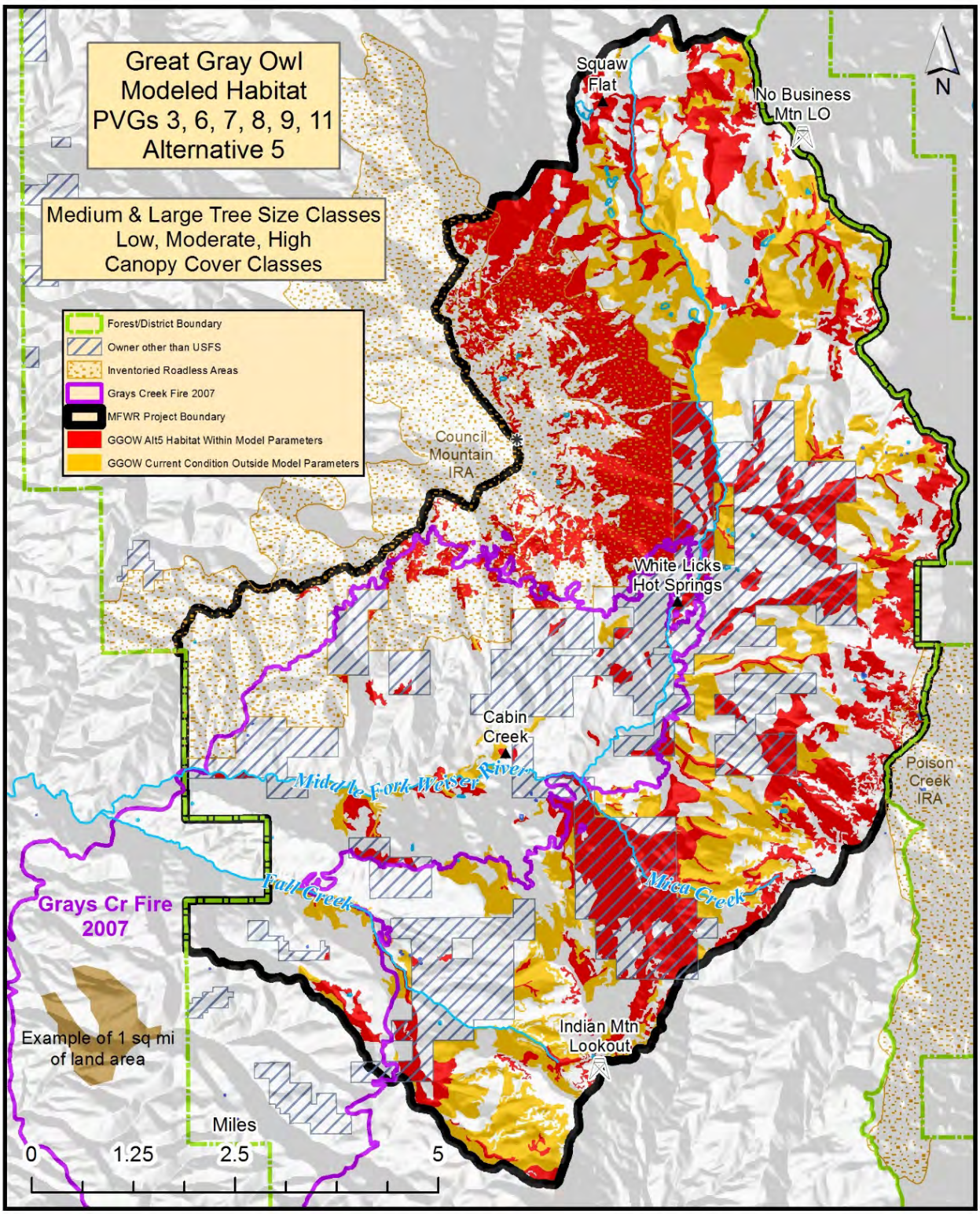


Figure 3.4-47. Great gray owl (GGOW) modeled habitat for Potential Vegetation Groups (PVGs) 3, 6, 7, 8, 9, and 11 in the Project area, under Alternative 5.

Northern Goshawk

Alternative 1 (No Action Alternative)

Alternative 1 would not change the quantity or quality of habitat for northern goshawks.

Effects Common to All Action Alternatives

Restoration treatments designed to improve habitat for Family 1 species and to reduce insect infestation would decrease modeled habitat for northern goshawks under all action alternatives. These treatments would lead to more rapid tree growth, but they would reduce canopy cover in the short term, as described for great gray owls. Treatments in PFAs would be restricted to specific timing and prescription, based on Southwest Guideline requirements (Reynolds et al. 1992).

Outside of the PFAs, the effects on patch and pattern of modeled habitat for northern goshawks would include smaller patch size, wider distribution, and decreased habitat connectivity. As tree density and size increases within and outside of PFAs in the future, the local northern goshawk population should gradually increase.

Direct and Indirect Effects from Alternatives 2, 3, 4, and 5

Modeled habitat for northern goshawks on NFS lands (14,433 acres) would decrease under all action alternatives, with most habitat reductions in PVGs 6, 7, and 9 (Table 3.4-46, Table 3.4-46, Table 3.4-47, Table 3.4-48, Table 3.4-49, Figure 3.4-48, Figure 3.4-49, Figuer 3.4-50, Figure 3.4-51). Overall, for all PVGs combined, there would be a reduction to 6,293, 6,807, 5,499, and 5,322 acres of northern goshawk modeled habitat on NFS lands under Alternatives 2, 3, 4, and 5, respectively; the greatest reduction in habitat would occur under Alternative 5.

The Southwest Guidelines (Reynolds et al. 1992) suggest a mix of Vegetation Structural Stages (VSS) required by northern goshawks that provide a variety of plant communities, which in turn provide a variety of prey species. In constructing the PFAs around known northern goshawk nests, each VSS should be present in different percentages within each PFA. The grass/forb/seedling VSS should be 10%, the sapling VSS should be 10%, the young forest VSS should be 20%, the medium age forest VSS should be 20%, and the combined mature and old forest should be 40% of the PFA. The guidelines also suggest that vegetation treatments can occur, as planned, outside of the PFAs. Within the PFAs, the active nest stands and the alternate nest stands could be thinned of submerchantable, smaller diameter, understory trees up to the height of the nest; but no overstory removal should occur. In the replacement nest stands, which are designed for future use, vegetation treatments could occur, but they overstory canopy requirements would apply, depending on the dominate tree species in the stand. Since the treatment restrictions would be within the PFA, stands outside the PFA could still receive the planned treatments to meet Project objectives. In theory, the eight PFAs would provide appropriate habitats for nesting and rearing young within each northern goshawk territory. Human activities within the PFAs would be restricted to a period outside of March 1 through September 30. Any new northern goshawk nests found during Project planning or implementation would have a PFA constructed around the nest, per PDFs.

These decreases in northern goshawk modeled habitat would be offset somewhat by the designation of the eight PFAs, as shown in Figure 3.4-10, and the application of specific management guidelines within the PFAs. The Southwest Guidelines and Forest Plan direction require the construction of a PFA around each known active nest. The PFA contains 6 nest stands of 30 acres each: the active nest stand, alternate nest stands that may be used over a period of a

few years, and replacement nest stands that will provide future nesting opportunities. Each nest stand has specific management guidelines, based on the type of nest stand and the dominant tree species in the stand. Silvicultural treatments could occur in the PFA and in the nest stands, but a timing restriction of no activity in the PFA would be in place from March 1 through September 30. Activities could occur in the PFA during this timing restriction if the Forest wildlife biologist can verify that no northern goshawks are using the PFA, per PDF. Specifics of these management requirements are presented in detail in the Southwest Guidelines.

Cumulative Effects

Actions on NFS lands that may cumulatively impact northern goshawks include ongoing fuelwood removal, as described for pileated woodpecker. All action alternatives would decrease northern goshawk habitat in the Project area in the short term. These losses should be offset by the construction and management of PFAs in the Project area. Losses in habitat would likely be cumulative, with other negative effects on northern goshawk habitat across the Project area. Losses in northern goshawk habitat would be a result of corresponding increases in Family 1 habitats and white-headed woodpecker habitat. Road obliteration would benefit northern goshawks and other Habitat Family 2 species, as described for pileated woodpecker.

Table 3.4-46. Acres of northern goshawk modeled (summer) habitat under Alternative 2 in the Project area, on private and National Forest System (NFS) lands.

Tree Size/Canopy Cover Class	PVG 2	PVG 4	PVG 5	PVG 6	PVG 7	PVG 8	PVG 9	Totals
Medium/Moderate NFS Lands	0	0	0	323	161	37	41	562
Large/Moderate NFS Lands	0	0	0	1,320	1,958	0	206	3,484
Large/High NFS Lands	82	0	80	882	994	0	209	2,247
Total NFS Lands	**82**	**0**	**80**	**2,526**	**3,112**	**37**	**456**	**6,293**
Medium/Moderate Private Lands	0	0	0	2,021	164	0	0	2,185
Large/Moderate Private Lands	0	0	0	351	106	0	64	521
Large/High Private Lands	29	0	18	253	31	0	0	331
Total Private Lands	**29**	**0**	**18**	**2,625**	**301**	**0**	**64**	**3,037**
Total All Ownership	**111**	**0**	**98**	**5,151**	**3,412**	**37**	**520**	**9,330**

Table 3.4-47. Acres of northern goshawk modeled (summer) habitat under Alternative 3 in the Project area, on private and National Forest System (NFS) lands.

Tree Size/Canopy Cover Class	PVG 2	PVG 4	PVG 5	PVG 6	PVG 7	PVG 8	PVG 9	Totals
Medium/Moderate NFS Lands	0	0	0	323	182	37	41	584
Large/Moderate NFS Lands	0	0	0	1,250	2,108	0	200	3,557
Large/High NFS Lands	82	0	80	884	1,337	0	282	2,666
Total NFS Lands	**82**	**0**	**80**	**2,457**	**3,627**	**37**	**524**	**6,807**
Medium/Moderate Private Lands	0	0	0	2,021	164	0	0	2,185
Large/Moderate Private Lands	0	0	0	351	106	0	64	521
Large/High Private Lands	29	0	18	253	31	0	0	331
Total Private Lands	**29**	**0**	**18**	**2,625**	**301**	**0**	**64**	**3,037**
Total All Ownership	**111**	**0**	**98**	**5,082**	**3,928**	**37**	**588**	**9,843**

Table 3.4-48. Acres of northern goshawk modeled (summer) habitat under Alternative 4 in the Project area, on private and National Forest System (NFS) lands.

Tree Size/Canopy Cover Class	PVG 2	PVG 4	PVG 5	PVG 6	PVG 7	PVG 8	PVG 9	Totals
Medium/Moderate NFS Lands	0	0	0	311	96	0	39	447
Large/Moderate NFS Lands	0	0	0	1,306	1,799	0	206	3,311
Large/High NFS Lands	82	0	78	843	528	0	209	1,741
Total NFS Lands	**82**	**0**	**78**	**2,460**	**2,424**	**0**	**454**	**5,499**
Medium/Moderate Private Lands	0	0	0	2,021	164	0	0	2,185
Large/Moderate Private Lands	0	0	0	351	106	0	64	521
Large/High Private Lands	29	0	18	253	31	0	0	331
Total Private Lands	**29**	**0**	**18**	**2,625**	**301**	**0**	**64**	**3,037**
Total All Ownership	**111**	**0**	**97**	**5,085**	**2,724**	**0**	**518**	**8,535**

Table 3.4-49. Acres of northern goshawk modeled (summer) habitat under Alternative 5 in the Project area, on private and National Forest System (NFS) lands.

Tree Size/Canopy Cover Class	PVG 2	PVG 4	PVG 5	PVG 6	PVG 7	PVG 8	PVG 9	Totals
Medium/Moderate NFS Lands	0	0	0	196	96	0	39	332
Large/Moderate NFS Lands	0	0	0	1,528	1,866	0	211	3,606
Large/High NFS Lands	82	0	116	634	615	0	209	1,657
Total NFS Lands	**82**	**0**	**116**	**2,359**	**2,578**	**0**	**459**	**5,595**
Medium/Moderate Private Lands	0	0	0	2,021	164	0	0	2,185
Large/Moderate Private Lands	0	0	0	351	106	0	64	521
Large/High Private Lands	29	0	18	253	31	0	0	331
Total Private Lands	**29**	**0**	**18**	**2,625**	**301**	**0**	**64**	**3,037**
Total All Ownership	**111**	**0**	**135**	**4,984**	**2,878**	**0**	**524**	**8,631**

Determinations

Alternatives 2, 3, 4, and 5 *may impact individuals or habitat*, but they would not likely contribute to a trend towards Federal listing or cause a loss of viability to the population or species.

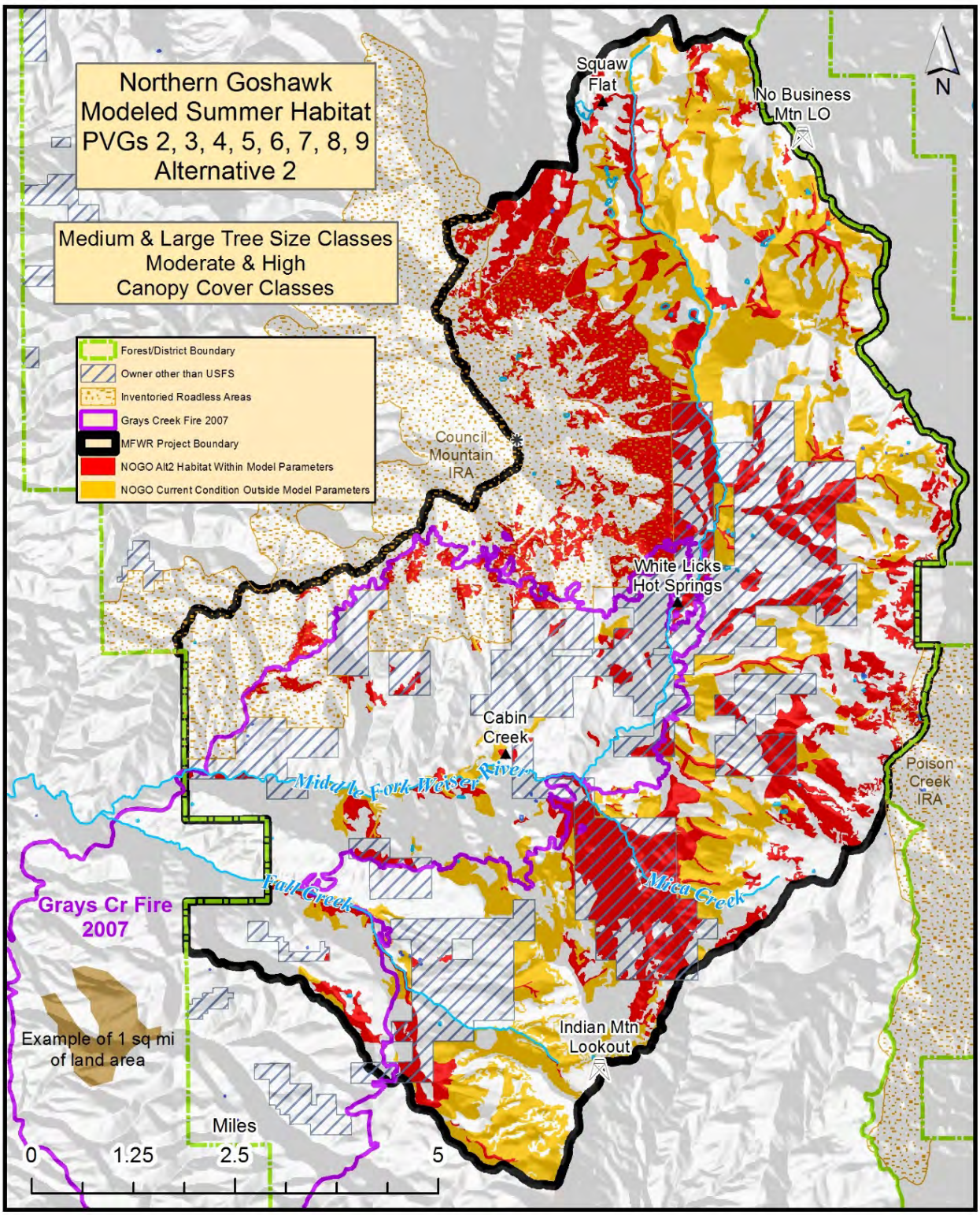


Figure 3.4-48. Northern goshawk (NOGO) modeled summer habitat supported by Potential Vegetation Groups (PVGs) 2, 3, 4, 5, 6, 7, 8, and 9 in the Project area, under Alternative 2.

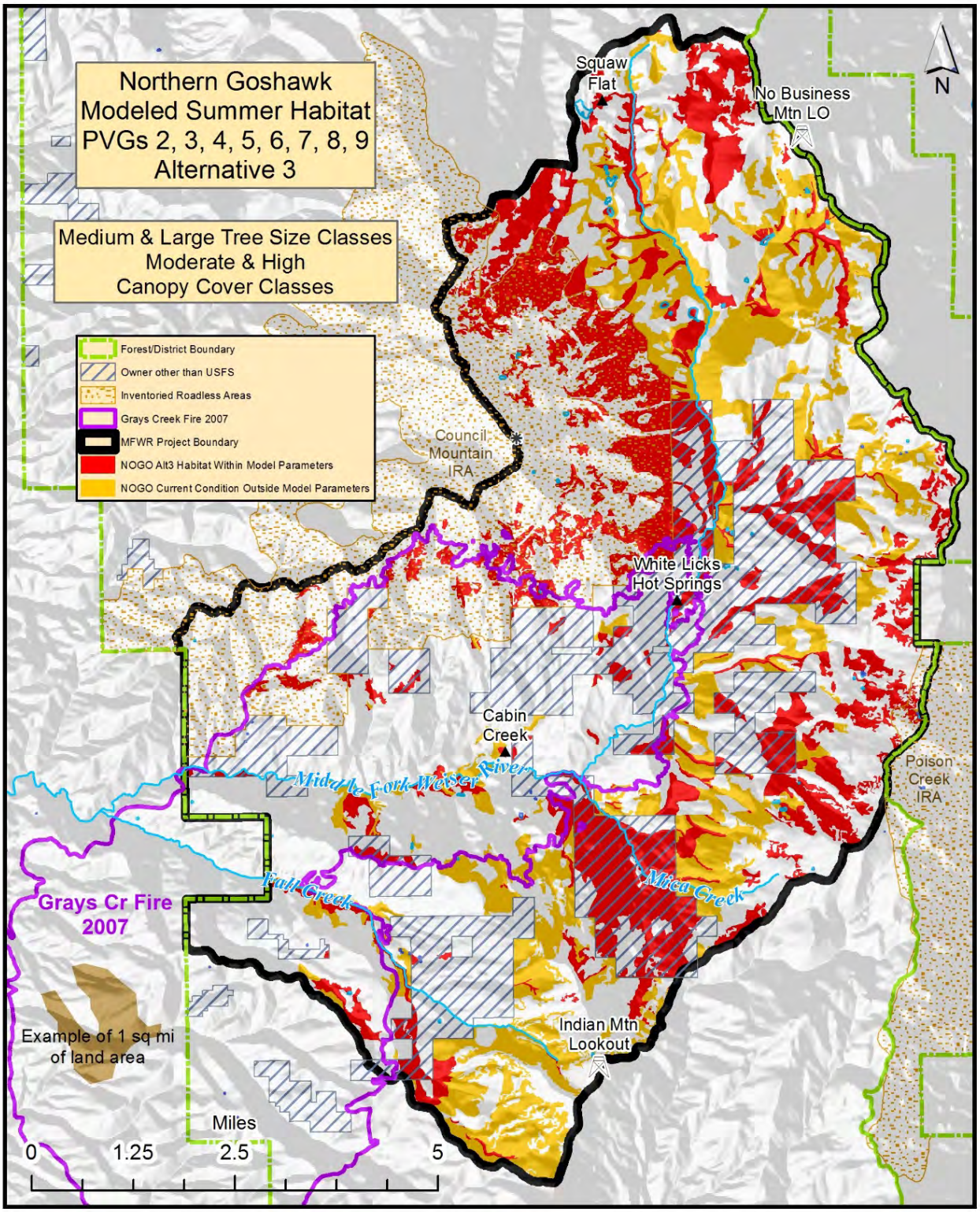


Figure 3.4-49. Northern goshawk (NOGO) modeled summer habitat supported by Potential Vegetation Groups (PVGs) 2, 3, 4, 5, 6, 7, 8, and 9 in the Project area, under Alternative 3.

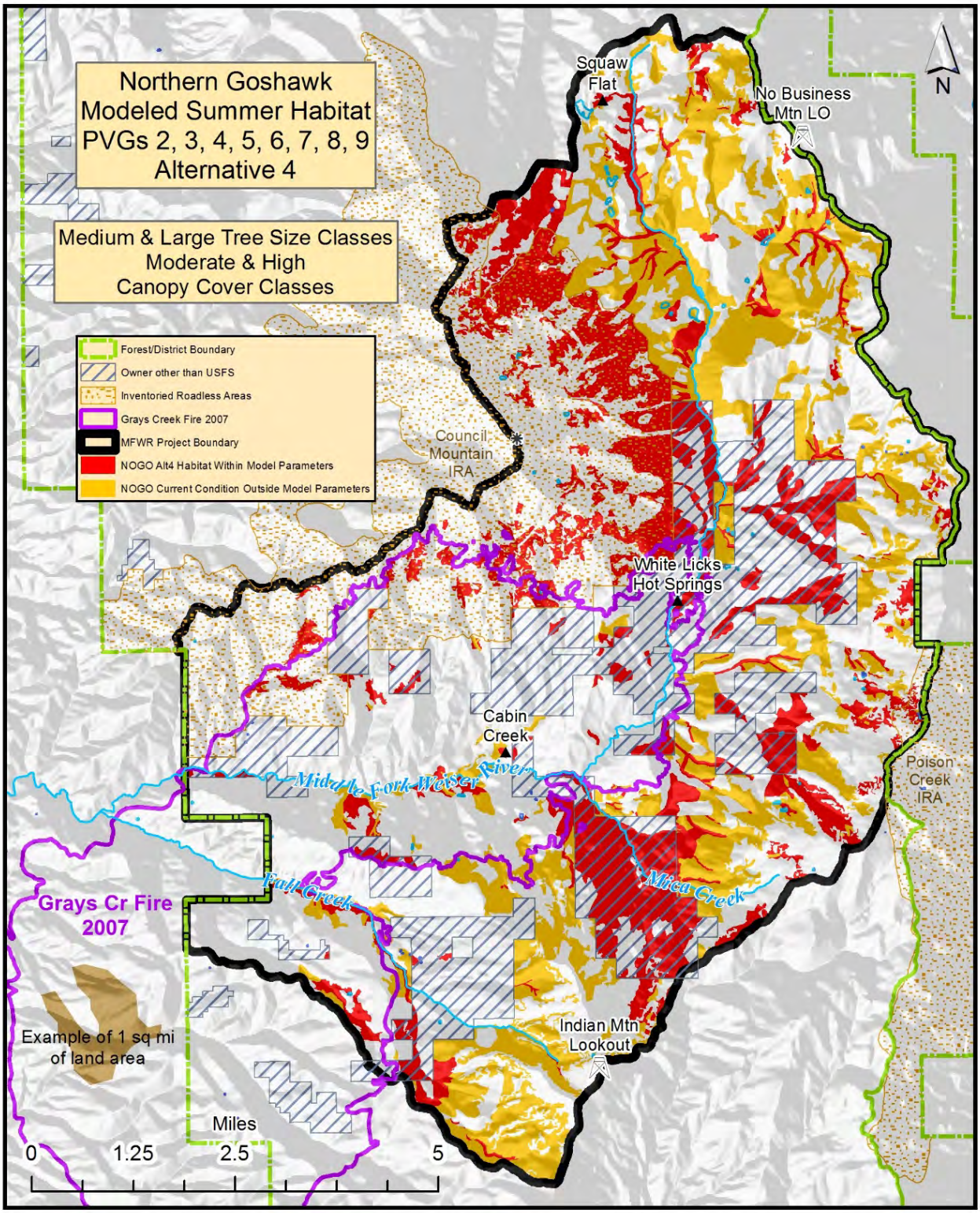


Figure 3.4-50. Northern goshawk (NOGO) modeled summer habitat supported by Potential Vegetation Groups (PVGs) 2, 3, 4, 5, 6, 7, 8, and 9 in the Project area, under Alternative 4.

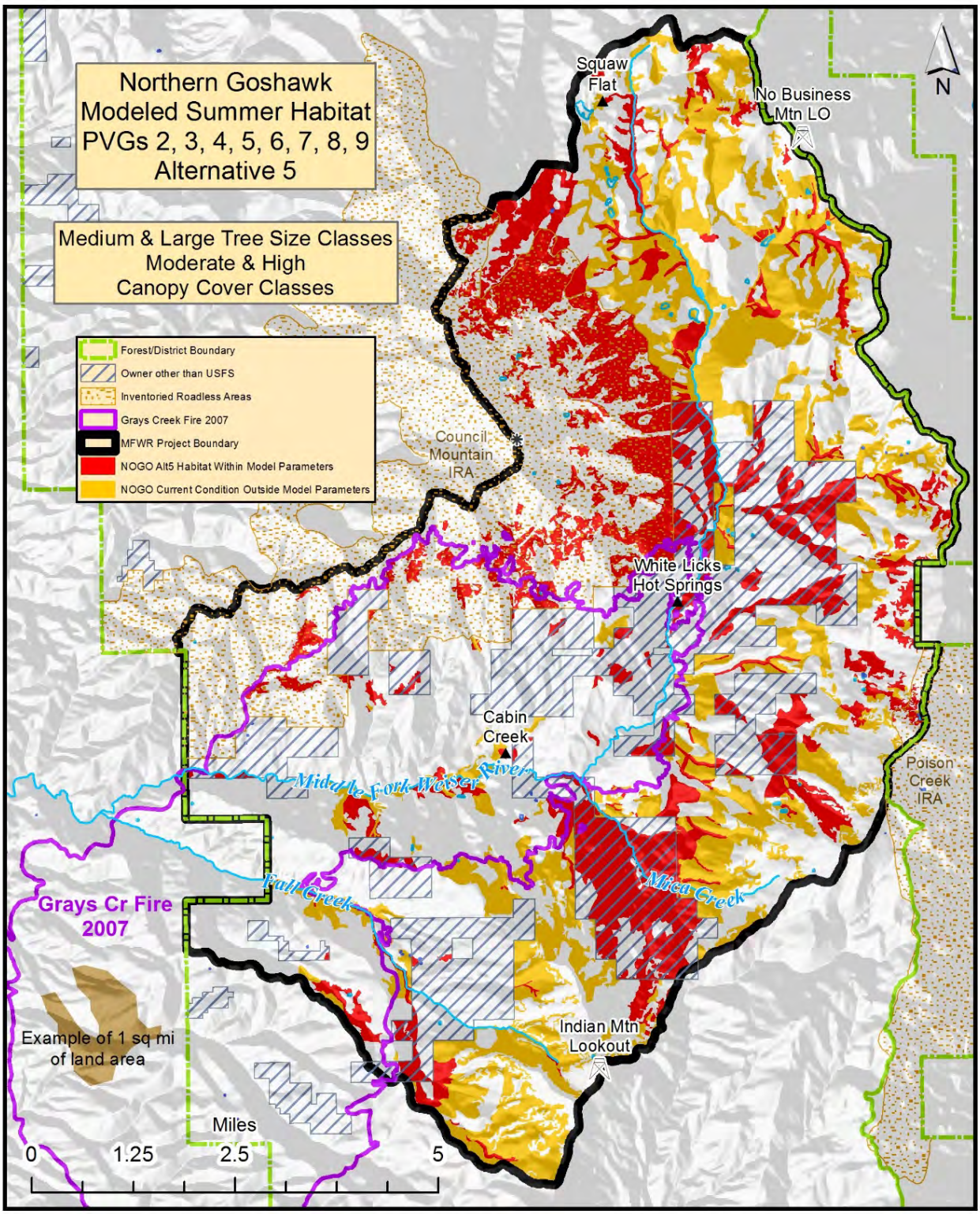


Figure 3.4-51. Northern goshawk (NOGO) modeled summer habitat supported by Potential Vegetation Groups (PVGs) 2, 3, 4, 5, 6, 7, 8, and 9 in the Project area, under Alternative 5.

3.4.6.4. Habitat Family 3—Forest Mosaic

Canada Lynx

Alternative 1 (No Action Alternative)

Under Alternative 1 no modeled habitat would be changed for Canada lynx, as no new management actions would be implemented. Combined with the lack of habitat improvement for Habitat Family 1, the Project area forests would be more susceptible under the No Action alternative to long-term alteration from uncharacteristic or even stand-replacement wildfire.

Effects Common to All Action Alternatives

Under all of the action alternatives, prescribed fire would be used to reduce wildfire fuel loads on the ground. Because the PVGs used to describe Canada lynx modeled habitats are all forested components of the LAU, the burns do not appear as an effect on lynx habitat under the lynx habitat model. Some burning outside of the nonforested patches would remove small amounts of trees along the edges of adjacent forested stands. This small number of trees burned would be negligible and unmeasurable.

Direct and Indirect Effects from Alternatives 2, 3, 4, and 5

Alternative 2 would result in 4,732 acres of Canada lynx modeled habitat (in suitable condition) in the Middle Fork Weiser LAU in the Project area (Table 3.4-50, Figure 3.4-52). Under Alternative 2, 74.0% of the lynx habitat in the Project area would be "source habitat." Following the Forest Plan direction, no more than 30% of suitable lynx habitat would be moved to an unsuitable condition for lynx (2000 LCAS, Ruediger et al. 2000). Although this alternative would not exceed the 30% standard, the change in habitat structure and species composition that would follow the current, ongoing insect infestation would likely lead to an overabundance of denning habitat and an increase in wildfire fuel loading at higher elevations, due to the increase in dead, dying, and down trees in those stands. This alternative would create less of a mosaic of habitat classes at higher elevations in the future, due to the increase in denning habitat. The potential of a stand-replacement fire at upper elevations would be increased, due to the increase in fuels.

Alternative 3 would result in 5,781 acres of Canada lynx modeled habitat (Table 3.4-51, Figure 3.4-53), a minor reduction in habitat compared with current condition (5,806 acres). Under this alternative, the Project area would have 90.4% modeled habitat, compared with source habitat capacity. No harvest treatments are proposed in forested stands of PVGs 7–11. This small loss of lynx modeled habitat would partially be due to the use of prescribed burns in open habitat adjacent to forested stands at higher elevations. Small islands of forested habitat within this open habitat could lose understory structure from the burn. If these forested islands are smaller than 10 acres, they would be removed from the lynx analysis; however, if the forested island is within 300 feet of a larger forested stand, it would still be considered lynx habitat, but it could be altered from the burn that would surround it. Because open, nonforested, grassland sites are not considered lynx "source habitat," burns in these areas would not alter lynx suitable habitat.

As with Alternative 2, Alternative 3 would likely produce a change in habitat structure and species composition that will follow the ongoing insect infestation and would likely lead to an overabundance of denning habitat and an increase in wildfire fuel loading, due to the increase in dead, dying, and down trees in the upper-elevation stands. This alternative would likely not provide as much of a mosaic of habitat classes in the future, due to the increase in denning

habitat. The potential of a stand replacement fire at upper elevations would be increased, due to the increase in fire fuels.

Alternative 4 would result in 2,736 acres of Canada lynx modeled habitat (Table 3.4-52, Figure 3.4-54). Under this alternative, the Project area would have 42.8% of modeled habitat. The types of treatments under this alternative would be identical to treatments under Alternative 2. Alternative 4 addresses internal and external comments concerning additional restoration in higher-elevation stands that contain a viable seral tree component. This alternative would treat stands in PVGs 7–11 that have a viable seral species component of mature ponderosa pine, Douglas-fir, and western larch, in addition to those stands proposed for treatment under Alternative 2. This viewpoint is supported by the revised, third edition of the LCAS (2013 LCAS, Interagency Lynx Biology Team 2013), which identifies the Project area as secondary habitat for lynx.

Alternative 4 would alter more than 30% of suitable Canada lynx habitat to an unsuitable condition in the short term (2000 LCAS). However, with an infestation of multiple species of insects ongoing in most of the high-elevation stands, if these sites are left to natural conditions created by this infestation much of the area would become denning habitat, which would mean a large conversion from foraging and traveling habitats to denning habitat. The 2000 LCAS suggests denning habitat be maintained in patches greater than 5 acres, so that at least 10% of the LAU is denning habitat. The insect infestation would likely create more dead, dying, and down trees, thus increasing denning habitat. These conditions would also increase the wildfire fuel load in these stands.

Alternative 5 would result in 4,569 acres of Canada lynx modeled habitat (Table 3.4-53, Figure 3.4-55). Under this alternative, the Project area would have 28.6% of modeled habitat. Patch cuts in insect-infested areas would provide small, scattered openings that would promote the maintenance of shrubs, such as Coulter's willow (*Salix* species), huckleberry (*Vaccinium* species), rose, spirea (*Spirea* species), snowberry, and western serviceberry. Patch cuts would also provide sites for regeneration of spruce, subalpine fir, and lodgepole pine, all of which support snowshoe hare habitats. Patch cuts also provide areas of lower fuel loads, which have the potential to shift a crown fire to a ground fire, possibly preventing a stand-replacement wildfire. Free thin harvest would also open the canopy, providing sites where shrub and regenerating trees can support snowshoe hare habitat. Both treatment approaches would provide lynx foraging habitat directly adjacent to, or very close to, denning habitat (Ruediger et al. 2000). Alternative 4 would provide the best support of producing a mosaic of habitats in the LAUs, for lynx foraging, traveling, and denning in the long term.

Cumulative Effects

Actions on NFS lands that could cumulatively impact Canada lynx include ongoing fuelwood removal and alteration of habitat in PVGs 7–11 (Table 3.4-54). Currently, private and State lands open to timber harvest are expected to have low levels of large tree, mixed-species forests, old forest characteristics, and snags. Future forest practices on these lands are expected to further reduce these important habitat components. Alternatives 2 and 4 would alter lynx habitat in the Project area in the short term. Because Alternative 4 would alter suitable lynx habitat in the LAU above the 30% limit, a Forest Plan amendment would be required to proceed with this alternative. Even though Alternative 4 would alter lynx habitat above the 30% limit, most of the altered habitat would actually be improved because much of the lynx habitat at higher elevations is dense, fuel laden, denning habitat. Treating a small amount of these dense stands would shift the stands from denning habitat to foraging and traveling habitat. Alternative 3 would neither alter lynx habitats in PVGs 7–11 nor would it alter suitable habitat above the 30% level.

Alternative 3 would also obliterate more roads and unauthorized routes than other alternatives, which would benefit lynx and other Habitat Family 3 species by decreasing human access into habitats.

Determinations

Alternatives 2, 3, 4, and 5 *May Effect, but are Not Likely to Adversely Affect* the Canada lynx or its habitat.

Table 3.4-50. Acres of Canada lynx modeled habitat under Alternative 2 in the Middle Fork Weiser Lynx Analysis Unit, on National Forest System (NFS) lands.

Potential Vegetation Group	PVG 3	PVG 7	PVG 8	PVG 9	PVG 10	PVG 11	Totals
NFS Lands	0	3,262	15	538	678	238	4,732

Table 3.4-51. Acres of Canada lynx modeled habitat under Alternative 3 in the Middle Fork Weiser Lynx Analysis Unit, on National Forest System (NFS) lands.

Potential Vegetation Group	PVG 3	PVG 7	PVG 8	PVG 9	PVG 10	PVG 11	Totals
NFS Lands	0	4,182	28	563	770	238	5,781

Table 3.4-52. Acres of Canada lynx modeled habitat under Alternative 4 in the Middle Fork Weiser Lynx Analysis Unit, on National Forest System (NFS) lands.

Potential Vegetation Group	PVG 3	PVG 7	PVG 8	PVG 9	PVG 10	PVG 11	Totals
NFS Lands	0	1,977	8	501	231	19	2,736

Table 3.4-53. Acres of Canada lynx modeled habitat under Alternative 5 in the Middle Fork Weiser Lynx Analysis Unit, on National Forest System (NFS) lands.

Potential Vegetation Group	PVG 3	PVG 7	PVG 8	PVG 9	PVG 10	PVG 11	Totals
NFS Lands	0	3,292	15	554	684	24	4,569

Table 3.4-54. Percent Canada lynx modeled habitat per alternative in the Middle Fork Weiser Lynx Analysis Unit.

Modeled Habitat (%)	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
Habitat Remaining	90.8	74.0	90.4	42.8	71.1
Habitat Made Unsuitable	9.2	26.0	9.6	57.2	28.9

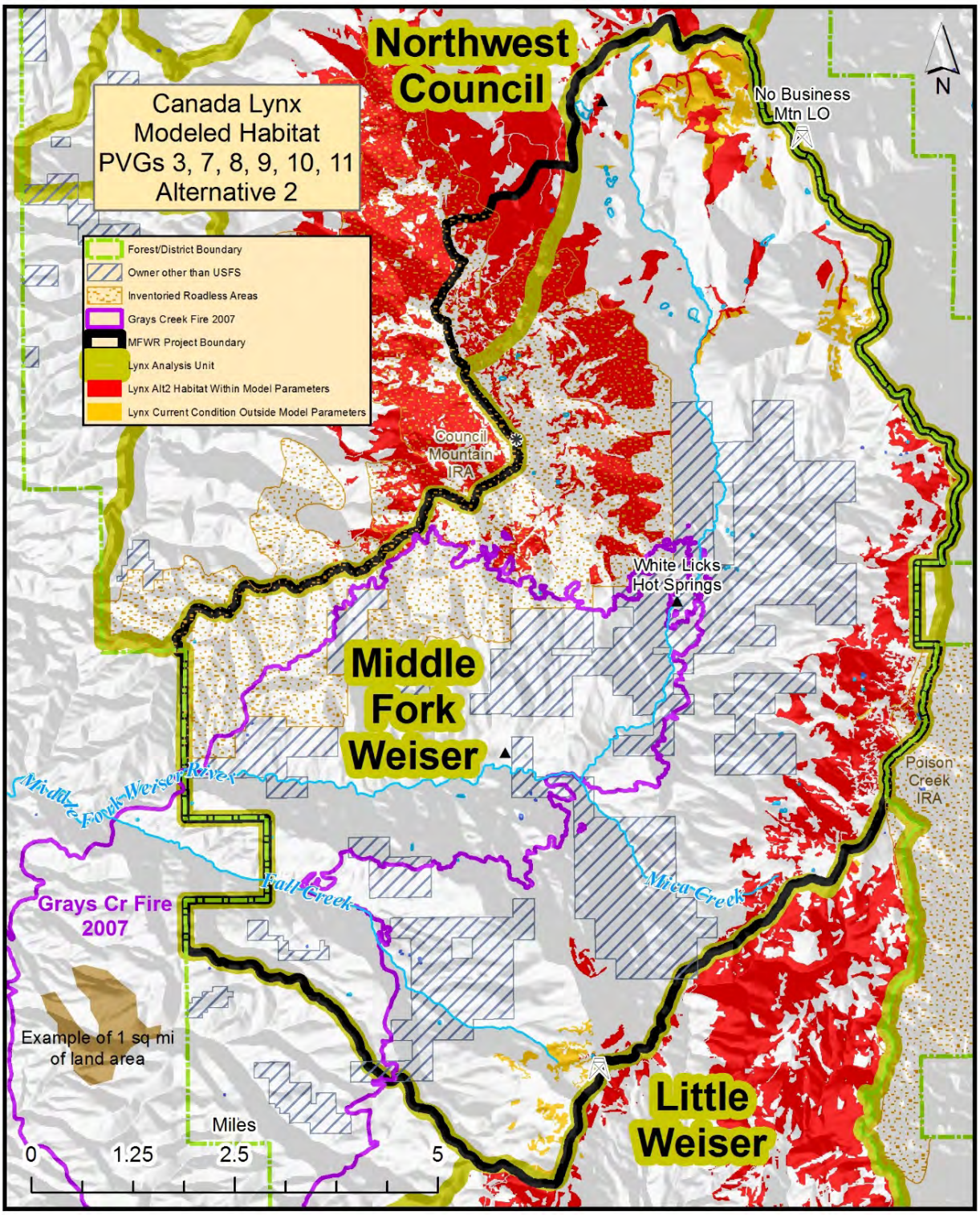


Figure3.4-52. Canada lynx modeled habitat under Alternative 2.

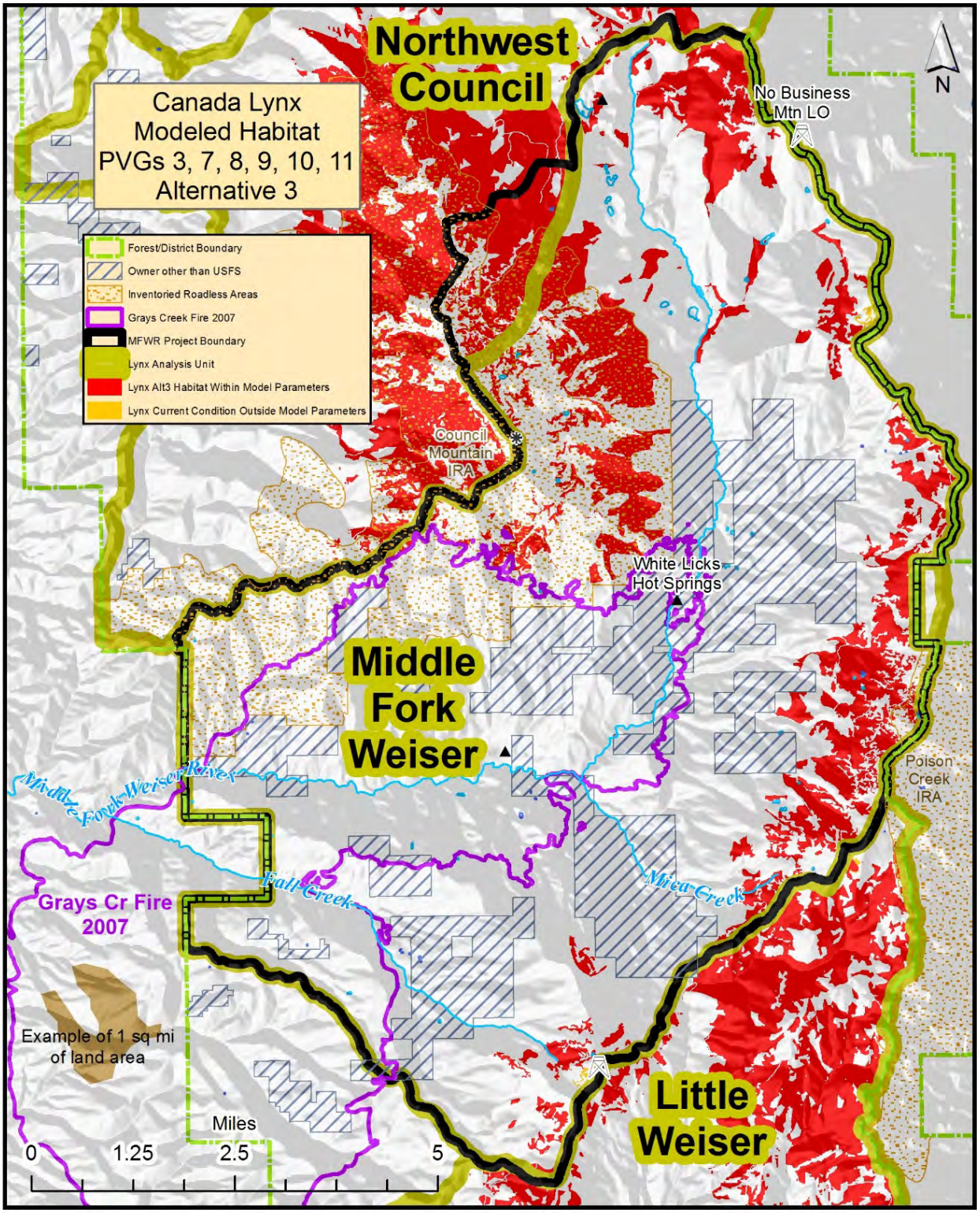


Figure 3.4-53. Canada lynx modeled habitat under Alternative 3.

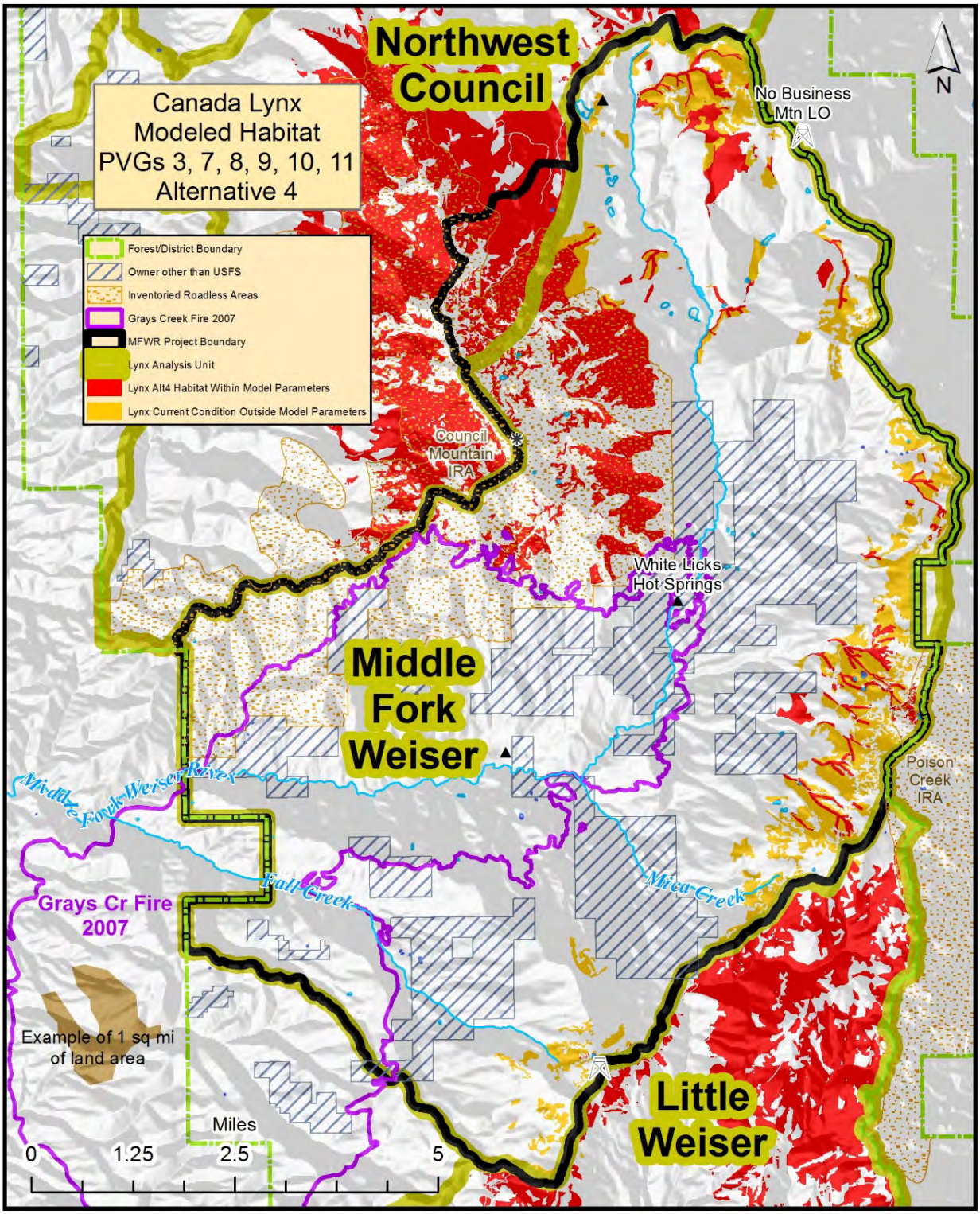


Figure 3.4-54. Canada lynx modeled habitat under Alternative 4.

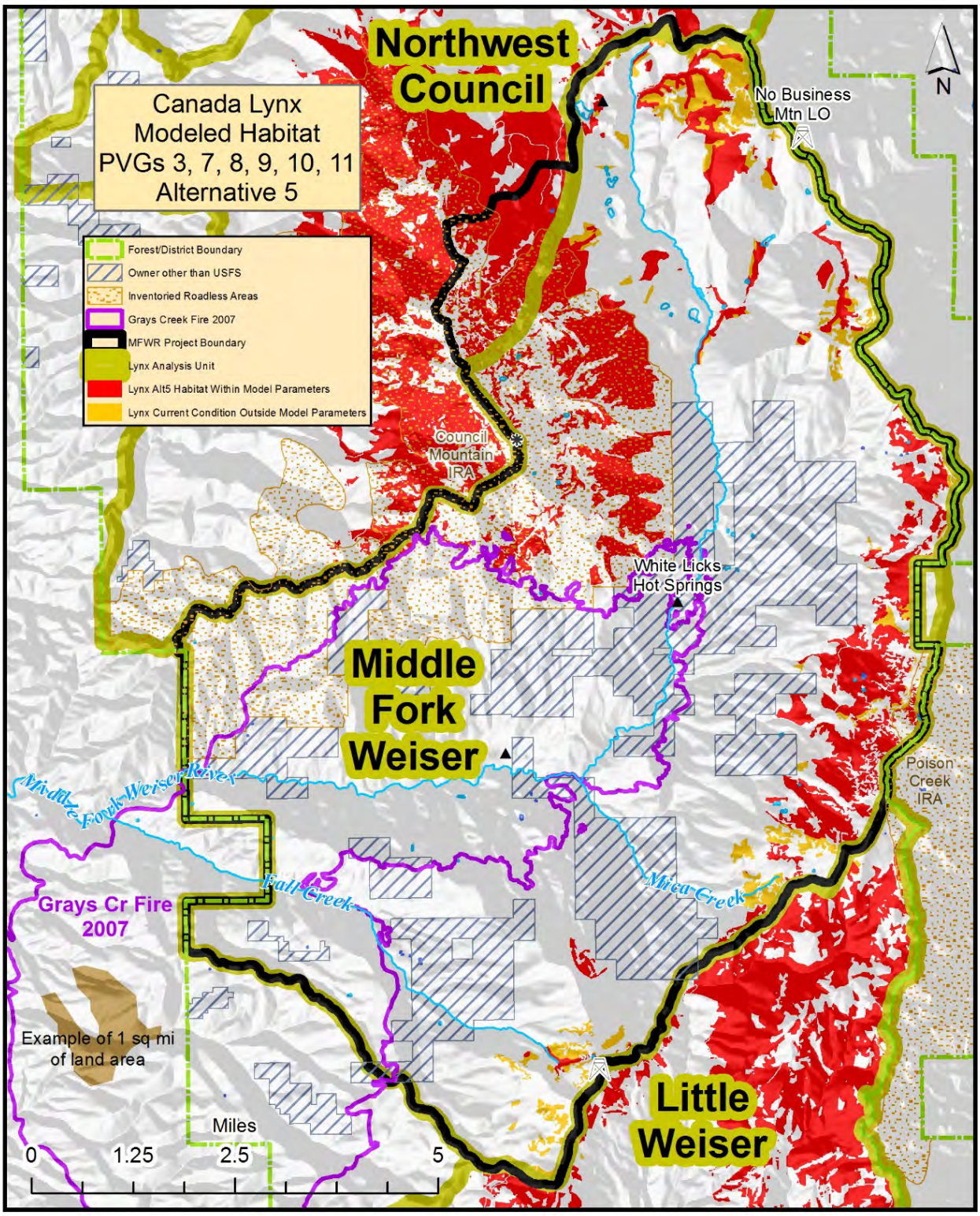


Figure 3.4-55. Canada lynx modeled habitat under Alternative 5.

Mountain Quail

Alternative 1 (No Action Alternative)

Under the No Action alternative no habitat would be changed for mountain quail, as described for Canada lynx.

Effects Common to All Action Alternatives

Modeled habitat for mountain quail in NFS lands in the Project area would be increased under all of the action alternatives by implementing restoration treatments.

Direct and Indirect Effects from Alternatives 2, 3, 4, and 5

The effect of implementing management actions on mountain quail modeled habitat would vary little by action alternative (Table 3.4-55, Table 3.4-56, Table 3.4-57, Table 3.4-58, Figure 3.4-56, Figure 3.4-57, Figure 3.4-58, Figure 3.4-59) because this species migrates elevationally through the Project area, using mostly riparian areas as movement corridors. The RCA treatments proposed under the action alternatives would produce small increases in mountain quail modeled habitat. On NFS lands, the 8,570 acres of currently occurring mountain quail modeled habitat would increase to 9,527, 9,329, 9,704 acres, and 9,759 acres respectively, under Alternatives 2, 3, 4, and 5. It is possible mitigation measures would be required for RCA treatments involving mountain quail surveys prior to vegetation manipulation and that timing restrictions would be implemented restricting the periods of treatments to late summer or fall, when the birds have likely completed their seasonal migration to high-elevation areas of the Project area. The RCA treatments would be coordinated with the Forest fisheries and wildlife biologists to accommodate the seasonal needs of fish and terrestrial wildlife species.

Table 3.4-55. Acres of mountain quail modeled habitat under Alternative 2 in the Project area, on private and National Forest System (NFS) lands.

Canopy Cover Class	PVG 1	PVG 2	PVG 4	PVG 5	PVG 6	PVG 7	PVG 8	PVG 9	PVG 10	PVG 11	PVG 99	Totals
GFSS <10% NFS Lands	0	42	0	22	43	0	0	0	0	0	279	386
Low NFS Lands	153	1,128	68	1,085	2,964	755	17	183	176	53	0	6,580
Moderate NFS Lands	0	112	0	171	1,076	932	19	195	257	99	0	2,861
High NFS Lands	0	2	0	0	2	0	0	0	0	0	0	3
Total NFS Lands	**153**	**1,284**	**68**	**1,278**	**4,084**	**1,687**	**36**	**378**	**433**	**151**	**279**	**9,830**
GFSS <10% Private Lands	0	8	0	2	0	0	0	0	0	0	131	142
Low Private Lands	9	283	0	844	635	39	0	0	0	0	0	1,809
Moderate Private Lands	0	377	0	624	1,388	128	0	27	11	0	0	2,555
High NFS Private Lands	0	0	0	0	0	0	0	0	0	0	0	**0**
Total Private Lands	**9**	**668**	**0**	**1,470**	**2,023**	**167**	**0**	**27**	**11**	**0**	**131**	**4,506**
Total All Ownership	**161**	**1,952**	**68**	**2,748**	**6,107**	**1,854**	**36**	**405**	**443**	**151**	**410**	**14,336**

Table 3.4-56. Acres of mountain quail modeled habitat under Alternative 3 in the Project area, on private and National Forest System (NFS) lands.

Canopy Cover Class	PVG 1	PVG 2	PVG 4	PVG 5	PVG 6	PVG 7	PVG 8	PVG 9	PVG 10	PVG 11	PVG 99	Totals
GFSS <10% NFS Lands	0	42	0	22	43	0	0	0	0	0	279	386
Low NFS Lands	151	1,127	65	1,007	2,743	495	6	139	107	79	0	5,919
Moderate NFS Lands	0	112	2	204	1,118	1,087	19	212	254	109	0	3,119
High NFS Lands	0	2	0	0	2	0	0	0	0	0	0	3
Total NFS Lands	**151**	**1,283**	**68**	**1,233**	**3,906**	**1,583**	**25**	**352**	**361**	**188**	**279**	**9,428**
GFSS <10% Private Lands	0	8	0	2	0	0	0	0	0	0	131	142
Low Private Lands	9	283	0	844	635	39	0	0	0	0	0	1,809
Moderate Private Lands	0	377	0	624	1,388	128	0	27	11	0	0	2,555
High NFS Private Lands	0	0	0	0	0	0	0	0	0	0	0	**0**
Total Private Lands	**9**	**668**	**0**	**1,470**	**2,023**	**167**	**0**	**27**	**11**	**0**	**131**	**4,506**
Total All Ownership	**159**	**1,951**	**68**	**2,703**	**5,929**	**1,750**	**25**	**378**	**372**	**188**	**410**	**13,933**

Table 3.4-57. Acres of mountain quail modeled habitat under Alternative 4 in the Project area, on private and National Forest System (NFS) lands.

Canopy Cover Class	PVG 1	PVG 2	PVG 4	PVG 5	PVG 6	PVG 7	PVG 8	PVG 9	PVG 10	PVG 11	PVG 99	Totals
GFSS <10% NFS Lands	0	42	0	22	43	0	0	0	0	0	279	386
Low NFS Lands	153	1,128	68	1,098	3,009	974	22	183	266	135	0	7,035
Moderate NFS Lands	0	112	0	159	1,059	897	0	193	99	27	0	2,547
High NFS Lands	0	2	0	2	0	0	0	0	0	0	0	3
Total NFS Lands	**153**	**1,284**	**68**	**1,279**	**4,113**	**1,871**	**22**	**377**	**365**	**162**	**279**	**9,971**
GFSS <10% Private Lands	0	8	0	2	0	0	0	0	0	0	131	142
Low Private Lands	9	283	0	844	635	39	0	0	0	0	0	1,809
Moderate Private Lands	0	377	0	624	1,388	128	0	27	11	0	0	2,555
High NFS Private Lands	0	0	0	0	0	0	0	0	0	0	0	**0**
Total Private Lands	**9**	**668**	**0**	**1,470**	**2,023**	**167**	**0**	**27**	**11**	**0**	**131**	**4,506**
Total All Ownership	**161**	**1,952**	**68**	**2,749**	**6,136**	**2,038**	**22**	**403**	**375**	**162**	**410**	**14,476**

Table 3.4-58. Acres of mountain quail modeled habitat under Alternative 5 in the Project area, on private and National Forest System (NFS) lands.

Canopy Cover Class	PVG 1	PVG 2	PVG 4	PVG 5	PVG 6	PVG 7	PVG 8	PVG 9	PVG 10	PVG 11	PVG 99	Totals
GFSS <10% NFS Lands	0	42	0	22	43	0	0	0	0	0	279	386
Low NFS Lands	153	1,136	68	1,069	3,114	1,092	36	190	399	132	0	7,389
Moderate NFS Lands	0	105	0	157	1160	953	0	190	132	29	0	2,726
High NFS Lands	0	2	0	0	2	0	0	0	0	0	0	3
Total NFS Lands	**153**	**1,284**	**68**	**1,248**	**4,319**	**2,045**	**36**	**380**	**531**	**162**	**279**	**10,504**
GFSS <10% Private Lands	0	8	0	2	0	0	0	0	0	0	131	142
Low Private Lands	9	283	0	844	635	39	0	0	0	0	0	1,809
Moderate Private Lands	0	377	0	624	1,388	128	0	27	11	0	0	2,555
High NFS Private Lands	0	0	0	0	0	0	0	0	0	0	0	**0**
Total Private Lands	**9**	**668**	**0**	**1,470**	**2,023**	**167**	**0**	**27**	**11**	**0**	**131**	**4,506**
Total All Ownership	**161**	**1,953**	**68**	**2,718**	**6,342**	**2,212**	**36**	**407**	**541**	**162**	**410**	**15,010**

Restoration treatments designed to improve habitat for Family 1 species and to reduce insect infestation would increase modeled habitat for mountain quail, mostly on sites where the treated unit is directly adjacent to a riparian corridor. These treatments would lead to more rapid growth of trees, but they would reduce canopy cover classes in the short term. It is likely that many treated stands that would move canopy cover from moderate to low cover class would still provide an increase in mountain quail modeled habitat.

Effects to patch and pattern of modeled habitat for mountain quail would include larger patch size, tighter distribution, and increased habitat connectivity. As overstory and understory density increases in the future, the local mountain quail population could gradually increase.

Cumulative Effects

Actions on NFS lands that may cumulatively impact mountain quail include ongoing fuelwood removal in, or adjacent to, riparian corridors. Currently, private and State lands open to timber harvest are expected to have low levels of large tree, mixed-species forests, old forest conditions, and snags. Future actions on these lands are expected to improve these important habitat components, but the key habitat structure of concern for mountain quail would be the riparian corridor and the understory of adjacent stands. All action alternatives would increase mountain quail modeled habitat in the Project area in the short term. The increases in mountain quail modeled habitat are a result of corresponding increases in Family 1 habitats and white-headed woodpecker habitat, which are habitats at greater risk. Alternative 3 provides for more obliteration of roads and unauthorized routes than other alternatives. These road obliterations also benefit other Habitat Family 2 species by decreasing human access.

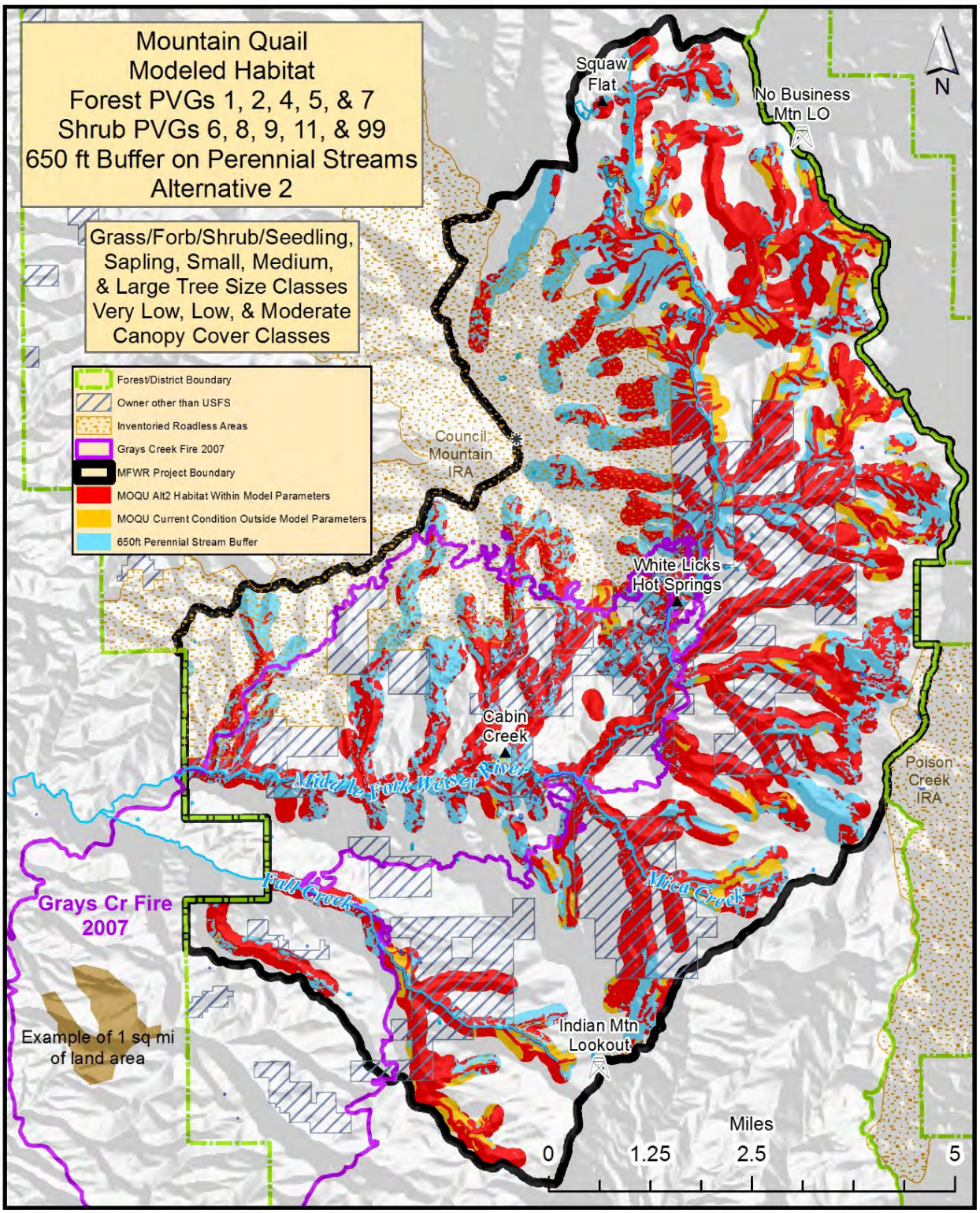


Figure 3.4-56. Mountain quail (MOQU) modeled habitat supported by Potential Vegetation Groups (PVGs) 1, 2, 4, 5, and 7 in the Project area, under Alternative 2.

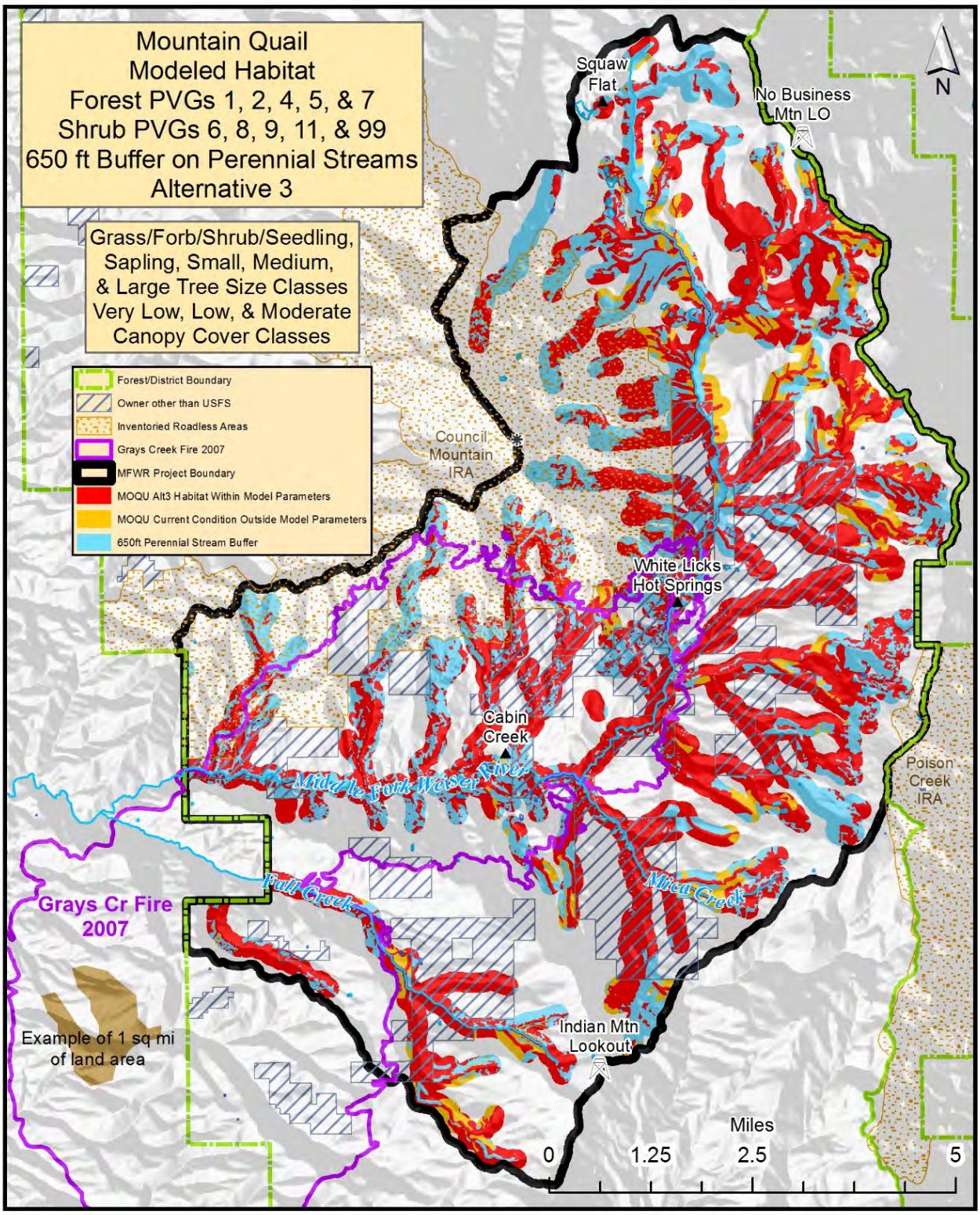


Figure 3.4-57. Mountain quail (MOQU) modeled habitat supported by Potential Vegetation Groups (PVGs) 1, 2, 4, 5, and 7 in the Project area, under Alternative 3.

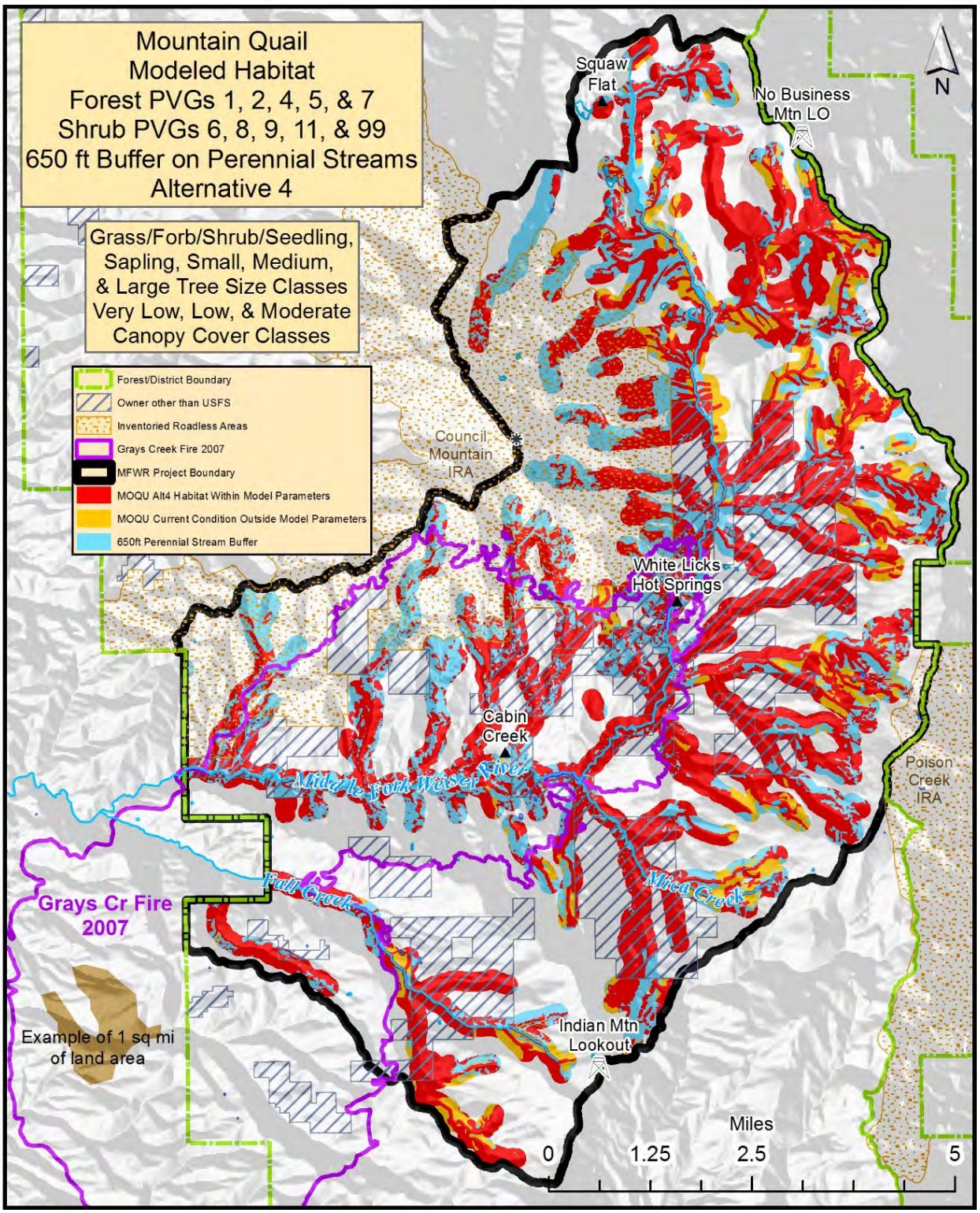


Figure 3.4-58. Mountain quail (MOQU) modeled habitat supported by Potential Vegetation Groups (PVGs) 1, 2, 4, 5, and 7 in the Project area, under Alternative 4.

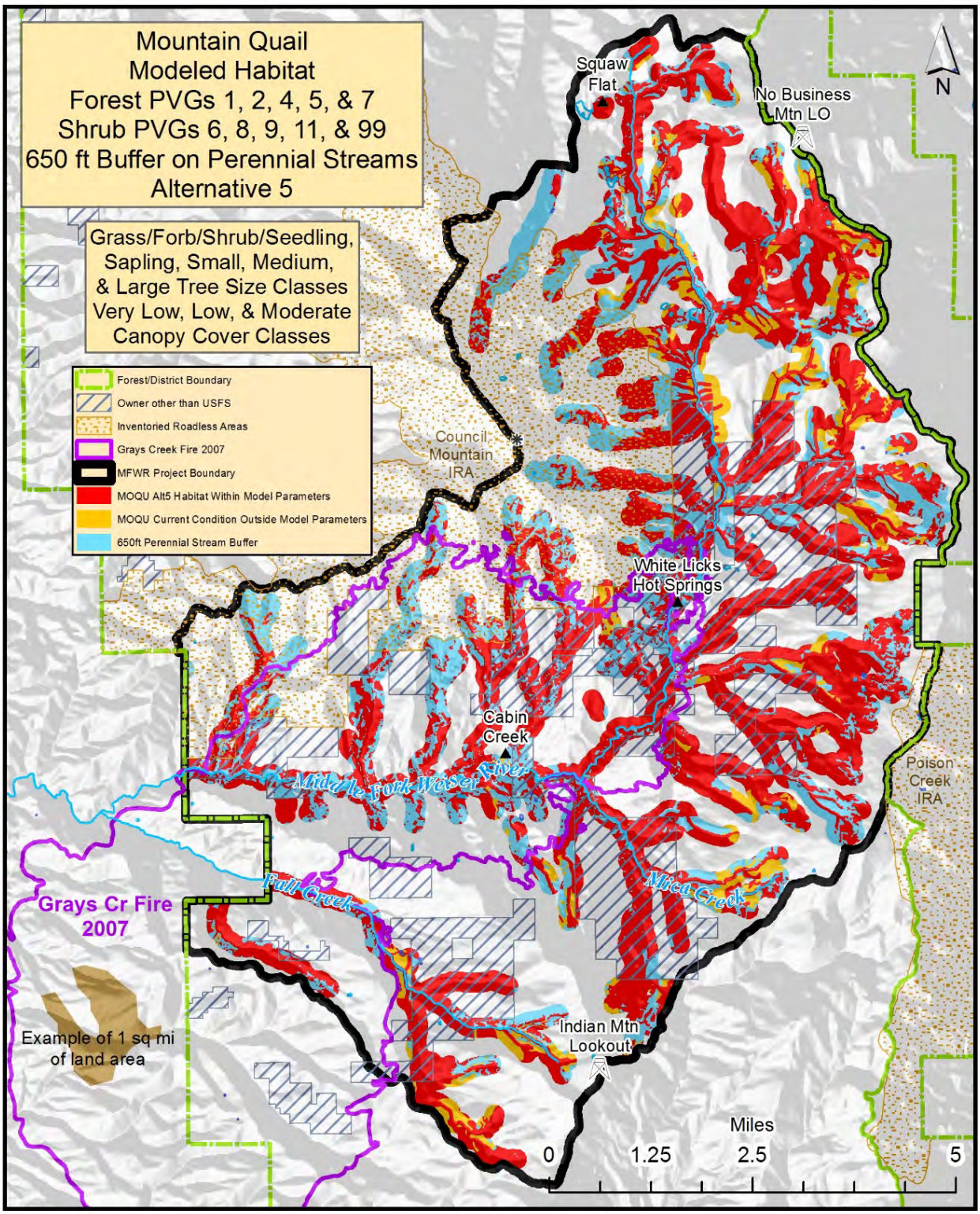


Figure 3.4-59. Mountain quail (MOQU) modeled habitat for Potential Vegetation Groups (PVGs) 1, 2, 4, 5, and 7 in the Project area, under Alternative 5.

Determinations

Alternatives 2, 3, 4, and 5 would *benefit* mountain quail, by increasing modeled habitat for this species.

Wolverine

Alternative 1 (No Action Alternative)

Under the No Action alternative, no habitat would be changed for wolverines. With no action taken there would be no habitat improvement for Habitat Family 1, and the Project area would be more susceptible to long-term alteration from uncharacteristic or even stand-replacement wildfire.

Effects Common to All Action Alternatives

Restoration treatments designed to improve habitat for Family 1 species and to reduce insect infestation would not affect habitat for wolverines under all action alternatives. These treatments would lead to more rapid tree growth, but they would reduce canopy cover classes in the short term. Effects to patch and pattern of habitat for wolverines would be smaller patch size, wider distribution, and decreased habitat connectivity in the forested stands below the higher-elevation ridges, which could be used as travel corridors by wolverines. As tree density and size increases in the future, the effects on these lower forested stands should gradually decrease.

Direct and Indirect Effects from Alternatives 2, 3, 4, and 5

Alternatives 2 and 3 would have no direct effect on wolverine habitat in the Project area because no treatments are proposed at the higher elevations where wolverine habitat exists (Figure 3.4-13). However, wolverines could travel outside of these high-elevation sites, whether foraging for food or moving to other habitat on another ridge system a distance away from the Project area. Conflicts caused by human disturbance in the high-elevation sites and at lower elevations could result from snowmobiling, hiking, ATV use, and vehicle traffic on open roads. The amount of long-term road closures and road decommissioning planned for each action alternative would greatly decrease the potential for these human conflicts from occurring, with the greatest decreased potential occurring under Alternative 3. Under Alternative 4 the restoration treatments planned for higher-elevation sites could pose a disturbance conflict for wolverines that might enter the area, leading to further isolation of occupied habitat, and could affect the distribution and/or abundance of wolverine prey species and animal carcasses used for food. This same disturbance potential exists under Alternative 5; however, because activities in the high-elevation sites would be during the snow-free period, the direct effects on wolverine would be minimal. The indirect effects would be beneficial, because most of these treatments would increase the potential habitat for snowshoe hares and red squirrels.

Cumulative Effects

Actions on NFS lands that may cumulatively impact wolverines include over-the-snow recreation (snowmobiling, cross-country skiing, snowshoeing), forest restoration treatments at high-elevation sites, and ongoing fuelwood removal, especially at higher-elevation sites. Currently, private and State lands open to timber harvest are expected to have low levels of large tree, mixed-species forests, old forest conditions, and snags. Future forest practices on these lands are expected to further reduce these important habitat components. Treatments that occur in forested stands at higher elevations, especially near ridge tops, would have the most effect on

wolverine use of the area. Alternative 3 provides for more obliteration of roads and unauthorized routes than other alternatives. These road obliterations would benefit wolverines by decreasing human access into habitats at high elevations.

Determinations

Alternatives 2, 3, 4, and 5 *May Effect, but are Not Likely to Adversely Affect* the wolverine or its habitat.

3.4.6.5. Habitat Family 5—Forest and Range Mosaic

Modeled habitat for wildlife species in Habitat Family 5 is characterized by habitat requirements for Rocky Mountain elk. No focal species was designated for Family 5; however, elk is included in this analysis because of its importance to local forest management and of special interest in elk management by the local communities.

Rocky Mountain Elk

Elk occur throughout the Forest and use a variety of habitats, ranging from open sagebrush-grasslands for foraging to dense conifer stands for year-round hiding cover and winter thermal regulation. Forest Plan direction for elk habitat requires identifying and protecting calving areas, wallows, travel corridors (if known), mineral licks, security polygons, and winter range. Conifer stringers on open grassland hillsides create a classic elk habitat mosaic, which is used through much of the snow-free season. Dense vegetation plays an important role in reducing the vulnerability of elk to hunting mortality. Elk calving areas consist of moderate- to open-density conifer stands on southerly slopes, with a moderate-to-dense shrub layer in the understory. Elk winter range consists of large areas that provide grass and browse forage with dense forested stands nearby for thermal and hiding cover.

Numerous studies consider wildlife habitat to be at risk when road densities exceed 1.0 to 1.7 miles of open road per square mile (Wisdom 2007; Rowland et al. 2005; Frederick 1991; Hillis et al. 1991; Lyon 1983). Elk habitat effectiveness and security are influenced by amount and proximity of forage and cover components, adequacy of hiding and thermal cover, and open road densities. As hiding cover dissipates, the influence of open roads on elk habitat effectiveness is magnified (S. Reinecker, IDFG Comment Letter for the Lost Creek-Boulder Creek Project, dated March 27, 2013 [see Project record]).

Road density plays an important role in elk management. Typically, road densities >1.0 mile of drivable road per square mile are considered detrimental to elk use and will likely increase vulnerability to hunting mortality (Hillis et al. 1991; Frederick 1991). Frederick (1991) noted results from several studies that show elk habitat effectiveness declines to 75% at an open road density of 1.0 mile of open road per square mile of land. At road densities of 2.0–3.0 miles of open road per square mile of land, elk habitat effectiveness declines to 25%.

Elk Security Area Analysis

Security Areas (Hillis et al. 1991) are used as a measure of the effects of road density on bull elk vulnerability to hunting mortality. An area of 0.5 mile on either side of an open NFS road or motorized trail is considered unsecure. The remaining blocks of suitable habitat are defined as SA polygons. The SAs must have vegetation and/or terrain features that provide appropriate hiding cover for elk and should be at least 250 acres in size. The total acreages of the SAs should be at least 30% of the analysis unit, which in this case is the roughly 50,000-acre Project area

(USDA Forest Service 2003a, Thomas et al. 1979). Security Area polygons that do not meet these criteria were dropped from the analysis because they are not SAs. An analysis unit may have large security polygons, but if the requisite hiding cover is not present in a polygon, the polygon is dropped from the security analysis. Hiding cover was defined by Thomas et al. (1979) as "vegetation capable of hiding 90% of a standing adult deer or elk from the view of a human at a distance equal to or less than 60 meters (200 ft)." On the Forest, vegetative structure that would typically provide hiding cover is found in Strata 23, 24, 34, and 35. Plantations (Stratum 32) may provide hiding cover, but they should be field verified. Plantations are not SAs, because they would have to meet the other criteria of size and distance away from roads. Although terrain features do not provide vegetative cover, they may provide a visual block of a deer or elk to the hunter, adding to the hiding cover quality of a particular site. Currently, GIS does not have the capability to appropriately model terrain features.

Under Alternative 1, the No Action alternative, Elk SAs would remain the same as the current condition (Figure 3.4-14) and as shown in Table 3.4-59. Under Alternatives 2 and 4, a loop OHV trail would be designated by linking NFS roads 50166 and 50485 with a constructed trail. As noted earlier in this chapter, this location does not have a designated SA, because the polygon did not meet the minimum size criterion of 250 acres. However, also as discussed earlier, this area does currently support a healthy elk herd, largely because of the current year-round closures on these two roads. Applying the Hillis Paradigm (Hills et al. 1991) to the analysis of this location gives a false impression of overall elk security, because the analysis used in the paradigm only applies to the high-powered rifle season in late summer and early fall. Creation and use of a loop OHV trail through this area would affect elk use of the area during spring calving and summer calf rearing. These new human disturbance factors could be intense enough to push elk out of the drainage at important seasons of elk behavior.

Additionally, having these two roads and the connector open during most of the snow-free season could provide motorized vehicle access to the ridges surrounding the area, which could lead to vehicles accessing a large, currently unroaded, area. If OHV use of this area follows the use pattern noted in much of the Project area, access to the area would likely lead to a system of pioneered routes, some of which could easily access the Council Mountain IRA. For these reasons, the proposed OHV loop trail could have detrimental impacts on the local elk herd and the area supporting that herd.

Under Alternative 3, the OHV route discussed above would not be created. Therefore, the impacts to the local elk herd would remain minimal, as noted at current conditions.

Under Alternative 5, this OHV loop is dropped and the associated roads would be placed in long-term closure. Trail 205 also is dropped under Alternative 5. This alternative creates a much larger SA #15 in an area used by elk year-round.

Unauthorized Routes and Closed National Forest System Roads

The EIS analysis addresses open roads but, as discussed above, unauthorized use of closed roads also effects elk security and habitat use. The public has legal access on open NFS or authorized roads, but since many unauthorized roads exist on the landscape, these routes may be used for illegal access (Table 3.4-59). Illegal use of unauthorized roads reduces the effectiveness of SAs, increasing the vulnerability of bull elk to hunting mortality. Figure 3.4-60, Figure 3.4-61, Figure 3.4-62, and Figure 3.4-63 illustrate this problem and the changes in SAs for each action alternative. For example, SA #2 meets all of the criteria for an SA, but note how the size of the area shrinks when the 0.5-mile buffer is applied to all drivable roads. Each of the SAs in the Project area shrinks significantly when all drivable roads are included in the analysis.

Table 3.4-59. Modeled Rocky Mountain elk security by elk polygon, owner, alternative, and type of road, route, and motorized trail buffer (minimum polygon area is 250 acres), on private and National Forest System (NFS) lands.

0.5-mile Buffer of Roads, Routes or Motorized Trails		Elk Security Polygon Area (in acres) by Alternative Open Year-round Routes					Elk Security Polygon Area (in acres) by Alternative Open Year-round and Seasonally Open Routes					Elk Security Polygon Area (in acres) by Alternative All Roads and Unauthorized Routes				
Polygon Number[a]	**Land Ownership**	**Alt 1**	**Alt 2**	**Alt 3**	**Alt 4**	**Alt 5**	**Alt 1**	**Alt 2**	**Alt 3**	**Alt 4**	**Alt 5**	**Alt 1**	**Alt 2**	**Alt 3**	**Alt 4**	**Alt 5**
2	NFS lands	596	596	596	596	596	307	307	307	307	307	0	0	226	0	0
5	NFS lands	318	319	319	319	319	318	319	319	319	319	0	0	0	0	0
5	Private Lands	191	191	191	191	191	191	191	191	191	191	0	0	0	0	0
7	NFS lands	1,672	1,672	1,672	1,672	1,672	1,672	1,672	1,672	1,672	1,672	195	194	282	194	235
10	NFS lands	1,207	1,207	1,207	1,207	1,207	1,207	1,207	1,207	1,207	1,207	109	109	109	109	109
10	Private Lands	213	213	213	213	213	213	213	213	213	213	170	170	170	170	170
12	NFS lands	640	295	295	295	295	640	295	295	295	295	437	276	276	276	276
15	NFS lands	1,075	710	710	710	1,349	1,075	710	710	710	1,349	841	582	582	582	1,125
18	NFS lands	436	436	436	436	436	75	75	126	75	75	0	0	54	0	0

[a]Elk Security Polygon Number as shown on elk security maps.

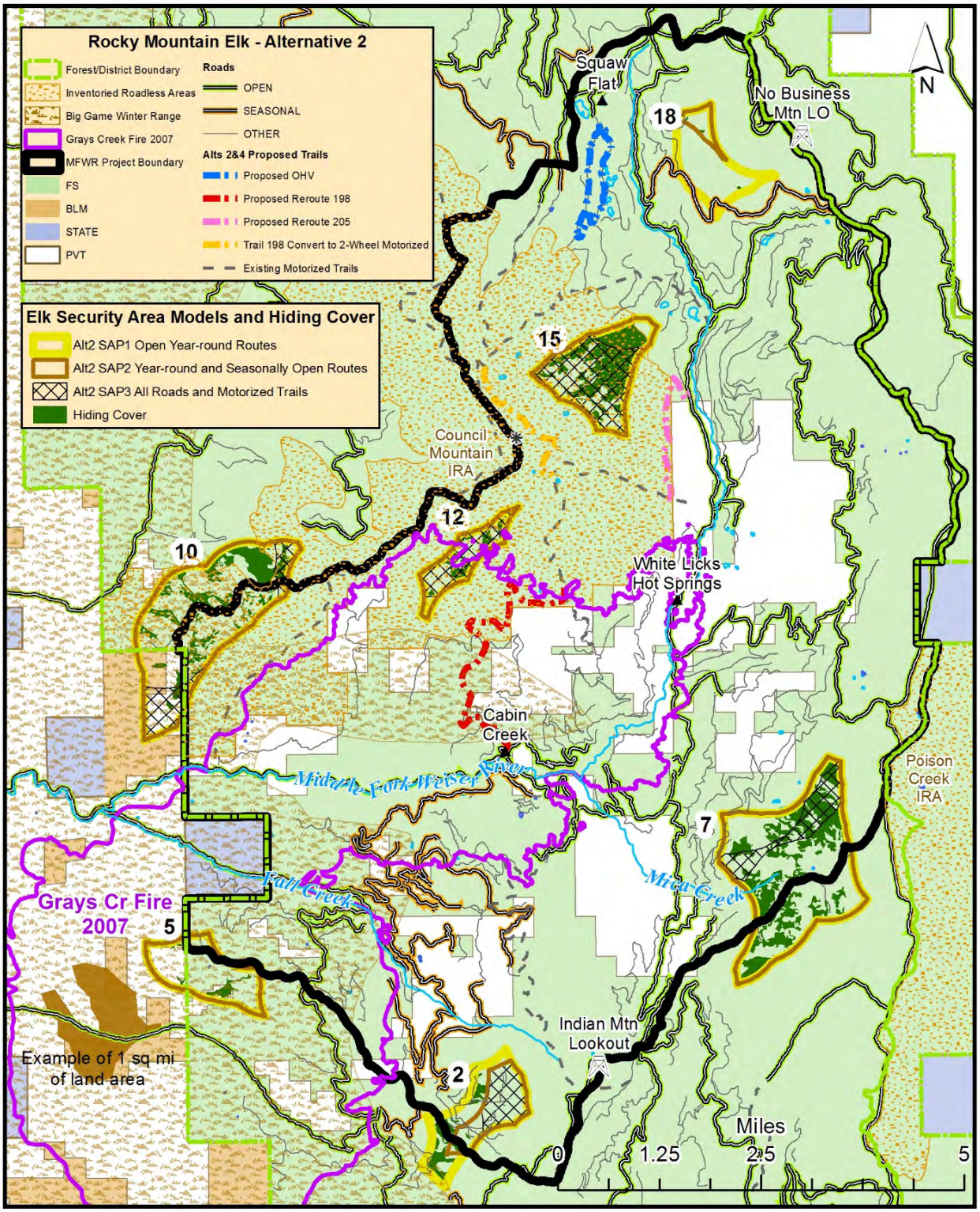


Figure 3.4-60. Elk security areas in the Project area identified by a 0.5-mile buffer on roads, unauthorized routes, and motorized trails under Alternative 2.

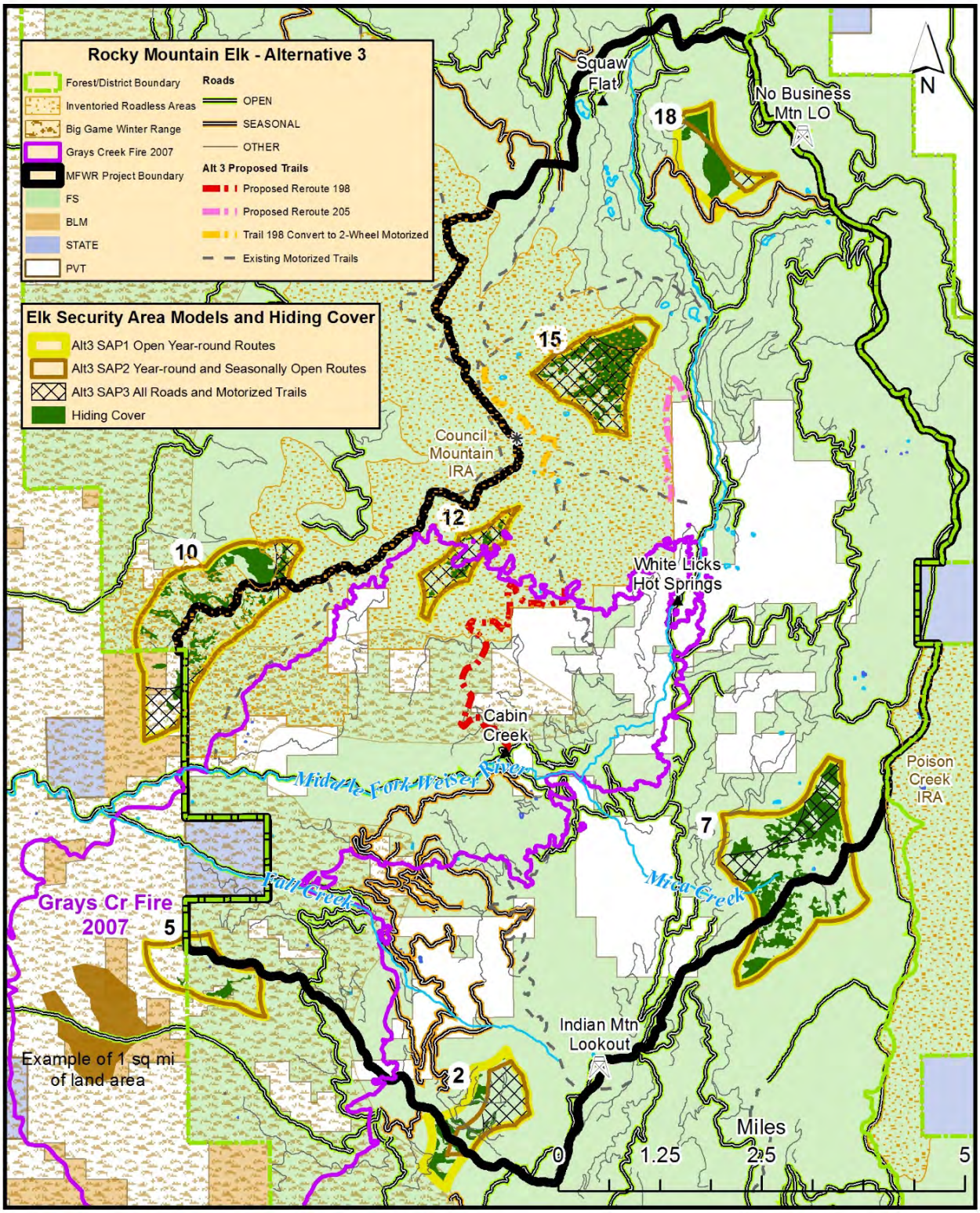


Figure 3.4-61. Elk security areas in the Project area identified by a 0.5-mile buffer on roads, unauthorized routes, and motorized trails under Alternative 3.

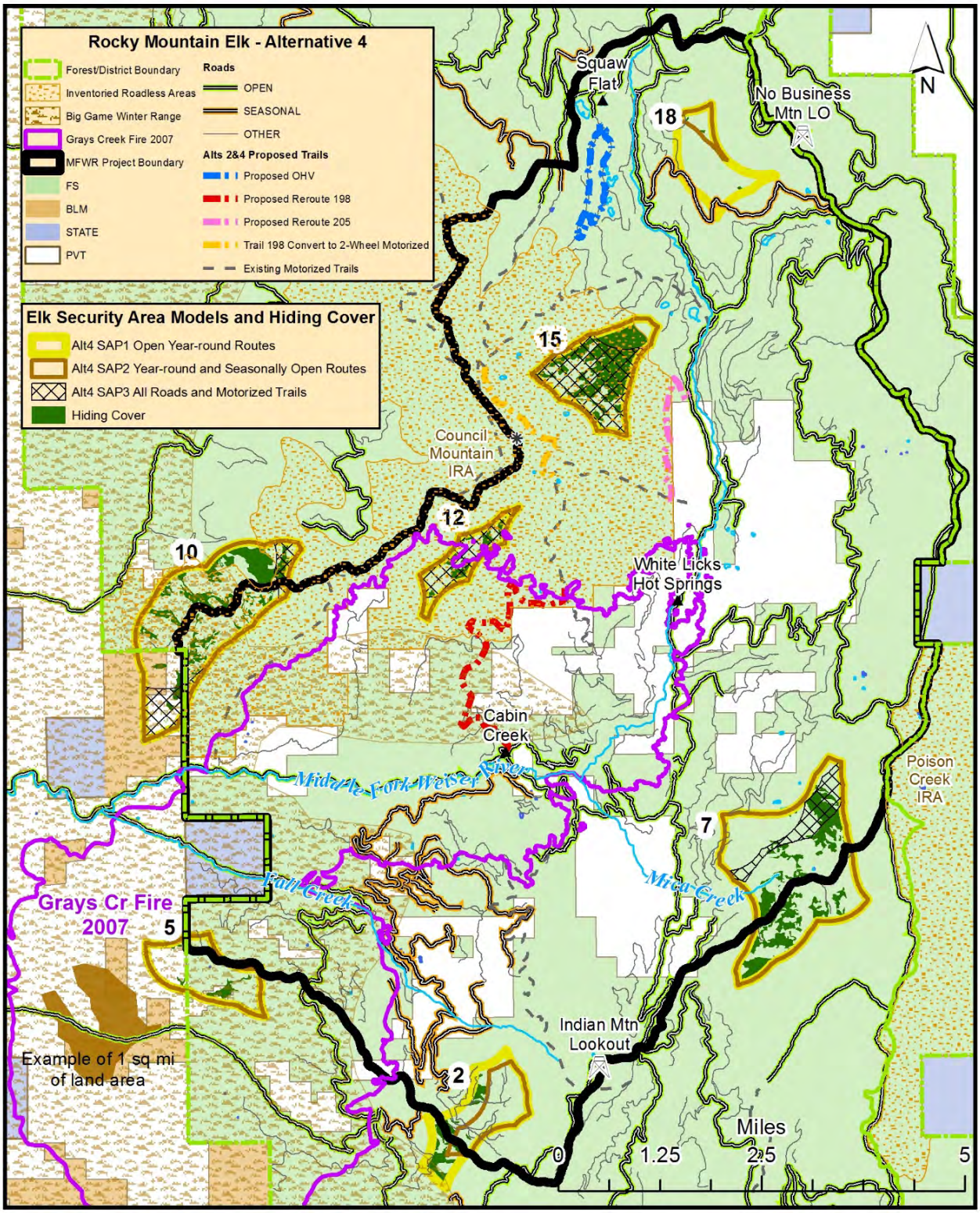


Figure 3.4-62. Elk security areas in the Project area identified by a 0.5-mile buffer on roads, unauthorized routes, and motorized trails under Alternative 4.

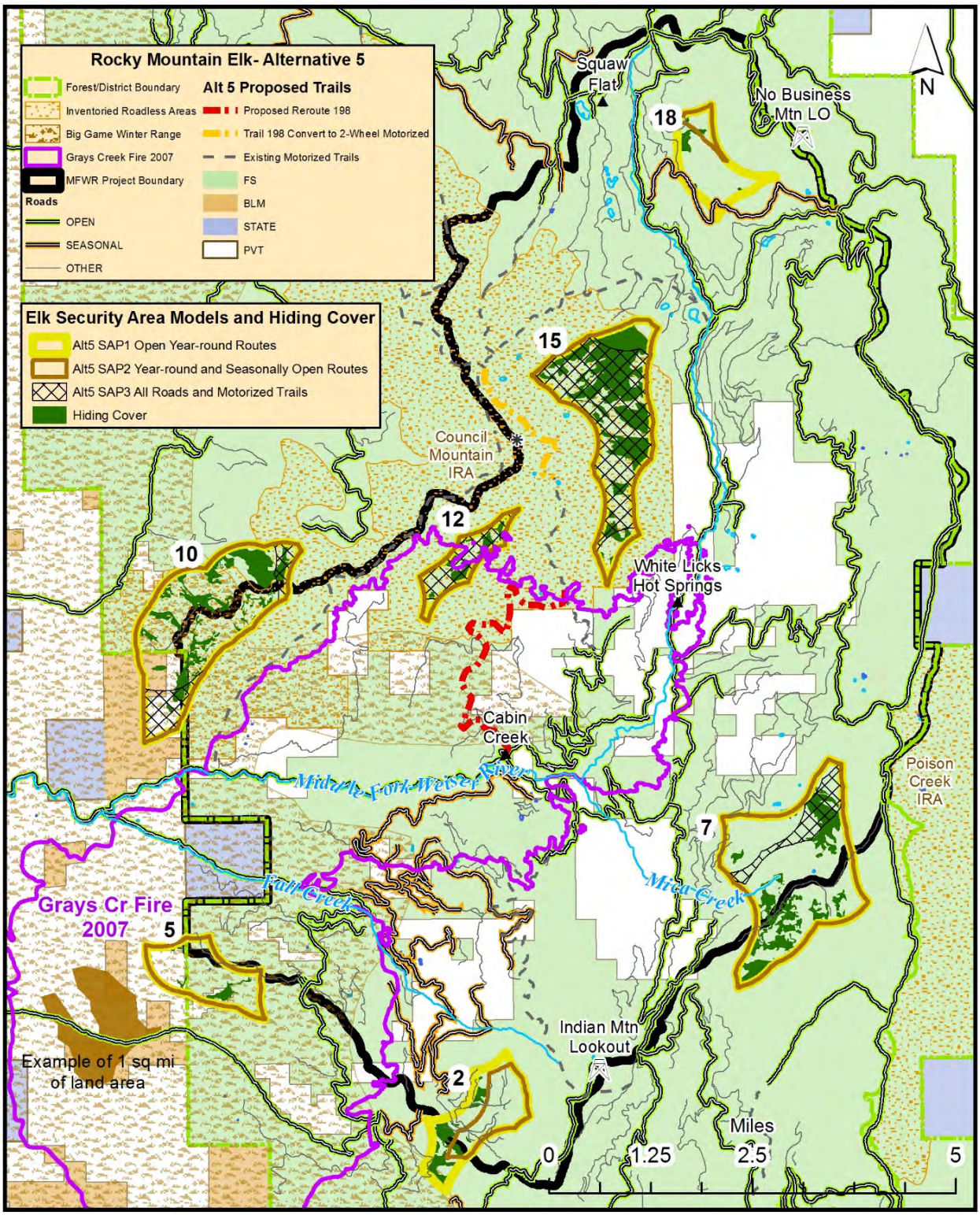


Figure 3.4-63. Elk security areas in the Project area identified by a 0.5-mile buffer on roads, unauthorized routes, and motorized trails under Alternative 5.

Road management plays an important role in elk habitat management and elk security. Note how the size of SA #15 increases (Figure 3.4-63), when Trail 205 is removed from the system. The proposed OHV loop was also dropped and the associated roads are placed into LTC. This did not increase a security area but it provides year round security for elk from motorized vehicles nonetheless. These changes under Alternative 5 would improve conditions for elk security in the Project area.

Elk Winter Range

Elk favor a mix of grassland/shrub landscapes and forested landscapes that provide important security cover.

Elk winter range exists in the Project area, primarily depending on snow depths at lower elevations in the lower-elevation sagebrush/grasslands that dominate the western foothills, including the lower areas of the Middle Fork Weiser River and Fall Creek drainages (Figure 3.4-14). This habitat abuts large acreages of private land. As a result, substantial winter range habitat exists west of the Project area, including much of the Weiser River Valley, which primarily is private land and several small blocks of State land.

Elk Calving

Elk calving areas will be identified and evaluated once individual harvest or burn units have been identified within the Project area. These important sites will be protected on a case-by-case basis, as the sites are located.

Cumulative Effects

The cumulative effects on elk in the Project area are the effects of the road system on the vulnerability of bull elk to hunting mortality. These effects are presented in the maps that are presented as Figure 3.4-60, Figure 3.4-61, Figure 3.4-62, and Figure 3.4-63, which show the changes in SAs depending on the road system management for each action alternative.

Determination

No determination is required for elk as this species is a species of special interest, not a Federally listed or Region 4 Sensitive species.

3.4.6.6. Habitat Family 12 Grassland/Open-Canopy Sage

Northern Idaho Ground Squirrel

Alternative 1—No Action

No northern Idaho ground squirrel populations are known to occur in the Project area, and no potential habitat would be altered under Alternative 1. Because northern Idaho ground squirrel habitat exists typically in the scabland community, the lack of prescribed fire treatments in these areas would most likely affect potential habitat for this species (Figure 3.4-15). The prescribed burns proposed for scabland habitats for the action alternatives would not occur, so fire stimulation of bunchgrasses, forbs, and some shrubs would not occur. In the long term, lack of fire would lead to a decrease in quantity and quality of modeled habitat for northern Idaho ground squirrel due to the encroachment of conifers and shrubs into the scabland communities and the loss of vigor in the bunchgrasses, forbs, and some shrubs.

Direct and Indirect Effects from Alternatives 2, 3, 4, and 5

No northern Idaho ground squirrel have been reported from surveys conducted over the past decade in the Project area or on the east side of District; hence, there would be no direct effect on individual northern Idaho ground squirrels from implementing any of the action alternatives. Indirectly, habitat for northern Idaho ground squirrel would be improved by the prescribed burns in the scabland habitats. The burns would restrict the encroachment of conifers and shrubs; improve the vigor of grasses, forbs, and some shrubs; and reduce the potential for stand-replacement fires. There is an unmeasurable potential for incidental habitat damage, due to machinery and vehicles being moved off of established roads and onto potential northern Idaho ground squirrel habitat for turn arounds and parking. These activities are not allowed under the PDFs, so it would be expected that these incidents would be few and minor.

Cumulative Effects

No cumulative effects are expected to individuals of this species, since no northern Idaho ground squirrel occur in the area. Prescribed burning would be cumulatively beneficial to northern Idaho ground squirrel by invigorating the grass/forb component of source habitat. Northern Idaho ground squirrel habitat management is guided by direction in the Forest Plan, the northern Idaho ground squirrel Recovery Plan (USDI Fish and Wildlife Service 2003), and the ESA. Specific mitigation measures would be used to ensure that northern Idaho ground squirrel habitat would not be altered or made unavailable to northern Idaho ground squirrel, which would be considered a “take” under the ESA. Because of the low potential for habitat alteration, the following determination was made for the action alternatives.

Determinations

Alternatives 2, 3, 4, and 5 *May Effect, but are Not Likely to Adversely Affect* the northern Idaho ground squirrel or its habitat.

3.4.7. Minimum Road System

The elk security model is the only analysis that includes road densities for this Project. Alternative 1 would not designate an MRS for the Project area. All action alternatives would implement the MRS as identified through the work of the IDT with long-term increases in elk security in the Project area. Of the action alternatives, Alternative 3 does the most for elk security while Alternative 4 does the least.

3.4.8. Irreversible and Irretrievable Commitments

The action alternatives are not expected to create any impacts that would cause irreversible or irretrievable commitment of terrestrial wildlife habitat.

3.4.9. Forest Plan Consistency

Alternative 1 (No Action) does not move wildlife habitat conditions towards the desired condition in the Forest Plan. The amount, quality, and distribution of wildlife habitats has declined throughout the Forest over the past 50 years, due to aggressive fire suppression, clear cut logging practices, and the increase of roads to support these two activities.

For Alternatives 2, 3, and 5 (action alternatives), consistency with the Forest Plan would be achieved both through the implementation of Project activities and with the implementation of

PDFs. Project Design Features and mitigation measures are designed to minimize potential negative effects on wildlife resources from some Project activities. Alternative 4 would be inconsistent with TEST 15 by making more the 30% lynx habitat unsuitable through vegetation treatments. Monitoring plans (Appendix 4) are incorporated into this FEIS to document that PDFs are implemented and effective in reducing effects and impacts to wildlife resources.

3.4.10. Project Record

This FEIS hereby incorporates, by reference, the Wildlife Specialist Report in the Project record (40 CFR 1502.21). The report is located in the Wildlife section of the Project record and it contains the data, methods, analyses, maps, references, and technical documentation that the Forest wildlife biologist relied on to reach the conclusions in this FEIS. The Project record also contains a copy of the signed BA and documented consultation with the FWS.

3.5. Watershed Resources

3.5.1. Analysis Scale, Data Sources, and Methodology

3.5.1.1. Scope and Scale of Analysis: Direct and Indirect Effects and Cumulative Effects

The watershed analysis for direct, indirect, and cumulative effects, like the fisheries analysis, was completed at the subwatershed scale (6th field HUC), which is larger than the Project area and includes all ownership within each subwatershed (Figure 3.5-1). The analysis area chosen to assess current conditions, direct and indirect effects, and cumulative effects includes Granite Creek—Middle Fork Weiser River (170501240401), Jungle Creek—Middle Fork Weiser River (170501240402), Little Fall Creek—Middle Fork Weiser River (170501240404), and Mica Creek—Middle Fork Weiser River (170501240403) 6th field HUCs.

Note: the only activity proposed for the East Fork Weiser River subwatershed (170501240203) is the addition of an existing non-motorized trail to the National Forest trail system. Therefore, an analysis of objectives and indicators for this subwatershed is not included in this chapter. See the fisheries section of this chapter for more information.

3.5.1.2. Temporal Scale of Analysis

Time frames as defined in the Forest Plan are used for analysis of effects: temporary (0–3 years), short term (3–15 years), and long term (15 or more years) (USDA Forest Service 2003a).

3.5.1.3. Analysis Process/Measurements and Indicators

The measurements and indicators described below are used to compare alternatives, assess achievement of treatment objectives, and determine compliance with Forest Plan Standards and Guidelines (USDA Forest Service 2003a).

Item 8 in Chapter 1 Section 1.7.2 describes the restoration need for improved watershed function and integrity. Objective 6 addresses this and calls for improving watershed function and integrity and moving watersheds toward Forest Plan and WCF desired conditions through a variety of actions:

Improve watershed and aquatic function and integrity by moving all watersheds within the Project area toward the desired condition for the soil, water, aquatic, and riparian resources.

The measurements for this objective are described below; proposed restoration actions focus on reducing the detrimental effects of roads on stream channels and watershed function and, through this, restoring resiliency and vigor to stream channels and adjacent riparian habitat.

Measurements:

Water Quality (Sediment)

- Amount of road-generated sediment reduced through road decommissioning and long-term closure over the long term as modeled by GRAIP and GRAIP Lite

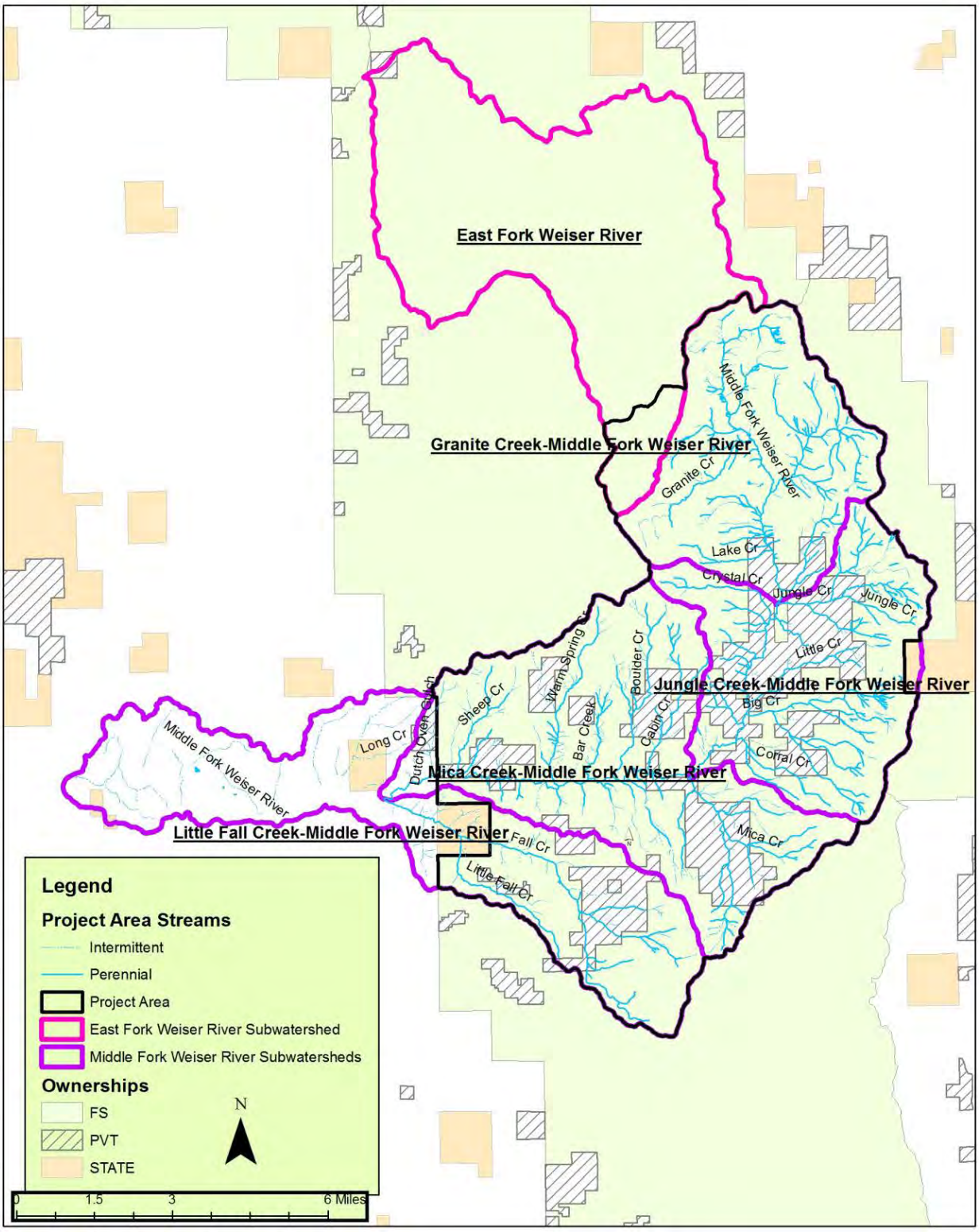


Figure 3.5-1. Watershed analysis—Middle Fork Weiser River landscape restoration Project area and subwatersheds.

Hydrologic Function (Channel Conditions, Changes in Peak and Base Flows, Floodplain Connectivity, and Road Density and Location)

- Total road density
- Road density within RCAs

Other proposed Project actions could affect SWRA resources. The following issue statements will allow for tracking this potential through the associated indicators:

Proposed activities for roads, vegetation treatments, and prescribed fire may affect water quality by modifying soil erosion and sediment delivery.

Indicators:

- Miles of temporary roads constructed, including use of unauthorized roads
- Miles of road realignment and reconstruction
- Miles of long-term road closures (road storage)
- Miles of roads decommissioned
- Acres of ground-based mechanical vegetation treatment
- Acres of prescribed burn

Proposed activities may change timing and duration of peak runoff, which may affect bank stability in sensitive channels.

Indicators:

- Total road density
- Number of drainages over 25% ECA ("high" category)

3.5.1.4. Data Sources and Methodology

Geomorphic Road Analysis and Inventory Package (GRAIP)

The Forest Service's RMRS collected road sediment data over the summers of 2013 and 2014 for use in the GRAIP sediment model. This model uses highly detailed road survey data to feed into a GIS-based model that quantifies road sediment production and delivery, mass wasting potential, and habitat fragmentation (Black et al. 2007). The intense survey protocol yields site-specific data on roads or road segments most affecting a stream reach or subwatershed. The RMRS completed GRAIP surveys for the entire Granite Creek subwatershed and surveyed roads within the Mica Creek, Jungle Creek, and Little Fall Creek subwatersheds prioritized for analysis in this Project. These data were used to identify and recommend specific road improvements or decommissioning treatments in conjunction with the TAP and identification of a MRS; however, the data are too incomplete in all but the Granite Creek subwatershed to use to quantify sediment delivery from the road network as a whole. Instead, for consistency's sake, GRAIP Lite was used for sediment analysis at the subwatershed scale.

GRAIP Lite

Developed by the RMRS, GRAIP Lite (Nelson et al. 2014) is a GIS-based sediment delivery model for roads. A simplified version of GRAIP (Black et al. 2012), GRAIP Lite is designed to

provide sediment-delivery estimates utilizing existing geospatial information (road layers, stream networks, and digital elevation models) to simulate road erosion and probability of sediment delivery based on road segment slope, surface type, ML, and proximity to the stream. Although the GRAIP model is an accurate field inventory of road drainage features combined with a sediment delivery model that can identify site-specific road surface erosion and sedimentation problems, using GRAIP to field inventory an entire watershed is time consuming and costly. GRAIP Lite identifies potential road sediment problems and provides a higher level of detail than existing sediment models (many of which do not account for proximity of roads to streams). GRAIP Lite does not provide the level of detail that GRAIP does with regard to identification of discrete drainage features and stream connection; however, it does include information about processes that are important drivers for sediment delivery, including road slope, road surface material, maintenance level (amount of use), and probability of drain-point connection (proximity to a stream). Results from GRAIP Lite should be interpreted with caution because the model outputs may include large uncertainties at site-specific locations. At larger scales, however, the accuracy of GRAIP Lite compared with GRAIP increases (Nelson et al. 2014).

With regard to the model results for the Project area, GRAIP Lite appears to predict what was anticipated with regard to sediment delivery (using modeled sediment delivery drain points, where road sediment enters a stream channel). Native surface roads located near streams are responsible for the majority of sediment delivery associated with the transportation system, and roads located on ridges or midslopes largely contribute sediment only at stream crossings. This representation of the road system is an improvement over other road sediment models where only more general road attributes can be modeled.

Other Data

Road Condition Surveys

Data were collected on the general condition of roads, both system and unauthorized, over the summers of 2013, 2014, and 2015. Information recorded included road surface condition as evidenced by erosional features like ruts and gullies, road-stream connectivity (number of crossings and/or culverts), and cut and fill slope stability. Road survey forms and photographs are on file at the District's hydrology office. This information was used to recommend specific road treatments such as surfacing, crossing upgrade or removal, or decommissioning.

Stream Condition Surveys

Stream surveys using the Forest Service R1/R4, Rosgen Level II, and Payette PACFISH/INFISH Biological Opinion (PIBO) stream survey protocols described the existing conditions of streams in the Project area and summarized conditions and stream type (Rosgen) as part of the channel condition risk indicator. Data used were collected between 1998 and 2012.

GIS Data

The PNF's GIS library of roads, strata, and stream layers was used as a source for analyzing road density, miles of roads in RCAs, drainage network density, and ECA. The definition of RCA for road-related analysis in this Project was any road or unauthorized route within 240 feet of a perennial or 120 feet of an intermittent stream channel; these widths are consistent with Forest Plan Option 2 for RCA delineation, RCA widths used for proposed management activities as described in Chapter 2.

3.5.1.5. Desired Condition

Desired conditions for SWRA resources are described in the Forest Plan (USDA Forest Service 2003a). The Forest Plan states that (1) riparian and aquatic ecosystems have appropriate types and amounts of vegetation; (2) appropriate LWD is sufficient in land and stream channel forms to maintain water quality, filter sediment, aid floodplain development, improve floodwater retention and groundwater discharge, and contribute to diverse habitat components; (3) instream flows are sufficient to support healthy riparian and aquatic habitats, the stability and effective function of stream channels, and the ability to route flood discharges and provide for downstream uses; and (4) the amount, distribution, and characteristics of life-stage habitats are present to maintain or reach viable populations of native and desired nonnative species (USDA Forest Service 2003a, pp. III–18).

Chapter 1 of this document includes relevant Forest Plan and MA-specific direction for SWRA resources.

The desired condition is for Watershed Condition Indicators (WCIs) to move toward a Functioning Appropriately (FA) level wherever achievable. Many WCIs for the drainages in the Project area are in the Functioning at Risk (FR) or Functioning at Unacceptable Risk (FUR) categories. In general, restoration activities that reduce road density through road decommissioning and/or improve soil-hydrologic function, especially in RCAs and landslide-prone (LSP) areas, help move SWRA resources toward desired conditions. Improvement or removal of stream crossings, improvement (graveling, hardening, drainage) of existing roads, and improvement of recreation sites also contribute to movement toward desired conditions.

Pathways and Watershed Condition Indicators

The WCIs represent an integrated suite of aquatic (including biophysical components), riparian (including riparian-associated vegetation species), and hydrologic (including uplands) condition measures that are intended to be used at a variety of scales. The WCIs assist in determining the current condition of a watershed and should be used to help design appropriate management actions or to alter or mitigate proposed and/or ongoing actions, in order to move watersheds toward desired conditions. The WCIs represent a diagnostic means to determine factors of current condition and to assist in determining future conditions associated with implementation of management actions or natural restoration over time (USDA Forest Service 2003a, p. GL-40).

Twenty-six WCIs are outlined in Forest Plan Appendix B to characterize current and desired SWRA resource conditions and the effects of land management activities on water quality (including temperature and sediment), habitat access, habitat elements, channel conditions and dynamics, flow/hydrology, watershed conditions, and the integration of species and habitat conditions (USDA Forest Service 2003a, pp. B-12 to B-21). Indicators are classified as FA, FR, or FUR.

See Section 3.6 of this document (fisheries analysis) for WCI baseline tables that describe current conditions in the Project area relevant to the fisheries analysis; entire Forest Plan Appendix B baseline tables for each subwatershed can be found in the Fisheries Specialist Report. Information used to complete the baseline includes the Forest Plan and WARS database (USDA Forest Service 2003a), the Fisheries Information Database (USDA Forest Service 2015d, FID unpublished data), GRAIP and GRAIP Lite data, Forest Service GIS databases, ranger district surveys, other agency information, and professional judgment.

Watershed Condition Framework (WCF), Aquatic Conservation Strategy (ACS), and Watershed and Aquatic Recovery Strategy (WARS)

See Chapter 1 of this document for background information on the Forest Service's WCF and on the Forest Plan's ACS and WARS. Although none of the subwatersheds in which the bulk of Project activities are occurring are designated as a focus in the WCF or a priority with respect to the ACS, one objective of this Project is to improve watershed conditions and move subwatersheds toward the next best condition class and toward desired conditions as described in the Forest Plan's Affected Environment section.

3.5.1.6. Current Condition

All five subwatersheds in the analysis area drain into the Weiser River; the East Fork Weiser flows into the Weiser River north of the rest of the subwatersheds, which enter the Weiser River via the Middle Fork Weiser.

The measurements and indicators analyzed for the water resource in this Project relate to water quality, channel conditions and dynamics, and streamflow/hydrology WCIs. This analysis focuses on the four subwatersheds affected by the bulk of proposed activities: Granite Creek, Jungle Creek, Mica Creek, and Little Fall Creek.

Indicators Derived from Watershed Condition Indicators (WCIs) Pertinent to this Project

Water Quality (Sediment)

Sediment can move efficiently along flowpaths such as roads (via ditch lines and the road surface) before either being retained by existing vegetation or routed to a stream via overland flow, channelized flow, or at a road-stream crossing. Road-related sediment can be a major contributor to stream sediment levels in heavily roaded watersheds. The subwatersheds in the analysis are all considered FUR for road density and location.

Road-related sediment rates predicted by the GRAIP and GRAIP Lite models are shown below (Table 3.5-1), along with the average natural erosion rate for a forested watershed of the inland Northwest (USDA Forest Service 1981). The full GRAIP inventory, which characterizes in detail sediment delivery from roads in a watershed, was completed for most (94%) of the Granite Creek subwatershed and, due to time constraints, for parts of each of the other subwatersheds. The GRAIP Lite model, which is reliable as a "big picture" of sediment delivery from a subwatershed but not at a site-specific level, was run for the entire Project area (Nelson 2015). The GRAIP results for each subwatershed only describe the sediment delivered from drain points on roads surveyed, so these results are not useful for characterizing sediment delivery from the subwatershed as a whole (other than perhaps in Granite Creek). Note that Granite Creek GRAIP and GRAIP Lite results are in good agreement.

The GRAIP Lite modeled sediment accounts for all roads in the Project area, including those on private lands, NFS roads, and unauthorized roads on NFS lands. Table 3.5-2 displays the breakdown of roads within the Project area.

Table 3.5-1. Road-related sediment as modeled by Geomorphic Road Analysis and Inventory Package (GRAIP) and GRAIP Lite.

Erosion Predicted	GRAIP Lite Sediment Delivery[a] (tons/year)	GRAIP (tons/year)[a] (% roads inventoried)	Natural Erosion Rate (tons/year) (USDA Forest Service 1981)
Granite Creek—Middle Fork Weiser River	47.3	47.0 (94%)	25
Jungle Creek—Middle Fork Weiser River	61.7	45.8 (36%)	25
Mica Creek—Middle Fork Weiser River	71.9	7.7 (9%)	25
Little Fall Creek—Middle Fork Weiser River	36.9	0.02 (4%)	25

[a]GRAIP Lite is not appropriate for prioritizing treatments by specific road segment; it is used to estimate overall sediment impacts on the stream network of a subwatershed as a result of road sediment production (Nelson 2015).

Table 3.5-2. Miles of road by type within the Project area.

Road Type	Number of Miles
National Forest System Open Year-round	55.2
County Open Year-round	18.1
National Forest System Open Seasonally	27.7
National Forest System Closed	74.8
Unauthorized Routes	64.9
Private (off-Forest) Roads	144.0
TOTAL ROADS	384.7
National Forest System Two-wheel Motorized Trail	21.8
National Forest System ATV Trail	2.4
National Forest System Non-motorized Trail	3.8
TOTAL TRAILS	28.0

Many of the main, open roads within the Project area are located in RCAs along the Middle Fork Weiser River and its major tributaries (e.g., No Business Canyon, Little Creek, and Big Creek). Portions of these routes where the road is directly adjacent to the stream contribute to chronic sediment input that has been punctuated by larger sediment-producing events such as the 2010 flooding, when a whole section of the Middle Fork Weiser River Road (over 200 feet) failed into the stream (Figure 3.5-2, below). See Section 3.6 Fisheries for miles of roads located in RCAs.

Unauthorized routes are not maintained as part of the NFS; many are producing sediment where drainage infrastructure has failed over time. In addition, some of these routes are still used by the public, which contributes to surface erosion via soil disturbance.

The condition of roads on private lands varies; some are regularly maintained to ensure adequate drainage and others are chronic sediment producers where rutting or crossing failures channelize flow from roads to streams.

Figure 3.5-2. Damage to the Middle Fork Weiser River Road (National Forest System road 50186) shown during and immediately following summer 2010 flooding.

Hydrologic Function (Channel Conditions, Changes in Peak and Base Flows, Floodplain Connectivity, and Road Density and Location)

Nearby roads can impair a stream's ability to access its floodplain. This can have detrimental effects on bank stability, bank erosion, and the channel's ability to handle peak flows. Loss of floodplain connectivity can increase the flooding potential downstream: flood flows no longer have access to the associated wetlands that naturally evolved adjacent to the stream to disperse water volume and energy. In the analysis area, 126.4 miles of open and closed roads are located within RCAs, many of which contribute to a loss of floodplain connectivity. Currently, floodplain connectivity is FUR, as are road density and location.

One example of the effects of loss of floodplain connectivity due to road encroachment into floodplains occurred during summer 2010 flooding in the Middle Fork Weiser River watershed (Figure 3.5-2). Rainfall totaling almost 6 inches fell over 2 days, in higher elevations on top of remaining winter snow pack, resulting in flooding and the failure of the Middle Fork Weiser River Road in several places, along with the loss of infrastructure (culverts) at several major tributaries. Water levels had clearly exceeded the capacity of the culverts and rip rap armoring the fill slope of the river road, rising well above bankfull and compromising road stability.

High road densities can affect watershed function in a variety of ways. Roads are efficient at routing runoff and sediment to stream channels and can increase the volume and affect the timing of peak flows, thus contributing fine sediment to stream channels and affecting both fish habitat and channel function (Belt et al. 1992; Jones et al. 2000). High road densities in riparian areas can decrease stream shade and pose an increased risk of road prism failure and mass wasting into the stream channel during flood events, which in turn can cause greater damage downstream and also degrade fish habitat (Luce and Wemple 2001; Nelson et al. 2004a).

In the Project area subwatersheds, road densities (including NFS and unauthorized routes) range from 2.6 to 4.2 miles per square mile on NFS lands and from 4.6 to 5.9 miles per square mile on all ownerships (Table 3.5-3). With respect to Forest Plan Appendix B, all subwatersheds with road densities above 1.7 miles per square mile are considered FUR.

As is evident from Table 3.5-3, road densities are considered FUR. Road densities within RCAs are also high, and evidence of roads impeding RCA function is apparent throughout the Project area, but no Forest Plan WCI exists for this. Twenty-eight percent of NFS roads and unauthorized routes on NFS lands within the Project area are located within RCAs.

Table 3.5-3. Overall road density (miles per square mile) and Riparian Conservation Area (RCA) road density by subwatershed within the Project area (see Fisheries section for additional related indicators, such as number of stream crossings).

Subwatershed	Road Density (National Forest System)	Road Density (All Ownership)
Granite Creek—Weiser River	4.2	4.6
Jungle Creek—Weiser River	3.1	5.9
Little Fall Creek—Weiser River	3.9	3.4
Mica Creek—Weiser River	2.6	4.8
Subwatershed	**RCA Road Density (National Forest System)**	**RCA Road Density (All Ownership)**
Granite Creek—Weiser River	4.8	5.5
Jungle Creek—Weiser River	3.2	7.1
Little Fall Creek—Weiser River	5.1	5.2
Mica Creek—Weiser River	2.8	5.3

Because roads are efficient at routing sediment and water to stream channels much more quickly than natural hillslope processes, these high road densities also contribute to FR or FUR ratings for Middle Fork subwatershed WCIs related to channel conditions, including the floodplain connectivity, change in peak and base flow, and change in drainage network.

Forest canopy condition in a watershed can affect both the magnitude and timing of streamflows (Burroughs and King 1989; Stednick 1996). Trees can influence the way snowfall is distributed and how it melts, and trees also extract and use a certain amount of water from the soil in transpiration (State of Idaho 2000). As a result of the relationship between precipitation and vegetation, streamflows can be influenced to some degree by alteration of the canopy in a watershed. The ECA concept is used as a measure to assess *potential* effects of changes in forest vegetation on water yields and peak flows. The ECA is a general index of hydrologically immature vegetation conditions in forested watersheds and can correlate to increases in water yield and changes in the timing of peak flows; however, research on the removal of live forest vegetation through harvest and road building has shown considerable variability in stream responses. Some studies indicate that 15%–25% of a drainage must be harvested in order for a measurable increase in water yield to occur, although the relationship between harvest and streamflow was poor at 15% (Stednick [1996] as cited in Muir 2008). Another study indicated no measurable increase in water yield when 22%–50% of a drainage was harvested (Fowler et al. 1987). *Note: the amount of ECA does not equate to acres of clearcuts.*

The Forest Plan Appendix B WCI for ECA is described at the watershed scale (5th level HUC). An ECA above 15% in a watershed is considered FUR. This WCI is based on both ECA percentage and whether the ECA is concentrated in sensitive areas like RCAs or LSPs (USDA Forest Service 2003a). In a white paper updating and expanding on the ECA WCI for the PNF in 2004, Bailey referred to an ECA of 25% at the watershed scale above as “high” and an ECA between 16% and 25% as “moderate,” with everything below 16% as “low.” The ECA percentages in Table 3.5-4 are at the subwatershed scale, as this size is more closely related to drainages studied in ECA research. Currently, ECA on NFS lands for the entire Middle Fork Weiser River watershed is 14.7%, or FR; for all ownerships, ECA is 21.7%, or FUR, with respect to the Forest Plan WCI.

Table 3.5-4. Equivalent Clearcut Area (ECA), Watershed Condition Indicators (WCIs), and general channel conditions in the Project area by subwatershed.

Subwatershed	ECA	Forest Plan WCI Rating	General Channel Condition/Notes[a]
Granite Creek—Middle Fork Weiser River			
All Ownerships	15.3%	n/a	Fair to good; overall data indicate stable channel but road-related bank failures along the Middle Fork Weiser River and several tributaries due to recent flooding (2010) are still evident and unstable.
National Forest System (NFS) Lands Only	13.0%	Functioning Appropriately	
Concentrated in Landslide-prone Areas (LPAs) or Riparian Conservation Areas (RCAs)[b]	No		
Jungle Creek—Middle Fork Weiser River			
All Ownerships	25.9%	n/a	Fair; effects of 2007 Grays Creek Fire coupled with presence of recreational impacts (old hot springs camping site, other dispersed sites) contribute to channel instability in tributaries.
NFS Lands Only	12.0%	Functioning Appropriately	
Concentrated in LPAs or RCAs[b]	No	*Majority of ECA concentrated on private land*	
Mica Creek—Middle Fork Weiser River			
All Ownerships	24.7%	n/a	Fair to poor; recent flooding has caused stream crossing failures on roads at several major tributaries; instability is still evident at these sites.
NFS Lands Only	19.2%	FUR	
Concentrated in LPAs or RCAs[b]	*Yes; ECA in Boulder Creek and Warm Springs Creek drainages due to the Grays Creek Fire is concentrated in RCAs and appears to be influencing timing and magnitude of peak flows*	*Majority of ECA result of Grays Creek Fire*	
Little Fall Creek—Middle Fork Weiser River			
All Ownerships	20.9%	n/a	Fair; similar impacts as can be seen in Mica Creek subwatershed in some areas, mainly where northern portions burned in the Grays Creek Fire. Impacts from recent flooding have caused road-related damage to stream banks but to a lesser degree than in Mica Creek.
NFS Lands Only	14.4%	Functioning Appropriately	
Concentrated in LPAs or RCAs[b]	No		
TOTAL			
All Ownerships within Project Area (Middle Fork Weiser River HUC 5)	21.7%	n/a	*Some ECA concentrated in RCAs and LPAs*
NFS Lands Only within Project Area (Middle Fork Weiser River HUC 5)	14.7%	FR	

[a]Sources: 2007–2014 stream survey data and professional observation.
[b]Concentration, in this case, means more than 50% of the total ECA occurred in RCA or LPAs. The ECA in the Boulder Creek drainage (a portion of the channel is shown in Figure 3.5-3) is high, or over 25% (Bailey 2004), after the Grays Creek Fire (2007) burned much of the headwater area. Debris plugged a concrete box culvert, causing the stream to scour out the culvert footings; debris and bank scour affected the channel over 0.5 mile downstream. This occurred again in July 2015 after several days of summer thundershowers.

Figure 3.5-3. Failed concrete box culvert on National Forest System road 50677 at the lower end of the Boulder Creek drainage in the Mica Creek subwatershed after June 2010 flooding; streamflow is right to left just behind the gate.

Beneficial Uses for the Middle Fork Weiser River

The CWA requires Idaho to recognize existing uses, which are uses that were actually attained in a water body on or after November 28, 1975, whether or not they are designated uses. Idaho presumes most undesignated waters will support cold water aquatic life and primary or secondary contact recreation. These are termed "presumed uses." Designated, existing, and presumed uses must all be protected. Those water bodies not found to be meeting water quality criteria are to be listed as water-quality impaired under Section 303(d) of the CWA. Designated beneficial uses for the Middle Fork Weiser River are cold water aquatic life, salmonid spawning, and primary contact recreation. The upper portions of the river are recognized as fully supporting these uses, but the lowest portion, from the mouth to 0.2 mile below its confluence with Sheep Creek, is not supporting these uses and is on the State 303(d) list for *Escherichia coli* and fish biological assessments (State of Idaho 2012). A small reach of this stream segment is on NFS land, but the reach is less than 0.5 mile long. No associated Total Maximum Daily Load is established for *E. coli* or other pollutants for the Middle Fork Weiser River at this time.

3.5.2. Environmental Effects

3.5.2.1. Direct and Indirect Effects

The following section discusses how each alternative meets the watershed restoration objective of the Project (objective/measurements) and how proposed Project activities affect the water resource (issues/indicators). Each measurement and indicator is discussed at the temporary, short-term, and long-term time scale.

Objective 6: *Improve watershed and aquatic function and integrity by moving all watersheds within the Project area toward the desired condition for the soil, water, aquatic, and riparian resources.*

Measurements:

Water Quality (Sediment)

- Percent of road-generated sediment reduced through road decommissioning and long-term closure as modeled by GRAIP and GRAIP Lite

Hydrologic Function (Channel Conditions)

- Road density by subwatershed
- RCA road density by subwatershed

Issue 1: *Proposed activities for roads, vegetation treatments, and prescribed fire may affect water quality by modifying soil erosion and sediment delivery.*

Indicators:

- Miles of temporary road constructed, including unauthorized road used as temporary road
- Miles of road realignment and reconstruction
- Miles of long-term closures (road storage)
- Miles of system and unauthorized roads decommissioned
- Acres of ground-based mechanical vegetation treatment
- Acres of prescribed fire

Scale of analysis*: Subwatershed, National Forest System Lands*

Issue 2*: Proposed activities may change timing and duration of peak runoff, which may affect bank stability in sensitive channels.*

Indicators:

- Total road density (all ownerships)
- Number of subwatersheds that are over 25% ECA (high category, as defined in Bailey [2004])

Scale of analysis: *Subwatershed*

Alternative 1 (No Action)

This alternative proposes no vegetation or watershed restoration treatments. Erosion from existing roads within the analysis area would continue at current levels as the primary management-induced cause of sediment generation and delivery to streams. The location at which the Grays Creek Fire burned in the Mica Creek and Little Fall Creek subwatersheds would continue to exhibit effects on peak flow timing, peak flow magnitude, and sedimentation, especially in the Warm Springs, Bar, and Boulder Creek drainages in the Mica Creek subwatershed, where burning in the south-facing headwater area of each has already resulted in channel scour and hillslope erosion.

Under this alternative, road density would remain the same within the Project area (see Table 3.5-3). Roads would not incur increased use as haul routes, and no new road would be constructed as a reroute to replace a poorly located existing road. No additional road maintenance would occur beyond that normally scheduled. No stream crossings would be removed or improved. The MRS would remain the same (i.e., all the roads currently included on the Forest System in each subwatershed).

No increase in ECA would occur and, therefore, no change in timing or duration of peak flows. Only one subwatershed is above 25% ECA; one is near the 25% mark (Table 3.5-4).

Table 3.5-4 exhibits the existing condition for ECA for all subwatersheds and for the watershed as a whole. Over time and as past harvest treatment areas mature, all ECA levels would gradually drop, but high-severity wildfire, wind events, insects, or other natural disturbances could also affect future ECA levels.

Proposed Management Activities Common to All Action Alternatives

The following section discusses information about proposed management activities common to all of the action alternatives. A discussion of the differences in the magnitude of effects and the degree to which the watershed restoration objective is met for each specific alternative follows.

Vegetation Management

Timber harvest within the analysis area has the potential to increase erosion rates and sediment delivery to streams—according to one study, up to 1.6 times natural rates (Ice and Stednick 2004). The level of surface disturbance and erosion attributed to logging is dependent on several factors, including logging systems used and the steepness of slopes. Logging systems, ranked from most to least potential disturbance, are ground based (tractor, skidder, feller-buncher), cable (here, meaning jammer and skyline), and helicopter yarding. Logging systems proposed to accomplish vegetation treatments include tractor, tractor/jammer, and skyline/cable.

Project design features and mitigation measures identified for this Project in Chapter 2 have been proven, through research and on-the-ground monitoring, to be effective at mitigating erosion from vegetation harvest units themselves (USDA Forest Service 2011–2014). These features and measures include proper skid trail location and rehabilitation, vegetation buffer strips, and avoidance or placement of timing restrictions for harvest on the more erosive soils. Sediment can be expected to increase over the temporary time frame relative to implementation, but with vegetation treatments most sediment increases would be attributable to roads (Ice and Stednick 2004).

Road actions associated with timber harvest (temporary road construction, road maintenance for haul routes) increase erosion and sedimentation on a much greater scale than vegetation treatments themselves—up to 500 times natural erosion rates (Ice and Stednick 2004). Project design features and mitigation measures are expected to limit these occurrences in magnitude and to a greater degree on a temporal scale; any increase in sedimentation is expected to occur only within the temporary time frame relative to implementation. See the Table 2.4-3 in Chapter 2 and Appendix 5 of this document for PDFs specific to vegetation harvest and associated roads and skid trails.

Riparian Conservation Area–Proposed Treatments

Within the Project area, approximately 2,600–3,600 acres of RCA treatments (using both manual and mechanical means) are proposed, almost all within the outer half of designated RCAs; any treatment within the inner RCA would be accomplished by hand. These treatments are discussed in detail in Chapter 2 and in Appendix 5 of this document. Differences between alternatives include a limited number of acres in the inner RCAs for Alternatives 2, 4, and 5; these are discussed specifically in the fisheries section of this chapter and in the “Water Quality (Sediment)” section below. Pictures of an RCA treatment, both post-harvest and after prescribed burning, from a previous project are shown in Figure 3.5-4

Figure 3.5-4. Example of a Riparian Conservation Area (RCA) unit harvested in November 2014 using an off-road jammer, which worked from outside the RCA; little to no soil disturbance was noted post-harvest. Note in the photo at right where conifers were removed to make room for aspen, which were regenerating just 6 weeks after a spring 2016 prescribed burn (bottom photos).

The suitability of an RCA for treatment would be determined by appropriate soil-, water-, aquatic-, or riparian-trained resource professionals in the field (preimplementation) by assessing a representative cross-section characteristic of RCAs in the Project area. If professionals determine that the RCA treatments have potential for eroding the slope directly below the

activity during a 10-year precipitation event, RCA treatments would be precluded. Project design features have been established (see Chapter 2, Table 2.4-3) to reduce the potential for sedimentation, loss of shade, and LWD within the RCA.

In general, the further one gets from a stream channel, the less effect forested vegetation has on stream processes. Generalized curves (see Figure 3.5-5) depicting microclimate and shade contributions to streams as a function of distance from the channel in site-potential tree height indicate that processes controlling stream shade and microclimatic variables decrease exponentially with distance from the channel. Eighty percent of effective shade comes from approximately one-half site-potential tree height distance from the channel (FEMAT 1993). For this Project, the bulk of riparian treatments are proposed more than 60 feet (one-half site-potential tree height) from intermittent and 120 feet (one site-potential tree height) from perennial channels. See the Fisheries section for a discussion of effects of RCA treatments on stream shade and temperature.

Belt et al. (1992) summarized scientific literature related to the design of vegetation buffer strips to protect water quality. For preventing sediment delivery via overland flow (sheet erosion) from road fill slopes on basalt-derived soils, they reported that buffer strips of 35–127 feet were capable of trapping 83.5% of sediment; adding 60 feet in length to those resulted in 97.5% efficiency. For this Project, the bulk of riparian treatments are proposed more than 60 feet from intermittent and 120 feet from perennial channels. Treatments (nonmechanical) proposed closer than these distances are on slopes less than 20%, which would limit the potential for erosion over and above the PDFs included in Chapter 2.

For all alternatives, a temporary increase in sediment as a result of vegetation treatments is expected, but PDFs detailed in Chapter 2 and Appendix 5, which include riparian buffer strips and restriction of equipment to operations outside riparian areas, are expected to protect SWRA resources—including water quality (sediment and temperature) and channel conditions—over the long term (see Figure 3.5-5). Minimal impact on hydrologic function (channel or RCA conditions) is expected with proposed RCA treatments.

With the exception of limited, specific locations proposed under Alternatives 2, 4, and 5, no treatments would occur within 120 feet of perennial streams (one site-potential tree height) or 60 feet of intermittent streams. Slope and equipment use restrictions and rehabilitation requirements, as described in the PDFs, are designed to limit sediment delivery. The total proposed acres of RCA treatments (for acres proposed in RCAs by subwatershed, see Section 3.6 Fisheries) are likely to be reduced during the layout stage of the Project, as some would likely not meet the requirements necessary to protect SWRA resources and prevent sediment delivery to channels.

Riparian buffers around wetlands and floodplains would be delineated to exclude harvest unless a specific objective associated with treatment (see Chapter 2, Wet Meadow Treatment [WMT] and Fuel Reduction within a Riparian Conservation Area [FR-RCA]); PDFs (i.e., winter logging) would result in maintaining the function of these areas. For the action alternatives, direct and indirect effects on wetlands and floodplains would be minimized through the application of BMPs and designation of RCAs.

The proposed treatments within RCAs for all alternatives are to be implemented with the design features and BMPs described above and under the guidance of the recent publication *National Best Management Practices for Water Quality Management on National Forest System Lands, Volume 1: National Core BMP Technical Guide* (USDA Forest Service 2012a) to achieve attainment of soil, water, riparian, and aquatic desired conditions.

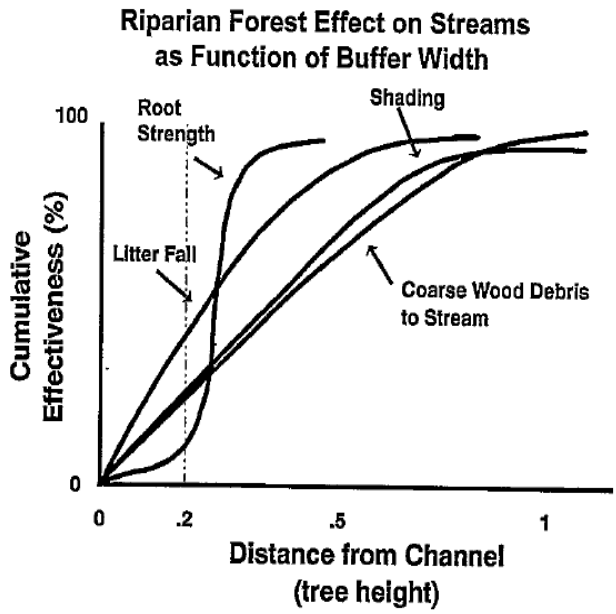


Figure V-12. Generalized curves indicating percent of riparian ecological functions and processes occurring within varying distances from the edge of a forest stand.

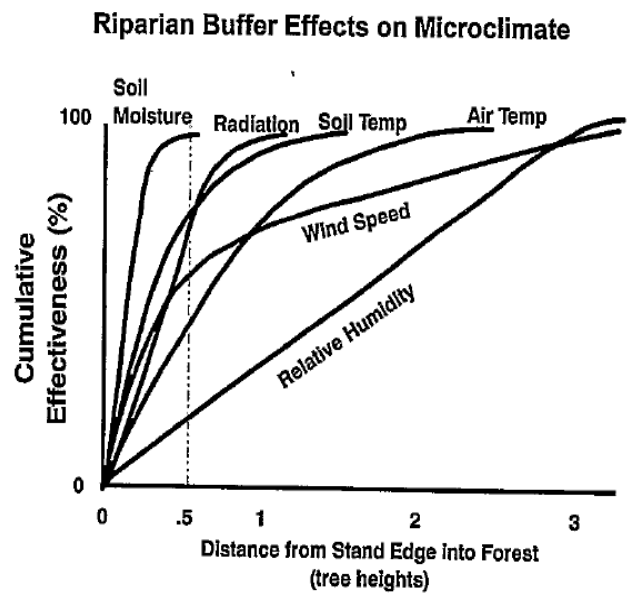


Figure V-13. Generalized curves indicating percent of microclimatic attributes occurring within varying distances of the edge of a riparian forest stand (after Chen, J 1991).

Figure 3.5-5. Generalized curves indicating percent of riparian functions and processes occurring within varying distances from the edge of a forest stand (FEMAT 1993).

Post-Harvest Activities

Excavator piling for brush disposal and reforestation site preparation disturbs forest litter and duff layers and exposes soil to increased surface erosion. These activities have the potential for transporting additional sediment to streams (Ice and Stednick 2004). Site preparation (slash burning or broadcast burning) increases total sediment output temporarily, until vegetation is established.

Postharvest residue redistribution, coupled with subsequent broadcast burning, will be considered in candidate units as a means to divert postharvest "waste" residues towards other beneficial uses (e.g, soil-building substrate, fuelwood). Postharvest residues will otherwise be disposed of via excavator or hand piling according to soil, hydrology, and fuels PDFs (see Chapter 2, Table 2.4-3).

Perennial and intermittent streams would have RCA buffers between postharvest activities and stream courses. Any postharvest slash piling or other treatment would be performed by hand if within an RCA. Perennial streams would have a minimum of a 240-foot buffer, and intermittent channels would have 120-foot buffers between any mechanical postharvest activities and the channel. These design features would decrease the likelihood of disturbance to soils and resulting sediment delivery to streams from postharvest activities.

Prescribed Fire

Broadcast burning for slash reduction would occur on the vegetation acres treated under each alternative. Additionally, prescribed fire is proposed to reduce fuel loading on 2,000–5,000 additional acres (depending on the alternative). The amount of fire that would actually occur in any given year depends on many factors that allow a burn "window" for implementation. In addition, broadcast burn footprints rarely cover the full spatial extent of the target areas. Therefore, the amount of sediment generated may vary by year, but it is estimated that the burning effects would predominantly exist over the temporary time frame for the range of alternatives.

The main concern with prescribed fire is the increased potential for surface erosion due to duff reduction and subsequent mineral soil exposure. There is a curvilinear relationship between duff reduction and mineral soil exposure, with mineral soil exposure increasing as duff consumption rises (Ice and Stednick 2004; Sandberg 1980). Broadcast burning generally results in zero to low soil burn severity; however, some localized areas of moderate soil burn severity are expected and acceptable for meeting ecological objectives. Pile burning generates sustained heat pulses that typically result in moderate-to-high soil burn severity. With increasing duff and litter moisture content, soil temperatures are reduced, preventing soil hydrophobicity and reducing surface erosion (Robichaud and Waldrop 1994). Burn plan prescriptions would include objectives to limit duff consumption and mineral soil exposure, including soil moisture considerations and well-dispersed slash piles within units.

Prescribed Fire within Riparian Conservation Areas

Prescribed fire treatment within RCAs is proposed under all alternatives, with the objective of stimulating new vegetation growth and making the upland vegetation located within RCAs more resilient in the event of wildfire. Approximately 25% of the total acres of RCAs within the treatment area may actually receive fire and ladder fuel treatments. The proposed ladder fuel treatment includes hand pruning and limbing in the understory; this material would be lopped

and scattered or, with prior approval from the District hydrologist, hand-piled. Design features to protect soil, water, riparian, and aquatic conditions are included in FEIS Chapter 2,Table 2.4-3.

Prescribed fire would be allowed to back into RCAs and may be ignited within RCAs where it would result in less ground disturbance or decrease the chance of higher-severity burning than backing fire in. Less fireline (ground disturbance and loss of ground cover) construction overall is expected with the additional flexibility to ignite within RCAs. Prescribed fire has the potential for sediment delivery, although implementation of the PDFs included in FEIS Chapter 2 (Table 2.4-3) will retain ground cover; limiting the burn to low severity minimizes this risk. Burning is not expected to have adverse effects on water quality over either the short or long term.

Some floodplains and wetlands may be lightly burned, but the effect would not be significant. Due to the season when burning would occur (fall or spring) the result is expected to be a patchy, low-severity fire that would therefore retain ground cover and soil productivity and result in minimal and insignificant effects on floodplains and riparian vegetation. For the action alternatives, direct and indirect effects on wetlands and floodplains would be minimized through the application of BMPs and designation of RCAs.

Guideline FMGU06 states: “Direct ignition of prescribed fire in RCAs should not be used unless site/project scale effects analysis demonstrates that it would not retard attainment of soil, water, riparian, and aquatic desired conditions.” The proposed treatments within RCAs, when implemented with the above design features, are not expected to retard attainment of SWRA desired conditions.

Road Restoration Treatments: Decommissioning and Long-term Closure

Proposed decommissioning treatments of Forest System roads and unauthorized routes are designed to restore long-term soil productivity and hydrologic function to the road prism—in a majority of cases, the most effective treatment is full obliteration of the road. This includes recontouring the road prism as closely as possible to the natural slope profile, restoration of stream crossings to match natural channel dimensions, placement of woody debris as represented in the adjacent forest, methods to relieve soil compaction, closure of the road to motorized use with rocks or natural barriers, and the establishment of native vegetative ground cover. However, full obliteration of a road may be unattainable under various conditions found during the implementation process. These may include:

- Excessive cuts and fills (i.e., 25 feet of cut)
- Excessive rock in the travelway (i.e., bedrock)
- Wetlands
- Lack of fill material
- Through cuts (a cut slope on both sides of road, without a fill slope)

Where a full recontour is not attainable or road conditions warrant a lesser treatment that would still meet restoration objectives, one or more of the following would be used to achieve restoration over the long term: outsloping, revegetation, stream-crossing restoration, or physically blocking or disguising the entrance.

Treatments reduce or eliminate road-related sediment generated from road prisms (travelway, cut and fill). Many of these roads are closed to the public and have erosion issues due to lack of maintenance. Obliteration of roads effectively reduces the overall road density in all the subwatersheds within the analysis area (see Table 3.5-3). In all alternatives, road reconstruction,

temporary road use, and restoration treatments could create a slight temporary sediment increase, but those roads decommissioned after use would exhibit reduced effects the first year after treatment and would greatly reduce long-term sediment production. Those roads with range management access or other permitted needs have been identified during the TAP and would have some level of access maintained.

Forest System roads not needed over the long term but still identified as important for future management are proposed for long-term closure (ML 1). This treatment leaves the road prism in place but stabilizes the surface and cut and fill slopes. Stream crossings are restored to natural contours, and ephemeral and relief culverts, if stable enough to leave in place, are treated by building a bypass channel so that water can still drain across the road should the culvert plug. Although this treatment does not restore soil productivity or hillslope hydrologic function, watershed benefit is realized at stream crossings, and sources of sediment associated with open or poorly draining roads are eliminated.

Over the long term, all road treatments would contribute to improving hydrologic function and channel conditions in the Project area subwatersheds.

Reducing Impacts from Dispersed Camping and System Trails

The MA 3 (Weiser River) direction in the Forest Plan specifically discusses reducing sediment impacts from dispersed camping sites along the Middle Fork of the Weiser River, near its confluence with Cabin Creek (aka “Horse Cabin Flat”) and at the horse camping area near the confluence with Jungle Creek.

Treatment for all alternatives at the Jungle Creek site includes hardening and narrowing the crossing of the Middle Fork Weiser River at the dispersed camping area to accommodate stock use while minimizing bank and bed erosion and focusing motorized access to the existing bridge, which is approximately 300 feet upstream. These treatments would improve bank stability and vegetation at a discrete location along the Middle Fork and also better enable this area to handle runoff generated by the Middle Fork road to the west/southwest. Improvements to the site in general (hardening areas retained for use, providing physical barriers to direct use, decompacting and revegetating of other areas) would also be made in order to minimize impacts on the adjacent Middle Fork Weiser River. The end result of this work would be a minor improvement to sediment delivery and streambank/floodplain function along the Middle Fork Weiser River in the Jungle Creek subwatershed.

All alternatives propose making improvements to the Horse Cabin Flat dispersed site, including installing up to four hitch rails; designating camping sites using boulders, graveling, and site signs to mark the allowed camping locations; and adding a single vault toilet. The end result of this work would be an incremental improvement to soil productivity and vegetation within the RCA of the Middle Fork Weiser River in the Mica Creek subwatershed.

All alternatives propose improvements to NFS trails that would incrementally improve SWRA resources. Specific actions include rerouting a small section of NFS Trail 212 (the section proposed to be added to the Forest trail system) in the East Fork Weiser River subwatershed to mediate current steep sections causing undue soil erosion, and rerouting portions of NFS Trail 198 in the headwaters of Granite Creek (Granite Creek subwatershed) to reduce resource impacts in sensitive soil types and improve sustainability of the trail system. Overdue trail maintenance would also be performed on 24 miles of existing trail within the Project area. These actions would result in incremental improvements to sediment delivery and soil productivity in all subwatersheds, with the most improvement in the headwaters of Granite Creek, as a result of trail reroutes and improvements.

Project Design Features for Soil and Water

Management requirements and PDFs reduce the risk of sediment delivery via channelized and diffuse flows from disturbed areas such as landings, skid trails, and harvested acres, as well as from harvest-associated haul routes and decommissioned roads (Chapter 2, Table 2.4-6 and Table 2.4-10). Effectiveness has been documented over the years through research findings and on-the-ground monitoring (USDA Forest Service 2011–2014; Foltz et al. 2007; Belt et al. 1992; Borroughs and King 1989).

Best Management Practices (BMPs)

Compliance with the CWA is achieved through the proper site-specific design, implementation, and monitoring of BMPs; these BMPs are incorporated into the PDF tables in Chapter 2, both specifically and by reference to the *National Best Management Practices for Water Quality Management on National Forest System Lands, Volume 1: National Core BMP Technical Guide* (USDA 2012a). Approved by the State and the U.S. Environmental Protection Agency (EPA), BMPs are intended to result in compliance with State water quality standards for nonpoint source pollution. Timber harvest practices identified by EPA include measures to protect sensitive areas (such as stream banks, wetlands, estuaries, ponds, lake shores, and riparian zones). Such measures include:

- Designated skid trails
- Graveling of roads and stream crossings
- Winter logging
- Skid trail rehabilitation
- Avoidance of mechanical equipment on steep slopes or saturated soil

The BMPs reduce the adverse effects on water quality by reducing the physical disturbance to soils and maintaining ground cover to reduce erosion.

A key concept of BMPs is that if monitoring identifies any circumstance of noncompliance during implementation, the Forest Service is then obligated to respond to the situation in order to restore compliance. As long as BMPs have been applied and monitored for effectiveness and adjustments are ongoing, the Forest Service is in compliance with the CWA (State of Idaho 2008).

The BMP monitoring on the West Zone of the Forest, where the Project is located, occurs annually; these annual reports indicate that BMPs have generally been effective (USDA Forest Service 2011–2014). There are isolated instances where BMP monitoring has identified areas where additional remediation is needed or the BMPs were not properly implemented. In these cases, additional work (erosion control, additional drainage features, etc.) was required.

The effectiveness of forestry BMPs has been studied extensively (Belt et al. 1992; Seyedbagheri 1996). Application of BMPs would be a requirement for the Project. Best Management Practices are incorporated into a project through B and C provisions in the timber sale contract. The BMP effectiveness ratings are based on research literature and on-the-ground experience. These practices have proven effective in minimizing off-site impacts (e.g., sediment movement to draws or channels).

Water Quality (Sediment)

Issue 1: *Proposed activities for roads, vegetation treatments, and prescribed fire may affect water quality by modifying soil erosion and sediment delivery.*

Indicator: *Miles of Temporary Roads and Miles of Road Realignment and Reconstruction*

Alternative 2 (Proposed Action)

This alternative proposes that 2.2 miles of permanent system roads be constructed on existing unauthorized road beds as reroutes for 3 miles of poorly located existing system roads (to be decommissioned for SWRA resource benefit); the net reduction in system roads is 0.8 mile. These reroutes would be constructed for future management access and put into ML 2 closed status when Project activities are complete. Entrances would be gated and road prism stabilized (cut and fill slopes seeded, drainage features installed and maintained) but would still be available for administrative access. These miles, considered road realignment, are counted as part of the total miles of road reconstruction below and in Table 3.5-5 (Note: Road miles are slightly different from Table 3.5-5). Road reconstruction is planned for 11.0 miles; actions include replacing undersized or aging culverts and surfacing areas with the greatest runoff and erosion potential with gravel or coarser material (pit run).

This alternative also proposes constructing 44.5 miles of temporary roads (34.8 miles utilizing existing unauthorized roads and 9.7 miles of new construction). Temporary road construction would temporarily increase sediment, but sediment would decrease back to the baseline (or with preexisting roads used as temporary roads, to below the baseline) over the short and long term, as these roads would be fully recontoured within 3 years of use. If not used for Project access, roads would still be decommissioned.

Road realignment would temporarily increase sediment; sediment production would decrease over the short term as disturbed cut and fill slopes revegetate and stabilize. Over the long term, with the new road located outside RCAs, properly closed to public use, and maintained, sediment contribution would be minimal.

Road reconstruction and temporary road construction would temporarily increase sediment, especially where road reconstruction involves disturbance of vegetated ditch lines, culvert replacement, or disturbance at stream crossings. With implementation of PDFs over the short and long term, however, sediment would be reduced as road reconstruction improves existing roads and as temporary roads are returned to natural slope profiles and soil productivity.

The seasonally open OHV trail described in Chapter 2 would be built on existing NFS roads 50166 and 50485, which are currently closed to public use. Building the OHV trail would increase sediment over the long term as a result of regular use and from building the approximately 0.5-mile section of new OHV trail to connect the two roads into a loop. Because these roads are existing and currently not well-vegetated or maintained, however, the current sediment contribution is close to what would result from use by OHVs.

Alternative 3

No new road construction (realignment) as part of road rerouting is proposed under this alternative. Roads proposed for decommissioning under Alternative 2 as part of rerouting would still be decommissioned, but the reroutes would not be built.

Road reconstruction is proposed for 8.8 miles; actions include replacing undersized or aging culverts and surfacing areas with the greatest runoff and erosion potential gravel or coarser material (pit run).

This alternative also proposes constructing 35.6 miles of temporary roads (27.5 miles utilizing existing unauthorized roads and 8.1 miles of new construction). Temporary road construction would temporarily increase sediment production, but sediment would decrease back to the baseline (or with preexisting roads used as temporary roads, to below the baseline) over the short and long term, as these roads would be fully recontoured within 3 years of use. If not used for Project access, roads would be evaluated for the appropriate level of treatment to still meet the ecological objective of soil-hydrologic restoration.

Road reconstruction and temporary road construction would temporarily increase sediment; sediment production would decrease over the short term as disturbed cut and fill slopes revegetate and stabilize. Over the long term, with the new road located outside RCAs, properly closed to public use, and maintained, sediment contribution would be minimal.

With this alternative, the OHV trail described on NFS roads 50166 and 50485 would not be built; instead, these roads would be decommissioned, resulting in a temporary increase in sediment but reducing long-term sediment contribution and restoring soil-hydrologic function in the headwaters of Granite Creek.

Because no new road construction (reconstruction as part of realignment) is associated with this alternative, it carries the least risk of sediment impacts over both the short and long term.

Alternative 4

This alternative proposes constructing 4.5 miles of permanent system roads on existing unauthorized road beds as reroutes for 8.7 miles of poorly located existing NFS roads (to be decommissioned for SWRA resource benefit) for a net decrease of 4.2 miles. These roads would be constructed for future management access and be put into ML 2 closed status when Project activities are complete. These miles, considered road realignment, are counted as part of the total miles of road reconstruction below and in Table 3.5-5.

Road reconstruction is planned for 17.3 miles; actions include replacing undersized or aging culverts and surfacing areas with gravel or coarser material (pit run). Road reconstruction includes road realignment (discussed above), as well as adding approximately 4 miles of unauthorized road to the NFS to facilitate access to vegetation and fuels treatments both for this Project and in the future. These roads were reviewed by the IDT during the TAP process, and resource concerns associated with adding them to the transportation system were minimal. Under Alternative 4, these roads would be closed ML 2 roads when completed. Entrances would be gated and road prism stabilized (cut and fill slopes seeded, drainage features installed and maintained), but they would still be available for administrative access.

This alternative also proposes constructing 48.1 miles of temporary roads (39.8 miles utilizing existing unauthorized roads and 8.3 miles of new construction). Temporary road construction would temporarily increase sediment production, but sediment production would decrease back to the baseline (or with preexisting roads used as temporary roads, to below the baseline) over the short and long term as these roads would be fully recontoured within 3 years of use. If not used for Project access, roads would be evaluated for the appropriate level of treatment to still meet the ecological objective of soil-hydrologic restoration.

Road realignment/reconstruction would temporarily increase sediment; sediment production would decrease over the short term as disturbed cut and fill slopes revegetate and stabilize. Over

the long term, with the new road located outside RCAs, properly closed to public use, and maintained, sediment contribution would be minimal.

Action regarding the OHV trail on NFS roads 50166 and 50485 (described under Alternative 2) would be the same for this alternative.

Regarding road-related sediment, the greatest potential for short- to long-term impacts is with this alternative because it involves the most road construction and reconstruction and the addition of an OHV trail. Road decommissioning and long-term storage would, however, more than offset this increase over the long term.

Alternative 5

This alternative, created in response to DEIS public comments and IDT recommendations, proposes constructing 3.9 miles of permanent system roads on existing unauthorized road beds as reroutes for 8.7 miles of poorly located existing NFS roads (to be decommissioned for SWRA resource benefit) for a net decrease of 5.0 miles. These roads would be constructed for future management access. Unlike Alternatives 2 and 4, these roads would then be put into ML 1 closed status (long-term closure) when Project activities are complete. Entrances would be recontoured and the road prism stabilized (culverts removed, cut and fill slopes seeded) for long-term, maintenance-free storage. These miles, considered road realignment, are counted as part of the total miles of road reconstruction below and in Table 3.5-5.

Road reconstruction is planned for 17.3 miles; actions include replacing undersized or aging culverts and surfacing areas with gravel or coarser material (pit run). Road reconstruction includes road realignment (discussed above), as well as adding approximately 3.9 miles of unauthorized road to the NFS to facilitate access to vegetation and fuels treatments both for this Project and in the future. These roads were reviewed by the IDT during the TAP process, and resource concerns associated with adding them to the transportation system were minimal. Under Alternative 5, these roads would be ML 1 closed roads (long-term closure) when completed.

This alternative also proposes constructing 48.8 miles of temporary roads (39.9 miles utilizing existing unauthorized roads and 8.9 miles of new construction). Temporary road construction would temporarily increase sediment production, but sediment production would decrease back to the baseline (or with preexisting roads used as temporary roads, to below the baseline) over the short and long term as these roads would be fully recontoured within 3 years of use. If not used for Project access, roads would be evaluated for the appropriate level of treatment to still meet the ecological objective of soil-hydrologic restoration.

Road realignment/reconstruction would temporarily increase sediment; sediment production would decrease over the short term as disturbed cut and fill slopes revegetate and stabilize. Over the long term, with the new road located outside RCAs, properly closed to public use, and maintained, sediment contribution would be minimal.

With this alternative, the OHV trail described on NFS roads 50166 and 50485 would not be built; instead, ML 1 closed status (long-term closure) BMPs would be implemented on these roads, which currently have culverts in place and several drainage issues. This would result in a temporary increase in sediment with culvert removal and stream bed and bank reshaping but reduce long-term sediment contribution and restore some soil-hydrologic function in the headwaters of Granite Creek.

Table 3.5-5. Breakdown of miles of National Forest System (NFS) road construction, reconstruction, and temporary road construction by subwatershed and alternative. (Note: Road miles are slightly different from Table 2.2-20 totals because of rounding and a small amount (up to 0.5 mile by alternative) occurs outside the watershed effects area).

Subwatershed		Alternative 2 (Proposed Action)	Alternative 3	Alternative 4	Alternative 5
Granite Creek—Middle Fork Weiser River					
Miles of NFS road construction (includes unauthorized road [existing prism] added to system)		1.2	0	2.1	1.7
Miles of NFS reconstruction (includes reconstruction as part of proposed realignment in Alternatives 2, 4, and 5)		6.3	5.1	9.0	8.3
Miles temporary road	New	2.9	2.9	2.9	2.9
	Utilize existing prism (unauthorized road)	12.1	9.2	15.0	16.1
Jungle Creek—Middle Fork Weiser River					
Miles of NFS road construction (includes unauthorized road [existing prism] added to system)		0.3	0	0.3	0.6
Miles of NFS reconstruction (includes reconstruction as part of proposed realignment in Alternatives 2, 4, and 5)		1.5	1.2	2.1	2.1
Miles temporary road	New	1.6	1.6	2.2	2.2
	Utilize existing prism (unauthorized road)	7.2	2.9	8.3	8.0
Mica Creek—Middle Fork Weiser River					
Miles of NFS road construction (includes unauthorized road [existing prism] added to system)		0.6	0	1.0	0.4
Miles of NFS reconstruction (includes reconstruction as part of proposed realignment in Alternatives 2, 4, and 5)		0.6	0	1.3	1.3
Miles temporary road	New	2.4	1.9	2.1	2.1
	Utilize existing prism (unauthorized road)	8.8	8.8	10.1	10.1
Little Fall Creek—Middle Fork Weiser River					
Miles of NFS road construction (includes unauthorized road [existing prism] added to system)		0	0	1.1	1.3
Miles of NFS reconstruction (includes reconstruction as part of proposed realignment in Alternatives 2, 4, and 5)		2.5	2.5	4.9	4.9
Miles temporary road	New	2.9	1.8	1.7	1.7
	Utilize existing prism (unauthorized road)	6.2	6.2	6.3	6.2

Regarding road-related sediment, the potential for short- to long-term impacts is less than Alternative 4 but more than Alternatives 2 and 3 with this alternative because it involves more road construction and reconstruction than those alternatives (minus the addition of an OHV trail). Road decommissioning and long-term storage would, however, more than offset this increase over the long term.

Indicator: *Miles of system and unauthorized road decommissioned*

Indicator: *Miles of long-term closure (storage)*

Alternative 2 (Proposed Action)

This alternative proposes 16.1 miles of system road decommissioning and 64.6 miles of unauthorized road decommissioning (Table 3.5-6). Approximately 24.6 of these miles are located in RCAs. All of these roads adversely affect watershed conditions by constricting floodplains, contributing sediment, intercepting subsurface flow and routing runoff to channels (influencing peak or base flows), or affecting riparian vegetation and stream shade.

Table 3.5-6. Miles of road decommissioning and long-term closure by subwatershed (Note: Road miles are slightly different from Table 2.2-20 because of rounding and a small amount occurs outside the analysis area).

Subwatershed	Alternative 1 (No Action)	Alternative 2 (Proposed Action)	Alternative 3	Alternative 4	Alternative 5
Granite Creek—Middle Fork Weiser River					
Decommissioning	0	30.1	36.8	28.3	28.3
Long-term Closure	0	9.1	6.3	9.1	10.6
Jungle Creek—Middle Fork Weiser River					
Decommissioning	0	11.9	11.9	11.0	10.8
Long-term Closure	0	0.7	0.7	0.7	0.7
Little Fall Creek—Middle Fork Weiser River					
Decommissioning	0	17.6	17.6	16.3	16.2
Long-term Closure	0	3.2	3.2	3.2	3.3
Mica Creek—Middle Fork Weiser River					
Decommissioning	0	20.0	20.2	19.7	19.7
Long-term Closure	0	4.7	4.6	4.7	4.7

Additional reductions in road-related effects on channel conditions are addressed by 17.8 miles of system road long-term closures. These are currently closed ML 2 system roads and ML 1 roads that have not been properly put into long-term storage. This long-term closure treatment would move all of these roads to the ML 1 category once stabilization treatments such as removal of culverts, outsloping, waterbarring, and scarification/seeding have been completed. Two roads in the Granite Creek subwatershed, totaling approximately 3 miles, would be classified as long-term closures but would be part of the proposed OHV trail loop described in FEIS Chapter 2; therefore, restoration would not be fully realized on these roads, and some impacts on channels at and downstream of trail fords would be present over the long term.

Overall, this alternative would result in isolated disturbance and impacts on channel conditions over the temporary time frame as crossings and roads adjacent to channels are treated, but it would result in restoration of conditions over the short and long term, especially where restoration takes place in RCAs. See the Fisheries section for a discussion specific to stream-crossing restoration. This restoration offsets the impacts of new road construction associated with road realignment over the short and long term.

Alternative 3

This alternative proposes 23.3 miles of system road decommissioning and 64.6 miles of unauthorized road decommissioning (Table 3.5-6). Approximately 26.2 of these miles are located in RCAs.

Additional reductions in road-related effects on channel conditions are addressed by 15.0 miles of system road long-term closures. Under this alternative, the 3 miles of long-term closures that would be converted to an OHV Trail in the Granite Creek subwatershed with Alternatives 2 and 4 and put into long-term closure without the OHV trail in Alternative 5 would be decommissioned instead. This would result in a greater reduction in sediment over the short and long term compared with Alternatives 2 and 4, both as a result of this decommissioning and the OHV trail not being built. This restoration offsets the impacts of new road construction associated with road realignment over the short and long term and overall results in an improvement in channel conditions over the baseline.

Alternative 4

This alternative proposes 16.1 miles of system road decommissioning and 60.6 miles of unauthorized road decommissioning (Table 3.5-6). Approximately 23.6 of these miles are located in RCAs.

Additional reductions in road-related effects on channel conditions are addressed by 17.8 miles of system road long-term closures. Similar to Alternative 2, two roads in the Granite Creek subwatershed, totaling approximately 3 miles, would be classified as long-term closure but would be part of the proposed OHV trail loop described in Chapter 2; therefore, restoration would not be fully realized on these roads, and some impacts on channel conditions at and downstream of trail fords would be present over the long term. This restoration offsets the impacts of new road construction associated with road realignment over the short and long term and overall results in an improvement in channel conditions over the baseline.

Alternative 5

This alternative proposes 16.0 miles of system road decommissioning and 60.1 miles of unauthorized road decommissioning (Table 3.5-6). Approximately 23.4 of these miles are located in RCAs.

Additional reductions in road-related effects on channel conditions are addressed by 19.3 miles of system road long-term closures. Unlike Alternatives 2 and 4, roads in the Granite Creek subwatershed, totaling approximately 2.5 miles, would be classified as long-term closure but would NOT be part of the proposed OHV trail loop described in Chapter 2. Therefore, restoration would be more fully realized on these roads and stream crossings and drainage issues could be addressed, though soil productivity and soil-hydrologic function would not be fully restored as they would with the decommissioning of these roads proposed under Alternative 3. This restoration offsets the impacts of new road construction associated with road realignment over the short and long term and overall results in an improvement in channel conditions over the baseline.

Indicator: *Acres of Ground-Based Mechanical Treatment and Acres of Prescribed Fire*

Note that acres may be slightly different (less than) than vegetation treatment acres in Chapter 2 as a result of (1) analyzing for vegetation treatments that have the most impact on soil disturbance (ground-based mechanical treatment) and (2) rounding to the nearest 5 acres for the sake of comparing alternatives.

Alternative 2 (Proposed Action)

This alternative proposes approximately 20,680 acres of mechanical vegetation treatments and 24,240 acres of prescribed fire (see Table 3.5-7) and previous section, "Effects Common to Action Alternatives"). The most treatment is proposed in Granite and Mica Creeks, with just over 6,000 acres proposed in each subwatershed. These subwatersheds also contain the highest percentage of NFS lands.

Both mechanical treatment and prescribed burning would result in temporary sediment increases but, over the short term, sediment where the ground is disturbed would return to pretreatment levels, as long as the PDFs and BMPs listed in Chapter 2 are implemented. The closer treatment units and associated skid trails, temporary roads, and equipment come to the edge of RCA buffers, the greater the statistical chance of sediment entering a stream channel, but with PDFs in place, this would be minimized and the greatest risk of sedimentation would be from the road network at via ditch systems and stream crossings.

The acres proposed for mechanical treatment, both inside and outside RCAs, would likely be fewer than those listed, as on-the-ground layout and implementation would result in dropped areas due to site-specific resource concerns such as sensitive soils, rocky ground, or inaccessibility.

Table 3.5-7. Acres of mechanical treatment and prescribed fire by alternative.

Subwatershed	Alternative 1 (No Action)	Alternative 2 (Proposed Action)	Alternative 3	Alternative 4	Alternative 5
Granite Creek—Middle Fork Weiser River					
Mechanical Treatment	0	6,360	4,650	6,695	6,315
Prescribed Fire	0	7,630	3,330	8,120	8,150
Jungle Creek—Middle Fork Weiser River					
Mechanical Treatment	0	3,540	3,180	5,240	4,070
Prescribed Fire	0	4,150	3,380	6,460	4,300
Little Fall Creek—Middle Fork Weiser River					
Mechanical Treatment	0	4,760	4,475	4,760	4,740
Prescribed Fire	0	5,370	3,200	5,380	5,490
Mica Creek—Middle Fork Weiser River					
Mechanical Treatment	0	6,020	5,680	6,350	6,225
Prescribed Fire	0	7,090	6,720	7,480	7,600
Total Mechanical	**0**	**20,680**	**17,985**	**23,045**	**21,350**
Total Prescribed Fire		**24,240**	**16,620**	**27,435**	**27,200**

Alternative 3

This alternative proposes approximately 17,985 acres of mechanical vegetation treatments and 16,620 acres of prescribed fire. The Granite Creek and Mica Creek subwatersheds would still receive the most treatment. Compared with the Proposed Action, approximately 1,710 fewer acres would be mechanically treated in Granite Creek, 360 fewer in Jungle Creek, 285 fewer in Little Fall Creek, and 340 fewer in Mica Creek.

Unlike Alternatives 2, 4, and 5, no treatment is proposed for certain higher-elevation areas (PVGs). The reduced treatment acreage in higher-elevation PVGs reduces the amount of mechanical treatment both inside and outside the RCAs. This decrease in acreage and reduction in treatment areas closer to water bodies reduces sediment risk over the temporary time frame. Over the short term, like other alternatives, sediment is expected to return to pretreatment levels.

Alternative 4

This alternative proposes approximately 23,045 acres of mechanical vegetation treatments and 27,435 acres of prescribed fire, the greatest number of treatment acres of the action alternatives. Treatment under this alternative would include more acres of certain high-elevation PVGs (as described in Chapter 2), more acres of RCA treatment and acres within the inner RCA of some water bodies (also described in Chapter 2 and in the Fisheries section of this chapter). Compared with the Proposed Action, approximately 335 more acres would be treated in Granite Creek, 1,700 more in Jungle Creek, and 330 more in Mica Creek; there would be no change to treatment acreage in Little Fall Creek.

This increased treatment acreage, along with the increase in treatment closer to water bodies, would result in an increase in sediment risk over the temporary time frame compared with Alternatives 2 and 3, and to a lesser degree Alternative 5. The most pronounced difference would be compared with Alternative 3, given the greatest difference between proposed treatment acreage. Over the short term, like under the other alternatives, sedimentation is expected to return to pretreatment levels.

Alternative 5

This alternative proposes approximately 21,350 acres of mechanical vegetation treatments and 27,200 acres of prescribed fire. Compared with the Proposed Action, treatment under this alternative would include more acres of certain high-elevation PVGs (as described in Chapter 2), more acres of RCA treatment and acres within the inner RCA of some water bodies (also described in Chapter 2 and in the Fisheries section of this chapter) but slightly fewer of these acres overall than under Alternative 4. Compared with the Proposed Action, approximately 45 fewer acres would be treated in Granite Creek, 530 more in Jungle Creek, 20 fewer in Little Fall Creek, and 205 more in Mica Creek.

This increased treatment acreage, along with the increase in treatment closer to water bodies, would result in an increase in sediment over the temporary time frame compared with Alternative 2, a greater increase with Alternative 3, but less than under Alternative 4. Over the short term, like under other alternatives, sediment is expected to return to pretreatment levels.

Objective 6: *Improve watershed and aquatic function and integrity by moving all watersheds within the Project area toward the desired condition for the soil, water, aquatic, and riparian resources.*

Measurement: *Percent of Road-generated Sediment Reduced over the Long Term, as Modeled by GRAIP and GRAIP Lite*

Alternative 2 (Proposed Action)

Over the long term, as a result of road decommissioning and long-term closure, under Alternative 2 the GRAIP Lite model indicates a net reduction in sediment for all subwatersheds (Table 3.5-8). The least amount of sediment reduction would be in Jungle Creek, with a 1.1% reduction through long-term closure and a 14.6% reduction through decommissioning. The most reduction

would be in Granite Creek and Little Fall Creek, with reductions of 10.6% and 3.7%, respectively, through long-term closure and reductions of 25.5% and 37.4%, respectively, for decommissioning. Decommissioning and long-term closure treatments would result in a small increase in sediment over the temporary time frame where stream crossings are rehabilitated and roads decommissioned adjacent to stream channels. However, recovery would begin almost immediately, and over the short-to-long term the sediment reduction would be realized.

Table 3.5-8. Long-term sediment reduction through road decommissioning and long-term closure by subwatershed and alternative as modeled by Geomorphic Road Analysis and Inventory Package (GRAIP) Lite.

Treatment	Alternative				
	1 (No Action)	2 (Proposed Action)	3	4	5 *within 0.1% of Alternative 4 for all but Granite Creek long-term closure
Granite Creek—Weiser River GRAIP Lite-modeled sediment (existing condition, whole subwatershed): 47.4 tons/year					
Decommissioning					
Tons/year reduced	0	12.1	19.2	11.8	Alternative 4
Percent reduced	0	25.5%	40.6%	24.9%	Alternative 4
Long-term Closure[a]					
Tons/year reduced	0	5.0	3.7	5.0	5.7
Percent reduced	0	10.6%	7.7%	10.6%	10.8%
Jungle Creek—Weiser River GRAIP Lite-modeled sediment (existing condition, whole subwatershed): 61.8 tons/year					
Decommissioning					
Tons/year reduced	0	9.0	9.1	8.3	Alternative 4
Percent reduced	0	14.6%	14.6%	13.4%	Alternative 4
Long-term Closure[a]					
Tons/year reduced	0	0.7	0.7	0.7	Alternative 4
Percent reduced	0	1.1%	1.1%	1.1%	Alternative 4
Little Fall Creek—Weiser River GRAIP Lite-modeled sediment (existing condition, whole subwatershed): 36.9 tons/year					
Decommissioning					
Tons/year reduced	0	13.8	13.8	13.7	Alternative 4
Percent reduced	0	37.4%	37.4%	37.3%	Alternative 4
Long-term Closure[a]					
Tons/year reduced	0	1.4	1.4	1.4	Alternative 4
Percent reduced	0	3.7%	3.7%	3.7%	Alternative 4
Mica Creek—Weiser River GRAIP Lite-modeled sediment (existing condition, whole subwatershed): 72.1 tons/year					
Decommissioning					
Tons/year reduced	0	10.5	10.5	10.3	Alternative 4
Percent reduced	0	14.5%	14.5%	14.3%	Alternative 4
Long-term Closure[a]					
Tons/year reduced	0	2.6	2.6	2.6	Alternative 4
Percent reduced	0	3.6%	3.6%	3.6%	Alternative 4

[a]This reflects an assumed elimination of all modeled sediment-delivery points.

Note: While a sediment increase from decommissioning is always analyzed for, recent GRAIP surveys on decommissioned roads immediately after treatment and after a 10-year recurrence interval rain event have shown almost no sediment leaving the recontoured road prism, even with heavy rains. Placing slash and mulch as erosion control and decompacting the road surface to allow water to infiltrate (rather than pool and run off) has been validated as an effective means of preventing erosion, even over the temporary time frame (Nelson et al. 2010).

Alternative 3

Over the long term, as a result of road decommissioning and long-term closure, the GRAIP Lite model indicates a net reduction in sediment for all subwatersheds (Table 3.5-8). The least amount of sediment reduction would be in Jungle Creek, with a 1.1% reduction through long-term closure and a 14.6% reduction through decommissioning; the most reduction would be in Granite Creek and Little Fall Creek, with reductions of 7.7% and 3.7%, respectively, through long-term closure and reductions of 40.6% and 37.4%, respectively, for decommissioning. Decommissioning and long-term closure treatments would result in a small increase in sediment over the temporary time frame where stream crossings are rehabilitated and roads decommissioned adjacent to stream channels. However, recovery would begin almost immediately, and over the short-to-long term the sediment reduction would be realized.

Alternative 3, overall, results in the greatest reduction in sediment at the Middle Fork Weiser River watershed scale and in all subwatersheds. The greatest contrast with the other alternatives is in the Granite Creek subwatershed, where sediment reduction from decommissioning would be 15% greater than under Alternative 2. Reduction through long-term closure is 2.9% less because roads proposed for long-term closure in the other alternatives would be decommissioned in Alternative 3.

Alternative 4

Over the long term, as a result of road decommissioning and long-term closure, the GRAIP Lite model indicates a net reduction in sediment for all subwatersheds (Table 3.5-8). The least amount of sediment reduction would be in Jungle Creek, with a 1.1% reduction through long-term closure and a 13.4% reduction through decommissioning; the most reduction would be in Granite Creek and Little Fall Creek, with reductions of 10.6% and 3.7%, respectively, through long-term closure and reductions of 24.9% and 37.3%, respectively, for decommissioning. Decommissioning and long-term closure treatments would result in a small increase in sediment over the temporary time frame where stream crossings are rehabilitated and roads decommissioned adjacent to stream channels. However, recovery would begin almost immediately, and over the short-to-long term the sediment reduction would be realized.

This alternative includes slightly less road decommissioning and long-term closure than Alternative 2. Coupled with proposed new road construction (as part of road realignment) and the proposed OHV trail, Alternative 4 would result in the least sediment reduction over the long term for all subwatersheds.

Alternative 5

Alternative 5 incorporates the same road actions as Alternative 4, with a few minor changes. These changes result in less than a 0.1% change in sediment as modeled by GRAIP Lite at the subwatershed scale, with one exception. The OHV trail proposed under Alternatives 2 and 4 would not be built under Alternative 5. Instead, the roads on which this trail would be located would be put into ML 1 (long-term closure). This would result in a 0.2% reduction in sediment in

Granite Creek over Alternative 4 through elimination of sediment-delivery points along these roads.

This Alternative would result in the second least sediment reduction, with more reduction than under Alternative 4 but less than under Alternatives 2 and 3.

Hydrologic Function (Channel Conditions, Changes in Peak and Base Flows, Floodplain Connectivity, and Road Density and Location)

Objective 6: *Improve watershed and aquatic function and integrity by moving all watersheds within the Project area toward the desired condition for the soil, water, aquatic, and riparian resources.*

Measurement: *Road Density by Subwatershed and Riparian Conservation Area Road Density*

Alternative 2 (Proposed Action)

Decommissioning roads reduces the overall road density in all subwatersheds within the analysis area by between 1.0 and 2.1 miles per square mile on NFS lands and by between 0.6 and 1.6 miles per square mile if all ownerships are included (see Table 3.5-8). This reduction would, over the long term, improve channel conditions as floodplains are restored, sediment input is reduced, hillslope hydrology is restored, and riparian and upland vegetation replaces road-related soil issues such as compaction and erosion.

Road treatments would also decrease the risk of larger, discrete channel-impacting events such as culvert and road prism failure (caused by flooding or wildfire) followed by precipitation, as restored flood plains would take the place of unstable road fills at crossings and parallel to stream channels.

Overall, this alternative would result in isolated disturbance and impacts on channel conditions over the temporary time frame as crossings and roads adjacent to channels are treated, but it would also result in restoration of conditions over the short and long term, especially where restoration takes place in RCAs. See the Fisheries section for a discussion specific to stream-crossing restoration. Figure 3.5-6 depicts the results of road decommissioning on an adjacent project.

Alternative 3

Decommissioning roads reduces the overall road density in all subwatersheds within the analysis area by between 1.0 and 2.1 miles per square mile for NFS lands and by between 0.6 and 2.0 miles per square mile if all ownerships are included (Table 3.5-8).

This alternative results in the most decommissioning both outside of and within the RCAs. It results in slightly less long-term closure because roads proposed for this treatment under Alternatives 2 and 4 would be decommissioned. Overall, this alternative results in a slightly greater impact on channel conditions over the temporary time frame but provides the greatest restoration of channel conditions over the short and long term.

Alternative 4

Decommissioning roads reduces the overall road density in all subwatersheds within the analysis area by between 0.9 and 2.0 miles per square mile for NFS lands and by between 0.5 and 1.5 miles per square mile if all ownerships are included (Table 3.5-8).

Figure 3.5-6. Examples of before and after road decommissioning showing soil decompaction, restoration to natural slope profile, and revegetation to restore hillslope hydrologic function.

This alternative includes fewer miles of decommissioning in RCAs than under Alternatives 2 and 4 but slightly greater than under Alternative 5. It results in slightly less impact on channel conditions over the temporary time frame as a result of less decommissioning and long-term closure related disturbance, but the alternative also realizes the least benefit to channel conditions over the short and long term.

Alternative 5

Decommissioning roads reduces the overall road density in all subwatersheds within the analysis area by between 0.8 and 1.7 miles per square mile for NFS lands and by between 0.4 and 1.5 miles per square mile if all ownerships are included (Table 3.5-8).

Additional reductions in road-related effects on channel conditions are addressed by 21.6 miles of new system road long-term closures. Unlike Alternative 2, roads in the Granite Creek subwatershed, totaling approximately 3 miles, would be classified as long-term closure but would NOT be part of the proposed OHV trail loop described in Chapter 2. Therefore, restoration would be more fully realized on these roads; stream crossings and drainage issues could be addressed, though soil productivity and soil-hydrologic function would not be fully restored as they would with the decommissioning of these roads proposed under Alternative 3.

This alternative includes the least number of miles of decommissioning in RCAs, though only by 0.2 mile across the Project area when compared with Alternative 4. It results in slightly less impact on channel conditions over the temporary time frame as a result of less decommissioning and long-term closure related disturbance, but this alternative also realizes the least benefit to channel conditions over the short and long term. It offsets the impacts of new road construction associated with road realignment over the short and long term.

Indicator: *Total Road Density and Number of Subwatersheds over 25% ECA*

Alternative 2 (Proposed Action)

For all the action alternatives, vegetation treatments that propose removing more than 20% of the crown cover would affect ECA. Prescribed burning, proposed under all action alternatives, does not affect ECA because it is not expected to remove more than 20% of the existing crown cover.

As displayed in Table 3.5-10, with Alternative 2 the greatest increase in ECA would occur in the Granite Creek—Middle Fork Weiser River subwatershed, with ECA increasing by 4.3%. The ECA would move from below 25% to above 25% in the Mica Creek—Weiser River subwatershed, but only to 26% (Table 3.5-10). Research indicates a change in ECA of 15% or greater (some research shows closer to 20%) is required for measurable change in peak or base flows (Stednick 1996). In summary, no significant change in peak and base flows, and by translation no increase in channel condition risk, is expected to occur with this alternative as a result of vegetation treatments.

Roads are also efficient at routing runoff more quickly to a channel than natural hillslope processes, which can influence magnitude and timing of peak flows. Reducing road density reduces the artificial (man-made) drainage network in a watershed, which in turn can reduce the impact this network has on peak flows. With this alternative, total road density (all ownerships) would be reduced by 0.6 and 1.6 miles per square mile, with the greatest reduction coming in the Granite Creek subwatershed, at the head of the Middle Fork watershed, with a 1.6 mile per square mile reduction (Table 3.5-9). This overall reduction in the drainage network would contribute to improving channel conditions by reducing unnaturally high peak flows and allowing more water to reach streams via natural hillslope processes (Jones et al. 2000).

Table 3.5-9. Road density and Riparian Conservation Area (RCA) road density by subwatershed (miles per square mile [mi/mi2]).

Subwatershed	Alternative 1 (No Action) (mi/mi^2) (all ownership/ National Forest System [NFS] lands only)	Alternative 2 (Proposed Action) (mi/mi^2) (all ownership/ NFS lands only)	Alternative 3 (mi/mi^2) (all ownership/ NFS lands only)	Alternative 4 (mi/mi^2) (all ownership/ NFS lands only)	Alternative 5 (mi/mi^2) (all ownership/ NFS lands only)
Granite Creek	4.6/4.2	3.0/2.5	2.6/2.1	3.1/2.6	3.1/2.6
Jungle Creek	5.9/3.1	5.3/2.1	5.3/2.1	5.4/2.2	5.5/2.3
Little Fall Creek	3.4/3.9	2.7/1.8	2.7/1.8	2.8/1.9	2.9/2.2
Mica Creek	4.8/2.6	4.0/1.6	4.0/1.6	4.1/1.6	4.1/1.7
RCA Road Density by Subwatershed					
Granite Creek	5.5/4.8	3.7/2.8	3.3/2.4	3.8/2.9	3.8/2.9
Jungle Creek	7.1/3.2	6.1/1.8	6.1/1.8	6.2/1.9	6.2/1.9
Little Fall Creek	5.2/5.1	4.1/1.8	4.1/1.8	4.1/2.0	4.2/2.1
Mica Creek	5.3/2.8	4.6/1.8	4.6/1.8	4.6/1.9	4.6/1.8

Note: Road densities are presented for all ownership/National Forest System lands only.

Alternative 3

The least increase in ECA overall would occur with Alternative 3. The ECA would move from below 25% to above 25% in the Mica Creek—Weiser River subwatershed, but only to 26%

(Table 3.5-10). In summary, no significant change in peak and base flows, and by translation no increase in channel condition risk, is expected to occur with this alternative.

The greatest reduction in total road density would be realized with this alternative, with reductions of between 0.6 and 2.0 miles per square mile (Table 3.5-9). This would result in the greatest contribution toward channel restoration and the greatest reduction in the artificial drainage network in the short-to-long term.

Table 3.5-10. Equivalent Clearcut Area (ECA) percentage by subwatershed and alternative (all land ownerships).

Subwatershed	Alternative 1 (No Action)	Alternative 2 (Proposed Action)	Alternative 3	Alternative 4	Alternative 5
Granite Creek—Middle Fork Weiser River	15.3%	19.6% (+4.3%)	18.3% (+3.0%)	19.9% (+4.6%)	19.1% (+3.8%)
Jungle Creek—Middle Fork Weiser River	25.9%	28.1% (+2.2%)	28.1% (+2.2%)	29.1% (+3.2%)	28.0% (+2.1%)
Mica Creek—Middle Fork Weiser River	24.7%	25.9% (+1.2%)	26.0% (+1.3%)	26.0% (+1.3%)	26.0% (+1.3%)
Little Fall Creek—Middle Fork Weiser River	20.9%	24.2% (+3.3%)	24.0% (+3.1%)	24.2% (+3.3%)	23.9% (+3.0%)

Alternative 4

The greatest increases in ECA would occur with Alternative 4. The largest increase would be in the Granite Creek—Middle Fork Weiser River subwatershed, with ECA increasing by 4.6%. The ECA would move from just below 25% to above 25% in the Mica Creek—Weiser River subwatershed, but only to 26% (Table 3.5-10). In summary, no significant change in peak and base flows, and by translation no increase in channel condition risk, is expected to occur with this alternative.

The least reduction in total road density would be realized with this alternative—although only slightly less than under Alternative 2—with reductions of between 0.5 and 1.5 miles per square mile (Table 3.5-9). This and Alternative 5 would result in the least contribution toward channel restoration and the least reduction in the artificial drainage network over the short-to-long term.

Alternative 5

The ECA would increase by 3.8% in the Granite Creek—Middle Fork Weiser River subwatershed, 2.1% in the Jungle Creek subwatershed, and 3.0% in the Little Fall Creek subwatershed. The ECA would move from just below 25% to 26% in the Mica Creek—Weiser River subwatershed. In summary, no significant change in peak and base flows, and by translation no increase in channel condition risk, is expected to occur with this alternative.

The least reduction in total road density would be realized with this alternative—although only slightly less than under Alternatives 2 and 4—with reductions of between 0.4 and 1.5 miles per square mile (Table 3.5-9). This alternative and Alternative 4 would result in the least contribution toward channel restoration and the least reduction in the artificial drainage network over the short-to-long term.

3.5.2.2. Summary of Direct and Indirect Effects

Water Quality (Sediment)

For all alternatives, the proposed vegetation harvest, prescribed fire, road reconstruction, road decommissioning, and long-term closures would result in temporary increases in sediment, as the ground is disturbed in implementing management activities. These activities would be spread out over several years, so the temporary spike would be smaller than if all were implemented at once, but the effects would also last longer. Over the short and long term, natural vegetation recovery and erosion-control measures would stabilize soil, and sediment would return to pretreatment levels and then drop below those levels as decommissioned roads recover. See Table 3.5-1 for GRAIP Lite sediment analysis that compares the long-term outcomes for each alternative.

Over the temporary time frame Alternative 4, with more road reconstruction/realignment, more temporary road construction, and more acres of vegetation treatment and prescribed fire, would result in the greatest sediment impact over both the temporary and long term; Alternative 5 would result in the same effects in all subwatersheds but Granite Creek, where it would achieve slightly more sediment reduction than Alternative 4 through long-term closure of 3.8 more miles of road. Alternative 3 would result in the least sediment increase over the temporary, with the fewest miles of road reconstruction and temporary road use and the fewest acres of vegetation treatment and prescribed fire.

All alternatives meet the objective of promoting watershed restoration over the long term and identify roads for decommissioning, especially in RCAs; however, Alternative 3 provides the biggest sediment reduction. This is due to the increased level of watershed restoration that road decommissioning and long-term closure treatments accomplish within the Project area and to the least amount of new long-term (chronic) sediment introduced by the addition of system roads and an OHV trail (Alternatives 2 and 4).

Hydrologic Function (Channel Conditions, Changes in Peak and Base Flows, Floodplain Connectivity, Road Density and Location)

For all alternatives, the proposed vegetation harvest, prescribed fire, temporary road construction, and road reconstruction would result in temporary impacts on hydrologic function at the subwatershed scale. These activities would be spread out over several years, so the temporary impact would be smaller than if all were implemented at once, but the potential effects would also last longer. Over the short and long term, natural vegetation recovery and road decommissioning would result in a decrease in drainage density and help restore subwatershed hydrologic function to a more natural state. Road decommissioning adjacent to streams and road-stream crossing restoration would immediately help to restore floodplain function and, therefore, contribute to an improvement in channel conditions. See Table 3.5-9 and Table 3.5-10 for changes in ECA and road densities that compare the long-term outcomes for each alternative.

For all alternatives, the ECA analysis indicates that drainages within the Project area are at only a slightly elevated risk for increased peak flows. Over time, as harvest treatment areas mature and regrow, all ECA levels would generally slowly decrease. However, natural disturbance events can also affect ECA levels.

Over the temporary time frame Alternatives 4 and 5, with more road reconstruction/realignment, more temporary road construction, and more acres of vegetation treatment and prescribed fire, would result in the greatest potential impact on hydrologic function by temporarily increasing the

drainage network via increasing road density and decreasing mature vegetation. They also would result in the least road decommissioning and long-term closure, so over the short and long term they would achieve the least in terms of hydrologic function restoration. Note: Alternative 5 is very close to Alternative 4; from an effects perspective, it is almost indiscernible from Alternative 4. Alternative 3 calls for the fewest acres to be treated and the least miles of temporary roads, so it would result in the least temporary increase in drainage network. It also would result in the greatest restoration of hydrologic function over the long term, with the most road decommissioning and long-term closures.

Conclusion

Overall, Alternative 3 does the most to move all Project area subwatersheds furthest toward the desired conditions in the Forest Plan (US Forest Service 2003a). The difference between Alternative 3, compared with Alternatives 2, 4, and 5, is most pronounced in Granite Creek (Table 3.5-11).

Table 3.5-11. Subwatershed indicators for direct and indirect effects and Project objective (measurements for objectives are in italics), compared by alternative.

	Measurement/ Indicator Category	Indicator/ Measurement	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Granite Creek	Water Quality (Sediment)	Miles of temporary road constructed (new/existing prism)	0	2.9/12.1	2.9/9.2	2.9/15	2.9/16.1
		Miles system road reconstructed (includes reconstruction as part of proposed realignment in Alternatives 2 and 4)	0	6.3	5.1	9.0	8.3
		Miles system road construction (includes unauthorized road added to system)	0	1.2	0	2.1	1.7
		Total miles of road decommissioned	0	30.1	36.8	28.2	28.3
		Total miles of road put into long-term closure	0	9.1	6.3	9.1	10.6
		Acres of mechanical vegetation treatment	0	6,360	4,650	6,695	6,315
		Acres of prescribed fire	0	7,630	3,380	8,120	8,150
		Percent over natural rates reduced (decommissioning/ long-term closure) (GRAIP Lite)	0	25.5%/ 10.6%	40.6%/ 7.7%	24.9%/ 10.6%	Alt 4/ 10.8%
	Hydrologic Function (Channel Conditions, Changes in Peak and Base Flows,	*Road density (all lands/NFS lands)*	4.6/4.5	3.0/2.5	2.6/2.1	3.1/2.6	3.1/2.6
		RCA road density (all lands/NFS lands)	5.5/4.8	3.7/2.8	3.3/2.4	3.8/2.9	3.8/2.9

	Measurement/ Indicator Category	Indicator/ Measurement	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
	Floodplain Connectivity, Road Density and Location)	ECA, subwatershed	15.3%	19.6%	18.3%	19.9%	19.1%
		Total road density all lands (mi/sq. mi)	4.6	3.0	2.6	3.1	3.1
Jungle Creek	Water Quality (Sediment)	Miles of temporary road constructed (new/existing prism)	0	1.6/7.2	1.6/2.9	2.2/8.3	2.2/8.0
		Miles system road reconstructed (includes reconstruction as part of proposed realignment in Alternatives 2 and 4)	0	1.5	1.2	2.1	2.1
		Mile system road construction (includes unauthorized road added to system)	0	0.3	0	0.3	0.6
		Total miles of road decommissioned	0	11.9	11.9	11.0	10.8
		Total miles of road put into long-term closure	0	0.7	0.7	0.7	0.7
		Acres of mechanical vegetation treatment	0	3,540	3,180	5,240	4,070
		Acres of prescribed fire	0	4,150	3,380	6,460	4,300
		Percent over natural rates reduced (decommissioning/long-term closure) (GRAIP Lite)	0	14.6%/ 1.1%	14.6%/ 1.1%	13.4%/ 1.1%	Alt 4
	Hydrologic Function (Channel Conditions, Changes in Peak and Base Flows, Floodplain Connectivity, Road Density and Location)	*Road density (all lands/NFS lands)*	5.9/3.1	5.3/2.1	5.3/2.1	5.4/2.2	5.5/2.3
		RCA road density (all lands/NFS lands)	7.1/3.2	6.1/1.8	6.1/1.8	6.2/1.9	6.2/1.9
		ECA, subwatershed	25.9%	28.1%	28.1%	29.1%	28.0%
		Total road density all lands (mi/mi^2)	5.9	5.3	5.3	5.4	5.5
Little Fall Creek	Water Quality (Sediment)	Miles of temporary road constructed (new/existing prism)	0	2.9/6.2	1.8/6.2	1.7/6.2	1.7/6.2
		Miles system road reconstructed (includes reconstruction as part of proposed realignment in Alternatives 2 and 4)	0	2.5	2.5	4.9	4.9
		Mile system road construction (includes unauthorized road added to system)	0	0	0	1.1	1.3

	Measurement/ Indicator Category	Indicator/ Measurement	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
		Total miles of road decommissioned	0	17.6	17.6	16.3	16.2
		Total miles of road put into long-term closure	0	3.2	3.2	3.2	3.3
		Acres of mechanical vegetation treatment	0	4,760	4,475	4,760	4,740
		Acres of prescribed fire	0	5,370	3,200	5,380	5,490
		Percent over natural rates reduced (decommissioning/long-term closure) (GRAIP Lite)	0	37.4%/ 3.7%	37.4%/ 3.7%	37.3%/ 3.7%	Alt 4
	Hydrologic Function (Channel Conditions, Changes in Peak and Base Flows, Floodplain Connectivity, Road Density and Location)	*Road density (all lands/NFS lands)*	3.4/3.9	2.7/1.8	2.7/1.8	2.8/1.9	2.9/2.2
		RCA road density (all lands/NFS lands)	5.2/5.1	4.1/1.8	4.1/1.8	4.1/2.0	4.2/2.1
		ECA, subwatershed	20.9%	24.2%	24.0%	24.3%	23.9%
		Total road density all lands (mi/mi^2)	3.4	2.7	2.7	2.8	2.9
Mica Creek	Water Quality (Sediment)	Miles of temporary road constructed (new/existing prism)	0	2.4/8.8	1.9/8.8	2.1/10.1	2.1/10.1
		Miles system road reconstructed (includes reconstruction as part of proposed realignment in Alternatives 2 and 4)	0	0.6	0	1.3	1.3
		Mile system road construction (includes unauthorized road added to system)	0	0.6	0	1.0	0.4
		Total miles of road decommissioned	0	20.0	20.2	19.7	19.7
		Total miles of road put into long-term closure	0	4.7	4.6	4.7	4.7
		Acres of mechanical vegetation treatment	0	6,020	5,680	6,350	6,225
		Acres of prescribed fire	0	7,090	6,720	7,480	7,600
		Percent over natural rates reduced (decommissioning/long-term closure) (GRAIP Lite)	0	14.5%/ 13.6%	14.5%/ 3.6%	14.3%/ 3.6%	Alt 4
	Hydrologic Function (Channel Conditions, Changes in Peak and	*Road density (all lands/NFS lands)*	4.8/2.6	4.0/1.6	4.0/1.6	4.1/1.6	4.1/1.7
		RCA road density (all	5.3/2.8	4.6/1.8	4.6/1.8	4.6/1.9	4.6/1.8

	Measurement/ Indicator Category	Indicator/ Measurement	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
	Base Flows, Floodplain Connectivity, Road Density and Location)	*lands/NFS lands)*					
		ECA, subwatershed	24.7%	25.9%	26.0%	26.0%	26.0%
		Total road density all lands (mi/mi^2)	4.8	4.0	4.0	4.1	4.1

3.5.3. Minimum Road System

Alternative 1 would not designate an MRS for the Project area. Overall, Alternative 3 does the most to move all Project area subwatersheds furthest toward the desired conditions in the Forest Plan (USDA Forest Service 2003a). The difference between Alternative 3, compared with Alternatives 2, 4, and 5, is most pronounced in Granite Creek.

The alternatives provide a range of options for implementing current road policy and for managing NFS roads and unauthorized routes. All action alternatives propose an MRS built on the initial work done for the area TAP. For all action alternatives, reduction in sediment yields and improvements in hydrologic function at the subwatershed scale are achieved over the long term.

3.5.4. Cumulative Effects

Within the Weiser River subbasin, the entire Middle Fork of the Weiser River watershed and the East Fork Weiser River subwatershed are analyzed. The cumulative effects area totals 78,765 acres, or approximately 123 square miles. Figure 3.5-7 displays the area analyzed for direct, indirect, and cumulative effects for watershed resources. Table 3.5-12 lists indicators for the direct and indirect effects analysis generalized over the cumulative effects area. Note that the only activity proposed for the East Fork Weiser River subwatershed is adding a NFS trail and performing trail maintenance and reroutes intended to decrease the grade and prevent erosion on this trail.

Past Management and Actions

Past management activities, including roads, grazing, timber harvest, residential development, agriculture, and recreation, have increased background levels of sediment in streams within the cumulative effects analysis area. A summary of projects that may contribute to cumulative effects within the Project area can be found in Appendix 3.

Roads

Historic roads and skid trails contribute to a loss in soil productivity and hydrologic function. If not revegetated and/or recontoured, they can also channel overland flow and cause rills and gullies. Past harvest likely has affected the timing and duration of peak flows in the drainages. These actions have occurred on both private and Forest land within the analysis area.

The cumulative effects area includes off-forest roads that deliver sediment, especially those located within 200 feet of streams or water bodies, which contribute to the cumulative condition for sediment, floodplain connectivity, and (in specific locations, such as the Middle Fork Weiser River Road 50186) streambanks.

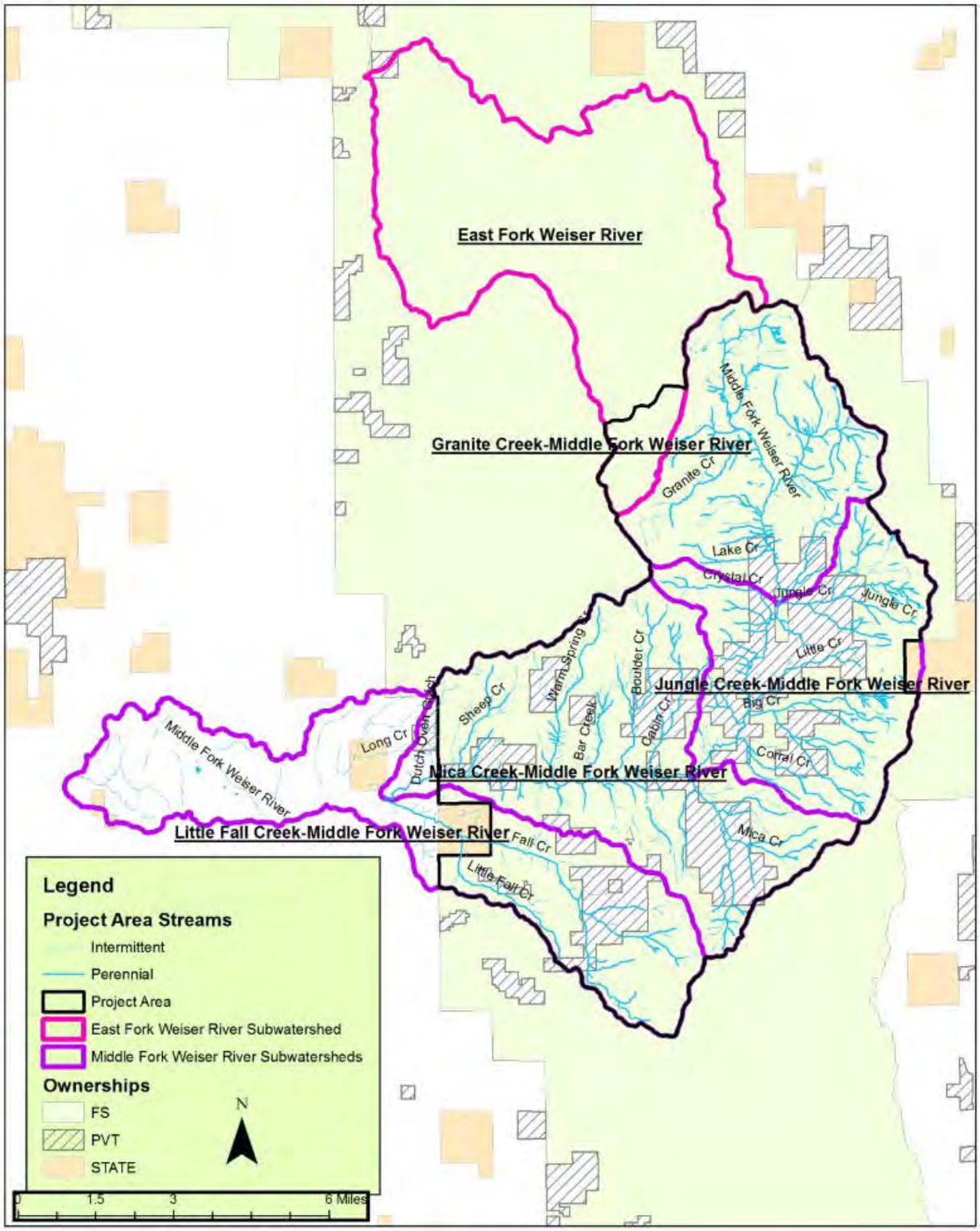


Figure 3.5-7. Cumulative effects analysis area.

Table 3.5-12. Cumulative effects in the Middle Fork and East Fork Weiser rivers.

WCI	Indicator	River System	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Sediment in Cumulative Effects Area	Temporary road constructed (new/existing prism)	East Fork Weiser River	No change	No change	No change	No change	No change
		Middle Fork Weiser River	No change	Slight increase, temporary	Slight increase, temporary	Slight increase, temporary	Slight increase, temporary
	System road reconstructed (includes road added to system as realignment)	East Fork Weiser River	No change	No change	No change	No change	No change
		Middle Fork Weiser River	No change	Slight decrease; reroutes include roads replacing system roads in RCAs	Slight decrease	Slight increase; unauthorized roads added to system outnumber roads they replace in RCAs	Slight increase; unauthorized roads added to system outnumber roads they replace in RCAs
	Long-term closure	East Fork Weiser River	No change	No change	No change	No change	No change
		Middle Fork Weiser River	No change	Slight decrease	Slight decrease	Slight decrease	Slight decrease
	System and unauthorized road decommissioning	East Fork Weiser River	No change	*estimated to be small reduction due to trail reroute	*estimated to be small reduction due to trail reroute	*estimated to be small reduction due to trail reroute	*estimated to be small reduction due to trail reroute
		Middle Fork Weiser River	No change	Decrease	Decrease	Decrease	Decrease
	Mechanical thinning and prescribed fire	East Fork Weiser River	No change	No change	No change	No change	No change
		Middle Fork Weiser River	No change	Slight increase, temporary	Slight increase, temporary	Slight increase, temporary	Slight increase, temporary
Hydrologic Function	Road density	East Fork Weiser River	No change	No change	No change	No change	No change
		Middle Fork Weiser River	No change	Decrease	Decrease	Decrease	Decrease
	Equivalent Clearcut Area	East Fork Weiser River	No change	No change	No change	No change	No change
		Middle Fork Weiser River	No change	Slight increase	Slight increase	Slight increase	Slight increase

Past Timber Harvest

There has been extensive timber harvest on private lands, owned until recently by private timber companies, over the past several decades. This has resulted in areas of concentrated ECA in some drainages, a reduction in stream shade on many reaches within the private land boundary, and high road densities, which have resulted in chronic erosion and sedimentation into many Project area streams. Areas with the highest concentration of this past harvest include the eastern potions of Mica Creek subwatershed and the central portion of the Jungle Creek subwatershed.

Ongoing and Proposed Actions

Travel Management Plan

The Forest has, within the last decade, revised motorized travel management on the Forest, including within the cumulative effects area for this Project. Indiscriminate cross-country travel by motorized vehicles, such as ATVs, motorcycles, and four-wheel drives, is prohibited except as authorized by valid permits. All motorized travel is restricted to designated roads and trails, including short distances off of those travelways for the purpose of dispersed camping.

Changes in areas designated for cross-country motorized travel and designated OHV trails, especially in areas with highly erodible soils, can benefit water quality by reducing erosion and sediment delivered to streams.

Noxious Weed Management

Mitigation measures have been developed to minimize the risk of adverse effects of noxious weed treatment to water quality. Implementing these weed-treatment measures would be expected to yield no (or negligible) effects on sediment, temperature, and other WCIs, and they would not be expected to contribute to the cumulative condition of the watershed. However, by keeping invasive species and the ecological changes they can bring about (i.e., altered fire regime), watershed degradation via altered species can be avoided and the soil and hydrologic processes under which the watershed evolved preserved.

Road Maintenance

Routine road maintenance occurs on most open roads within the area. Maintenance on gravel and native surface roads is mainly surface grading, culvert and ditchline cleaning, and replacement of gravel on the road. Road maintenance on NFS roads would not be expected to appreciably affect sediment within the effects area, as long as associated BMPs are followed.

Livestock Grazing

Active grazing on range allotments, both on NFS and private lands, within the cumulative effects area can contribute to loss of ground cover in RCAs and conversion of desirable native vegetation to less favorable weedy species. Wetlands are at risk for compaction as well, and possible effects on shallow water tables exist.

Proposed and Ongoing Timber Harvest/Vegetation Treatment

The East Fork Integrated Resource Stewardship Contract in the East Fork Weiser River, as well as road decommissioning, long-term closure, and maintenance associated with the MCCM Landscape Restoration project in the same subwatershed, are ongoing projects. Timber harvest on private lands was ongoing in the Middle Fork Weiser River subwatershed until mid-2016,

when ownership changed from a private timber company to a new owner. The plans for the land as of this report are uncertain. These projects are considered as part of the existing condition baseline for the effects analysis and are included in the analysis for cumulative environmental effects. Prescribed fire activities are expected to occur in the East Fork Weiser River subwatershed (also part of MCCM) within the next 5 years.

Recreation

Myriad other recreational activities occur within the cumulative effects area year-round. One developed campground exists, located near the confluence of Cabin Creek and the Middle Fork Weiser River (see Recreation section), and dispersed camping is found throughout the entire cumulative effects area during the snow-free months. The area is popular with hunters and berry pickers in the fall and snowmobilers in the winter. Authorized, groomed snowmobile trail routes traverse the area. Road and trail use by OHVs, motorcycles, and mountain bikes cause erosion and ground disturbance; the use is expected to increase as the human population increases and development continues. These activities are expected to adversely affect sedimentation and water quality in the cumulative effects area.

Designation of dispersed camping and site hardening in some high-use areas, installation of new toilets, and closure and rehabilitation of unauthorized motorized routes in the Middle Fork Weiser River area would result in reductions in soil erosion and improvements to water quality.

Proposed Actions (General)

The same indicators used for the direct and indirect effects analysis were extrapolated to the cumulative effects area (Table 3.5-12). Effects were assessed in a qualitative manner.

Alternative 1 (No Action) would not contribute to the cumulative amount of sediment reaching the Weiser River, either via the East Fork or the Middle Fork Weiser rivers, when added to conditions influenced by past management. It would not contribute to a change in peak or base flows, or implement any prescribed fire, vegetation, or watershed restoration activities.

Under the action alternatives, beneficial uses for the Middle Fork Weiser River would not be impaired, and no Forest Plan WCI would be degraded when added to conditions influenced by past management. Generally, proposed actions would result in a slight increase in sediment in the temporary to short term and a decrease in sediment over the long term. The GRAIP Lite model indicates that all action alternatives would result in a decrease in the cumulative amount of sediment over the long term. It is unlikely that this change in sediment levels would be measurable at the mouth of the East Fork Weiser River (due to very little proposed activity with this Project), nor would it be measurable for the Middle Fork Weiser River, due to remaining high road densities on private land and the large and fairly regular fill-slope failures and chronic erosion of the Middle Fork Weiser River Road (50186). At least for the foreseeable future, the regular sediment input from the recently burned Warm Springs and Boulder Creek drainages (Grays Creek Fire, 2007), which have already experienced major runoff events and contributed large amounts of sediment to the Middle Fork Weiser River three times since 2007, would be significant. The GRAIP Lite model was not used to model the entire cumulative effects area, so the results presented are qualitative.

Over the temporary time frame, hydrologic function at the subwatershed or watershed scale could be affected by a temporary increase in road density as temporary roads are constructed to facilitate vegetation treatments. These roads would contribute to already high road densities on private lands interspersed with NFS lands throughout the Project area. Over the long term, however, road density would be reduced on NFS lands and the cumulative road density over the

entire watershed would be reduced, with approximately one-third of this reduction occurring in RCAs on NFS lands. This, coupled with removal of culverts on system roads proposed as part of long-term storage, would result in a reduced impact and risk to hydrologic function at the subwatershed and watershed scales for all alternatives. Because of the very limited amount of activity proposed in the East Fork Weiser River subwatershed, no change in current or future conditions is expected, and the proposed activity would not contribute cumulatively to any change in the subwatershed.

Wetlands and Floodplains

Within the cumulative effects area, wetlands and floodplains are an important part of hydrologic functionality. Floodplains of varying extent are associated with streams within the cumulative effects area. Past activities have had an effect on wetlands and floodplains. Impacts have been related to historic logging in riparian areas, road construction, placement of drainage structures, cattle grazing, and flow alteration. The floodplains and wetlands along the Middle Fork Weiser River, especially below the Granite Creek subwatershed and numerous other roads within RCAs, have been affected by road fill, which altered flow patterns and restricted flood flows. Action alternatives propose to decommission 23–26 miles of road within the RCAs. Removal of these roads would improve floodplain function and benefit riparian-dependent species. This could result in an incremental improvement for hydrologic functionality in the cumulative effects area. No adverse cumulative effects on wetlands and floodplains are expected from the proposed Project.

Climate Change

The broadly agreed expectation of climate forcing in this ecoregion is a gradual increase in average temperature and an increase in the variability of precipitation (Peterson et al. 2014). Especially if this means more rain as part of the precipitation regime, this could affect hydrologic processes at the watershed scale enough to alter watershed condition indicators like sediment and channel conditions, timing of peak and base flows, and bank stability, which could in turn affect water quality and riparian and stream habitats.

Activities and watershed improvements proposed under the action alternatives with this Project would, over the long term, increase resilience to disturbance and/or changed precipitation regimes when considered in the context of natural processes, past management, and reasonably foreseeable future actions. Proposed restoration activities would result in improvements in sediment and channel conditions throughout the Project area subwatersheds, thus better allowing hill slopes and channels to handle a more variable precipitation regime as more soil is restored to natural infiltration and productivity levels and stream banks revegetate at previously disturbed crossings and where roads were decommissioned adjacent to channels.

Cumulative Effects Summary

Existing harvest units and roads (especially roads in RCAs), road maintenance, livestock grazing, and recreational activities may affect stream conditions and watershed indicators within the cumulative effects area and would be expected to continue to affect watershed conditions and water quality parameters such as stream temperature, nutrients, bacteria, and sediment. In combination with the other activities in the cumulative effects area, the proposed Project is not expected to have any additional detectable negative cumulative effect on watershed resources or water quality in the Middle Fork or East Fork Weiser River drainages or their tributaries. Road

decommissioning planned within the cumulative effects area is expected to result, at the subwatershed scale, in an incremental reduction of sediment produced by roads over time.

3.5.5. Irreversible and Irretrievable Commitments

The action alternatives are not expected to create any impacts that would cause irreversible or irretrievable commitment of aquatic habitat, water quality, or watershed conditions.

3.5.6. Forest Plan Consistency

Alternative 1 (No Action) meets all Forest Plan Standards and Guidelines for water and riparian resources, as no management activity is proposed to increase sediment or cause land disturbance. The WCIs would be maintained. Alternative 1 does not propose any restoration of unneeded roads.

For the action alternatives, consistency with the Forest Plan is proposed to be achieved with the implementation of PDFs and BMPs. Although temporary and short-term increases in sediment may occur, long-term reductions in road-related sediment are documented in the effects analysis as a result of road decommissioning and long-term closure. Project design features and mitigation measures are designed to minimize effects on water and riparian resources. Monitoring plans (Appendix 4) are incorporated into this FEIS to document that BMPs and PDFs are implemented and effective in reducing nonpoint source pollution.

3.5.7. Project Record

This FEIS hereby incorporates by reference the Watershed Specialist Report in the Project record (40 CFR 1502.21). The report is located in the Watershed section of the Project record and contains the data, methodologies, analysis, maps, references, and technical documentation relied on to reach the conclusions in this FEIS.

3.6. Fisheries Resources

3.6.1. Analysis Scale and Data Sources

3.6.1.1. Scope of Analysis

Direct, Indirect, and Cumulative Effects Analysis Area

The fisheries analysis area for baseline conditions as well as direct, indirect, and cumulative effects was completed at the subwatershed scale (6th field HU), which is larger than the Project area (Figure 3.6-1). The analysis area includes the East Fork Weiser River (#170501240203), Granite Creek—Middle Fork Weiser River (#170501240401), Jungle Creek—Middle Fork Weiser River (#170501240402), Little Fall Creek—Middle Fork Weiser River (#170501240404) and Mica Creek—Middle Fork Weiser River (#170501240403) 6th field HUCs. The subwatershed was used as a reporting unit because that scale is biologically and physically relevant and allows for an operational way to understand the spatial context of the existing conditions. Where appropriate for some WCIs, the analysis was also completed at a more site-specific level. Although only a portion of the East Fork Weiser River is included in the Project area, the baseline was completed at the subwatershed scale. The effects analysis will be completed at several scales, as directed in the Forest Plan, including both the subwatershed and site-specific scales. The current Watershed Boundary Dataset (WBD) created by the NRCS was used to delineate subwatersheds.

Temporal Scale of Analysis

Time frames defined in the Forest Plan as temporary (0–3 years), short-term (3–15 years), and long-term (>15 years) were used to temporally define the effects of management actions on the WCIs. The long-term effects on the fisheries resource from implementation of the proposed actions cannot be said to have an “end point” with any accuracy. Therefore, effects were assumed to persist until a natural event or new management action is introduced.

Data Sources

The baseline (current condition) information and descriptions in this analysis were compiled using the WCF (USDA Forest Service 2011a), PNF Fisheries Inventory Database (FID) (unpublished data), PNF WARS database (USDA Forest Service 2003a), GIS coverages[2], Idaho Department of Environmental Quality information, Forest survey data, and online information and/or professional judgment. Habitat data were collected using modified methods described within the R1/R4 method (Overton et al. 1997) and the PNF PIBO Method developed by the Forest fisheries biologists (Nelson and Bonaminio 2011). Figure 3.6-4, shown later in this section, displays fish, habitat, and temperature survey sites from the FID (unpublished data) and National Aquatic Survey (AqS) database (USDA Forest Service 2015c). District and Forest GIS information was used to create maps. See the Fisheries Specialist Report (available in the Project record) for a complete list of references.

[2] The GIS analysis completed by individual specialists sometimes results in slight variations in summarized values. Total acre values and total road miles in this analysis may not always equal those in other resource specialist reports. The direct, indirect, and cumulative effects for indicators are not sensitive to these minor differences at this analysis scale.

The Forest Plan (USDA Forest Service 2003a, Appendix B) and the best information available were used to calculate the baseline and analyze effects on WCIs. Existing literature and scientific data were reviewed to determine potential effects on species, habitat requirements, and other physical and biological parameters resulting from the proposed activities.

The measurements and indicators described below will be used to compare alternatives, determine effects of treatments, and determine compliance with Forest Plan Standards and Guidelines (USDA Forest Service 2003a).

3.6.2. Analysis Process/Measurements and Indicators

The Forest Plan (USDA Forest Service 2003a, Appendix B) and the best information available were used to calculate the baseline and analyze effects on WCIs. Existing literature and scientific data were reviewed to determine potential effects on species, habitat requirements, and other physical and biological parameters resulting from the proposed activities. The WCIs were evaluated at the subwatershed scale and, where appropriate, at the site-specific scale. See the Fisheries Specialist Report (Project record) for more detailed information.

Objective: Project Objective 6 is to improve watershed function and integrity by moving watersheds toward Forest Plan SWRA resource desired conditions. Part of the objective (see the Watershed section for the other parts) includes improving aquatic habitat, restoring riparian vegetation, and reconnecting streams by obliterating and realigning roads within RCAs, reducing the size of and hardening dispersed recreation sites, and removing or upgrading culverts.

Measurements:

- Number of fish barriers replaced (specifically to improve fish passage)
- Stream miles improved (includes miles of fish habitat reconnected and miles of stream enhanced through road decommissioning and road graveling within RCAs)
- Miles of roads within RCAs (left on the landscape)

Miles of stream improved includes miles of fish habitat reconnected (from fish barriers replaced and culverts removed from road decommissioning) and miles of RCA road decommissioning and road improvements (graveling) in RCAs. Crossings would be improved to provide fish passage by either removal or replacement based on the proposed treatment for that road. For each stream crossing removed on a perennial stream, 0.2 mile was considered improved. Graveling can substantially reduce sediment production from roadways (Burroughs and King 1989; USDA Forest Service 2012a) contributing to improved stream sediment conditions.

In addition, the issue statement below addresses the potential for other effects on SWRA resource conditions.

Issue Statement: *Proposed vegetation treatment in RCAs may negatively affect stream temperatures and LWD.*

Indicators:

- Acres of vegetation treatments within RCAs
- Acres treated within one site-potential tree height

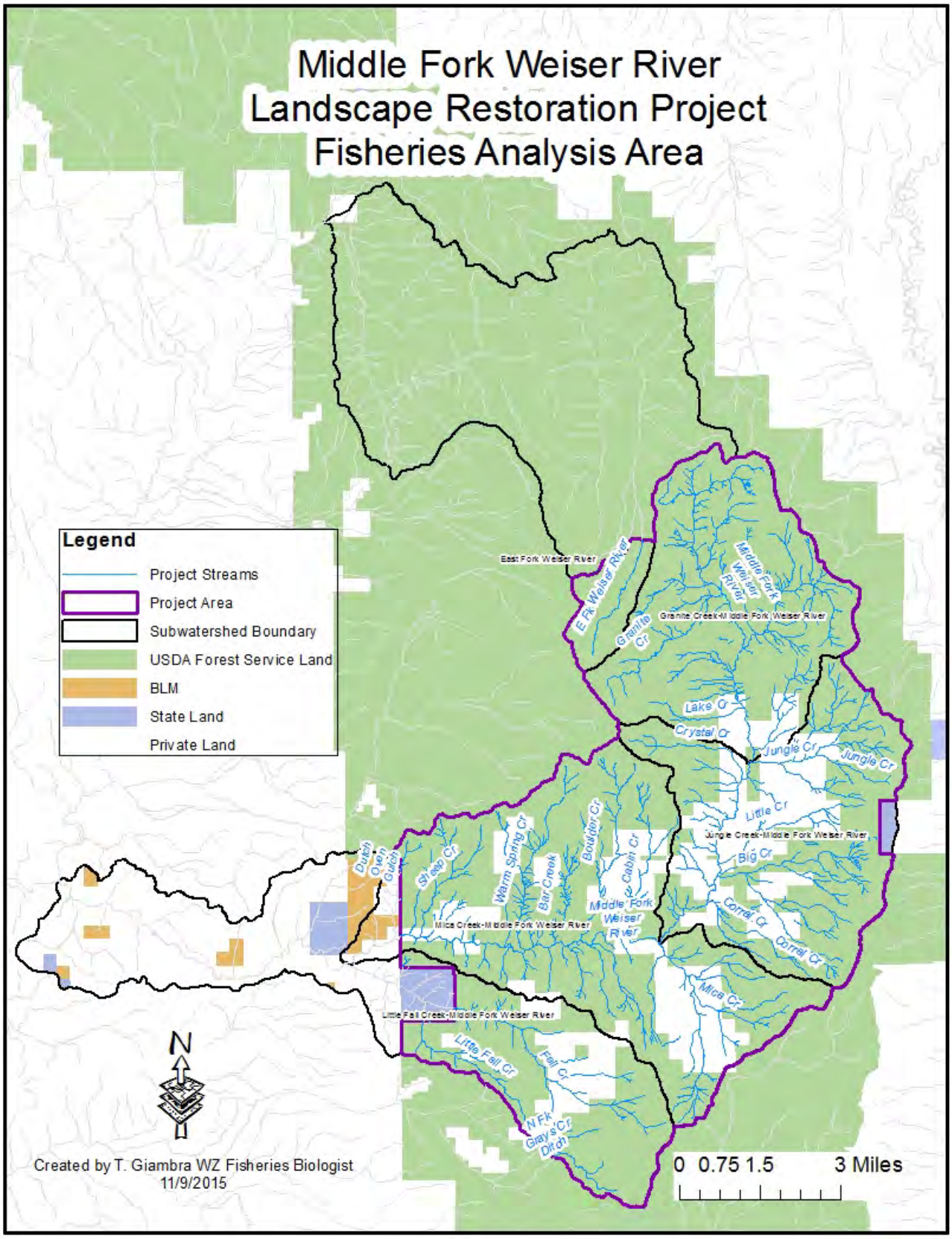


Figure 3.6-1. Fisheries analysis area.

3.6.3. Affected Environment

3.6.3.1. Description of the Project Area

Two main drainages occur in the Project area: the Middle Fork Weiser River and the East Fork Weiser River.

Middle Fork Weiser River Watershed

The Middle Fork Weiser River watershed (5th field HUC# 1705012404) comprises the majority of the Project area including four subwatersheds (Figure 3.6-1), totaling approximately 57,900 acres (Table 3.6-1). Portions of the subwatersheds are located on private land outside Forest Service jurisdiction. Natural waterfalls ranging from partial to full barriers to fish passage occur within the watershed. A large bedrock waterfall about 40 feet high, which is located in the Middle Fork Weiser River between Cabin Creek and Mica Creek, is likely a barrier to upstream fish migration (McGee and Burns 2001). There have been anecdotal accounts of bull trout (*Salvelinus confluentus*) in the drainage; however, intensive fish surveys have not found any bull trout. A large portion of the watershed is privately owned.

Table 3.6-1. Watershed Aquatic Recovery Strategy (WARS) and Aquatic Conservation Strategy (ACS) designations for the subwatersheds in the Project area.

Subwatershed	6th Field Hydrologic Unit Codes (HUC)	6th HUC acreage (mi^2)	Project Acres	WARS Restoration	WARS Priority	ACS Priority	WCF Class
East Fork Weiser River	170501240203	20,906 (32.7)	1,438	Active	Moderate	Yes	3
Granite Creek – Middle Fork Weiser River	170501240401	11,672 (18.2)	11,672	Active	Low	No	3
Jungle Creek – Middle Fork Weiser River	170501240402	12,384 (19.4)	12,187	Active	Low	No	2
Little Fall Creek – Middle Fork Weiser River	170501240404	16,200 (25.3)	7,122	Active	Low	No	2
Mica Creek-Middle Fork Weiser	170501240403	17,564 (27.4)	16,857	Active	Low	No	3

East Fork Weiser River Subwatershed

The East Fork Weiser River subwatershed (6th field HUC #170501240203) is approximately 20,906 acres (Table 3.6-1). However, only about 1,440 acres in the upper portion of the subwatershed are included in the Project area (Figure 3.6-1, Table 3.6-1). The Mainstem East Fork Weiser River and Dewey Creek support a local population of bull trout and are designated critical habitat (USDI FWS 2010, 75 FR 63898). Brook trout (*Salvelinus fontinalis*) are present in the subwatershed.

Current Condition

Columbia River Bull Trout—Listed Species

The Columbia River bull trout is the only Federally listed fish species in the Weiser River subbasin (USDI Fish and Wildlife Service 2015b). The FWS listed bull trout (*Salvelinus confluentus*) as Threatened under the ESA on June 10, 1998 (USDI FWS 1998, 63FR31647).

In 2015, the FWS finalized the *Recovery Plan for the Coterminous United States Population of Bull Trout* (USDI Fish and Wildlife Service 2015a). The Recovery Plan outlines actions believed to be necessary to protect and recover the species. The goal of the Recovery Plan is "…to manage threats and ensure sufficient distribution and abundance to improve the status of bull trout throughout their extant range in the coterminous United States so that protection under the Act is no longer necessary" (USDI Fish and Wildlife Service 2015a, p. vi). The biology and ecology of bull trout in the Columbia River Distinct Population Segment are described in the Recovery Plan. The Recovery Plan includes Recovery Unit Implementation Plans (RUIPs) for each of the six Recovery Units. The Project is located in the Upper Snake Recovery Unit in the Weiser River Core Area. Within the Weiser River Core Area, populations are known to exist in the East Fork Weiser River, Little Weiser River, and in the headwaters of Hornet Creek; however, these local populations isolated and are considered vulnerable (USDI Fish and Wildlife Service 2015a). The East Fork Weiser River is the only bull trout local population within the Project analysis area. No bull trout local populations or potential local populations were identified within the Middle Fork Weiser River drainage.

In 2010 the RMRS developed a scientifically defensible bull trout monitoring protocol based on Isaak et al. (2009). The RMRS identified habitat patches on the Forest with the potential to support bull trout using elevation, stream slope, and contributing drainage area. A bull trout patch is considered a contributing drainage area greater than 500 hectares in size above 1,600 meters elevation (Isaak et al. 2009; Rieman and McIntyre 1995). Twelve patches occur within the analysis area with 11 in the Middle Fork Weiser River drainage and one in the East Fork Weiser River drainage (Figure 3.6-2).

Burns et al. (2005) evaluated bull trout viability and trend on the Forest and concluded that bull trout viability is low in the Weiser River subbasin. A single adult bull trout (200–300 millimeters [mm]) was reported by Hurley (1995) in the mainstem Middle Fork Weiser River above the mouth of Warm Springs Creek in 1994 (Figure 3.6-2). Bull trout have also been reported near Jungle Creek and anglers have reported catching bull trout high in the headwaters of the Middle Fork Weiser River (McGee and Burns 2001). Veach (1998) reported that a fisheries technician caught bull trout in the Middle Fork Weiser River near Jungle Creek, between Warm Springs Creek and Cabin Creek and downstream from the mouth of Fall Creek. Although anecdotal accounts of bull trout have been reported, extensive electrofishing and snorkel surveys completed after those sightings were reported failed to document bull trout presence in any streams in the Middle Fork Weiser River drainage (USDA Forest Service 2015d, FID unpublished data; McGee and Burns 2001; Hogen and Burns 2003; Nelson and James 2010; Williams and Veach 1999). Surveys in 1999 were intense enough to detect a population of bull trout that was larger than 0.74 fish per 100 meters (Hogen and Burns 2003). Brook trout are prevalent throughout the watershed, especially in headwater reaches, and have likely been misidentified as bull trout (Figure 3.6-3). Based on over 250 surveys in the drainage, the absence of bull trout critical habitat, the waterfall near Cabin Creek, and no connectivity with other occupied patches, bull trout are not likely present in the Middle Fork Weiser River.

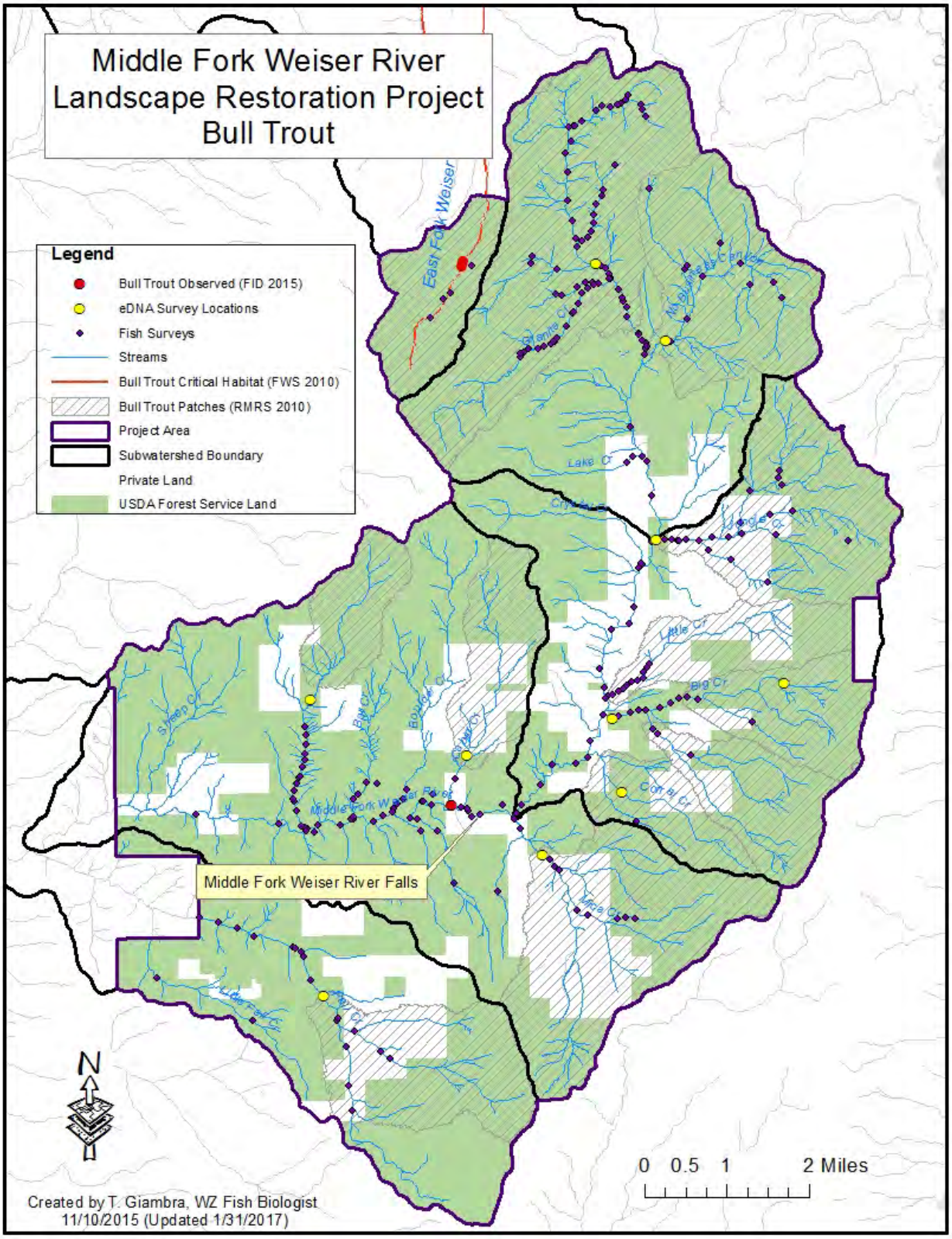


Figure 3.6-2. Bull trout patches, observations, eDNA sample sites, and critical habitat (CH) within the Project area.

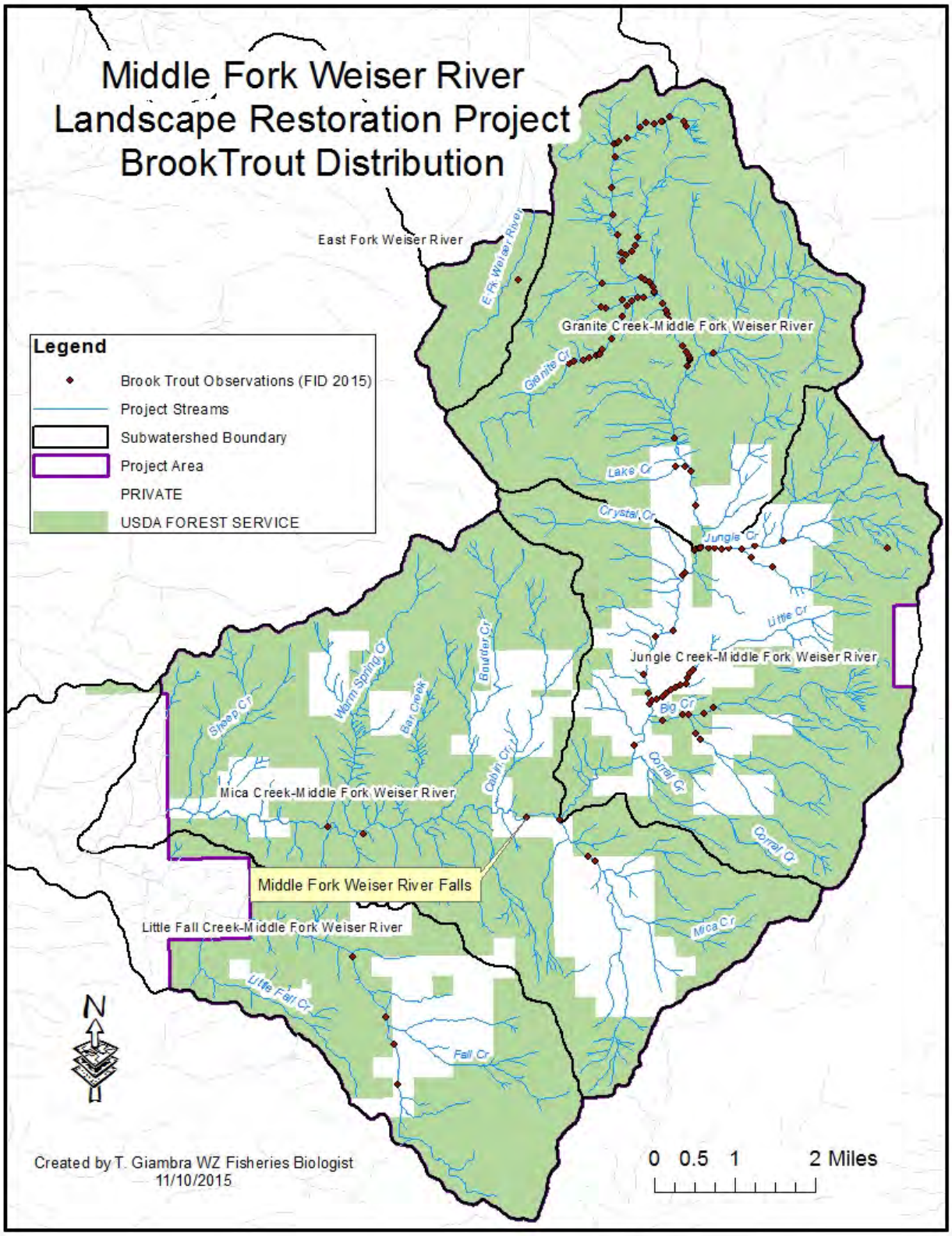


Figure 3.6-3. Brook trout distribution in the Project area.

In 2014 the Forest Fisheries program initiated a strategy to sample bull trout patches throughout the Forest. A temperature monitoring device was placed in stream at the bottom of identified patches and a habitat survey using the Forest PIBO 100 protocol was completed to determine whether suitable habitat exists. An environmental DNA (eDNA) water sample was collected near each site to determine whether bull trout are present (Carim et al. 2015a, b; Jane et al. 2015) (Figure 3.6-2). Nine of the 11 patches within the Project area were sampled in 2014. Two eDNA samples were collected in 2015, at upper East Fork Weiser River above a potential natural waterfall barrier and at Big Creek. The Little Creek patch was not sampled because Little Creek is located primarily on private land. The temperature data were analyzed and included in the baseline data. The RMRS analyzed the eDNA samples collected in 2014 and 2015 and found that bull trout were present in only the East Fork Weiser River patch below the potential natural barrier. Bull trout were not found in the sample collected above the waterfall (Carim et al. 2015a, b, unpublished data). Bull trout were not found in any of the Middle Fork Weiser River drainage samples.

The Rangewide Bull Trout eDNA Project is a partnership between the Forest Service RMRC and biologists from 20 different organizations to collect information about the distribution of bull trout in the northwest (RMRS 2016). Several streams within the Project area were modeled as potentially providing suitable habitat for bull trout. These include Granite Creek, an unnamed tributary to the Middle Fork Weiser River, Jungle Creek, No Business Creek, and the upper Middle Fork Weiser River (USDA Forest Service 2017, raw data in Project record). The eDNA collected will be used to validate modeled habitat and inform conservation planning. In the Middle Fork Weiser River, the Forest Service has collected eDNA from all the patches on Forest lands, along with numerous other past fish presence absence surveys (Figure 3.6-2). In July 2016 the PFC and the Idaho Conservation League contributed to this partnership by collecting about 19 eDNA samples throughout the Middle Fork Weiser River drainage. The data were not available as of January 2017.

Critical Habitat

On October 18, 2010, the FWS (USDI Fish and Wildlife Service 2010) designated critical habitat (CH) for bull trout (75 FR 63898). Within the analysis area, CH occurs only within the East Fork Weiser River (Figure 3.6-2). Although CH was proposed in the Middle Fork Weiser River in 2009 (75 FR 2270), it was not included in the final designation based in part on bull trout distribution information provided by the Forest fisheries group to the FWS (Nelson and James 2010).

Snake River spring/summer and fall Chinook salmon and steelhead

Snake River spring/summer and fall Chinook salmon (*Oncorhynchus tshawytscha*) and steelhead (*O. mykiss*) are listed as Threatened under the ESA, but they have been extirpated from the Weiser River system (USDA Forest Service 2003a, p. III-123) by construction of Hells Canyon Dam complex. No designated or proposed critical habitat or essential fish habitat exists in the Weiser River system for Snake River spring/summer and fall Chinook salmon or steelhead. The proposed Project will have *No Effect* on these species or its habitats, and these species will not be discussed further in this document. A biological evaluation for Chinook salmon and steelhead can be found in the Project record.

Westslope Cutthroat Trout—Sensitive Species

Westslope cutthroat trout (*O. clarkii lewisi*) are listed as a sensitive species by the Regional Forester (USDA Forest Service 2013c). Westslope cutthroat trout are not listed under the ESA. Westslope cutthroat trout are not known to be native to the Weiser River drainage (Behnke 1992) and are not known to inhabit any streams within the Project area. There will be no impact on westslope cutthroat trout within its historical range. A biological evaluation for westslope cutthroat trout can be found in the Project record.

Columbia River Bull Trout—Management Indicator Species

The bull trout is the only aquatic MIS identified in the Forest Plan (USDA Forest Service 2003a, p. E-3). See the bull trout description above.

Other Fishes

The Forest FID (USDA Forest Service 2015d, unpublished data) indicates that several non-ESA-listed fish species occur within the analysis area (Figure 3.6-4) including rainbow/redband trout (*O. mykiss*), brook trout, mountain whitefish (*Prosopium williamsoni*), and sculpin (*Cottus* species).

The Middle Fork Weiser River waterfall (Figure 3.6-5) is approximately 40 feet high, located about 0.5 mile upstream from the Cabin Creek Campground, and an upstream migration barrier to fish (Hogen and Burns 2003). Mountain whitefish were found below the waterfall but not above it (Williams and Veach 1999). During a 2005 Beneficial Use Reconnaissance Program survey near Warm Springs Creek, rainbow trout, shorthead sculpin (*Cottus confusus*), longnose dace (*Rhinichthys cataractae*), and mountain whitefish (State of Idaho 2013) were found. Below Granite Creek, rainbow trout, shorthead sculpin, and brook trout were observed. Bridgelip suckers (*Catostomus columbianus*) have also been reported in the lower Middle Fork Weiser River below the falls (USDA Forest Service 2001).

3.6.3.2. Environmental Baseline (Current Conditions)

A variety of past natural events and management actions have affected the current conditions. Past natural events include flooding and wildland fire. Management actions that have affected current fish habitat conditions include vegetation management, prescribed fire, fire suppression, road building, livestock grazing, irrigation diversions and development, and land management on private lands. Physical barriers and sediment delivery to streams are affecting fish habitat in the analysis area.

Desired Condition

Desired conditions for SWRA resources are described in the Forest Plan (USDA Forest Service 2003a). The Forest Plan lists the following desired condition for SWRA resources (USDA Forest Service 2003a, p. III-18):

- Riparian and aquatic ecosystems have appropriate types and amounts of vegetation
- Appropriate LWD is sufficient in land and stream channel forms to maintain water quality, filter sediment, aid floodplain development, improve floodwater retention and groundwater discharge and contribute to diverse habitat components

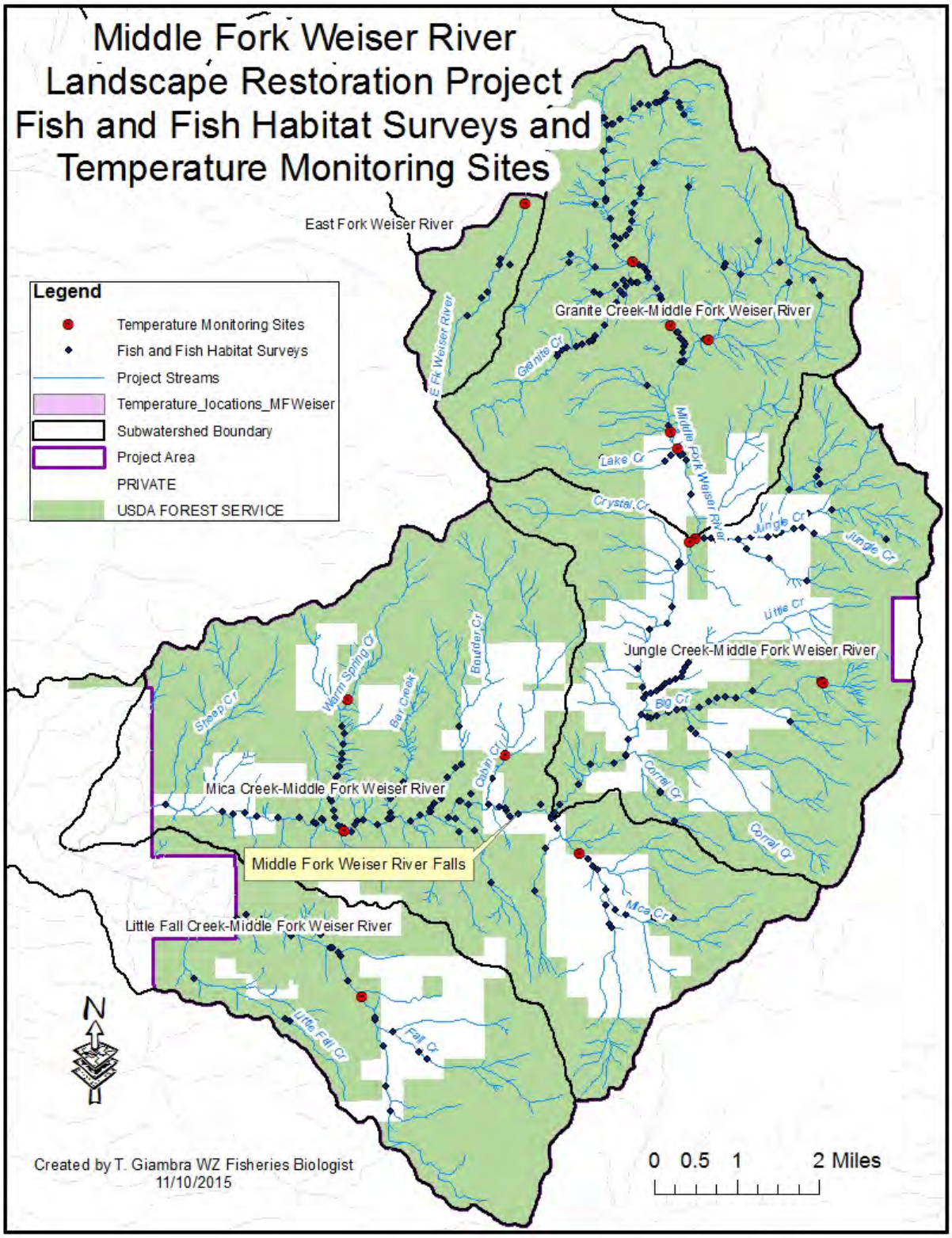


Figure 3.6-4. Locations of fish, habitat, and temperature surveys in the Project area (USDA Forest Service, FID 2015).

Figure 3.6-5. Middle Fork Weiser River falls (photo by T. Giambra 2015).

- Instream flows are sufficient to support healthy riparian and aquatic habitats, the stability and effective function of stream channels, and the ability to route flood discharges and provide for downstream uses
- The amount, distribution and characteristics of life-stage habitats are present to maintain or reach viable populations of native and desired non-native species

Desired conditions for Threatened and Endangered Species as described in the Forest Plan are as follows (USDA Forest Service 2003a, p. III-8):

- Habitats for Threatened and Endangered (TE) species are managed consistent with established and approved Recovery Plans
- Management actions either contribute to or do not prevent recovery or de-listing of these species
- Habitats for Proposed or Candidate species are managed to help preclude listings as TE under the ESA
- Degrading effects from Forest programs are at levels that do not threaten the persistence of Threatened, Endangered, Proposed or Candidate (TEPC) species populations

Pathways and Watershed Condition Indicators

The WCIs and the associated matrices in Appendix B of the Forest Plan (USDA Forest Service 2003a, p. B-12) represent a diagnostic means to determine current conditions and assist in determining future SWRA resources and fish habitat conditions associated with implementing management actions (USDA Forest Service 2003a, GL-40). The matrix tables are intended to be used at a variety of scales. The Forest Plan allows managers to apply functional levels for each WCI: FA, FR, and FUR. Current condition (baseline) tables include a description of the desired conditions, current conditions, and the functional rating for the WCIs. The tables were taken and modified, where appropriate, from the Forest Plan (USDA Forest Service 2003a, p. B-22).

There are 26 WCIs outlined in the Forest Plan (USDA Forest Service 2003a, pp. B-12 to B-21); however, the WCIs most relevant to fish and fish habitat that may be affected by implementing this Project include temperature, sediment/turbidity, physical barriers, LWD, and road density and location. Road location is analyzed in this Fisheries section while road density is discussed in the Watershed section. Current functional ratings for those WCIs are summarized in Table 3.6-2. The environmental baselines were developed at the subwatershed scale and indicate current conditions in the subwatershed, including effects from past management actions. More information on all the WCIs can be found in the Fisheries Specialist Report in the Project record.

Bull Trout Subpopulation Character Pathway

The desired condition for the bull trout WCIs is applicable to the East Fork Weiser River only. Only the local population size and growth and survival WCIs are applicable to the Project. No effect on life history diversity and isolation and persistence and genetic integrity WCIs would occur because connectivity would not be affected. The functional level descriptions for the local population size WCI and growth and survival WCI are described in Table 3.6-3. See the bull trout description above and the Fisheries Specialist Report (Project record) for more information. Table 3.6-4 displays the desired and current conditions for the local population size and growth and survival WCIs.

Table 3.6-2. Subwatershed baseline summary for the Watershed Condition Indicators (WCIs) analyzed for fisheries.

Subwatershed	Bull Trout WCIs[a]	Temperature WCI	Sediment/Turbidity WCI	Physical Barriers WCI	Large Woody Debris WCI	Road Density and Location WCI
East Fork Weiser River	FR[b]	FR (bull trout)	FUR (bull trout)	FR	FA	FUR
Granite Creek	NA	FR	FA	FUR	FA	FUR
Jungle Creek	NA	FR	FA	FUR	FR	FUR
Little Fall Creek	NA	FR	FA	FUR	FA	FUR
Mica Creek	NA	FR	FA	FUR	FUR	FUR

[a]Includes the relevant WCIs – local population size and growth and survival.
[b]FA – Functioning Appropriately, FR – Functioning at Risk, FUR – Functioning at Unacceptable Risk, NA- Not Applicable.

Table 3.6-3. Local population size and growth and survival Watershed Condition Indicators (WCIs) functional level description as identified in the Forest Plan (USDA Forest Service 2003a).

WCI	Functioning Appropriately	Functioning at Risk	Functioning at Unacceptable Risk
Local Population Size	Mean total local population size or local habitat capacity more than several thousand individuals. Adults in local population >500. All life stages are represented within the local population.	Adults in local populations <500 but >50	Adults in local populations <50
Growth and Survival	Local population has the resilience to recover from temporary or short-term disturbances (e.g., catastrophic events) or local population declines within 1–2 generations (5–10 years). The local population is characterized as increasing or stable. At least 10 years of data support this estimate.	When disturbed, the local population will not recover to pre-disturbance conditions within 1 generation (5 years). Survival or growth rates have been reduced from those in the best habitat. The local population is reduced in size but the reduction does not represent a long-term trend. At least 10 years of data support this characterization. If less data are available and a trend cannot be confirmed, a local population will be considered at risk until enough data is available to accurately determine the trend.	The local population is characterized as in rapid decline or is maintaining at alarmingly low numbers. Under current management, the local population condition will not improve with 2 generations. This is supported by a minimum of 5 years of data.

Temperature Watershed Condition Indicator (WCI)

Direct solar radiation is the primary factor influencing summer stream temperatures (Beschta et al. 1987; Chamberlin et al. 1991; Johnson 2004), and stream temperature is directly proportional to the amount of direct sunlight that reaches the stream. As shade in the riparian area increases, water temperature decreases. Consequently, riparian vegetation maintains stream temperatures

(Murphy and Meehan 1991). Cross (2002) indicates that stream temperatures are the result of several factors including direct radiation, air temperature, relative humidity, groundwater input, substrate composition, discharge rate, and reach length.

Table 3.6-4. Current local population size and growth and survival conditions in the Project area.

Subwatershed	Desired Conditions	Current Conditions	Functional Rating
East Fork Weiser River	Mean total local population size or local habitat capacity more than several thousand individuals. Adults in local population > 500. All life stages are represented within the local population.	Bull trout have been found in Dewey Creek and upper East Fork Weiser River above Bench Creek (Greenway 2005; USDA Forest Service 2015d). In 2001, Idaho Fish and Game electrofished in Dewey Creek and East Fork Weiser River and they estimated bull trout densities in Dewey Creek to be 0.06 fish per square meter and 0.008 fish per square meter in the upper East Fork Weiser River. A bull trout (225 millimeters) that was collected 100 meters downstream of the East Fork Ditch diversion (Greenway 2005) was the furthest downstream bull trout have been observed in the East Fork Weiser River.	Functioning at Risk
	Local population has the resilience to recover from temporary or short-term disturbances (e.g., catastrophic events) or local population declines within 1–2 generations (5–10 years). The local population is characterized as increasing or stable. At least 10 years of data support this estimate.	Sufficient data (>10 years) are not available to support an estimate of growth and survival. Therefore, the baseline is described as Functioning at Risk as directed in the Forest Plan (USDA Forest Service 2003a, Table B-1).	Functioning at Risk
Granite Creek	NA	NA	NA
Jungle Creek			
Little Fall Creek			
Mica Creek			

Removing riparian and overhanging vegetation, including overstory, can increase direct solar radiation and insolation during summer months, resulting in elevated water temperatures.

Water temperature influences the metabolism, distribution, behavior, and mortality of fish and other organisms in their environment (Magnuson et al. 1979; Dunham et al. 2003). Fish can often withstand short durations of temperatures above or below their preferred range. Although fish may survive at temperatures near the extremes of their suitable range, growth is reduced at low temperatures because all metabolic processes are slowed and at high temperatures because most or all food must be used for maintenance (Bjornn and Reiser 1991).

The desired condition for the bull trout temperature WCI is applicable to the East Fork Weiser River only. The desired conditions for bull trout are a maximum weekly (7-day average) mean temperature (MWMT) of a reach during the following life history stages: incubation 2–5°C,

rearing 4–12°C, and spawning 4–9°C. Table 3.6-5 displays the Forest Plan descriptions of functional ratings for the Temperature WCIs.

Table 3.6-5. Temperature Watershed Condition Indicator functional level description as identified in the Forest Plan (USDA Forest Service 2003a).

WCI	Functioning Appropriately	Functioning at Risk	Functioning at Unacceptable Risk
Temperature (bull trout)	7-day maximum temperature in a reach during the following life history stages: • Incubation 2–5°C • Rearing 4–12°C • Spawning 4–9°C Also, temperatures do not exceed 15 C or 59.0 F in areas used by adults during migration (no thermal barriers)	7-day maximum temperature in a reach during the following life history stages: • Incubation <2–6°C • Rearing <4°C or 13-15°C • Spawning <4–10°C Also temperatures in areas used by adults during migration sometimes exceed 15 C or 59°F	7-day maximum temperature in a reach during the following life history stages: • Incubation <1 or >6°C • Rearing >15°C • Spawning <4 or >10°C Also temperatures in areas used by adults during migration regularly exceed 15 C or 59°F (thermal barriers present)
Temperature (other fishes: i.e. redband trout) (all life stages)	Summer MWMT is 17–20°C	Summer MWMT is >20 and ≤27°C Or <17 C and ≥15°C	Summer MWMT >27°C or <15°C

Source: Nelson and Burns (2007).

Temperature criteria for other fishes were not developed in the Forest Plan. Nelson and Burns (2007) proposed temperature WCIs specific to redband trout. This temperature criterion will be used for all subwatersheds in the Middle Fork Weiser River drainage portion of the analysis area because bull trout are not present and it is likely more appropriate for the resident species found there.

Temperature data are not available for all streams in the analysis area. Project area temperature monitoring sites are displayed in Figure 3.6-6. Table 3.6-6 displays the current conditions for stream temperatures in the Project area.

Sediment/Turbidity Watershed Condition Indicator

High levels of fine sediment in streams can have many deleterious effects on salmonids and their habitats. Fine sediment can reduce the quality of habitat by filling the interstitial spaces and silt spawning gravels, which can reduce overall stream productivity and fill in pool habitat (Quigley and Arbelbide 1997). Zurstadt and Nelson (2009) state that, "Excess sediment can degrade spawning gravels, reduce embryo survival and emergence, impair growth and survival of juvenile salmonids, fill pool habitat, and reduce the productivity of aquatic macroinvertebrates and other prey items for fish (Bjornn et al. 1977, Suttle et al. 2004)." When spawning gravel exceeds approximately 20% fines, trout embryo survival begins to sharply decrease (McCuddin 1977; Chapman and McLeod 1987). Harvey et al. (2009) observed reduced survival of rainbow trout when habitat complexity was decreased as a result of an increase in sediment in riffles that decreased habitat complexity.

Potential anthropogenic causes of instream fine sediment (≤6 mm) include roads, livestock grazing, recreation, past and ongoing timber harvest, and activities on private and State property.

The Forest Plan desired condition for sediment/turbidity in bull trout spawning areas is <12% fines (<0.85 mm) in gravel or ≤20% surface fines (≤6 mm) (Table 3.6-7; USDA Forest Service

2003a). The desired condition for substrate embeddedness is a dominant substrate of gravel or cobble (interstitial spaces clear) or embeddedness is <20% (Table 3.6-8).

Table 3.6-6. Current temperature conditions in the Project area.

Subwatershed	Desired Conditions	Current Conditions (°C)	Functional Rating
East Fork Weiser River	Bull trout: 7-day maximum temperature in a reach during the following life history stages: Incubation 2–5°C Rearing 4–12°C Spawning 4–9°C Also temperatures do not exceed 15°C or 59.0°F in areas used by adults during migration (no thermal barriers)	The median MWMT (from 2001-2010) in the headwaters of the East Fork Weiser River is 12.1°C which is in bull trout spawning and rearing areas. The MWMT (from 2001-2005, 2010) sometimes exceeded 15°C at locations that are not spawning and rearing areas, but are where an adult bull trout has been documented.	Functioning at Risk
Granite Creek	Other fishes: Summer MWMT is 17–20°C	Average MWMT is 14.0°C in Granite Creek and Middle Fork Weiser River at four different sites. Temperatures ranged from 14.1°C to 15°C from 2000 to 2013.	Functioning at Risk
Jungle Creek		The average MWMT is 15.8°C in Jungle Creek including data from 2001, 2012, and 2013 from three sites. Temperatures ranged from 11.6°C to 22.3°C.	Functioning at Risk
Little Fall Creek		The average maximum weekly maximum temperature was 16.5°C in Fall Creek at two sites (2000, 2001, 2010-2013).	Functioning at Risk
Mica Creek		The average maximum weekly maximum temperature was 20.1°C in Warm Springs Creek and the Middle Fork Weiser River (three sites).	Functioning at Risk

Table 3.6-7. Sediment/turbidity Watershed Condition Indicator (WCI) functional level description as identified in the Forest Plan (USDA Forest Service 2003a) and Overton et al. (1995).

WCI	Functioning Appropriately	Functioning at Risk	Functioning at Unacceptable Risk
Sediment/Turbidity (bull trout)	<12% surface fines (<0.85 mm) in gravel, surface fines (≤6 mm) ≤12%	12%–17% surface fines (<0.85 mm) in gravel, surface fines (≤6 mm) are 12-20%	>17% surface fines (<0.85 mm) in gravel, surface fines (≤6 mm) or depth fines >20% in spawning habitat
Sediment/Turbidity (other fishes: redband trout)	<27% surface fines (Overton et al. 1995)	>27% surface fines (Overton et al. 1995)	

Table 3.6-8. Environmental baseline for sediment/turbidity Watershed Condition Indicator in the Project area.

Subwatershed	Desired Conditions	Baseline Conditions	Functional Rating
East Fork Weiser River	<12% surface fines (<0.85 mm) in gravel, surface fines (≤6 mm) ≤12%	17.5%	Functioning at Risk
Granite Creek	<27% surface fines (Overton et al 1995)	23.5%	Functioning Appropriately
Jungle Creek		23%	Functioning Appropriately
Little Fall Creek		13.7%	Functioning Appropriately
Mica Creek		21%	Functioning Appropriately

Since criteria for sediment for other fishes were not developed in the Forest Plan, the desired condition was developed for the Project using the Natural Conditions Database (Overton et al. 1995). The default criteria were defined as streams with <27% surface fines (≤6 mm) with a

standard deviation of 22 for volcanic B-type streams (Table 3.6-8). The Natural Conditions Database was used to describe the desired condition because the document describes stream conditions in areas that have not been extensively managed by humans.

Physical Barriers Watershed Condition Indicator

Stream crossings can deliver sediment to stream channels, restrict and plug channels during high flows, contribute to road failure, and prevent upstream and downstream passage for fish and aquatic organisms. Improperly installed culverts can fragment habitats and plug them with debris during high runoff periods (Luce and Wemple 2001; Gibson et al. 2005; Colyer et al. 2005). Isolated fish populations are at higher risk of extirpation from stochastic events in habitats where culverts or bridges are inadequately sized, resulting in decreased population viability (Rieman and McIntyre 1995). Fragmented populations also affect gene flow and life history variations and result in smaller refuge habitat and smaller population size (Rieman and McIntyre 1995; Burns et al. 2005). Adams and Zurstadt (2005) estimated that 82% of the culverts surveyed on the Forest were a barrier to juvenile fishes. A Boise National Forest culvert survey (USDA Forest Service 2003c) found that approximately 90% of the culverts on the Boise National Forest were a barrier to at least one life stage of fish at some time of the year.

The Forest Plan desired condition for the physical barriers WCI is that any man-made barriers present in the watershed allow upstream and downstream fish passage at all flow levels (Table 3.6-9). Based on survey data and GIS estimates, the physical barriers WCI is FUR in all four subwatersheds (Table 3.6-10). Several culverts were replaced with AOP structures in the past, including Warm Springs Creek, Bar Creek, Boulder Creek, Little Fall Creek, and mainstem Middle Fork Weiser River. In July 2015, high flows from a storm damaged the Boulder Creek structure, removing the stream simulation and making it impassable to aquatic organisms.

Table 3.6-9. Physical barriers Watershed Condition Indicator (WCI) functional level description as identified in the Forest Plan (USDA Forest Service 2003a).

WCI	Functioning Appropriately	Functioning at Risk	Functioning at Unacceptable Risk
Physical Barriers	Any man-made barriers present in the watershed allow upstream and downstream fish passage at all flows.	Any man-made barriers present in a watershed do not allow upstream and/or downstream fish passage at base/low flows.	Any man-made barriers present in a watershed do not allow upstream and/or downstream fish passage at a range of flows

Large Woody Debris Watershed Condition Indicator

Large woody debris is an important biological and physical component in forested stream ecosystems (McDade et al. 1990); it provides cover for fish and influences stream channel formation, pool formation, and sediment transport and deposition (Sullivan et al. 1987; Bragg et al. 2000). Pool formation is highly correlated to LWD (Quigley and Arbelbide 1997). McDade et al. (1990) found that most LWD originates in areas immediately adjacent to the stream channel. Large woody debris also provides thermal refuge and protection from predators.

The Forest Plan desired condition for LWD is at least 20 pieces of LWD per mile that exceed 12 inches in diameter (0.3 m) and 35 feet (20.6 m) in length, and adequate sources of LWD for both long and short-term recruitment (Table 3.6-11; USDA Forest Service 2003a). LWD were also compared with natural conditions described by Overton et al. (1995). Stream habitat surveys have collected LWD data for pieces that are smaller than those described in the Forest Plan but are consistent with Overton et al. (1995). Table 3.6-12 displays the current conditions for the LWD WCI.

Table 3.6-10. Environmental baseline for the physical barriers Watershed Condition Indicator by subwatershed.

Subwatershed	Desired Conditions	Baseline Conditions	Functional Rating
East Fork Weiser River	Any man-made barriers present in the watershed allow upstream and downstream fish passage at all flows.	All of the mainstem East Fork Weiser River fish passage barriers and those on Dewey Creek have been replaced. A culvert at the mouth of the East Fork Weiser River on Highway 95 remains.	Functioning at Risk
Granite Creek		About 173 road-stream crossings in the subwatershed including about 151 on National Forest Service (NFS) land. Some of the culverts on major streams are currently Aquatic Organism Passage (AOP) structures. Most of the road-stream crossings are on small tributary streams including many non-fish-bearing or intermittent streams.	Functioning at Unacceptable Risk
Jungle Creek		About 203 road-stream crossings in the subwatershed including about 76 on NFS land. Most of the crossings are on tributary streams on non-NFS lands and many of the crossings on NFS land are on small headwater streams.	Functioning at Unacceptable Risk
Little Fall Creek		About 87 road-stream crossings in the subwatershed, including about 33 on NFS land. The major stream crossings have been replaced with AOP structures. Many of the crossings are on non-NFS lands.	Functioning at Unacceptable Risk
Mica Creek		About 156 road-stream crossings in the subwatershed, including about 83 on NFS land. Several of the major tributary stream crossings have been replaced with AOP structures. Many of these crossings are on non-NFS lands or on small headwater streams.	Functioning at Unacceptable Risk

Table 3.6-11. Large woody debris Watershed Condition Indicator (WCI) functional levels as described in the Forest Plan (USDA Forest Service 2003a).

WCI	Functioning Appropriately	Functioning at Risk	Functioning at Unacceptable Risk
Large Woody Debris	**Forest Plan**: >20 pieces per mile, >12 inches in diameter, >35 feet long; and adequate sources of large woody debris for both long and short-term recruitment	Currently meets standards for functioning appropriately but lacks potential source of short or long-term large woody debris recruitment from RCAs to maintain that desired condition	Does not meet the standards for functioning appropriately and lacks potential large woody debris for short and/or long-term recruitment

Table 3.6-12. Environmental baseline for the large woody debris (LWD) Watershed Condition Indicator (WCI) in the Project area.

Subwatershed	Desired Conditions	Baseline Conditions	Functional Rating
East Fork Weiser River	**Forest Plan**: >20 pieces per mile, >12 inches in diameter, >35 feet in length; and adequate sources of large woody debris for both long and short-term recruitment	39 pieces per mile	Functioning Appropriately
Granite Creek		35 pieces per mile	Functioning Appropriately
Jungle Creek		16 pieces per mile	Functioning at Risk
Little Fall Creek		33 pieces per mile	Functioning Appropriately
Mica Creek		6.7 pieces per mile	Functioning at Unacceptable Risk

Road Density and Location Watershed Condition Indicator (WCI)

The Fisheries section focuses on the location portion of the road density and location WCI while road density is addressed in the Watershed section.

High road densities can affect watershed function in a variety of ways. Roads are efficient at routing runoff and sediment to stream channels, so they can increase the volume and affect the timing of peak flows and can contribute fine sediment to stream channels, affecting both fish habitat and channel function (Belt et al. 1992). High road densities in riparian areas can decrease stream shade and pose an increased risk of road prism failure and mass wasting into the stream channel during flood events, which, in turn, can cause greater damage downstream and also degrade fish habitat (Luce and Wemple 2001; Nelson et al. 2004b). When located in riparian areas, roads can directly influence a stream channel and floodplain, alter riparian vegetation, decrease LWD and stream shade, and create fish passage barriers at stream crossings (Furniss et al. 1991). High road density and associated chronic sediment delivery can decrease stream habitat complexity (Furniss et al. 1991; Luce et al. 2001). Nelson et al. (2004b) evaluated relationships between road density and fish habitat attributes on the Forest and found that sediment deposition (i.e., percent surface fines) was positively correlated with road density. High sediment levels can have deleterious effects on salmonids and their habitats. Effects of high sediment levels are described above. Table 3.6-13 displays the Forest Plan descriptions of functional ratings for the road density/location WCI.

In the Project area subwatersheds, road densities (including NFS and unauthorized routes) range from 3.6 to 5.9 miles per square mile on all ownerships with 20.7 to 41.7 miles within RCAs (Table 3.6-14). These densities and road locations are considered FUR, with respect to the Forest Plan.

Table 3.6-13. Road density and location Watershed Condition Indicator (WCI) functional levels as described by the Forest Plan (USDA Forest Service 2003a).

WCI	Functioning Appropriately	Functioning at Risk	Functioning at Unacceptable Risk
Road Density/Location	Total road density of <0.7 mile/square mile of subwatershed, no roads within RCAs	Total road density of 0.7–1.7 miles/square mile of subwatershed, few roads in RCAs	>1.7 miles/square miles of subwatershed, many roads within RCAs

Table 3.6-14. Environmental baseline for the Road Density (mi/mi2)/Location (mi) Watershed Condition Indicator (WCI) functional rating by subwatershed and road miles in Riparian Conservation Areas (RCAs).

Subwatershed	Desired Conditions	Baseline Conditions (mi/mi^2)	Road Miles in RCAs	Functional Rating
East Fork Weiser River	Total road density of <0.7 mile/square mile of subwatershed, no roads within RCAs	4.5	25.2	FUR
Granite Creek		4.5	29.2	FUR
Jungle Creek		5.9	41.7	FUR
Little Fall Creek		3.6	20.7	FUR
Mica Creek		4.8	34.8	FUR

Soil, Water, Riparian, and Aquatic Objective Measurements

The Fisheries section for direct, indirect, and cumulative effects focuses on the relevant WCIs and the measurements related to Objective 6 identified above, including the number of fish barriers removed or replaced, miles of fish habitat reconnected, and miles of road decommissioned within RCAs. A complete analysis for all of the WCIs is included in the Fisheries Specialist Report in the Project record.

3.6.4. Environmental Effects

3.6.4.1. Direct and Indirect Effects

Alternative 1 (No Action Alternative)

Alternative 1 (No Action alternative) does not propose any new management actions for the Project area. Natural processes and ongoing management activities, such as recreation, public firewood gathering, fire suppression, and routine road and trail maintenance, are expected to continue in the Project area.

Physical barriers to fish passage would remain at the current level because no culverts would be removed or replaced. Streams would remain disconnected and fish would not be able to access habitat above impassable culverts. Road decommissioning/obliteration, long-term closures, and graveling would not occur and roads would continue to negatively affect RCAs, sediment, stream shade, temperature, LWD, floodplain connectivity, and the drainage network. The transportation system within the analysis area would remain at current levels under this alternative. Implementing this alternative would not contribute to the Goals and Objectives of the Forest Plan, ACS, or SWRA resource objectives of this Project.

Action Alternatives

Physical Barriers Watershed Condition Indicator (WCI)

East Fork Weiser River Subwatershed (FR)

<u>Alternatives 2, 3, 4, and 5</u>

Physical barriers would be maintained at FR in all three time frames in the East Fork Weiser River subwatershed. The addition of the non-motorized trail and the hardening of the approaches to two crossings would not change physical barriers and would not affect stream miles improved.

Granite Creek (FUR), Jungle Creek (FUR), Little Fall Creek (FUR), and Mica Creek (FUR) Subwatersheds

Culvert Replacements

Table 3.6-15 shows the number of stream crossings that would be replaced with each alternative. Replacing the culverts at Big Creek and the Middle Fork Weiser River near the Granite Creek trailhead with AOP structures would improve hydrologic function and fish passage at these sites under all action alternatives. The PDFs would be implemented for all culvert replacements. Although many stream crossings are present on tributaries to the Middle Fork Weiser River, these streams are intermittent or small perennial headwater streams and provide little, if any, fish habitat. Some culverts, including the main crossings on Bar Creek, Warm Springs Creek, and the mainstem Middle Fork Weiser River, have already been replaced with fish-passable structures.

Table 3.6-15. Culvert replacements by alternative.

Aquatic Organism Passage (AOP)/Habitat Connectivity					
	Alternative 1	**Alternative 2**	**Alternative 3**	**Alternative 4**	**Alternative 5**
Number of AOP improved	0	2	3	2	2

Culvert replacements and removals associated with road decommissioning would benefit native and nonnative fishes throughout the Project area by reconnecting perennial streams and improving hydrologic function at the crossings, reducing the potential for failure during high-flow events in all three time frames. Table 3.6-16 shows the number of road-stream crossings on NFS lands within each subwatershed in the Middle Fork Weiser River drainage. The number of culvert removals was estimated using GIS.

Table 3.6-16. Road-stream crossings on National Forest System land by subwatershed and alternative.

Subwatershed	**Alternative 1**	**Alternative 2**	**Alternative 3**	**Alternative 4**	**Alternative 5**
	Number of crossings (# on perennial streams)	**Number of crossings (# on perennial streams)**	**Number of crossings (# on perennial streams)**	**Number of crossings (# on perennial streams)**	**Number of crossings (# on perennial streams)**
Granite Creek	151 (105)	65 (52)	59 (46)	67 (54)	65 (52)
Jungle Creek	76 (57)	53 (39)	53 (39)	56 (41)	52 (39)
Little Fall Creek	39 (18)	17 (6)	17 (6)	21 (9)	16 (5)
Mica Creek	70 (41)	41 (24)	41 (24)	42 (24)	40 (24)
Total[a]	**337**	**176**	**170**	**186**	**173**

[a]Includes culvert replacements specifically for aquatic organism passage and estimated culvert removals as part of road decommissioning and long-term closures.

Trail crossings associated with the reroutes would not affect physical barriers because the crossings would be either fords or bridges that would not impede aquatic organism passage.

Alternatives 2, 4, and 5 would incrementally improve the physical barriers WCI with replacement of the culverts at Big Creek and the Middle Fork Weiser River. Alternative 3 would improve the WCI slightly more by replacing an additional culvert at Jungle Creek.

Although implementing any of the action alternatives would incrementally improve the physical barriers WCI in all three time frames at all scales, improvements would not be enough to move the WCI from FUR to FR. This WCI would be maintained at all scales.

Stream Miles Improved

Stream miles improved were calculated with GIS using the miles of perennial stream upstream of a proposed culvert replacement, either upstream to known barriers or to the headwaters if no known barriers were present, and miles of stream enhanced through road decommissioning and road improvement (graveling) within RCAs. Culvert removals on perennial streams associated with road decommissioning were each assumed to enhance 0.2 mile of stream. Actual stream miles may vary because not every road-stream crossing is a culvert barrier and miles were estimated using GIS. This is meant for a relative comparison of alternatives. Intermittent streams were not included in the stream miles improved because they do not typically provide fish habitat. No known intermittent, fish-bearing streams occur in the Project area. Table 3.6-17 and Table 3.6-18 display road activities by subwatershed and stream miles improved, respectively.

Table 3.6-17. Road activities within Riparian Conservation Areas (RCAs) by subwatershed and alternative.

Subwatershed	Existing Cond.	Alt 1	Alt 2		Alt 3		Alt 4		Alt 5	
			RCA Road Decom (Oblit)	RCA Road Main[a]	RCA Road Decom (Oblit)	RCA Road Main[a]	RCA Road Decom (Oblit)	RCA Road Main[a]	RCA Road Decom (Oblit)	RCA Road Main [a]
Granite Creek	FUR	0	9.8	14.5	11.4	14.2	9.4	14.5	9.4	15.0
Jungle Creek	FUR	0	5.6	9.2	5.6	9.1	5.3	9.2	5.2	9.1
Mica Creek	FUR	0	4.5	5.5	4.5	5.5	4.3	5.5	4.3	5.4
Little Fall Creek	FUR	0	4.7	5.8	4.7	5.7	4.6	5.8	4.6	5.6
Total Road Miles		**0**	**24.6**	**35.0**	**26.2**	**34.6**	**23.6**	**35.0**	**23.4**	**35.1**

Note: Road miles are slightly different from Table 2.2-7 because of rounding and a small amount occurs outside the analysis area. Alt = alternative, Decom = decommissioned, Oblit = obliterated, Main = maintenance.

Table 3.6-18. Stream miles improved including miles of stream reconnected, Riparian Conservation Area (RCA) system road graveling, and RCA road decommissioning.

Subwatershed	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Granite Creek	0	20.4	23.2	19.6	20.0
Jungle Creek	0	9.2	9.2	8.5	8.8
Little Fall Creek	0	6.9	6.9	6.1	6.9
Mica Creek	0	8.1	8.1	8.0	8.0
Culvert Replacements	0	6.3	6.8	6.3	6.3
Graveling within RCAs	0	5.5	5.5	5.5	5.5
Total[a]	**0**	**56.4**	**59.7**	**54.0**	**55.5**

[a]Includes stream miles reconnected from culvert replacements specifically for aquatic organism passage, estimated culvert removals as part of road decommissioning, RCA road decommissioning and RCA road graveling

Road improvement (graveling) would be 5.5 miles within RCAs for each action alternative.

Alternative 2 (Proposed Action) would improve approximately 53.8 stream miles. This includes 24.6 miles of road decommissioning within RCAs and the removal of approximately 100 total crossings on perennial streams, which would improve about 20 stream miles (0.2 mile per crossing). Replacement of two culverts with AOP structures would reconnect about 6.3 miles of stream. The Big Creek culvert replacement would reconnect about 1.9 stream miles and replacement of the Middle Fork Weiser River culvert would reconnect about 4.4 stream miles in the mainstem Middle Fork Weiser River and Granite Creek. About 5.5 miles of roads would be graveled within RCAs with implementation of Alternative 2.

Alternative 3 would improve a total of approximately 59.7 stream miles. About 21.2 miles would be improved from removal of 106 total crossings on perennial streams associated with RCA road decommissioning (0.2 mile per crossing). Alternative 3 would decommission about 26.2 miles of roads within RCAs. A total of 6.8 miles of streams would be reconnected with replacement of the Big Creek, Middle Fork Weiser River, and Jungle Creek culvert, about 0.5 mile more than under the other action alternatives. Replacement of the Jungle Creek culvert would reconnect about 0.5 mile of the stream up to a fish passage barrier located on private land. About 5.5 miles of road graveling within RCAs would occur. Alternative 3 would result in slightly more road-stream crossings improved than the other alternatives.

Alternative 4 would improve about 54 stream miles. This includes 23.6 miles of road decommissioning within RCAs and the removal of approximately 93 total crossings on perennial streams, which would improve about 18.6 stream miles (0.2 mile per crossing). Replacement of two culverts with AOP structures would reconnect about 6.3 miles of stream. The Big Creek culvert replacement would reconnect about 1.9 stream miles and replacement of the Middle Fork Weiser River culvert would reconnect about 4.4 stream miles in the mainstem Middle Fork Weiser River and Granite Creek. About 5.5 miles of roads would be graveled within RCAs with implementation of Alternative 4. Implementation of Alternative 4 would improve slightly less stream miles than the other alternatives.

Alternative 5 would improve about 55.5 stream miles. This includes 23.4 miles of road decommissioning within RCAs and the removal of approximately 101 total crossings on perennial streams, which would improve about 20.2 stream miles (0.2 mile per crossing). Replacement of two culverts with AOP structures would reconnect about 6.3 miles of stream. The Big Creek culvert replacement would reconnect about 1.9 stream miles and replacement of the Middle Fork Weiser River culvert would reconnect about 4.4 stream miles in the mainstem Middle Fork Weiser River and Granite Creek. About 5.5 miles of roads would be graveled within RCAs. Implementation of Alternative 5 would improve slightly more stream miles than the other alternatives due to more roads placed in long-term closure (with the associated culvert removals).

Road Density and Location Watershed Condition Indicator (WCI)

Road density and location are used to determine a reduction in road-related impacts on streams; however, only road location is analyzed in the Fisheries section. See the Watershed section for road density information. Road decommissioning, particularly in RCAs, under all action alternatives is expected to result in long-term sediment reduction across the Project area. Road treatments are described for each of the alternatives in Chapter 2. Road activities and resulting RCA road miles (RCA road miles that will be left on the landscape) are displayed in Table 3.6-19. Alternative 3 results in slightly fewer RCA road miles than Alternatives 2, 4, or 5, which would result in slightly more benefit to SWRA resources. The miles of roads decommissioned include NFS roads and unauthorized routes. The miles of unauthorized routes decommissioned

include those proposed for treatment and any planned temporary roads located on unauthorized routes. Road mileages were calculated using the Project GIS information.

Table 3.6-19. Riparian Conservation Area (RCA) road miles by subwatershed and alternative left on the landscape.

Subwatershed	RCA Road Miles left on the Landscape by Alternative (All ownership/National Forest System land only)				
	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Granite Creek	29.2/23.7	19.9/13.7	18.2/12.0	20.4/14.3	20.0/14.2
Jungle Creek	41.7/12.8	36.4/7.2	36.3/7.1	36.8/7.5	36.7/7.6
Little Fall Creek	20.7/7.4	16.5/2.6	16.5/2.6	16.7/3.0	16.7/3.1
Mica Creek	34.8/13.4	30.6/8.4	30.4/8.3	30.6/8.5	30.3/8.5
Total	126.4/57.3	103.4/32.8	100.4/29.9	104.5/33.3	103.7/33.3

The action alternatives are expected to result in a temporary to short-term sediment increase (potentially caused by road use, decommissioning, realignment, and reconstruction) followed by a long-term decrease in sediment delivery to streams in all of the subwatersheds (see the Watershed section in this document for more information). By decommissioning roads within RCAs, sediment delivery would be reduced and shade and LWD potential would be increased in the long term. All action alternatives would address the SWRA resource objective to reduce road-related effects on streams. Because the fewest miles of RCA road miles would remain under Alternative 3, it would result in slightly more benefit than the other action alternatives (Table 3.6-17).

Bull Trout Subpopulation Character Pathway Watershed Condition Indicator (WCI)

Local Population Size, Growth and Survival, Life History Diversity and Isolation, Persistence and Genetic Integrity Watershed Condition Indicators (WCIs)

East Fork Weiser River Subwatershed

Alternatives 2, 3, 4, and 5—The only activities proposed within the East Fork Weiser River drainage are the formal designation and signage of the former non-motorized trail 202 as non-motorized 212 trail and a trail reroute on the same trail. The non-motorized 202 trail has existed for approximately 30 years and was maintained informally by a local group. The trail crosses the upper East Fork Weiser River and an unnamed tributary stream. The topography in the contributing area of the East Fork Weiser River crossing is flat and passes between two cattle exclosure fences. The river in that location often runs dry in late summer. The topography near the trail crossing on the tributary stream is flat on one side and slopes upward on the other side. The trail crossings would be hardened with rock to stabilize the streambanks and minimize sediment delivery to the streams from trail use. See the Fisheries Specialist Report (Project record) for more information.

Trail work would be completed during low flows after spring peak flows and prior to August 15, which is the start of the bull trout spawning period. The work would be completed by hand and would occur outside the wetted stream width. Instream work would be minimized to the extent possible. Erosion-control and sediment-plume mitigation measures would minimize sediment delivery to the stream; however, some sediment delivery is likely unavoidable.

A natural waterfall is located approximately 0.16 mile (844 feet) downstream from the trail crossing. The natural waterfall is approximately 5 feet high and is likely a passage barrier to some life stages of fishes, particularly in low flows. The waterfall has not been verified as a fish-passage barrier; however, the closest observation of a bull trout was immediately below the waterfall. An electrofishing survey completed in 2014 did not find bull trout in either the mainstem or the tributary above the waterfall to the trail crossings. An eDNA sample collected above the waterfall in 2015 did not detect any fish (Carim et al. 2015a, b, unpublished data; USDA Forest Service 2015d, FID unpublished data). Trail hardening approaches may affect but are not likely to adversely affect bull trout and critical habitat because an electrofishing survey and an eDNA sample did not find bull trout in that section of river. Bull trout have not been documented above the potential barrier, and all work would be completed prior to August 15th to avoid the bull trout spawning period. Sediment delivery is expected to be minimal and effects from sediment generally would occur up to 600 feet downstream from the site (Faurot and Burton 2005), which is less than the closest observation of a bull trout.

Approximately 530 feet of the non-motorized trail would be rerouted within the RCA of the tributary to the East Fork Weiser River. Currently, the trail within the RCA is very steep and does not disperse water properly, resulting in rutting and erosion. Rerouting the trail and improving trail drainage would decrease erosion and incrementally decrease sediment delivery to the stream. No direct effects on bull trout from the trail reroute are expected because there would be no instream work. No trees are expected to be cut because the trail would be designed to avoid large trees. Stream shading and temperatures, LWD, and sediment would be maintained in all three time frames from implementation of this activity.

Granite Creek, Jungle Creek, Mica Creek, and Little Fall Creek Subwatersheds

Alternatives 2, 3, 4, and 5—There would be no effect on any of the bull trout-specific WCIs in the Middle Fork Weiser River drainage, including local population size, growth and survival, life history diversity and isolation, persistence and genetic integrity, temperature (bull trout), sediment/turbidity (bull trout) and refugia because neither bull trout nor its critical habitat exist within or downstream from the analysis area (USDA Forest Service 2015a, unpublished data; USDI Fish and Wildlife Service 2010).

Stream Temperature Watershed Condition Indicator (WCI)

This indicator would be maintained under all action alternatives. Direct solar radiation is the primary factor influencing stream temperatures in the summer (Beschta et al. 1987; Chamberlin et al. 1991; Johnson 2004). Stream temperature is directly proportional to the amount of direct sunlight that reaches the stream. Riparian vegetation maintains stream temperatures and, as shade increases, water temperature decreases. Murphy and Meehan (1991) and FEMAT (1993) evaluated the effectiveness of buffer widths with respect to tree height and demonstrated a buffer width of one tree height effectively maintains litter fall and root strength and retains most of the shading and LWD functions. Project activities that would remove or alter vegetation that provides shading to streams have the potential to increase insolation and, in turn, increase stream temperatures. Vegetation treatments within RCAs have the potential to reduce stream shading and affect stream temperatures. The RCA vegetation treatment guidelines are described in Appendix 5.

East Fork Weiser River Subwatershed (FR)

Alternatives 2, 3,4, and 5—The only activity proposed in the East Fork Weiser River subwatershed is recreation improvements, including adding an existing trail to the system,

hardening the approaches of two stream crossings, and rerouting a trail. Stream temperatures would be maintained because no trees would be cut within RCAs. The trail reroute would be designed to avoid cutting large trees and would not affect stream shading. Some brush and small trees may need to cut, which would not affect stream shading in any time frame.

Granite Creek (FR), Jungle Creek (FR), Little Fall Creek (FR) and Mica Creek (FR) Subwatersheds

Riparian Conservation Area Vegetation Treatments

Alternative 2—Approximately 13,900 acres of RCAs (delineated using one or two site-potential tree heights on intermittent and perennial streams) occur within the entire Granite Creek, Jungle Creek, Little Fall Creek, and Mica Creek subwatersheds—12,317 acres within the entire Project area and 9,480 acres on NFS lands within the Project area. All treatments would occur as described in Chapter 2, and thinning within RCAs would follow the RCA Management Guidelines located in Appendix 5. A no treatment buffer of 120 feet from perennial streams and 60 feet from intermittent streams would exist for most treatments within RCAs. Treatments within the inner RCAs are described below. Alternative 2 proposes to treat up to about 3,000 acres within the outer portion of RCAs, which is approximately 31% of the total RCA acres on NFS lands within the Project area, about 24% of the RCAs on all lands within the Project area, and about 21% of the total RCA acres in all the subwatersheds. Outer RCA treatments would not be expected to measurably affect stream temperatures at the subwatershed scale because no RCA treatments would occur within one site-potential tree height (0–120 feet from perennial streams), which would retain shade, and only limited harvest would occur within two site-potential tree heights (120–240 feet from perennial streams). At least 30% of the canopy cover would be retained in the outer portion of the RCA. In western Oregon, Steinblums (1977) found that buffer strips 85 feet wide are adequate to provide shading to protect stream temperatures. Also in Oregon, Brazier and Brown (1973) found that stream buffers of 80 feet are adequate to provide maximum shading and 90% of shading occurs in the first 55 feet of buffer. DeWalle (2010) found that buffer widths of approximately 59–65.6 feet provided approximately 85%–90% of total shade to streams. The FEMAT (1993) evaluates the effectiveness of buffer widths with respect to tree height and demonstrated a buffer width of one-tree height effectively maintains litter fall and root strength and retains most of the shading and LWD functions. Therefore, limited treatments in the outer RCA (beyond one site-potential tree height) are expected to maintain adequate shade, and no treatment within 120 feet of streams would protect existing shade.

Treatments would occur within 120 feet of a small fuel-reduction site on a small perennial tributary to Mica Creek (Appendix 1). The fuel reduction site would be up to 15 acres in size and would treat both the outer and inner portion of RCAs. Hand thinning, noncommercial thinning (ladder fuel reduction), and the introduction of fire would not occur within 15 feet of the channel but would occur from 15 feet to 120 feet. No mechanical ground-disturbing treatments would occur within 120 feet of the stream channel. If feasible, equipment may sit on the road and remove trees from the RCA. This treatment would occur on the north side of the stream and would not be expected to measurably affect stream temperatures because trees on the north side of streams do not provide much shade.

Limited vegetation treatments within one site-potential tree height would occur on intermittent streams. Alternative 2 proposes approximately 594 acres of treatment on the outer 60 feet of intermittent streams. No treatment would occur within 60 feet of intermittent stream channels. Vegetation treatment from 60 feet to 120 feet from intermittent streams is expected to maintain

adequate stream shading at the subwatershed scale because the treatment acres within one site-potential tree height is small relative to the overall amount of RCAs (about 6.2%) and intermittent streams are expected to be dry during the hottest months when increases in water temperatures from reduced shading would most likely occur.

Based on the PDFs (RCA distances, no treatment buffers and PDF #13), literature cited above, the fact that at least 30% of the canopy cover would be retained, and that intermittent streams would be dry during the hottest months, vegetation treatment within RCAs is expected to maintain stream shading and temperature in all three time frames at the subwatershed scale. Treatments within RCAs of wet meadows would not affect stream temperatures.

Alternative 3—Alternative 3 proposes treating 2,668 acres within the outer portion of RCAs, which would be approximately 28% of the total RCA acres on NFS lands within the Project area and about 22% of the RCAs on all lands within the Project area. Alternative 3 is expected to maintain stream temperatures. This alternative would remove less vegetation within RCAs than Alternatives 2 and 4 and no inner RCA treatments are proposed.

Alternative 4—Alternative 4 proposes treating 3,627 acres within the outer portion of RCAs, which would be approximately 38% of the total RCA acres on NFS lands within the Project area and about 28% of the RCAs on all lands within the Project area. Approximately 2,696 acres would be treated in the outer portion of perennial stream RCAs and about 620 acres treated in intermittent stream RCAs. Also, approximately 203 acres of RCA treatments would occur within inner RCAs, primarily in wet meadows and wetlands, including about 15 acres along perennial streams. Alternative 4 treats more RCA acres than Alternatives 2 and 3. Stream temperatures could be affected; however, stream temperatures are expected to be maintained at the subwatershed scale as indicated in the literature cited above, as a result of PDFs, and because intermittent streams would be dry during the hottest months.

Alternative 5—Alternative 5 proposes treating 3,162 acres within the outer portion of RCAs, which would be approximately 33% of the total RCA acres on NFS lands within the Project area and about 26% of the RCAs on all lands within the Project area. Approximately 2,250 acres would be treated in the outer portion of perennial stream RCAs and about 558 acres treated in intermittent stream RCAs. Also, approximately 213 acres of RCA treatments would occur within inner RCAs, primarily in wet meadows and wetlands, including about 15 acres along perennial streams. Alternative 5 treats fewer RCA acres than Alternative 4 and more than Alternatives 2 and 3. Stream temperatures could be affected; however, stream temperatures are expected to be maintained at the subwatershed scale as indicated in the literature cited above, as a result of PDFs, and because intermittent streams would be dry during the hottest months.

<u>Prescribed Fire, Noncommercial Thinning and Shaded Fuelbreak</u>

Alternative 2—Within the Granite Creek, Jungle Creek, Little Fall Creek, and Mica Creek subwatersheds, burn blocks under Alternative 2 propose treating approximately 24,200 acres with prescribed fire, including about 6,319 RCA acres (outer RCA), which may also include noncommercial thinning treatments (Table 2.2-5). A SFB of approximately 370 acres is also proposed, with about 52 acres in the outer RCA. Commercial activities would generally be completed prior to fire application. Prescribed fire would be allowed to back into RCAs, and some ignition may occur in appropriate vegetation types. Ignition is expected to occur in the outer portion of up to 25% of RCAs located in burn blocks (LaChapelle, Fuels Specialist, personal communication). No ignition or noncommercial thinning would occur within 120 feet of perennial channels or 60 feet of intermittent channels, except within the 15-acre fuel treatment area described above or where approved by a hydrologist and/or fisheries biologist. All ignitions in RCAs would be subject to PDFs designed to improve or maintain riparian areas and their

functions and would require approval from a hydrologist and/or fish biologist. Fire would not be directly applied to nontarget areas. Approximately 20% of nontarget acres located within the proposed burning areas would be expected to receive fire through backing (low-intensity fire spread, without additional lighting).

Fire allowed to back into RCAs could alter stream shade by changing the structure of both overstory and understory vegetation, and a few trees may be directly or indirectly killed by prescribed fire. However, prescribed burning, including active ignition within RCAs, is not expected to measurably change stream temperatures in the Project area because mortality would not be substantial as prescriptions would require low-intensity fire and would not target overstory vegetation. The seasonal timing of burning (spring or fall) and anticipated lower fire intensities due to higher soil moisture and relative humidity would not be expected to measurably alter stream shade. Much of the riparian vegetation would either not burn or burn at a low intensity, resulting in a mosaic of low-intensity burned and unburned areas. Noncommercial thinning may also occur, which would reduce ladder fuels with the intent of keeping fire from entering the overstory, which would also maintain stream shade. Revegetation after prescribed fire treatments is expected to occur quickly. Prescribed fire research on the Forest shows that riparian effects are often not observed (Arkle and Pilliod 2010). Halofsky and Hibbs (2009) found that riparian functions are resilient and rapid regeneration of vegetation within riparian areas followed wildland fires in Oregon.

The 370-acre SFB (approximately 52 acres in the outer RCA) is expected to maintain stream temperatures because no vegetation would be cut within 120 feet of perennial streams and 60 feet of intermittent streams. Ignition may occur with approval from the hydrologist and/or fisheries biologist in areas where SWRA resource conditions can be maintained, and ignition would only occur in the outer RCAs.

Alternative 3—Approximately 16,600 acres of prescribed fire, including about 4,511 RCA acres (outer RCA), are proposed under Alternative 3. Anticipated effects on stream temperatures would be less than and similar to those described under Alternative 2.

Alternative 4—Approximately 27,400 acres of prescribed fire, including 7,422 RCA acres (outer RCA), are proposed under Alternative 4. Effects to stream temperatures from prescribed fire under Alternative 4 would be similar to and slightly greater than effects under Alternative 2.

Alternative 5—Approximately 27,200 acres of prescribed fire, including 7,386 RCA acres (outer RCA), are proposed under Alternative 5. Effects to stream temperatures from prescribed fire under Alternative 5 would be similar to and slightly less than effects under Alternative 4.

<u>Road Activities (including decommissioning, reroutes, realignments and temporary roads)</u>

Within RCAs, road reconstruction, road reroutes, realignments, and planned new temporary roads may reduce stream shading when trees or other vegetation are removed near streams. About 1.2 miles of planned new temporary roads within RCAs are included under each action alternative. Developing these new temporary roads would not measurably change stream temperatures at the subwatershed scale in any time frame because the mileage is small relative to the entire subwatershed and few shade-providing trees would be cut. In addition, about 50 miles of unauthorized roads would be decommissioned after use. These activities would occur primarily on existing roadbeds where the vegetation is likely not substantially contributing to stream shade because the trees are generally not large enough to provide shade. Therefore, removing vegetation on existing roadbeds and on planned new temporary roads would not measurably affect stream temperatures at the subwatershed scale. Expanding gravel pits or their

access roads or developing new gravel pits would not affect stream shading because they are not located within any RCA.

Incidental temporary roads (up to 7 miles total) would be approved by the hydrologist and/or fisheries biologist prior to construction, and all temporary roads would be decommissioned after vegetation treatments/Project activities are completed. These roads are expected to be located outside RCAs and would not affect stream temperatures.

Decommissioning (obliteration) of roads within RCAs would incrementally increase riparian vegetation in the short and long term as the areas revegetate. Increased riparian vegetation would provide more trees that would potentially provide stream shade, depending on the aspect and their distance from stream channels, with a corresponding incremental decrease in stream temperature over the long term. Localized, site-specific reductions in stream shading may occur in the temporary-to-short term from road decommissioning adjacent to streams and at stream crossings, but no measurable effects are expected at the subwatershed scale because of the relatively small change in shading. Table 3.6-17 displays the RCA road activities by subwatershed and alternative. Under Alternative 2, approximately 24.6 miles of RCA road would be decommissioned (obliterated) in the Project area. Stream temperatures would be maintained at the subwatershed scale in all time frames.

Alternative 3—Alternative 3 proposes decommissioning (obliterating) approximately 26.2 miles of RCA roads within the Project area. Because of the additional road miles decommissioned under Alternative 3, this alternative is expected to increase stream shading and decrease stream temperatures slightly more over the long term than the other alternatives.

Alternative 4—Alternative 4 proposes decommissioning (obliterating) approximately 23.6 miles of RCA roads within the Project area. Effects to stream temperatures from road activities are expected to be similar to those under Alternative 2.

Alternative 5—Alternative 5 proposes decommissioning (obliterating) approximately 23.4 miles of RCA roads within the Project area. Effects to stream temperatures from road activities are expected to be similar to those under Alternative 4.

Fish Passage Improvements and Temporary Stream Crossings

Improvements to fish passage, including culvert replacements and installation of temporary stream crossing during road reconstruction, are not expected to measurably affect stream temperatures at the site-specific or subwatershed scale because those activities would not measurably alter stream-shading vegetation. Alternatives 2, 4, and 5 propose replacing two culverts for fish passage, and Alternative 3 proposes replacing three culverts. Site-specific reductions in stream shading may occur at stream crossings where roads are reconstructed immediately adjacent to stream channels but, based on other past culvert replacements on the Forest, few trees would be removed to install or remove culverts. Culvert replacement would reduce shading at individual sites, but the disturbed areas would revegetate over time with short- and long-term increases in shading as the vegetation reestablishes.

Recreation Improvements

Alternative 2—Recreation improvements proposed in Cabin Creek campground are expected maintain stream shading and temperatures because the activities—including installing kiosks, site markers, and accessible tables, graveling an accessible trail to the toilet, relocating a vault toilet, and widening and graveling of the loop road—require few, if any, trees to be cut, and the campground is located outside RCAs.

Other activities include improvements to several dispersed camping sites (installing a vault toilet, fire rings, and hitch rails; graveling and installing signs to identify camping sites; installing boulders to direct use) and hardening a crossing of the Middle Fork Weiser River for stock. These activities are expected to maintain stream shading because the area is already disturbed and few, if any, trees would need to be cut.

Designating motorized and non-motorized routes would not be expected to measurably alter stream shading because the routes are on existing system routes, generally outside RCAs, and removing stream shading vegetation is not expected to occur. Trail reroutes would be designed to minimize or avoid cutting trees within RCAs and would not measurably affect stream shading or temperatures. Constructing and designating a new 3-mile OHV trail is not expected to affect stream shading because the trail would primarily be located on two existing ML 1 roads. A 0.5-mile section would need to be constructed to connect the two roads and complete the loop. This new road would be located outside RCAs and would not affect stream temperatures.

Maintenance on 28 miles of trails within the Project area would not remove trees or remove any trees to the extent that stream shading (or temperatures) would be measurably affected at any scale.

Alternative 3—All recreation improvements proposed under Alternative 3 are the same as those proposed under Alternative 2, except the 3-mile OHV Loop Trail. Not creating the OHV loop would have little effect on stream temperatures because stream shading is expected to remain at the current levels and the road would remain as an ML 1 road.

Alternative 4—All recreation improvements proposed under Alternative 4 are identical to Alternative 2. Effects to stream temperatures are expected to be the same as those under Alternative 2.

Alternative 5—Potential effects from proposed recreation activities are expected to be similar to Alternative 3. Not creating the OHV loop would have little effect on stream temperatures because stream shading is expected to remain at the current levels and the road would remain as an ML 1 road.

Summary—Stream temperatures would be maintained in all three time frames at the subwatershed scale under any of the action alternatives. The action alternatives are expected to result in short- and long-term incremental benefits and would not retard the attainment of properly functioning temperatures. Localized affects to stream shading may occur from prescribed burning, installation and removal of stream crossings, and RCA road reconstruction and decommissioning. These effects are expected to be negligible due to the small amount of stream shading that would be affected. Vegetation treatments within one site-potential tree height on intermittent streams are not expected to measurably affect stream temperatures because the streams are dry during the hottest time of the summer, and the number of acres proposed for treatment is relatively small. In the short and long term, RCA road decommissioning would incrementally increase stream shading.

Sediment/Turbidity (Bull Trout) Watershed Condition Indicator (WCI)

Vegetation removal and mechanical disturbance increase the erodibility of forest soils and, consequently, increase the amount of soil available for transport and the likelihood of transport downslope and into streams. Once in streams, fine sediment (particles smaller than 6.3 mm in diameter) may be transported farther downstream or deposited in slow water areas and behind obstructions, locally altering fish habitat conditions. In particular, fine sediment has been shown to fill the interstitial spaces among larger streambed particles, which can eliminate the living

space for various microorganisms, aquatic macroinvertebrates, and juvenile fishes. Potential problems associated with excessive sediment have been recognized in a variety of salmonid species and at all life stages, from possible suffocation and entrapment of incubating embryos (Peterson and Metcalfe 1981; Irving and Bjornn 1984; Tagart 1984) through loss of summer rearing and overwintering cover for juveniles (Hillman et al. 1987; Griffith and Smith 1993) to reduced availability of invertebrate food for resident adults (Cederholm and Lestelle 1974; Bjornn et al. 1977; Alexander and Hansen 1986).

East Fork Weiser River Subwatershed (FUR)

Hardening of the approaches to an existing stream crossing the East Fork Weiser River and one crossing on a tributary stream may deliver a small amount of sediment to the stream from ground disturbance near the channels when rocks are placed in the ground. The work would be completed by hand during low flows prior to August 15 to avoid bull trout spawning. Instream work would be minimized to the extent possible. Work is expected to occur outside the wetted width. The amount of sediment delivered to the stream is not expected to be measurable at either the local or the subwatershed scale with implementation of PDFs and erosion-control measures, such as straw wattles, and the relatively small scope of the activity. The trail reroute would be expected to incrementally decrease sediment delivery to the East Fork Weiser River tributary stream by directing water off the trail.

Granite Creek (NA), Jungle Creek (NA), Little Fall Creek (NA), and Mica Creek (NA) Subwatersheds

There would be no effect on sediment/turbidity (bull trout) because bull trout and their critical habitat do not exist in these subwatersheds.

Sediment/turbidity (Other Fishes) Watershed Condition Indicator (WCI)

See the Watershed section for a sediment analysis for all activities and alternatives.

East Fork Weiser River Subwatershed (FA)

Effects would be similar to sediment/turbidity (bull trout) and substrate embeddedness WCIs discussed above.

Granite Creek (FA), Jungle Creek (FA), Little Fall Creek (FA), and Mica Creek (FA) Subwatersheds

Riparian Conservation Area Vegetation Treatments

The watershed analysis indicates all alternatives would temporarily increase sediment with a long-term decrease. That analysis shows that Alternative 4 would impact sediment the most over all three time frames, and Alternative 3 would have the least impact on sediment. Alternative 3 would also result reduce sediment the most over the long term.

Alternatives 2, 3, 4, and 5—Under Alternative 2, thinning would occur on approximately 3,000 acres in the outer portions of RCAs, with about 2,303 acres occurring in the outer 120 feet of perennial stream RCAs and on approximately 593 acres in the outer 60 feet of intermittent streams. Also, approximately 64 acres in the outer portion of wet meadow RCAs would be treated, and a total of 25 acres in the outer portion of RCAs of seeps, springs, and wetlands would be treated. Under Alternative 2 approximately 31% of the total RCAs in the Project area would be thinned. Treatments in the outer portions of wet meadows would not affect fish habitat.

Inner RCA treatments include approximately 10 acres of vegetation treatments near perennial streams, 2 acres near intermittent streams, and 15 acres of fuel-reduction treatments near the intersection of NFS roads 186 and 206. A no-treatment buffer of 15 feet would occur in the 15 acres proposed for fuel-reduction treatments. Vegetation treatments within one site-potential tree height of perennial and intermittent streams may increase sediment delivery to streams; however, the increase would not be measurable at the subwatershed scale due to the small amount of acreage that would be treated, the no-activity buffers within RCAs, PDFs, mitigation measures, and BMPs.

Alternative 3 would treat about 2,057 acres in the outer portions of perennial stream RCAs and about 540 acres in the outer portion of intermittent stream RCAs. No inner RCA treatment is proposed under this alternative.

Alternative 4 would treat about 3,421 acres in the outer portions of RCAs; 2,680 acres in the outer 120 feet of perennial streams RCAs and 619 acres in the outer 60 feet of intermittent streams. Also, approximately 80 acres would be treated in the outer portions of RCAs in wet meadows and 190 acres within the inner RCA of wet meadows. Approximately 36% of the total RCAs in the Project area would be treated under this alternative. Treatments within RCAs of wet meadows would not affect fish habitat.

Alternative 5 would treat about 3,162 acres in the outer portions of RCAs; 2,250 acres in the outer 120 feet of perennial streams RCAs and 558 acres in the outer 60 feet of intermittent streams. This includes, approximately 205 acres would be treated in the inner portions of wet meadows and wetlands and 118 acres would be treated in the outer portion. Approximately 33% of the total RCAs in the Project area would be treated under this alternative. Treatments within RCAs of wet meadows would not affect fish habitat.

Prescribed Fire, Noncommercial Thinning, and Shaded Fuelbreak

No active ignition would occur within the inner RCAs, except within the 15-acre fuel treatment area described above or where approved by a hydrologist and/or fisheries biologist. Any handline that may be constructed within RCAs (for spot fires that may occur outside the main Project area boundary or if weather conditions do not produce substantial moisture to naturally control the burn) would be minimized to the extent possible and rehabilitated after conclusion of Project activities, which would minimize sediment delivery to streams. Beche et al. (2005) found no effect on sediment in watershed streams 1 year after a low-to-moderate intensity prescribed fire with active ignition within RCAs. Arkle and Pilliod (2010) also did not observe effects from prescribed fire on sediment in a stream in a ponderosa pine forest with no ignition within RCAs. Effects from prescribed fire in the Project area are expected to be similar to effects observed in these studies.

Road Activities (including road decommissioning, maintenance, realignment, reconstruction, and temporary roads)

The GRAIP modeling analyzed sediment delivery to streams from the road network and is discussed in detail in the Watershed portion of this document and in the Watershed Specialist Report (Project record). The watershed analysis indicated that sediment delivery to streams would increase in the temporary to short term with a long-term decrease from road decommissioning, realignment, and reconstruction, long-term closures, and culvert removals and replacements. Implementing road activities proposed under the action alternatives would incrementally (not measurably) improve the sediment/turbidity WCI in the short and long term. See Table 2-2.18 for a comparison of the road decommissioning (obliteration) and RCA road decommissioning (obliteration) mileages by alternative. Alternative 2 would decommission

approximately 24.6 miles of roads within RCAs, and Alternative 3 would have the most benefit for fish habitat by decommissioning about 26.2 miles within RCAs. Alternative 4 would decommission 23.6 miles of roads in RCAs and Alternative 5 would decommission about 23.4 miles of roads in RCAs. Roads were selected for decommissioning using both GIS information and field data. According to the hydrologist report, a temporary to short-term, localized increase in sediment/turbidity would result from road decommissioning (obliteration) within RCAs and culvert removals. This temporary increase in sediment is not expected to result in loss of water quality, beneficial uses, or aquatic habitat. In the short and long-term, an incremental to measurable improvement to the Sediment/Turbidity WCI would occur as the areas stabilize and revegetate. However, the functionality would remain the same.

Road maintenance (including blading, cleaning plugged culverts and replacing damaged culverts) would occur on about 137.5 miles under Alternative 2 and 4 (including 35 miles in RCAs), 129.7 miles under Alternative 3 (including 34.6 miles within RCAs) and 137.4 miles under Alternative 5. Road maintenance is expected to reduce erosion and reduce sediment delivery to streams compared with not maintaining roads.

Fish Passage Improvements and Temporary Crossings

Some temporary sediment delivery is expected from replacing two culverts (Big Creek and Middle Fork Weiser River) under Alternatives 2, 4 and 5 and three culverts under Alternative 3 (Big Creek, Middle Fork Weiser River and Jungle Creek).

All culvert replacement structures would comply with Forest Plan Standards FRST02 and SWST08 and would be designed to provide fish passage for all life stages of fish at all flow levels (USDA Forest Service 2003a). The replacement structures would be equal to or greater than bankfull width. Erosion and sediment control features would be used during culvert replacements. Instream work would be completed after spring peak flows. Culvert replacements and removals are expected to benefit fish habitat in all three time frames by reconnecting habitat. Streams are expected to be diverted or constricted during replacement and would be replaced with a bridge or open-bottom culvert. Diversion of the stream during replacement would not change connectivity since the stream segments are not currently connected. Turbidity is expected to increase temporarily downstream from the culvert replacements during and immediately after work. However, erosion control measures (e.g., silt fences, straw wattles, straw bales, Sedimats® or similar products) are expected to trap much of the sediment released during implementation. Effectiveness information provided by the Sedimat® manufacturer indicates that, depending on the substrate, Sedimats are able to trap and remove up to 80% of the disturbed sediment. Personal observation of Sedimat® use during large culvert replacements also indicates that Sedimats trap a large amount of sediment. Monitoring from a large culvert replacement on the Boise National Forest indicates that turbidity would increase immediately after water is returned to the channel, decrease by order of magnitude within an hour, and continue to decrease before returning to baseline conditions within one week (Yenko 2007). Turbidity is expected to be temporary and localized. Scaife and Hoefer (2011) identified that sediment transport would be limited to within 600 feet of the Project. Sediment delivery is expected to have small, isolated impacts on fish habitat.

Recreation Improvements

Alternatives 2 and 4—Some sediment may be delivered to streams from proposed recreation improvements; however, the amount is not expected to be measurable at the subwatershed scale under any time frame. Activities within Cabin Creek campground are not expected to deliver sediment to streams because graveling roads, installing kiosks, replacing the toilet and installing

site markers would not measurably produce sediment, sediment control measures would reduce or eliminate sediment movement and the campground is located outside RCAs.

Other activities include improvements to several dispersed camping sites (installation of a vault toilet, fire rings and hitch rails, graveling and installation of signs to identify camping sites, installation of boulders to direct use) and hardening a crossing of the Middle Fork Weiser River for stock. Some sediment may be produced in the temporary time frame during hardening of the crossing of the Middle Fork Weiser River for stock. Sediment will likely be produced during installation of a vault toilet, hitch rail, signs and boulders however application of PDFs and erosion control are expected to minimize or eliminate sediment delivery to streams. Sediment is not expected from these activities in the short- and long-term time frames.

Designating motorized and non-motorized routes is not expected to deliver sediment to streams because the routes are on existing NFS roads and generally outside of RCAs. Trail reroutes and associated stream crossings would be designed to minimize sediment delivery to streams. The construction and designation of a new 3-mile OHV trail is not expected to affect sediment because the trail would be primarily located on two existing ML 1 roads. A 0.5-mile section would be constructed to connect the two roads and complete the loop. However, this new section would be located outside of RCAs and would not affect sediment.

Trail maintenance on 28 miles of trails within the Project area is not expected to disturb sediment except where stream crossings would be improved or where water bars would be installed. Trail maintenance is not expected to measurably affect sediment at any scale.

Alternative 3–All recreation improvements proposed under Alternative 3 are identical to Alternative 2 except the OHV Loop Trail is not proposed under this alternative. Not creating the OHV loop would have little effect on stream sediment because no ground disturbing activities would occur, stream shading is expected to remain at the current levels and the road will remain as an ML 1 system road.

Alternative 5–Recreation improvements proposed under Alternative 5 are identical to Alternative 3 except about two fewer trails miles would be re-routed to provide legal access from a trailhead (198 and 205). Not creating the OHV loop would have little effect on stream sediment because no ground disturbing activities would occur, stream shading is expected to remain at the current levels and the road will remain as an ML 1 system road.

Summary–A temporary to short-term increase in sediment delivery and a long-term decrease in sediment would result from proposed treatments under all action alternatives in all subwatersheds. All subwatersheds in the Middle Fork Weiser River drainage are FA for sediment/turbidity. The temporary to short-term increase in sediment would not likely be measurable in any given channel and would not change the sediment/turbidity WCI functional rating. The long-term decrease in sediment would not change functionality of the sediment or substrate embeddedness WCIs (sediment is FA in all subwatersheds). In the long-term, sediment would decrease more under Alternative 3 than with the other action alternatives. See the Watershed section for more information.

Large Woody Debris Watershed Condition Indicator

Literature indicates approximately 80% of LWD comes from trees within the first 60 feet (18.3 meters) of the edge of a stream, with the remaining 20% coming from beyond 60 feet of the stream's edge (Fleece 2002; Naiman et al. 2002). Robison and Beschta (1990) found that the probability of a tree becoming LWD approaches zero when its distance from the stream equals or is greater than the tree height. Fetherston et al. (1998) and Murphy and Koski (1989) found that

almost all LWD comes from within 98.4 feet (30 meters) of the stream channel. Spies et al. (2013) synthesized professional judgment and published studies on wood recruitment as it pertains to riparian thinning and found that 95% of LWD comes from 82 to 148 feet of the stream channel.

LWD influences channel development with more LWD creating more habitat complexity (Bragg et al. 2000). Pool formation and frequency is highly correlated to LWD (Quigley and Arbelbide 1997). Pools provide protective cover from predators, resting habitat, and thermal refuge. FEMAT (1993) evaluated the effectiveness of buffer widths with respect to tree height and demonstrated that a buffer width of one tree height effectively maintains litter fall and root strength and retains most of the shading and LWD functions.

East Fork Weiser River Subwatershed (FA)

Alternatives 2, 3, 4 and 5—LWD would not be affected in any time frame from implementing the action alternatives in the East Fork Weiser River subwatershed because no trees would be cut within RCAs.

Granite Creek (FA), Jungle Creek (FA), Little Fall Creek (FA) and Mica Creek (FUR) Subwatersheds

Riparian Conservation Area Vegetation Treatments

Alternative 2—Under Alternative 2, thinning would occur on approximately 3,000 acres in the outer portions of RCAs (2,315 acres in the outer 120 feet of perennial stream RCAs) and on approximately 594 acres in the outer 60 feet of intermittent streams. Also, approximately 64 acres in the outer portion of wet meadow RCAs would be treated, and 25 acres in the outer portion of RCAs of seeps, springs, and wetlands would be treated. Approximately 31% of the total RCAs in the subwatersheds in the Project area would be treated. Treatments in the outer portion of RCAs are not expected to measurably affect LWD at the subwatershed scale because the one site-potential tree height no activity buffer is expected to maintain LWD on perennial streams. Treatments in the outer portion of wet meadows would not affect fish habitat. Vegetation treatment from 60 to 120 feet from intermittent streams would maintain adequate LWD at the subwatershed scale because the acres treated within one site-potential tree height are small relative to the overall amount of RCAs (about 6.2%) and at least 30% of the canopy cover would be retained.

Alternative 3 would treat about 2,668 acres, including 2,057 acres on perennial streams (outer portion of the RCA), and 540 acres on intermittent streams (in the outer portion of the RCA). This alternative would treat the fewest RCA acres and would not include treating inner RCAs. This alternative would affect LWD less than the other alternatives.

Alternative 4 would treat the most RCA acres (3,624) including 2,668 acres on perennial streams (outer portion of the RCA) and 203 acres on intermittent streams. This alternative would have a greater effect on temporary and short-term LWD than the other alternatives.

Alternative 5 would treat the about 3,162 RCA acres, including 2,250 acres on perennial streams (outer portion of the RCA) and 558 acres on intermittent streams. This alternative would have a greater effect on temporary and short-term LWD than Alternatives 2 and 3 but slightly less effect than Alternative 4.

Inner RCA treatments include approximately 10 acres of vegetation treatments near perennial streams, two acres near intermittent streams, and 15 acres of fuels reduction treatments near the intersection of NFS roads 186 and 206. A no-treatment buffer of 15 feet would occur in the 15-

acre fuels reduction treatment area. Vegetation treatments within one site-potential tree height of perennial and intermittent streams may decrease LWD recruitment; however, the decrease would not be expected to be measurable at the subwatershed scale due to the relatively small amount of acreage that would be treated.

Prescribed Fire, Noncommercial Thinning and Shaded Fuelbreaks

Alternative 2 identifies approximately 24,200 acres of prescribed fire, which may also include noncommercial thinning (i.e., ladder fuel treatments) (Table 2.2-18). Prescribed fire would be allowed to back into RCAs and some ignition may occur in appropriate vegetation types. A total of 6,319 acres of RCAs occur within burn blocks; however, not all of those RCAs would be treated. Ignition is expected to occur in the outer portion of up to 25% of RCAs located in burn blocks (LaChapelle, Fuels Specialist, personal communication). All ignitions in RCAs would be subject to PDFs designed to improve or maintain riparian areas and their functions and would require approval from a hydrologist and/or fish biologist. No ignition or noncommercial thinning would occur within 120 feet of perennial channels or within 60 feet of intermittent channels, except within the 15-acre fuel reduction treatment described above. Fire in RCAs that is allowed to back farther into RCAs could affect potential future LWD because a small number of trees may be directly or indirectly killed by prescribed fire. The number of trees killed is expected to be small. Prescribed burning, including active ignition within RCAs, is not expected to result in any measurable changes to LWD in the Project area because fuel moisture levels are expected to be high at the time of implementation (spring or fall) and prescriptions would require low-to-moderate intensity fire and would not target overstory vegetation. Noncommercial thinning may also occur, which would reduce ladder fuels with the intent of keeping fire from entering the overstory. Much of the riparian vegetation would either not burn or burn at a low intensity, resulting in a mosaic of low-intensity burned and unburned areas. Revegetation after prescribed fire treatments is expected to occur quickly. Beche et al. (2005) found no effect on LWD recruitment after a low-to-moderate prescribed fire with active ignition within RCAs. Arkle and Pilliod (2010) found no effect on LWD after a prescribed fire in a ponderosa pine forest on the Forest with no ignition in RCAs. Halofsky and Hibbs (2009) found that riparian functions are resilient and rapid regeneration of vegetation occurred within riparian areas following wildland fires in Oregon.

The 370-acre shaded fuel break is expected to maintain LWD because no vegetation would be cut within 120 feet of perennial streams and 60 feet of intermittent streams, ignition may occur with approval from the hydrologist and/or fisheries biologist in areas where SWRA resource conditions can be maintained, and ignition would only occur in the outer RCAs.

Alternative 3—Approximately 16,600 acres of prescribed fire, including about 4,511 RCA acres, are proposed under Alternative 3. Anticipated effects on LWD are expected to be less than and similar to those described under Alternative 2.

Alternative 4—Approximately 27,400 acres of prescribed fire including about 7,422 RCA acres are proposed under Alternative 4. Effects to LWD from prescribed fire proposed under Alternative 4 are expected to be similar to and greater than effects under Alternative 2.

Alternative 5—Approximately 27,200 acres of prescribed fire (about 7,386 acres within RCAs) are proposed under Alternative 4. Effects to LWD from prescribed fire proposed under Alternative 5 are expected to be similar to and less than effects under Alternative 4.

Road Activities (including road decommissioning, maintenance, reconstruction, and temporary

roads)

Alternatives 2 and 4—Approximately 13.8 miles of road reconstruction (including 5.5 miles proposed within RCAs under Alternative 2 and 6.9 miles proposed within RCAs under Alternative 4), 137.5 miles of road maintenance (35 miles within RCAs), 1.2 miles of planned temporary roads within RCAs in Alternative 2, and 0.9 mile of planned temporary roads within RCAs in Alternative 4 may reduce LWD when trees or other vegetation are removed near streams. These actions are not expected to measurably change LWD at the subwatershed scale in any time frame.

Approximately 4 miles of unauthorized routes would be added to the system (only in Alternative 4) and up to 7 miles of incidental temporary roads would be added. About 0.2 mile would be constructed or added to the system within RCAs. Approximately 23.3 miles of RCA roads would be decommissioned under these alternatives for a net decrease of approximately 23.1 miles within RCAs. This net decrease in road miles within RCAs (particularly within one site-potential tree height) would be expected to incrementally improve LWD potential as the areas revegetate in the long term at the subwatershed scale.

Alternative 3—Road reconstruction (including 5.1 miles within RCAs), 129.7 miles of road maintenance (34.6 miles within RCAs), and 1.2 miles of planned temporary roads within RCAs may reduce LWD when trees or other vegetation are removed near streams. These actions are not expected to measurably change LWD at the subwatershed scale in any time frame. No road realignment is proposed under Alternative 3.

No roads would be added to the system and up to 7 miles of incidental temporary roads are proposed. About 25.7 miles of roads within RCAs would be decommissioned. Road decommissioning is expected to incrementally improve LWD as the areas revegetate over the long term at the subwatershed scale.

Alternative 5—Road reconstruction (including 5.1 miles within RCAs), 129.7 miles of road maintenance (35.1 miles within RCAs), and 1.2 miles of planned temporary roads within RCAs may reduce LWD when trees or other vegetation are removed near streams. These actions are not expected to measurably change LWD at the subwatershed scale in any time frame.

About four miles of roads would be added to the system and up to 7 miles of incidental temporary roads are proposed. About 23.4 miles of roads within RCAs would be decommissioned. Road decommissioning is expected to incrementally improve LWD as the areas revegetate over the long term at the subwatershed scale.

Fish Passage Improvements and Temporary Crossings

Effects to LWD from culvert replacements and removals and temporary crossings proposed under the action alternatives are not expected to be measurable at the subwatershed scale. Few large trees would be cut to remove, install, or replace culverts because the area is located on a road and is already disturbed. The amount of trees that would be cut is small and site specific. In order to comply with SWST10, trees cut within RCAs must be left intact unless determined not to be necessary for achieving SWRA resource desired conditions or resource protection or public safety requires bucking them into smaller pieces (USDA Forest Service 2003a). No measurable effects on LWD are expected because of compliance with SWST10 and the small amount of stream channel affected by culvert activities.

Recreation Improvements

All action alternatives: Recreation improvements proposed in Cabin Creek campground are not expected to affect LWD because the activities require few, if any, trees to be cut.

Other activities include improvements to several dispersed camping sites (installation of a vault toilet, fire rings, and hitch rails, graveling and installation of signs to identify camping sites, installation of boulders to direct use) and hardening a crossing of the Middle Fork Weiser River for stock are expected to maintain LWD at all scales because few, if any, trees would need to be cut and the activities would disturb a very small area.

Designation of motorized and non-motorized routes are not expected to measurably alter LWD because the routes are on existing NFS roads generally outside RCAs and removing trees is not expected to occur. Trail reroutes would occur outside RCAs and would not affect LWD. The construction and designation of a new 3-mile OHV trail would not affect LWD because the trail would be primarily located on two existing ML 1 system roads. A 0.5-mile section would need to be constructed to connect the two roads and complete the loop. This construction would be located outside RCAs and would not affect LWD.

Maintenance on 28 miles of trails within the Project area would remove few, if any, trees within RCAs and would not measurably affect LWD at the subwatershed scale.

Summary: The LWD would be maintained in all three time frames at the subwatershed scale with implementation of any of the action alternatives. The action alternatives are expected to result in short- and long-term incremental benefits and would not retard the attainment of properly functioning LWD. Localized temporary to short-term affects to LWD may occur from removing stream crossings and RCA road reconstruction and decommissioning. These effects are expected to be negligible due to the relatively small amount of area that would be affected. Treatments in the outer portion of RCAs are not expected to have a measurable effect on LWD at the subwatershed scale because the one site-potential tree height no activity buffer would maintain LWD on perennial streams. Vegetation treatments within one site-potential tree height of perennial and intermittent streams may decrease LWD recruitment; however, the effects would not be measurable at the subwatershed scale due to the relatively small amount of acreage that would be treated. In the short and long-term time frames, RCA road decommissioning would incrementally increase LWD.

Summary of Effects

Implementation of Alternative 1 would not contribute to the objectives of this Project. The SWRA resource conditions would not be improved in the subwatersheds. Implementation of any of the action alternatives would move all the subwatersheds toward FA. Although the current functional ratings would not change, Alternative 3 would benefit SWRA resource conditions and fish and fish habitat the most.

3.6.4.2. Effects to Listed Species and Critical Habitat

The determination for all of the action alternatives is *May Affect, Not Likely to Adversely Affect* bull trout and its critical habitat in the East Fork Weiser River. This determination is from the addition of an existing trail to the trail system, hardening the approaches to a crossing in critical habitat, and hardening of the approaches to a crossing in a tributary to critical habitat. No other actions are proposed in the East Fork Weiser River subwatershed.

The rationale for this determination is as follows:

- The trail and crossings already exist and only the approaches to the crossings would be hardened.

- Work would occur during low flows prior to August 15 (which is considered to be the start of the bull trout spawning period).
- Work would occur outside the wetted width, which would minimize sediment delivery to the stream.
- Bull trout have not been found in the vicinity of the trail crossings. The closest observation was about 0.4 mile downstream from the crossing below a potential natural fish passage barrier.
- The trail crossing on the East Fork Weiser River and critical habitat is often dry or nearly dry in the summer.

Bull trout critical habitat includes nine Primary Constituent Elements (PCEs) (75 FR 63898). A crosswalk was developed by Nelson (2011) that links the PCEs and the Forest Plan WCIs described in the baseline and the matrices. Nelson demonstrated how analysis and disclosure of project effects and using the effects matrix adequately addresses effects on PCEs. Effects to designated critical habitat are therefore addressed by evaluation of the WCIs. Additional analysis of the bull trout critical habitat PCEs is located in the Fisheries Specialist Report (Project record) and ESA consultation documents are included in the Project record. Sediment delivery associated with the trail activities would be expected to be temporary. Hardening of the approaches would minimize sediment delivery from trail use in all three time frames.

In the Middle Fork Weiser River watershed (5th field HU), the Project would have *No Effect* to bull trout or their critical habitat because neither the bull trout local population nor its critical habitat are present within or downstream from the Project area.

3.6.5. Minimum Road System

Alternative 1 would not designate an MRS for the Project area. All action alternatives implement the MRS as identified through the work of the IDT with long-term reductions in sediment delivery to streams and improvements in fish passage at the subwatershed scale. Of the action alternatives, Alternative 3 does the most to move all Project area subwatersheds furthest toward the SWRA desired conditions identified in the Forest Plan while Alternative 4 does the least.

3.6.6. Cumulative Effects

Cumulative effects occur when existing soil, water resource, and aquatic conditions from past, present, and reasonable and foreseeable future land management activities overlap in both spatial and temporal scales with the direct and indirect effects associated with the alternatives' proposed activities. A complete list of past, present, and reasonably foreseeable future actions in the cumulative effects analysis area can be referenced in Appendix 3 of the FEIS. The fisheries cumulative effects analysis area for the Project is the same as for the direct and indirect effects analysis area (Section 3.3), which is the 6th level Hydrologic Units (or subwatersheds), that comprise the Project area.

A combination of past management actions, including timber harvest, livestock grazing, road building, irrigation diversion and development, land management on private and State property, and fire suppression have altered the condition of fish habitat and WCIs in the analysis area. The existing condition (baseline) represents the impacts of past actions within the analysis area. Man-made fish passage barriers and increased sediment production and delivery to streams (primarily from roads) are affecting fish habitat in the analysis area.

Reasonably foreseeable future actions in the analysis area include prescribed fire, Forest System road use and maintenance, long-term road closures and decommissioning of roads, recreational use, motorized OHV use, firewood cutting, livestock grazing on Forest and private lands, timber harvest on Forest and private lands, housing development on private lands, agriculture practices, noxious weed management, wildfires, and fire suppression. See the FEIS for a detailed summary of the foreseeable future activities.

Alternative 1

Alternative 1 (No Action) does not propose any new management actions although natural processes and ongoing management activities are expected to continue. Implementation of Alternative 1 is expected to maintain SWRA resources at the current trends. No vegetation treatments, prescribed fire, road decommissioning, road graveling, recreation improvements, or culvert replacements or removals would occur. The current road system and fish passage barriers would remain on the landscape and would continue to affect fish and fish habitat (including LWD, sediment, stream shading, and riparian functions and processes). Beneficial effects on WCIs, such as from road decommissioning within RCAs including culvert removals and replacements, would not occur. There would be no stream miles improved or reduction in road-related effects on streams.

Alternatives 2, 3, 4 and 5

When considered in conjunction with existing conditions and other reasonably foreseeable future actions, the cumulative effect of the action alternatives on WCIs are expected to range from none to improving over the short- to long-term time frames at the subwatershed scale, given the reduction in roads (especially within RCAs) and road-related effects on fish habitat and the incremental improvement in riparian functions and processes toward desired conditions (particularly with Alternative 3). Temporary to short-term negligible increases in sediment are expected with implementation of the action alternatives and this may have a temporary to short-term cumulative effect when considered with other ongoing and future projects. However, in the short- to long-term time frames, beneficial reductions in sediment are expected that would not result in cumulative effects. Negligible temporary to short-term effects on temperature and LWD are expected that may result in a negligible temporary to short-term cumulative effects.

Figure 3.6-6 through Figure 3.6-8 display the existing condition for temperature and modeled stream temperatures (August mean temperature °C) for 2040 and 2080 (Isaak et al. 2016). Isaak et al. (2016) indicates that climate change is expected to result in increased stream temperatures in the Middle Fork Weiser River drainage. Vegetation treatments within RCAs have the potential to affect stream temperatures; however, the effects are not expected to be measurable due to PDFs (e.g., 120-foot no-treatment buffers) and results found in the literature cited. In the East Fork Weiser River, stream shade would not be affected by the trail reroute or trail designation.

When Alternative 1 (No Action) is combined with other reasonably foreseeable future actions, SWRA resource conditions and riparian functions and processes would be maintained at the current trend. The action alternatives would decommission (obliterate) roads within RCAs and would incrementally improve SWRA resource conditions and riparian functions and processes. It is expected that the incremental effect of all action alternatives in relation to other actions on both private and public lands is a temporary to short-term increase in RCA disturbance followed by a short- to long-term incremental improvement in fish habitat and RCA condition associated with decommissioning (obliteration) roads within RCAs and culvert removals/replacements.

3.6.7. Irreversible and Irretrievable Commitments

The Project is not expected to result in any irreversibly or irretrievable commitments of habitat for MIS, ESA-listed, or desired native fish species. The ESA-listed bull trout is found in the East Fork Weiser River. The determination for all the action alternatives is *May Affect, Not Likely to Adversely Affect* bull trout and their habitat.

3.6.8. Forest Plan Consistency

All of the proposed alternatives meet Forest Plan Standards and Guidelines. Forest Plan consistency is documented in Tables 2.4-1 through 2.4-10 and the Appendix B matrix tables located in the Project record.

3.6.9. Project Record

This FEIS hereby incorporates by reference the Fisheries Specialist Report in the Project record (40 CFR 1502.21). The report is located in the Fisheries section of the Project record and contains the data, methodologies, analysis, maps, references, and technical documentation that the specialist relied on to reach the conclusions in the FEIS. The Project record also contains a copy of the signed BA and documented consultation with the FWS.

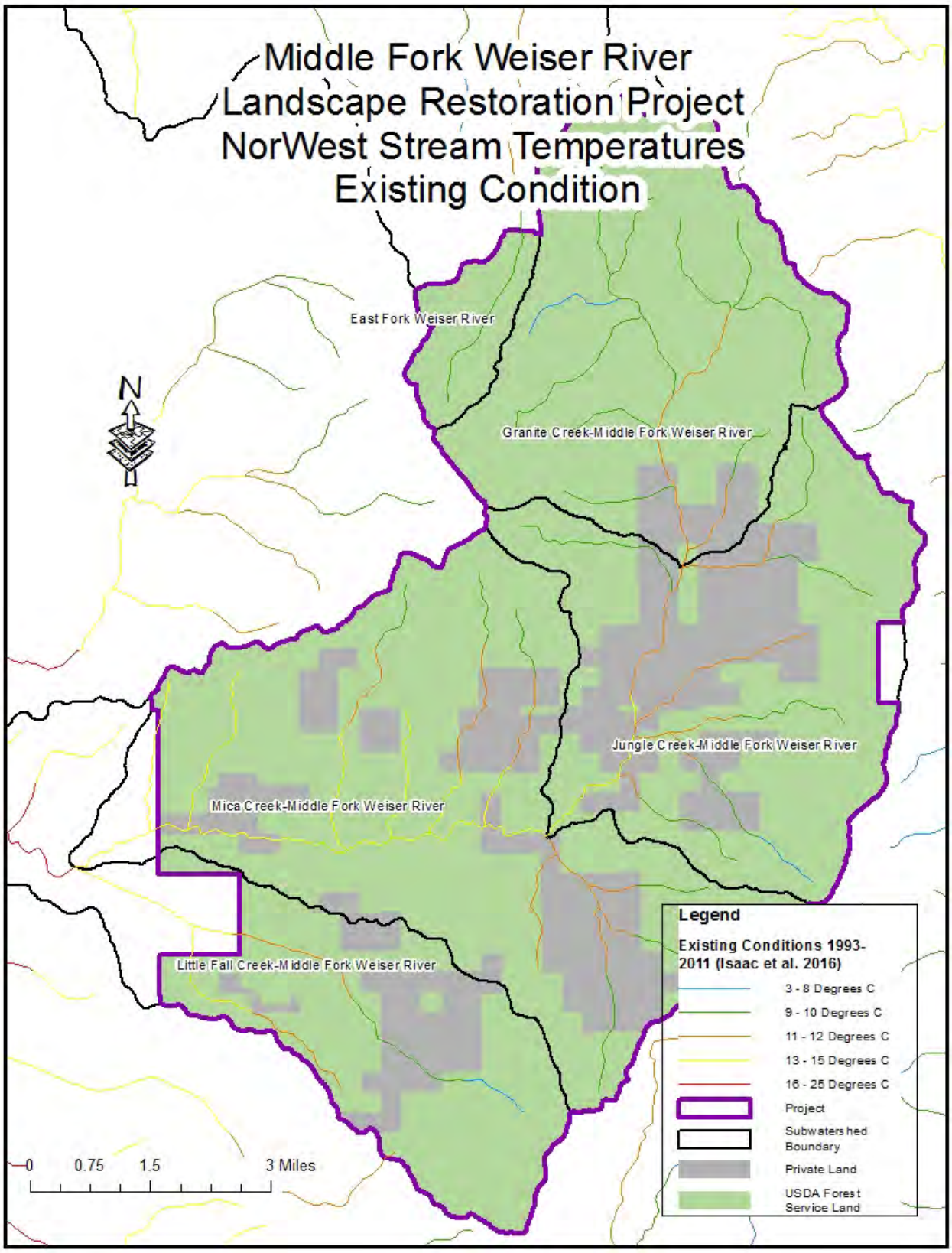


Figure 3.6-6. Isaak et al. (2016) NorWeST Modeled Stream Temperatures for existing conditions in the Project area.

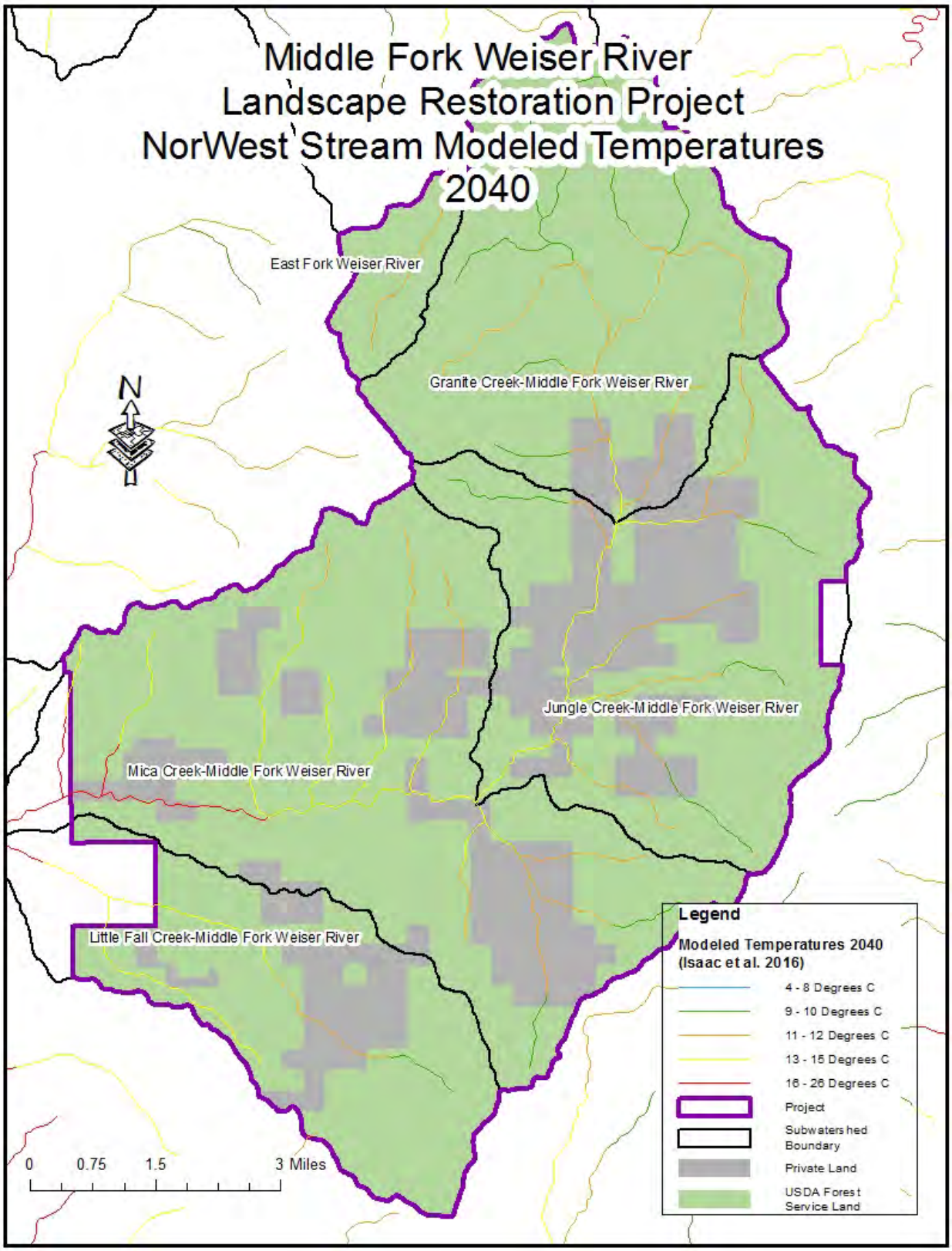


Figure 3.6-7. Isaak et al. (2016) NorWeST Modeled Stream Temperatures for 2040 in the Project area.

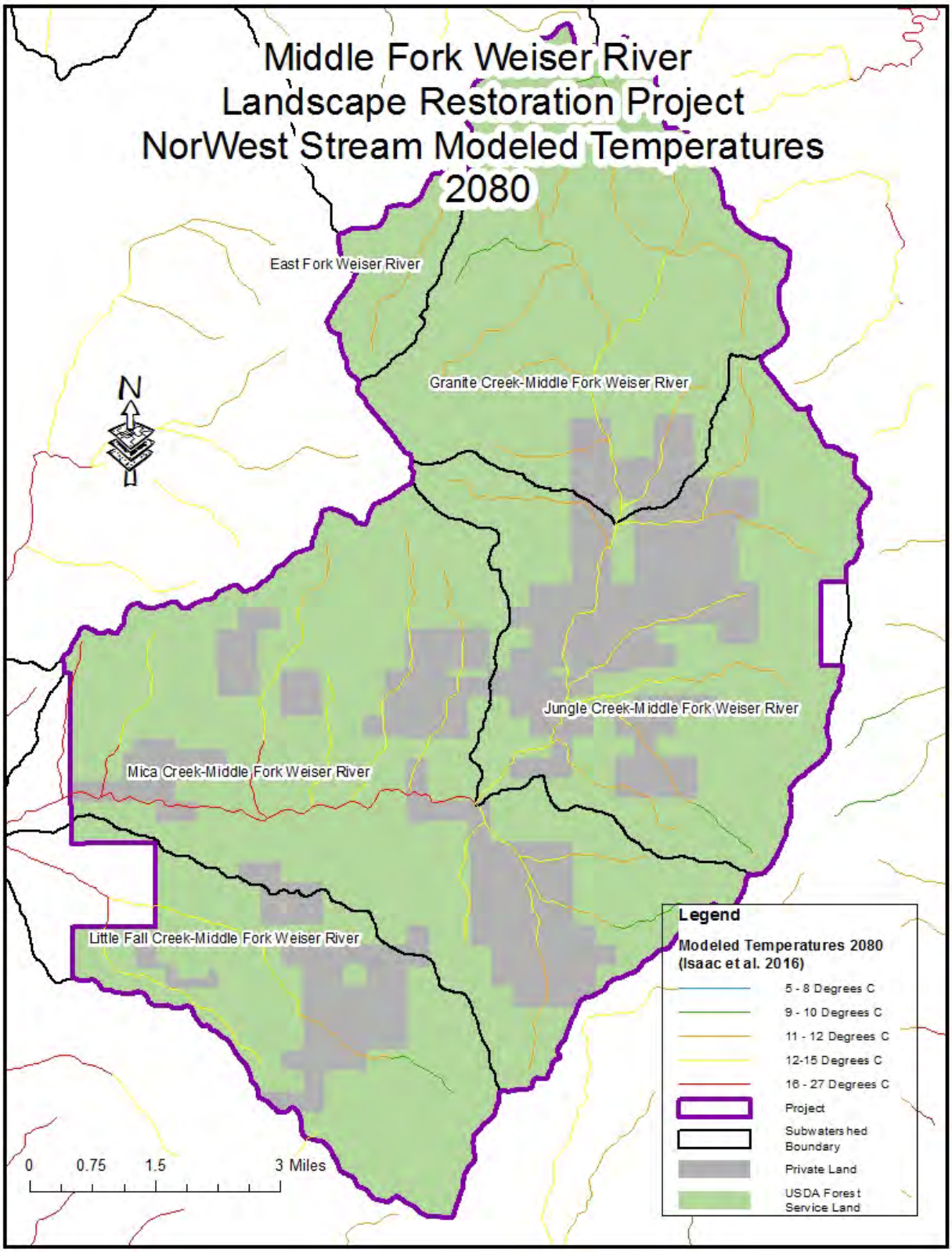


Figure 3.6-8. Isaak et al. (2016) NorWeST Modeled Stream Temperatures for 2080 in the Project area.

3.7. Soils Resources

3.7.1. Analysis Scale, Data Sources and Methodology

3.7.1.1. Analysis Scale

Direct and Indirect Effects Analysis Area

The analysis area for both direct and indirect effects on soil resources are activity areas specific to each indicator being analyzed. The Forest Plan describes the activity area as "the smallest logical land area where the effect that is being analyzed or monitored is expected to occur." The Forest Plan further describes specific activity areas that are to be used for analysis of TSRC, DD, and CWD (USDA Forest Service 2003a, p. GL-1), all of which are within the Project area (Figure 1.1-1).

For the DD indicator, the activity areas are each of the individual treatment units (e.g., vegetation treatment units and prescribed fire units). The effects of the Project on DD are confined to individual treatment units.

For the TSRC indicator, the activity area is the NFS lands excluding IRA and private lands within the analysis area. The TSRC effects can occur across the entire Project area, both within and outside of individual treatment units.

For the CWD indicator, the activity areas are each of the individual treatment units. The effects of the Project on CWD are confined to individual treatment units.

Cumulative Effects Analysis Area

The cumulative effects analysis area is the Project area as displayed in Figure 1.1-1.

Temporal Scale of Analysis

Time frames as defined in the Forest Plan were used for analysis of effects as follows: temporary (0–3 years), short term (3–15 years) and long term (15 or more years) (USDA Forest Service 2003a).

Detrimental soil disturbance, such as compaction, displacement, soil puddling, and severely burned soils, could persist for up to 50 years without restorative actions. Soil compaction and displacement DD from secondary skid trail use could result in short- to long-term impacts with natural recovery taking 5–20 years (Arnup 1998; Dickerson 1976). The time period used to analyze trends of DD was 50 years.

The TSRC is the conversion of a productive site to an essentially nonproductive site for a period of more than 50 years and persists without restorative actions. The time period used to analyze trends of TSRC was more than 50 years.

The CWD levels are very dynamic and historically have varied by fire regime (Agee 2002). Proposed actions would either maintain existing conditions or trend toward the desired range of CWD. Areas currently below desired CWD levels (e.g., a plantation) may not be able to meet the desired range over the temporary to short term, while an action that promotes larger size class trees or a prescribed fire that would consume CWD and create mortality that would become snags and future CWD could meet the desired range over the long term. Since it takes several

decades to develop large trees > 15 inches DBH or larger, which provide the most benefit for soil productivity, a time period of 80 years was used to analyze trends of CWD.

3.7.1.2. Data Sources and Methodology

The soil resources current condition was evaluated using the Forest soil disturbance pace transect field form and landslide field verification form. On the ground DD surveys were conducted in the Project area during summer 2013 and 2015. Surveys were stratified by focusing on previously harvested units (using the strata GIS layer) that were predominantly tractor harvested (using a slope digital elevation model and Forest past-harvest GIS layer) and within the dominant landtypes (using the Forest Landtype GIS layer) and PVGs (using the Forest PVG GIS layer) where mechanical vegetation treatments are proposed. Seventy-five geographically dispersed potential treatment units were surveyed on the ground in 2013 and 2015 for DD, TSRC, and to view levels of CWD, as well as to document vegetation type, productivity characteristics, and validate information from the Land System Inventory (LSI).

The TSRC was evaluated using a set of assumptions aided by Forest GIS layers such as the road layer, trail layer, and administrative area layer. Assumptions include road width and slope-adjusted area (using the Forest Landtype GIS layer), landing size and frequency, and designated primary and constructed skid trail spacing.

The Project area was analyzed for mass stability hazards using the West Zone GIS layer map based on the landslide predictive model Stability Index Mapping (SINMAP) (Pack et al. 1998) with calibration parameters developed from the 1997 landslide inventory (Dixon and Wasniewski 1998).

Inventory methods and data sources are further described in Middle Fork Weiser River Detrimental Disturbance Surveys, 2013 (Thompson 2013) and the Soil Resource Technical Report (Project record).

3.7.1.3. Analysis Indicators

Proposed Project actions could affect SWRA resources. The following issue statement will be used to compare alternatives and allow for tracking this potential through the associated indicators:

Proposed activities may decrease long-term soil productivity and impair soil-hydrologic function.

Indicators:

- Percent DD within activity areas (Forest Plan Standard SWST02).
- Percent TSRC across the Project area (Forest Plan Standard SWST03).
- Levels of CWD retained within activity areas for long-term soil productivity.

3.7.2. Desired Condition

The desired condition for the soil resource is as follows (USDA Forest Service 2003a, p. III-18):

- “Soil protective cover, soil organic matter, and coarse woody material are at levels that maintain or restore soil productivity and soil-hydrologic functions where conditions are at risk or degraded.”

- "Soils also have adequate physical, biological, and chemical properties to support desired vegetation growth."
- "Management actions result in no long-term degradation of soil resource conditions."

Forest Plan Standards require management activities that may affect soil productivity to meet the following requirements for DD and TSRC (USDA Forest Service 2003a, p. III-21):

- SWST02— "In an activity area, where existing conditions of detrimentally disturbed soil are below 15 percent of the area, management activities shall leave the area in a condition of 15 percent or less detrimental disturbance following completion of the activities. In an activity area where existing conditions of DD exceed 15 percent of the area, management activities shall include mitigation and restoration so that DD levels are moved back toward 15 percent or less following completion of the activities."
- SWST03—"In an activity area, where existing conditions of TSRC exceed 5 percent of the area, management activities shall include mitigation and restoration so that TSRC levels are moved back toward 5 percent or less following completion of the activities."

3.7.3. Affected Environment

3.7.3.1. Current Condition

The geology, topography, and geomorphic processes—which helped formed the soils in the analysis area— are described in *Geology of the Payette National Forest* (Lund 2004) and the *Soil-Hydrologic Reconnaissance Council Ranger District, Payette National Forest* (Larson et al. 1973). The LSP lands were identified and evaluated using the SINMAP model. Imnaha Basalt (one of two members of the Columbia River Basalt group) dominates the area. These volcanic flows occurred sometime around 15–18 million years ago and were followed by the Grande Ronde Basalt flows. The next most extensive formation are rocks of the Idaho Batholith, which formed between 75 and 95 million years ago. This material has a generally higher erosion risk than the basalt rock and its associated soils.

At the landscape scale, ecological units are defined by general topography, geomorphic process, surficial geology, associations of soil families, and potential natural communities, patterns, and local climates. These factors affect biotic distributions, hydrologic function, natural disturbance regimes, and general land use. Local landform patterns become apparent at this level in the hierarchy, and differences among units are usually obvious to on-the-ground observers. At this level, terrestrial features and processes may also have a strong influence on ecological characteristics of aquatic habitats. Landtype association ecological units represent this scale in the hierarchy. These are groupings of landtypes or subdivisions of subsections based on similarities in geomorphic process, geologic rock types, soil complexes, stream types, lakes, wetlands, subseries, or plant association vegetation communities. Repeatable patterns of soil complexes and plant communities are useful in delineating map units at this level. Names of landtype associations are often derived from geomorphic history and vegetation community (Wendt et al. 1975; Cleland et al. 1997).

Landtypes (subdivisions of landtype associations) are based on similarities in soils, landform, rock type, geomorphic process, and plant associations. Land surface forms that influence hydrologic function (e.g., drainage density, dissection, and relief) are often used to delineate different landtypes in mountainous terrain. Valley bottom characteristics (e.g., confinement) are commonly used in establishing riparian landtype map units (Cleland et al. 1997). This local level

of mapping is described in Larson et al. (1973) and was field verified for the analysis area in the Soils Field Report, located in the Project record. See Figure 3.7-1 for a map of landtypes within the analysis area.

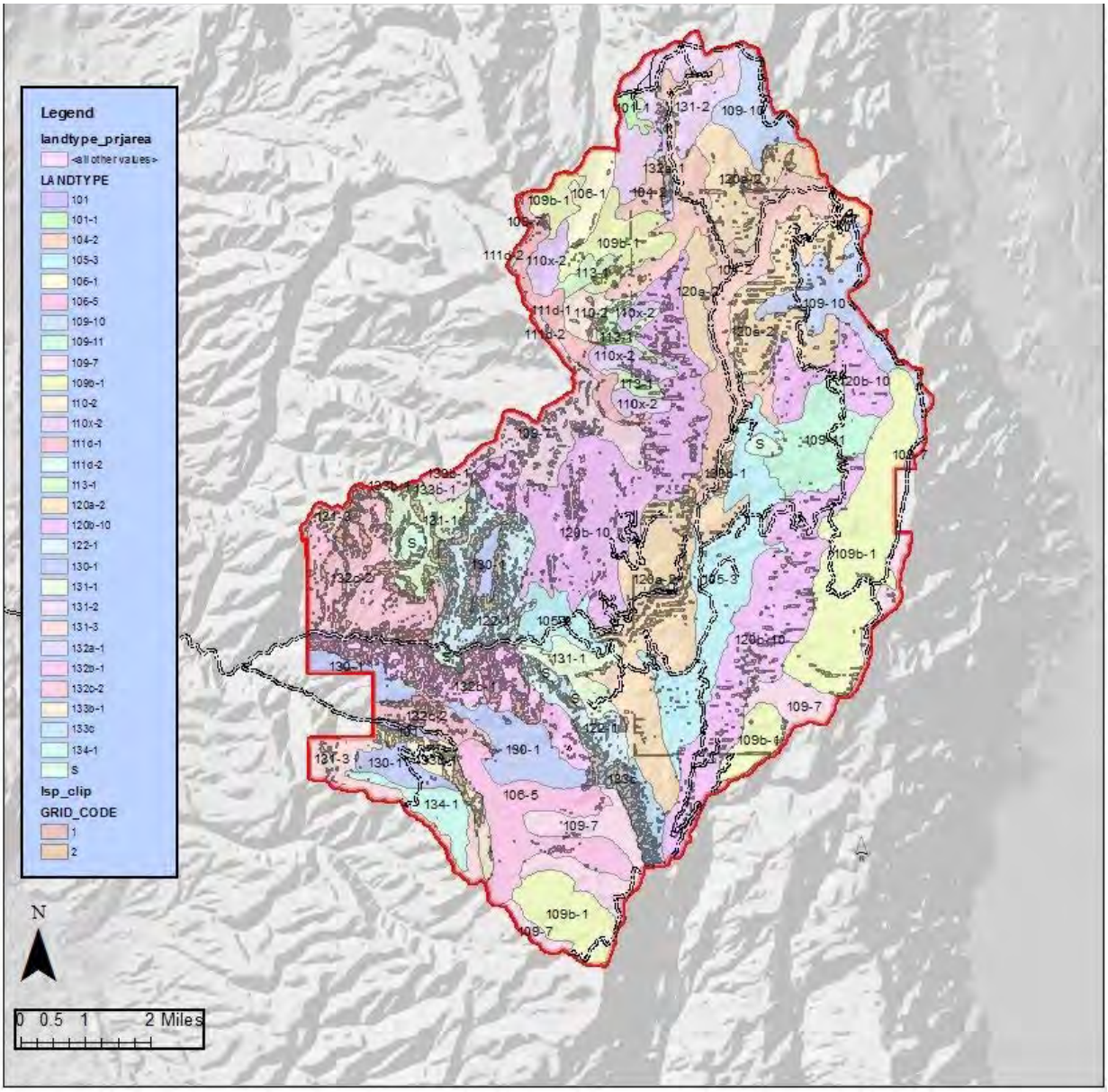


Figure 3.7-1. Analysis area land types.

Landtype associations included in the analysis area include Depositional Lands, Volcanic Glacial Trough Lands, Cryoplanated Volcanic Lands, Cryoplanated Granitic Lands, Fluvial Lands, Steep Granitic Mountain Slopes, and Structurally Controlled Lands (Plateaus and Escarpments). A description of each landtype association follows.

A list of LSI map units within the analysis area follows in Table 3.7-1. Descriptions of these landtypes can be found in the LSI.

Table 3.7-1. Land types in the analysis area.

Map Unit Symbol	Map unit name
101	Alluvial land—undifferentiated soils
101-1	Alluvial land—deep fine loamy over sandy skeletal soils
104-2	Valley train land—deep loamy skeletal soils
105-3	Alluvial fan land—deep loamy skeletal and fine loamy soils
106-1	Moraine land undifferentiated—deep sandy and loamy skeletal soils
106-5	Benchy moraine land—deep sandy skeletal and loamy soils
109-7	Cryoplanated ridge land—moderately deep loamy skeletal and fine loamy soils
109-10	Cryoplanated ridge land—moderately deep loamy skeletal soils
109-11	Cryoplanated uplands—moderately deep loamy skeletal soils
109b-1	Moderately dissected cryoplanated mountain slopes—moderately deep loamy skeletal
110-2	Cirque basin land—moderately deep fine loamy and loamy skeletal soils
110x-2	Scoured cirque basin land—moderately deep and shallow loamy skeletal soils
111d-1	Steep benchy glacial headlands—moderately deep and shallow fine loamy soils
111d-2	Steep glacial headlands—moderately deep fine loamy soils
113-1	Rocky ridge land—moderately deep and shallow loamy skeletal soils
120a-2	Weakly dissected mountain slope land—moderately deep and deep loamy skeletal soils
120b-10	Moderately dissected mountain slope land—moderately deep and deep loamy skeletal soils
122-1	Rocky oversteepened canyon land—shallow and moderately deep skeletal, sandy and loamy soils
130-1	Plateau land—shallow and moderately deep loamy skeletal xeric soils
131-1	Dissected dip slope land—shallow loamy skeletal soils
131-2	Dissected dip slope land—moderately deep loamy skeletal cryic soils
131-3	Dissected dip slope land—shallow and moderately deep loamy skeletal and fine loamy xeric soils
132a-1	Weakly dissected escarpments—shallow and moderately deep loamy and loamy skeletal soils
132b-1	Moderately dissected escarpments—moderately deep and shallow loamy skeletal soils
132c-2	Strongly dissected escarpments—shallow and moderately deep loamy skeletal soils
133b-1	Moderately dissected scarp slopes—moderately deep and deep loamy skeletal soils
133c	Strongly dissected scarp slopes—moderately deep and deep loamy skeletal and coarse loamy soils
134-1	Benchy plateau slopes—moderately deep and shallow fine and loamy skeletal soils
S	Slump

Depositional Lands

This landtype association (landtypes 101, 101-1, 104-2, 105-3, 106-1, and 106-5 in the analysis area) is characterized by the nearly level to gently sloping alluvial and toe slope lands that are commonly adjacent to or near water. Within the analysis area, these are along or near the Middle Fork Weiser River, Mica Creek, and No Business Canyon. Soils are dominantly deep, with standing water and high water tables common, especially during snowmelt. These more gently sloping lands provide an important buffer to soil erosion and sediment production from the steeper surrounding uplands. The primary management concern associated with these landtypes is their close proximity to streams and the compaction and trafficability concerns related to fine textured soils and high water tables.

Cryoplanated Volcanic Lands

This landtype association (landtype 109-7 and 109b-1 in the analysis area) generally occurs in the higher elevations adjacent to glaciated areas. Lands are characterized by generally gentler slopes, weak drainage dissection, and highly fractured bedrock (which allows for high rates of

percolation). Inherent erosion hazards are generally low. Higher elevations and short growing seasons reduce timber and vegetation production. In some locations these lands have been overgrazed in the past and are slow to recover.

Cryoplanated Granitic Lands

This landtype association (landtype 109-10 and 109-11 in the analysis area) generally occurs in the higher elevations and was formed adjacent to glaciated areas (see the description of Cryoplanated Volcanic Lands above); the only difference is the parent material—in this case intrusive, plutonic vs. extrusive, volcanic rock.

Fluvial Lands

This landtype association (landtypes 120a-2, 120-b10, and 122-1 in the analysis area) is essentially unglaciated and has definite drainage patterns resulting from the erosive force of running water. Although the fluvial action of stream cutting is the dominant geomorphic process, mass wasting, faulting, and uplift have also contributed to the current geomorphology. The primary management concern is risk for natural slides and slumps and failure of cut and fill slopes on constructed roads.

Structurally Controlled Lands (Plateaus and Escarpments)

This landtype association (landtypes 130-1, 131-1, 131-2, 131-3, 132a-1, 132b-1, 132c-2, 133b-1, 133c, and 134-1 in the analysis area) is characterized by relatively stable lands that have formed as the direct result of the geologic structure of basalt flows that originally produced relatively flat lands. This post-basalt-flow landscape has subsequently been tilted, uplifted, and eroded over time, producing landforms (landtypes) that consist of moderately to steeply sloping dip slopes, scarp slopes, and escarpments. The primary management concerns associated with these landtypes are risks for natural slides and slumps and failure of cut and fill slopes on constructed roads.

Soil Interpretations

Soil interpretations are used by managers to predict the effect of management activities on the soil resource and are listed in Larson et al. (1973). Soil profile descriptions provide the information necessary to make good soil interpretations. Table 3.7-2 displays the soil interpretations for the selected landtypes in the analysis area.

The current condition of the soil resource has been influenced by both natural processes (e.g., climatic events, floods, drought, wind, fire) and human-related disturbances (e.g., roading, grazing, timber harvest, recreation, power line development). Natural processes have been, and continue to be, the foundation of soil formation while human-related disturbances have effects on soil productivity and soil hydrologic function. Management activities create various degrees of soil disturbance that can alter natural soil characteristics, resulting in the immediate and/or prolonged degradation of onsite resources or vegetation productivity. The indicators of current soil condition that will be used in the effects analysis are DD, TSRC, and CWD. All of these indicators can be affected by timber harvest, reforestation activities, and prescribed fire, as well as by the presence of roads, power lines, gravel pits, administrative sites, landings, skid trails, and firelines associated with these actions.

Table 3.7-2. Soil interpretations for selected landtypes.

Landtypes from Land System Inventory	Acres	Slope %	Soil Depth	Erosion Hazard Rating	Mass Failure Rating	Trafficability[a]
101-1	114	2-10	30-60	Mod low	Low	Good-poor
106-1	427	5-30	40-70	Mod low-mod	Mod low	Fair-poor
106-5	1,569	5-30	40-70	Mod low-mod	Mod high	Fair-poor
109-10	1,774	10-70	20-40+	Mod high	Moderate	Good-fair
109-11	1,129	5-30	20-50	Mod low-mod	Low	Fair-poor
109b-1	4,911	20-60	20-40	Mod-mod high	Mod low	Good-poor
120a-2	6,064	20-60	20-60+	Mod-mod high	Moderate	Good-poor
120b-10	8,101	20-50	20-60+	Mod-mod high	Moderate	Good-poor
122-1	2,099	50-80	<20	High	Moderate	Fair
130-1	1,743	10-25	<20-60	Mod low	Mod low	Fair
131-1	1,318	5-40	<20-50	Mod low	Low	Fair
131-2	1,387	10-40	<20-40	Moderate	Mod low	Good-poor

[a]Trafficability is the ability of a wet unsurfaced soil material to support vehicle wheel loads without rutting.

Detrimental Soil Disturbances

According to the Forest Plan, "Detrimental soil disturbance is the alteration of natural soil characteristics that results in immediate or prolonged loss of soil productivity and soil-hydrologic conditions" (Forest Plan page GL-10). The DDs are those effects on the soil resource that cause soils to be compacted, displaced, severely burned, or puddled to an extent that the disturbance meets the criteria (Forest Plan page GL-10) to be detrimental to long-term soil productivity. At least 85% of an activity area should be in a nondetrimentally disturbed condition. The Forest Plan requires DD to be below and remain below 15% within activity areas unless current conditions for DD are already above 15%. In cases where the current condition is above 15%, management activities are required to move DD toward or below 15% within those activity areas.

Detrimentally disturbed soils are often scattered throughout areas of past management and are not always readily visible. Commercial timber harvest, specifically using heavy equipment to yard logs across the ground, compacts and disturbs surface soils. Detrimental disturbances can last for decades, but normally DD successfully recovers from a detrimental condition through natural processes (e.g., freeze/thaw processes, wet/dry cycles, root penetration, rodent burrowing) over a period of 50 years or less. Recovery of soils from compaction due to harvesting operations to preharvest conditions can take 5–10 years for well-drained clay soils and 10–20 years for poorly drained clay soils (Arnup 1998). Coarse textured soils like those derived from granitic parent material are less susceptible to compaction compared with finer textured soils derived from basalt. Dickerson (1976) estimated that recovery of wheel-rutted soils and log-disturbed soils would take about 10 years following whole tree yarding on silty clay loam soils.

On the ground, DD surveys were conducted in the Project area in summer 2013 and 2015. Surveys were stratified by focusing on previously harvested units that were predominantly tractor harvested and within the dominant landtypes and PVGs proposed for mechanical vegetation treatments. Of the 75 units surveyed, 61 had visible signs that they had been previously harvested. Detrimental soil disturbances were primarily from soil displacement, while soil compaction was rarely observed, and severely burned and puddled soils were not observed.

Existing DD ranged from 0 to 17% and was largely 5% or less (Table 3.7-3). Recent salvage logging and past soil disturbance, which primarily associated slash piling with a dozer equipped with a brush blade, is the cause for three units having DD greater than 11%.

Table 3.7-3. Soil field survey units and percent detrimental disturbance (DD).

Percent DD	Surveyed Units (%)
0–5%	67 (89.3)
6–10%	6 (8.0)
11–15%	1 (1.3)
>16%	1 (1.3)

For the most part, the soils of the planning area are productive and suitable for timber harvest. Previous harvest activities did not result in excessive erosion, loss of effective ground cover, or slope instability that could have affected the long-term viability of the soils to support productive healthy forests. However, prior harvest with ground-based equipment has resulted in residual soil displacement in many units. The adverse effects and extent of DD are within the Forest Plan Standards and Guidelines of 15% with the exception of one unit.

Total Soil Resource Commitment (TSRC)

A TSRC is the conversion of a productive site to an essentially nonproductive site for a period of more than 50 years (USDA Forest Service 2003a). A TSRC is an effect on the soil that produces conditions that are more visible, longer lasting, and generally results in greater reductions in soil productivity than DD. Examples of TSRC within the Middle Fork Weiser River analysis area include roads, landings, designated or constructed skid trails, gravel pits, recreational trails, developed campgrounds, and administrative facilities. Productivity on these areas ranges from 0 to 40% of natural (USDA Forest Service 2003a). These effects do not completely recover through natural processes, but soil productivity and hydrologic function can be recovered with the implementation of physical treatments such as road obliteration.

The existing amount of TSRC within the 28,784-acre activity area that includes only NFS lands within the Project area is 3.1%. The greatest area of TSRC is associated with roads, which includes the total width of the road prism from the top of the cut slope to the bottom of the fill slope, followed by past harvest-related impacts from primary skid trails and landings. Table 3.7-4 displays the TSRC source, associated acres, and percent contribution to total TSRC within the analysis area. The existing condition of 3.1% meets Forest Plan Standard SWST03.

Table 3.7-4. Source and extent of total soil resource commitment (TSRC) on National Forest System Lands within the activity area.

TSRC Source	Estimated Acres	Percent of Analysis Area
Roads	459	1.6
Past harvest related	376	1.3
Recreation (campgrounds, dispersed sites)	40	0.1
Trails	6	0.02
Gravel pits	4	0.01
Total	885	3.1

Coarse Woody Debris (CWD)

Coarse Woody Debris is defined as “Pieces of woody material having a diameter of at least 3 inches and a length greater than 6 feet” (USDA Forest Service 2003a, p. GL-6). As CWD

becomes incorporated into the soil, it contributes to long-term soil productivity by providing micro sites for moisture retention and microbial activity. The current condition of CWD within individual activity areas has not been quantified. Through site visits and observations, it is apparent that CWD amounts within activity areas are highly variable, depending both on past management activities and natural events; some areas have desired amounts while others do not. Areas most lacking in CWD are plantations. These were previously treated by clear cutting, piling and/or burning residual material, and replanting, resulting in even-aged stands with little or no coarse wood on the ground. There may also be areas within the Grays Creek Fire perimeter that burned with moderate to high intensity, resulting in the consumption of existing CWD and the creation of a "gap" in the future supply as fire-killed trees fall and the next oldest age class (post-fire seedlings) come to maturity.

The amount and size of CWD that should remain on the ground within activity areas following the completion of all proposed activities is determined by the PVG and is outlined in Appendix A of the Forest Plan (USDA Forest Service 2003a, Table A-9, p. A-9). The desired ranges of CWD tonnages and percent large CWD for PVGs identified in Table A-9 are minimums and identify the portion of the tonnage (as a percentage) that should remain in the larger size class (greater than 15 inches). The dominant PVGs represented within treatment areas (harvest, biomass, and burn units) include PVGs 2, 5, and 6. The desired range of total tonnage for these PVGs is from 4 to 14 tons, with varying desired percentages of tonnage for the larger size class (greater than 15 inches) material from greater than 65% for PVG 6 to greater than 75% for PVGs 2 and 5.

Current levels of CWD were estimated during 2015 field surveys in 35 units that had been either clearcut or partial cut harvest. Of the 14 clearcut units, 13 were estimated to be outside the desired range of CWD. Of the 21 partial cut units, 12 were estimated to be within or above the desired range of CWD.

Landslide Prone (LSP)

Mass movements, or landslides, occur when earthen materials become unstable and slide downslope. These mass failures typically occur on steep, concave slopes, oversteepened upper stream banks, and headland areas where surface and subsurface waters tend to concentrate, saturating these areas of deeper soil accumulation. Landslide events are most likely to occur after intense storms or during periods of rapid snowmelt and often cause debris slides/torrents and severe gully erosion. Debris slides and torrents contribute sediment to stream channels and can change channel geomorphology, but they also provide benefits to aquatic habitats through introduction of LWD and coarse substrate. Trees, rocks, and soil material are either deposited directly into streams or the finer particles may eventually reach main channels when tributary drainages flow with water.

To avoid or prevent landslides, it is important to understand the primary factors that regulate slope stability (i.e., soil moisture, root strength, and slope gradient) and what disturbances (management-related or natural) have a greater potential to initiate landslides. Human-caused disturbances, such as road construction and, to a lesser extent, timber harvest, can increase the potential for and occurrence of landslides. Megahan et al. (1989) looked at management-induced landslides and found that roads account for 58% of landslides, while forest vegetation removal accounts for only 9%. A *Summary of Landslide Inventory on the Westside of the Payette National Forest from the New Year 1997 Storm* (Dixon and Wasniewski 1988) looked at natural and management induced landslides. Of the 483 landslides that were identified within the 294-square mile inventory area, 15% were influenced by management activities such as roading and timber harvest. Eighty five percent of the landslides occurred in grass and brush vegetation types, while only 15% occurred in timber. The majority of the inventoried area was on basalt geology.

Landslide occurrence was influenced by the geologic contact zone between the Grand Ronde Basalt and the Imnaha Basalt on steep side slopes greater than 60% having a concave shape where water would concentrate.

The Project area was analyzed for mass stability hazards using the West Zone GIS layer map based on the landslide predictive model SINMAP (Pack et al. 1998) with calibration parameters developed from the 1997 landslide inventory (Dixon and Wasniewski 1998). Characterization and analysis of hydrologic processes and vegetation characteristics within the LSP areas (as delineated by SINMAP) identify the factors controlling slope stability and prioritize locations for field verification to validate whether proposed activities have the potential to modify landslide processes. The model does not address the potential for large geologic structural failures. The 1997 landslide inventory identified nine landslides within the Project area; all were naturally caused and within grass and brush vegetation types (Dixon and Wasniewski 1998). Eight of the nine were centrally located within the Sheep Creek drainage and one was within the lower Little Fall Creek drainage.

Approximately 1,053 acres (3%) of the Project area have been identified with high-to-moderate LSP for shallow debris slides (Figure 3.7-2). Past timber harvest has occurred on 300 of these acres. During soils field surveys, seven potential harvest units having high-to-moderate LSP were evaluated using the LSP field verification form. None of the units had active landslides or exhibited LSP characteristics. During this field review, no other landslides were identified that could be attributed to past timber harvest activities. Evidence of past geologic structural failures were observed in several units inventoried during DD surveys as evidenced by a number of old slumps; they are discussed below.

Of 1,053 acres identified with high-to-moderate potential for shallow debris slides, approximately 616 acres are proposed for vegetative treatments that would remove trees or fuel treatment that could result in tree mortality and effect slope stability. Concentrations of high-to-moderate landslide potential occur within the southwest portion of the analysis area, along a prominent ridge running north-northwest from Indian Mountain, the north aspect along lower Weiser River, and in the Warm Springs Creek drainage. These areas have not been ground-truthed, but where LSP areas are modeled as having a high-to-moderate hazard and falling within the boundaries of proposed vegetation treatment units, methods for avoidance and prevention of landslides may include but are not limited to (USDA Forest Service 2004):

- Limited Practices—(In moderate hazard areas with low-to-moderate risk) Management actions are designed with review and guidance from appropriate resource specialists. Limited practices may include, but are not limited to, reducing yield or basal area, removal of forested vegetation, increased rotation lengths, and selective harvest with full or one end log suspension yarding.
- Restricted Practices—(In high or moderate hazard areas with high relative risk) Management actions are severely restricted or eliminated so as to minimize initiation of landslides and effects on other resources.

High or moderate LSP areas will be visited by a specialist trained in field identification of slope stability to determine the LSP and prescribe practices for the avoidance and prevention of landslides. Project design features to reduce the landslide risk are included as part of the action alternatives (see Chapter 2 of this FEIS).

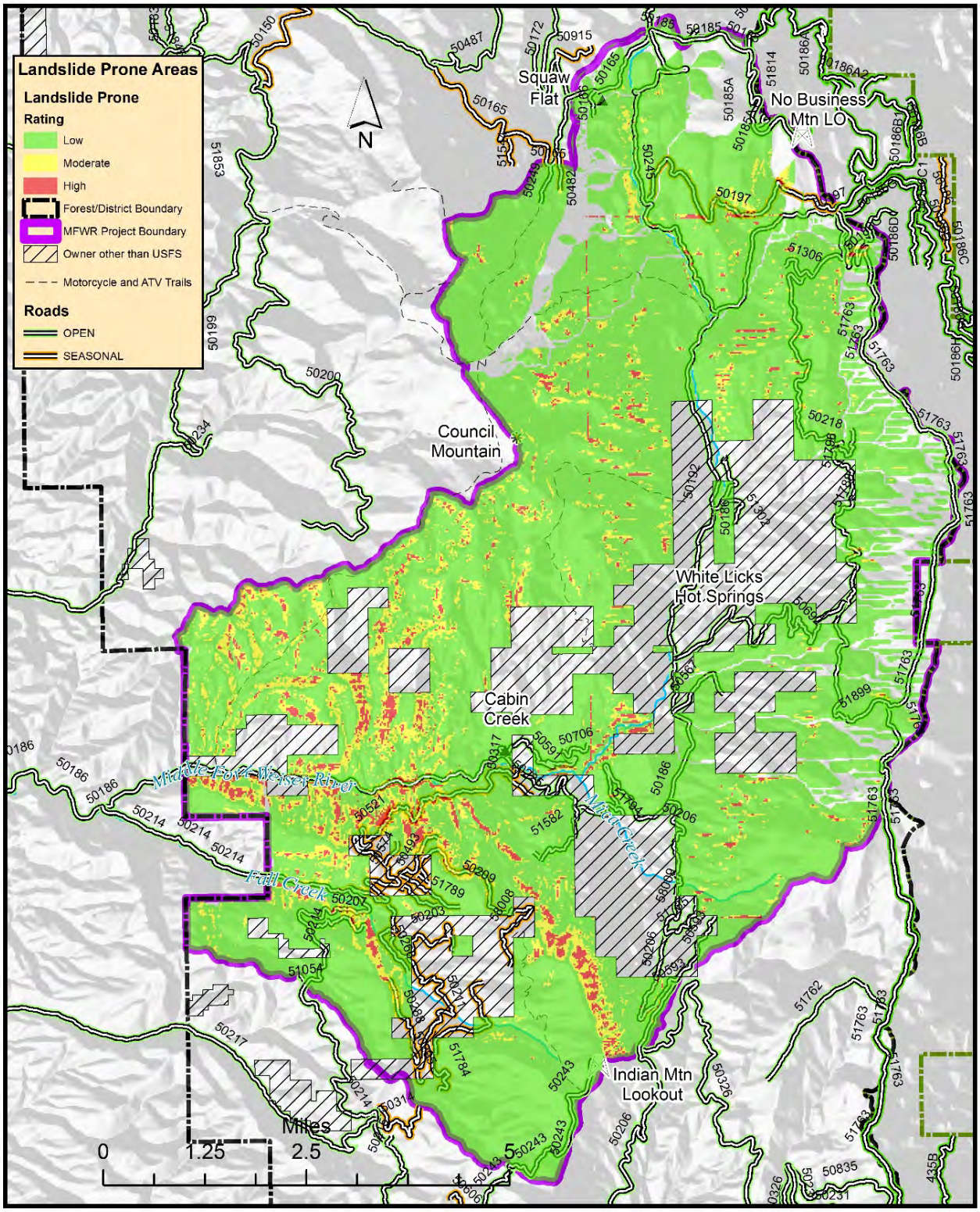


Figure 3.7-2. High, moderate, and low landslide potential (LSP) within the Project area.

Geologic structural failures are larger movements of cohesive materials that overlay hard bedrock. These types of landslides are considered to be historic slumps that were caused by slippage and faulting near the contact zone between different geologies. Although structural failures have been identified within the Project area, evidenced by old scarp and slump terrain, these features are currently stable and not active with the exception of the Cabin Creek slide. This landslide is a deep seated slump, with deposits 0.75-mile long, approximately 750-feet wide, and potentially 20–30 feet thick. It existed prior to road building and has had subsequent smaller movements within the last 200 years and in 2011 when it covered NFS road 591 (GSH Geotechnical Report 2015).

3.7.4. Environmental Effects

3.7.4.1. Direct and Indirect Effects

Detrimental Disturbance

The combined implementation of site-specific Project design requirements and existing DD rehabilitation actions (Chapter 2, Mitigation Table and Project Design Features, summarized in part below) will meet Forest Plan Standards for DD in Project area under Alternatives 2, 3, 4, and 5.

Most soils in the analysis area have the capacity to partially recover from disturbance through natural processes of hillslope soil creep, frost heave, and biophysical mixing. Where soil disturbance rises to DD levels, post-activity mitigation measures can prime soil recovery by partially restoring soil porosity, soil cover, and nutrient status. With the exception of sensitive soil types, this is sufficient to return soils to reasonable ecological functioning over 5–30 years (Knapp and Graves 1989; Miller et al. 2004; Powers 2005). In cases of severe and extensive soil physical disturbance, loss, or thermal damage, a return to predisturbance (i.e., native) soil conditions is not likely on the timescale of human management and should not be expected (Neary et al. 1999; Cambi et al. 2015). Detrimental soil disturbance from harvesting, primary and secondary skid trails, skyline, cable corridors, and prescribed burning will be discussed in the following paragraphs.

Vegetation treatments proposed under Alternatives 2, 3, 4, and 5 will result in soil disturbance from the use of mechanized equipment. The DD may occur with operation of ground-based heavy equipment and cable yarding equipment for tree removal and thinning, primarily in areas where logging equipment traffic is concentrated or in corridors where logs are cable yarded. Log-retrieval systems differ substantially in their immediate effect on soils, with tractor skidding causing the greatest area of soil disturbance within harvest units followed by jammer logging and lastly cable. Soil disturbance impacts—such as primary designated skid trails, which include constructed skid trails, log landings, and temporary roads—are considered TSRC and have been evaluated in another section of this report.

For logging under summer conditions, tractor skid trails, which are flagged on the ground prior to the start of logging operations, would typically be located in a parallel pattern in a harvest unit. Skid trail spacing of 200 feet or greater for primary or constructed skid trails is required except where converging at the log landings. Skid trail spacing of 100 feet or greater for secondary lateral trails, which branch off of primary skid trails, is required. These skid trails typically receive three to five passes by machinery and could contribute to an increase in DD (Froehlich et al. 1983).

For example, with an average skid trail spacing of approximately 150 feet apart, skid trails would affect about 7% of the activity area in a tractor harvest unit (Froehlich et al. 1981). Of this 7%, it is assumed that approximately 2.4% of these skid trails could be primary designated skid trails or constructed skid trails, spaced at 200 feet or greater, and they would be considered TSRC effects and not DD. The remaining 4.6% of secondary skid trails could contribute to DD. In units that have been previously managed, a requirement to reuse the existing skid trails where available should minimize DD. For logging under winter conditions, the amount of area impacted by log skidding would be less and is estimated to be about 3% of the activity area. Soil compaction and displacement DD from secondary skid trail use could result in short- to long-term impacts with natural recovery taking 5 to 20 years (Arnup 1998; Dickerson 1976).

Detrimental soil disturbance would occur within jammer and cable yarding and skyline corridors, where the logs drag on the ground or are partially suspended while being pulled up the hill by the cable system. As with tractor skid trails, jammer and cable yarding corridors would generally be located in a parallel pattern in a harvest unit and spaced about 100 feet apart. With an average width of soil disturbance at 4 feet, jammer and cable yarding corridors could affect about 3.7% of the activity area. Skyline cable yarding disturbance would result in even less DD since the log is mostly suspended and could result in an approximate 2.0% increase in DD within an activity area (Allen et al. 1999).

Site-specific BMPs and post-activity mitigation measures have been developed and will be implemented (Chapter 2, Mitigation Table and Project Design Features) to reduce the potential for any additional incremental DD incurred from harvest, road, and prescribed fire activities in all activity areas, regardless of whether existing levels of DD are above 15%. The measures stipulate soil properties and operating conditions that must be met to maintain soil quality standards. These include soil moisture thresholds for prescribed burning and the use of heavy equipment, maximum slopes that heavy equipment can operate on, and that heavy equipment (other than feller buncher and excavator operations) remain on designated skidtrails except when soils are frozen and snow covered.

All skidtrails and landings are to be designated for activity areas, and all skidtrails and landings using with this proposal, as well as any compacted or displaced soil from previous harvest activities in units where existing DD is greater than 15%, will be rehabilitated to restore long-term soil productivity. The use and obliteration of existing skidtrails/landings and the restoration of productivity on compacted and displaced soils adjacent to new and existing skidtrails and landings within all tractor units will reduce the DD below current levels, meeting the Forest Plan Standard. A net reduction in DD is required in harvest units 2101 and 2203 and any units not previously inventoried. Activity areas previously harvested using ground-based tractor, cable, or skyline methods mostly have low percentages of existing DD (Table 3.7-3), predominantly below 5%.

- To avoid unacceptable soil rutting, displacement or compaction, approval of ground-based equipment operations…
- Implement DD and TSRC remediation prescriptions on trails and landing areas progressively by activity unit as mechanical thinning operations are completed.
- Reuse existing, well-located skid trails and landings (as determined by a soil scientist or hydrologist) and reclaim (as described above) following the completion of harvest activities.

- Reclaim disturbed skyline/cable corridors by pulling soil berms back to original configuration and scattering slash (as available) on all areas of soil disturbance to provide for minimum 50% and maximum of 80% effective cover.
- Replace topsoil (if needed and as possible), incorporate intact vegetation plugs from adjacent undisturbed areas, scatter organic matter to provide a minimum of 50% and maximum of 80% effective ground cover, seed with native seed (where preexisting roads or landings are reused and then obliterated), and mulch to facilitate vegetation recovery where slash is not available.

Prescribed fire would be implemented to reduce existing natural fuel loads as well as harvest-related slash. Techniques and their impacts are variable, but overall impacts on the soil resource will be low, with limited pockets of severe impact from burning of large slash piles.

Prescribed fire treatments are readily divided into broadcast burning and pile burning. Broadcasting burning objectives for the analysis area will target a mosaic pattern of light burning, resulting in extensive and negligibly low soil burn severity impacts (Busse et al. 2014). Soil-burn severity from pile burning will generally be moderate to high, sometimes resulting in DD; however, the spatial footprint is small relative to the soil resource base. Soil disturbance from prescribed fire containment line construction is variable. Prescribed fire activities are concentrated during spring or fall when soil and fuels moistures are favorable for minimizing soil thermal impacts (Parsons et al. 2010; Busse et al. 2014). Specific BMPS and mitigation measures for prescribed fire are found in Table 2.4-3.

Total Soil Resource Commitment

Alternative 1 (No Action)

Under the No Action alternative, none of the Proposed Action activities would be implemented and there would be no change in the current status of TSRC conditions on NFS lands. The existing TSRC of 3.1% would continue to meet the Forest Plan Standard of less than 5% of the activity area.

Alternatives 2, 4, and 5

Management activities would return 207 acres to productivity through the obliteration of 78 miles of road resulting in a 0.7% reduction in TSRC across the analysis area. Slightly less road obliteration (0.8 mile) is prescribed under Alternative 5, which would result in a negligibly greater reduction (<0.1%) in TSRC across the analysis area. New TSRC from the construction of landings, temporary roads, and primary skidtrails associated with vegetation treatment activities would result in a short-term increase and would be rehabilitated following use resulting in no net gain in TSRC in the long term. Additional reduction in TSRC would be realized when existing skidtrails and landings from past harvest entries are reused and then returned to productivity through obliteration. New permanent road construction totaling 21.5 acres and new recreation trail construction totaling 10.1 acres would result in a 0.1% increase in TSRC within the analysis area. The Forest Plan Standard threshold of 5% for TSRC would be met as TSRC is reduced from 2.3 to 3.1 % of the activity area, a minimum 207 mostly roaded acres (Table 3.7-5).

Table 3.7-5. Total soil resource commitment (TSRC) projected by alternative.

Alternative	Percent TSRC Restored (road obliteration) (%)	Percent TSRC from roads and trails (%)	Percent TSRC from past harvest (%)	Total percent TSRC (%)
1 (No Action)	0	1.6	1.3	3.1
2	0.7	1.0	1.3 (would improve slightly)	2.3
3	0.8	0.8	1.3 (would improve slightly)	2.1
4	0.7	1.0	1.3 (would improve slightly)	2.3
5	0.7	1.0	1.3 (would improve slightly)	2.3

Alternative 3

Management activities would return 229 acres to productivity through the obliteration of 86 miles of road resulting in a 0.8% reduction in TSRC within the analysis area. New TSRC from the construction of landings, temporary roads, and primary skidtrails associated with vegetation treatment activities would result in a short-term increase and would be rehabilitated following their use resulting in no net gain in TSRC in the long term. Additional reduction in TSRC would be realized when skidtrails and landings from past harvest entries are reused and then returned to productivity through obliteration. No new permanent road construction is proposed and new recreation trail construction totaling 1.7 acres would result in a 0.01% increase in TSRC within the analysis area. The Forest Plan Standard threshold of 5% for TSRC would be met as TSRC is reduced by at least 229 acres, from 3.1% to 2.1 % of the activity area (Table 3.7-5).

Coarse Woody Debris (CWD)

Alternative 1 (No Action)

With the implementation of this alternative, CWD would remain at existing levels for the short term. Existing CWD levels vary, with some areas meeting desired amounts and sizes and others lacking in desired tonnage and/or size depending on past management activities and the natural processes (e.g. fire, windthrow, mortality) that have occurred. Additional changes to the amount of CWD would occur through time as natural processes add to and/or remove CWD from activity areas. Coarse woody debris would trend toward the desired conditions in the Forest Plan.

Alternatives 2, 3, 4, and 5

Removing biomass through thinning vegetation treatments and prescribed burning can potentially leave insufficient CWD organic material for future nutrient cycling. Researchers have recommended optimum amounts of coarse woody material to remain following vegetation management activities to sustain nutrient cycling and maintain long-term site productivity (Graham et al. 1994; Brown et al. 2003).

The desired condition for CWD would be met in these alternatives as CWD would be produced or retained at levels that meet desired conditions (where desired amounts and sizes are available) or trend toward desired conditions (where desired amounts and/or sizes are lacking).

Mitigation measures have been developed requiring the retention of CWD in desired amounts and sizes (or trending towards desired amounts and sizes) for all harvest units and prescribed burning units. These mitigation measures will ensure that the desired amounts and sizes of CWD (or trends toward desired amounts and sizes) are immediately supplied to all activity areas. With the implementation of these alternatives, CWD would be retained at, or move toward, the desired levels for PVGs within activity areas.

In all activity areas, the retention of CWD (6-foot minimum lengths) will be as evenly distributed as possible in the tonnages and diameters described below. Total tonnage is measured following the completion of all activities and must retain the percentages of the large size class CWD (greater than 15 inches DBH) identified in Table 3.7-6 (USDA Forest Service 2003a). When developing burn prescriptions, CWD (in desired amounts and sizes) will be retained at the desired condition. If CWD is presently below the desired condition, it will be maintained at existing levels or moved toward the desired condition.

Table 3.7-6. Desired range of coarse woody debris, in tons per acre, and desired amounts in large classes for Potential Vegetation Groups (PVGs).

Indicator	PVG 1	PVG 2	PVG 3	PVG 4	PVG 5	PVG 6	PVG 7	PVG 8	PVG 9	PVG10	PVG11
Dry weight (tons per acre in decay classes I and II	3–10	4–14	4–14	4–14	4–14	4–14	5–19	5–19	5–19	5–19	4–14
Distribution >15 inches	>75%	>75%	>65%	>65%	>75%	>65%	>50%	>25%	>25%	>25%	>25%

Note: The recommended distribution is to try to provide coarse wood in the largest size classes, preferably over 15 inches in DBH, which provide the most benefit for both wildlife and soil productivity. This table is not meant to provide an even distribution of coarse wood across every acre of the forested landscape but to provide numbers that serve as a guide to approximate an average condition for an activity area.

These alternatives propose harvest of mature plantations on approximately 1,100 acres. Due to the homogeneity of these units as a result of past management, special consideration should be given to levels of CWD. Minimum tonnages for the appropriate PVG should be retained for all thinned mature plantation units, and while the large size class may not be available, a variety of sizes should be left on the ground, with 65–75% of the retained tonnages falling in the “large” size class for the particular plantation, which will be based on the average diameter for the stand.

The Forest Plan desired conditions for CWD for all activity areas within the Project area would be met or improved on with the implementation of the mitigation measures under Alternatives 2, 3, and 4.

3.7.5. Minimum Road System

Alternative 1 would not designate an MRS for the Project area. All action alternatives implement the MRS as identified through the work of the IDT with long-term reductions in TSRC at the subwatershed scale. Of the action alternatives, Alternative 3 does the most to move all Project area subwatersheds furthest toward the SWRA desired conditions identified in the Forest Plan while Alternative 4 does the least.

3.7.6. Cumulative Effects

The following subsections describe reasonably foreseeable future interactions pertinent to the soil resource within this Project area. Assuming the implementation of any of the action alternatives (and associated PDFs and mitigation) for this Project and the actions described in this cumulative effects section, all Forest Plan Standards related to the soil resource would be met.

3.7.6.1. Soil Disturbance and Coarse Woody Debris

Cumulative effects for the soil resource include all past, present, and foreseeable future actions that will cause DD, TSRC, and CWD effects within the activity areas for the Project. The activity areas for the analysis of cumulative effects for DD, TSRC, and CWD are identical to the activity areas for the same indicators contained in the Direct and Indirect Effects section because these indicators do not affect, and are not affected by, soil productivity outside of those areas.

The effects of past management actions on DD, TSRC, and CWD within the corresponding activity areas are included in the Current Condition section. The effects of present management actions are included in the Direct and Indirect Effects section.

The reasonably foreseeable effects of future actions on DD, TSRC, and CWD in the activity areas, in combination with past and present effects, are discussed in this section. The reasonably foreseeable effects that were considered for the analysis of DD, TSRC, and CWD are those contained in the Cumulative Effects Appendix of the FEIS.

The only reasonably foreseeable future action likely to have the potential for cumulative effects on the soil resource within the activity areas as defined above is the continuation of the temporary opening of currently closed system roads for firewood access. This has been occurring on an annual basis on the West Zone of the PNF for the past 2 years and is proposed to continue. Members of the public submit currently closed system roads to be considered for a 6-8 week opening during the permitted firewood season. Roads are evaluated by the Zone IDT and approved or denied. This allows for additional firewood access on a temporary basis. Cumulative effects on DD and TSRC where these road corridors might intersect activity areas proposed for the Project would be minimal, if they occur at all. Access on these roads occurs during the driest time of the year (July–August), and the potential for soil disturbance would be limited to vehicles that illegally left the existing road prism, or firewood cutters who illegally skidded logs instead of hand cutting, bucking, and piling.

The cumulative effects on CWD within activity areas proposed for this Project would be variable. Firewood cutting would increase in corridors along roads for the time the roads were open and would result in lower amounts of CWD—especially in the greater than 15-inch category—as downed logs and standing material that would become CWD are used for firewood. However, given the limited number of roads open for this program each season and the limited time period for access, the reduction of CWD where these potential future firewood roads intersect activity areas proposed for this Project would likely be minimal.

3.7.6.2. Climate Change

The broadly agreed expectation of climate forcing in this ecoregion is a gradual increase in average temperature and an increase in the variability of precipitation (Peterson et al. 2014). By their nature, soils form, persist, and degrade in response to tightly coupled feedbacks that change based on thresholds (Muhs 1984; Chadwick and Chorover 2001; Slessarev et al. 2016). As such, pronounced changes in soils of this ecoregion due to climate change would mostly be driven by thresholds of soil temperature and moisture feeding back into soil productivity (Nash et al. 2015, draft). On most spatial scales, the proposed activities would generally reduce evaporative demand and conserve soil moisture (Berryman et al. 2015). This would tend to buffer belowground temperatures from threshold changes induced by aboveground climate forcing and may be considered a positive, long-term outcome of the proposed management in context of climate change. However, this benefit can be undermined locally by management activities through indirect/direct soil disturbance. Specifically, shifts in soil moisture (e.g., through

compaction) and temperature regulation (e.g., loss of herbaceous understory or canopy cover reduction) would interact with topography and intrinsic soil properties to amplify or buffer long cumulative effects of climate change.

In semiarid upland soils in the Project area, an increase in soil temperature, coupled with decreasing soil moisture, would tend to prolong soil disturbance recovery, decrease forest nutrient cycling, and lower soil carbon storage potential (Powers et al. 2005). An increase in both soil temperature and moisture would likely increase soil productivity and result in little change or a possible increase in carbon storage. In colder and wetter PVGs, an increase in soil temperature may lead to longer growing seasons if soil moisture is not limiting (Kurylyk et al. 2014). A shift in precipitation timing and form would primarily affect soils in the Project area by increasing near-term vulnerability to erosion during periods of reduced forest soil cover and disturbance recovery.

Soil responses to temperature and moisture shifts are highly dependent on the soil parent material. Soils derived from coarse textured granitic soils in the upper Project areas are less resilient because they drain readily and are lower in organic matter. Fine textured soils, dominant in the lower elevation of the Project area, would generally be more resilient to changes in soil temperature and moisture but potential decreases in vegetative cover would offset that benefit. In terms of erosion, a shift away from winter snow precipitation towards rain would generate a higher probability of runoff erosion events from areas made vulnerable by ground-disturbing activities (Litschert et al. 2014).

3.7.7. Irreversible and Irretrievable Commitments

None of the alternatives would create irreversible commitments of soil productivity.

The TSRC is considered to be irretrievable losses of soil productivity until the time when physical measures are taken to restore the productivity and hydrologic function of the soil. The obliteration of roads, landings, and skid trails are examples of restoring soil productivity and hydrologic function and reducing the amount of irretrievable loss of soil productivity.

Alternative 1 (No Action alternative) would maintain the existing condition of 885 acres of irretrievably committed soil productivity. No additional areas would be added and no additional areas would be restored.

Alternatives 2, 3, 4, and 5 (action alternatives) would result in a net reduction in the acreage of irretrievably committed soil productivity (TSRC)—at least 77.8 acres under Alternatives 2, 4, and 5, and 86.2 acres under Alternative 3. These net reductions would be from road obliteration.

3.7.8. Forest Plan Consistency

Alternative 1 (No Action alternative) meets the Forest Plan Standards for DD, TSRC, and CWD since trends toward the standard or desired condition are required only when management activities are implemented.

Alternatives 2, 3, 4, and 5 (action alternatives) meet the Forest Plan Standards and Guidelines for DD, TSRC, and CWD since activity areas meet or trend toward the Forest Plan Standard or the desired condition. Standards and Guidelines are achieved by combining implementing Forest Plan direction, developing specific design features and prescriptions, and applying site-specific mitigation measures.

3.7.8.1. Detrimental Disturbance

Existing levels of DD would continue to recover naturally and DD standards would be met for all activity areas by implementing the mitigation measures described in Chapter 2 for Alternatives 2, 3, 4, and 5 (action alternatives).

Reductions in DD would be achieved by implementing management requirements, BMPs, burning prescriptions, and specifically designed mitigation measures that restrict heavy equipment operations. These measures would provide little opportunity for additional DD to be produced. Additionally, by obliterating all skid trails and landings used with the proposed activities, as well as areas that are visually compacted or displaced from past activities, DD levels will be reduced from the current condition in all action alternatives.

3.7.8.2. Total Soil Resource Commitment

As the TSRC would remain at 3.1% under Alternative 1 (No Action alternative), the Forest Plan Standard for TSRC would continue to be met.

For Alternatives 2, 3, 4, and 5 (action alternatives), the Forest Plan Standard for TSRC would be met through net reductions in the amount of TSRC. The existing level of 3.1% TSRC for the Project area would be reduced to 2.2% through the net decrease of approximately 78.8 acres under Alternatives 2, 4, and 5 to 2.1% through the net decrease of approximately 86.2 acres under Alternative 3.

3.7.8.3. Coarse Woody Debris (CWD)

Alternative 1 (No Action alternative) would retain existing quantities of CWD within activity areas in the short term while fluctuations through natural events (tree mortality, blowdown, fires) would be expected over the longer term.

Alternatives 2, 3, 4, and 5 (action alternatives) would immediately place CWD within each activity area at (or trending toward) levels that are within the desired range for the activity area PVG(s).

See the Project record for applicable Forest Plan Standards and Guidelines for this Project.

3.8. Botany and Rare Plants

3.8.1. Analysis Scale, Data Sources, and Methodology

3.8.1.1. Analysis Scale

Direct, Indirect, and Cumulative Effects Analysis Area

The botanical and rare plant analysis area for baseline conditions and direct, indirect, and cumulative effects includes the entire Project area. Site-specific level surveys were conducted in the Project area where habitat is present for the candidate species whitebark pine, other rare plants, or Region 4 Forest Service-listed sensitive plant species.

Temporal Scale of Analysis

Time frames were defined in the Forest Plan as temporary (0–3 years), short term (3–15 years), and long term (>15 years) (USDA Forest Service 2003a). These time frames are used to qualitatively define the effects of management actions on botanical resources and rare plants.

3.8.1.2. Data Sources and Methodology

This section incorporates by reference the Botanist Specialist Report in the Project record. The report contains the data, methodologies, analyses, maps, references, and technical documentation on which the specialist relied to reach the conclusions in the FEIS.

3.8.1.3. Analysis Indicators

The analysis indicators for botanical resources and rare plants include the following:

- Impacts to Federally listed threatened, sensitive, proposed, and candidate species.
- Impacts to Region 4-listed sensitive plant species and Forest watch species.

3.8.2. Desired Conditions

The desired condition for botanical resources identified in the Forest Plan (USDA Forest Service 2003a, p. III-32) states, “the amount, distribution, and characteristics of life-stage habitats are present to maintain or reach viable populations of native species. Habitat conditions generally contribute to survival and recovery, and prevent listing on the Region 4 Sensitive Species List.” A summary of these desired forest components is presented in Chapter 3 of the Forest Plan.

Forestwide Goals, Objectives, Standards, and Guidelines for botanical resources are found on pages III-8, III-11, and III-32 through III-34 of the Forest Plan (USDA Forest Service 2003a). Forest Plan direction specifically applicable to the Project for botanical resources is listed below (USDA Forest Service 2003a):

- **TEST08—**Avoid management actions within occupied TEPC plant species habitat that would adversely affect long-term persistence of those species.
- **BTST01—**Management actions that occur within occupied sensitive plant species habitat must incorporate measures to ensure habitat is maintained where it is within desired conditions, or restored where degraded.

- **BTGU01—**For site/project-scale analysis, suitable habitat should be determined for sensitive species within or near the Project area. Conduct surveys for those species with suitable habitat to determine presence. Document the rationale for not conducting surveys for other species in the Project record.
- **BTGU05—**Coordinate with Forest botanists to consider sensitive species habitat needs when designing and implementing management activities that may affect these species or their habitats.

The Project area is in MA 3, Weiser River. Pertinent management direction for this MA includes the following objective (USDA Forest Service 2003a, p. III-132):

- **Objective 0328—**Maintain or restore known populations and occupied habitats of TEPCS plant species, including Snake River goldenweed, giant helleborine orchid, Tolmie's onion, squaw apple, dwarf gray rabbitbrush, and Mahala-mat ceanothus to contribute to the long-term viability of these species.

General overall management of botanical resources in the Forest Plan includes the following Goals. The management direction of Forest Plan Goal BTGO01 is to:

- Provide habitat capable of:
  - supporting viable populations of native plants species within the Forest, and
  - supporting plant biodiversity to meet social needs, biological diversity, and ecological and functional integrity" (USDA Forest Service 2003a, page III-32).

The management direction of Forest Plan Goals BTGO02 through BTGO06 is as follows (USDA Forest Service 2003a, page III-32):

- BTGO02—Emphasize conservation and recovery of Region 4 Sensitive species, Forest "watch" plants, and other species at risk where quantity and quality of habitat needed to support viability is a concern.
- BTIGO03—Maintain or restore globally-rare plants identified as Natural Heritage Program G1, G2 and G3 and/or S1 and S2 species, and provide for their continued compositional and functional integrity for those species for which we have habitat.
- BTGO04—Maintain habitats for native plants that provide nectar, floral diversity, and pollen throughout the season during which pollinator species are active, with emphasis on rare plant species.
- BTGO05—Maintain or restore unique habitats (e.g., unique assemblages of rare plant species, tall forb communities, etc.) throughout the Forest.
- BTGO06—Manage plant community habitats (e.g., riparian, wetland, and upland forest, shrub, and grassland habitats) to provide for:
  a. The desired amount, quality, and distribution of habitats.
  b. Reduced fragmentation within habitats.
  c. Juxtaposition and connectivity to other habitats.
  d. Ecosystem processes that shape habitat.

3.8.3. Affected Environment

3.8.3.1. Current Condition

Table 3.8-1 lists the Federal, State, and Forest Service status of rare plants with potential or known habitat on the Forest. This table was generated from results of the Idaho rare plant conference sponsored by the Idaho Native Plant Society in 2016 in Boise, Idaho. Because information about rare and sensitive plant species is continuously updated, the botanical species tracked are considered dynamic.

Table 3.8-1. Federal, State, and Forest Service status of rare plant species with potential or known habitat on the Payette National Forest.

Species Name	Common Name	Global[a]	State[b]	Forest Service Status[c]		Global Distribution[d]
				Regional Sensitive	Forest Plan	
Allium madidum	Swamp onion	G3	S3	S	S	re
Allium tolmiei var. *persimile*	Tolmie's onion	G4G5T3	S3	S	S	le
Allium validum	Tall swamp onion	G4	S3	N	W	w
Allotropa virgata	Candystick	G4	S3	S	S	d
Astragalus paysonii	Payson's milkvetch	G3	S3	S	S	re
Astragalus vexilliflexus var. *vexilliflexus*	Bentflower milkvetch	G4T4	S1	S	S	d
Botrychium lanceolatum var. *lanceolatum*	Lance-leaved moonwort	G5T4	S3	N	W	cb
Botrychium lineare	Linear-leaved moonwort	G2?	SH	S	S	sd
Botrychium simplex	Least moonwort	G5	S2	S	W	cb
Buxbaumia viridis	Green bug moss	G4G5	S3	N	W	w
Calamagrostis tweedyi	Cascade reedgrass	G3	S2	S	S	re
Camassia cusickii	Cusick's camas	G4	S2	S	S	re
Carex aboriginum	Indian Valley sedge	G1	S1	N	W	le
Ceanothus prostratus ssp. *prostratus*	Mahala-mat ceanothus	G5/?	S1	N	W	d
Crepis bakeri ssp. *idahoensis.*	Idaho hawksbeard	G4T2	S2	N	W	le
Douglasia idahoensis	Idaho dwarf-primrose	G3	S3	S	S	le
Draba incerta	Yellowstone draba	G5	*S2*	N	W	re
Eatonella nivea	White eatonella	G4G5	S3	N	W	d
Epilobium palustre	Swamp Willow Weed	G5	S3	N	W	w
Epipactis gigantea	Giant helleborine orchid	G4	S3	N	W	sd
Ericameria nauseosa ssp. *nana*	Dwarf grey rabbitbrush	G5T4	S3	N	W	re
Hackelia davisii	Davis' stickseed	G3	S3	N	W	le
Halimolobos perplexa var. *perplexa*	Puzzling halimolobos	G4T3	S3	S	S	le
Helodium blandowii	Blandow's helodium	G5	S2	N	W	cb
Hierochloe odorata	Sweetgrass	G4G5	S1	N	W	w
Howellia aquatilis	Water howellia	T-G3	S1	N	W	sd

Species Name	Common Name	Global[a]	State[b]	Forest Service Status[c]		Global Distribution[d]
				Regional Sensitive	Forest Plan	
Leptodactylon pungens ssp. *hazelia* (Linanthus)	Hazel's prickly phlox	G5T2	S2	S	S	le
Lewisia sacajaweana	Sacajawea bitterroot	G2	S2	S	S	re
Lobaria scrobiculata	Pored lungwort	G4	S1	N	W	cb
Mimulus clivicola	Bank monkeyflower	G4	S3	S	S	re
Mirabilis macfarlanei	MacFarlane's four o'clock	T-G2	S2	N	W	le
Peraphyllum ramosissimum	Wild crab apple	G4	S2	N	W	sd
Pilophorus acicularis	Nail lichen	G4	S2	N	W	sd
Pinus albicaulis	Whitebark pine	C-G3G4	S3	S	—	w
Polystichum kruckebergii	Kruckeberg's sword-fern	G4	S2	N	W	re
Pyrrocoma radiata	Snake River golden weed	G3	S3	S	S	re
Ribes sanguineum	Redflower currant	G5	S1	N	W	sd
Ribes wolfii	Wolf's current	G4	S2	N	W	d
Rubus bartonianus	Bartonberry	G2	S2	S	S	le
Sanicula graveolens	Sierra sanicle	G4G5	S2	N	W	w
Saxifraga bryophora var. *tobiasiae*	Tobias' saxifrage	G5T2	S2	S	S	le
Schistostega pennata	Luminous moss	G3G4	S1	N	W	cb
Sedum borschii	Borch's stonecrop	G4 ?	S2	N	W	sd
Sedum valens	Salmon River sedum	G1G2	S1S2	N	W	le
Silene spaldingii	Spalding's silene	T-G2	S1	N	W	re
Sphagnum platyphyllum	Sphagnum	G5	S1	N	-	sd
Spiranthes diluvialis	Ute ladies'-tresses	T-G2G3	S1	N	W	re
Trifolium douglasii	Douglas' clover	G2	S1	N	W	re
Trifolium longipes var. *multipedunculatum*	Many stalked clover	G4T2	S2	N	W	—
Tripterocladium leucocladulum	Naked rhizomnium moss	G3	S3	N	W	le

[a]**Global**—Global ranking as assigned by Natural Heritage Program and Idaho Native Plant Society; G1 = Critically Imperiled, G2 = Imperiled, G3 = Vulnerable, G4 = Apparently Secure, G5 = Secure, ? = Inexact Numeric Rank, **T** = Threatened, **C** = Candidate.
[b]**State**—Idaho State ranking; **SH =** State Historical Occurrence, **S1 =** State Critically Imperiled, **S2** = State Imperiled, **S3 =** Vulnerable, **S4 =** Apparently Secure
[c]**Forest Service Status—S** = Region 4 sensitive, **W** = Forest Watch Plants, **N** = No current status.
[d]**Global Distribution—d** = disjunct, **le** = local endemic (<100 square miles), **re** = regional endemic (distribution 100–10,000 individuals), **sd** = sparsely distributed (isolated populations), **w** = widespread, **cb** = circumboreal, circumpolar.
Source: Based on the results of the Idaho rare plant conference sponsored by the Idaho Native Plant Society in February 2016, Boise, Idaho (http://www.idahonativeplants.org/rpc/RarePlantList.aspx).

The analysis area contains four Regional Forester Sensitive plant species (swamp onion [*Allium madidum*], Tolmie's onion [*Allium tolmiei* var. *persimile*], bank monkeyflower [*Mimulus clivicola*], and whitebark pine) and one Forest watch species (giant helleborine orchid [*Epipactis gigantea*]). Whitebark pine is also a FWS Federal candidate species for listing. Table 3.8-2 shows the species considered in this analysis and lists their habitat requirements and global and local status ratings of vulnerability.

Table 3.8-2. Botanical species considered in the analysis for the Project based on known habitat and populations.

Species Name/Family	Habitat Requirements	Global[a]	State[b]	Forest Service Status[c]	Global Distribution[d]
				Current	
Allium madidum Swamp onion Liliaceae family		G3	S3	S	re
	Found in seasonally moist meadows, along low groundwater courses, or around vernal pools. Sites may be surrounded by coniferous forests but seldom found under forest canopies. Sites open with flat-to-little gradient. Known to occur at elevations from 3,800 to 6,500 feet (NatureServe 2016). Most populations occur on the west side of the Forest.				
Allium tolmiei var. *persimile* Tolmie's onion Liliaceae family		G4/G5	S3	S	le
	Occurs in seasonally wet soils of swales, seeps, road cuts, and intermittent water courses that become very dry during the summer. Sites range from open sagebrush habitat to ponderosa pine, Douglas-fir, and grand fir at elevations from 3,000 to 5,500 feet (Moseley & Mancuso 1990). Occurs predominately on the west side of the Forest.				
Epipactis gigantea Giant helleborine orchid Orchidaceae family		G4	S3	W	sd
	Occurs in wet areas along stream banks, lake margins, seeps, and springs, especially thermal waters. Populations on the Payette and Boise National Forests are found near hot springs or seeps. Although it can occur at sea level, giant helleborine orchid occurs in the mountains at elevations from 5,000 to 7,400 feet. (NatureServe 2016).				
Mimulus clivicola Bank monkeyflower Scrophulariaceae family		G4	S3	S	re
	Occurs in moist microhabitats such as seeps, perched water tables, and runoff channels. Sites have southerly aspects. Soils range from moderate to deep basaltic. Found between elevations from 4,200 to 6,700 feet (NatureServe 2016). Most populations occur on the west side of the Forest in grass/shrub communities.				
Pinus albicaulis Whitebark pine Pinaceae family		C-G3G4	S3	S	w
	Occurs in subalpine and timberline zones from west-central British Columbia east to west-central Alberta and south to central Idaho, southwestern Wyoming, and southern California (NatureServe 2016). Commonly occurs at elevations from 7,400 to 9,000 feet on the Forest.				

[a]**Global—**Global ranking as assigned by Natural Heritage Program and Idaho Native Plant Society. G1 = Critically Imperiled, G2 = Imperiled, G3 = Vulnerable, G4 = Apparently Secure, G5 = Secure, **T** = Threatened, **C** = Candidate.
[b]**State—**Idaho State ranking; **SH =** State Historical Occurrence, **S1 =** State Critically Imperiled, **S2** = State Imperiled.
[c]**Forest Service Status—S** = Region 4 sensitive, **W** = Forest Watch Plants, **N** = No current status.
[d]**Global Distribution—d** = disjunct, **le** = local endemic (< 100 square miles), **re** = regional endemic (distribution 100–10,000), **sd** = sparsely distributed (isolated populations), **p** = peripheral, **w** = widespread, **cb** = circumboreal, circumpolar.

Swamp Onion (*Allium madidum*)

Species Description: A member of the lily family (Liliaceae), the perennial swamp onion has a slender stem rising from an ovoid bulb. A cluster of easily detached bulblets are located at one side of the base of the mature bulb. Flowers are white to pink with green midribs.

Habitat and Management Description: Swamp onion occurs in seasonally wet meadows along low ground water courses and around vernal pools at elevations from 3,800 to 6,500 feet. Plants bloom from early May to early July. Populations on the Forest of this Region 4 sensitive plant appear stable and are not trending towards Federal listing. Currently, no conservation strategy exists for the plant; none is required at this time.

Tolmie's Onion (*Allium tolmiei* var. *persimile*)

Species Description: A member of the lily family (Liliaceae), the perennial Tolmie's onion has a slender stem, circular in cross-section, rising from an ovoid bulb. This plant has two flat, thick, falcate leaves that are about equal in length to the stem. Flowers are white to pink with darker pink midvein. Plants bloom from early May to early July.

Habitat and Management Description: Tolmie's onion occurs in seasonally wet soils of swales, seeps, road cuts, and intermittent water courses that become very dry during the summer. Sites range from open sagebrush habitat to ponderosa pine, Douglas-fir, and grand fir forest types at elevations from 3,000 to 5,500 feet.

Populations on the Forest of this Region 4 sensitive plant appear stable and are not trending towards Federal listing. Currently, no conservation strategy exists for the plant; none is required at this time.

Management Efforts: In managing for this species, new road construction in or near populations is avoided. Controlled access to populations is maintained so that hydrologic patterns supporting the plant are maintained.

Giant Helleborine Orchid (*Epipactis gigantea*)

Species Description: A member of the orchid family (Orchidaceae), this perennial orchid grows 1–3 feet tall. The lower leaves are ovate but narrow higher up the stem. The flowers, which occur in sets of three to nine, are showy with greenish sepals surrounding the brown-purple petals. Plants flower from June to early July.

Habitat and Management Description: A species of open, early successional habitats, the giant helleborine orchid grows on open wet sites adjacent to mineral hot seeps or cool springs along rivers, meadows, seeps. Elevations range from about 2,500 feet at Barth Hot Springs to 4,500 near the Council Ranger District Office on the Forest. Plants flower from June to July. The plant is not on the Region 4 sensitive list because it has a broad range from central Mexico northward throughout the western United States and into southern British Columbia. Giant helleborine orchid is on the Forest watch list because recreational use and collection cause local viability concerns. Currently no conservation strategy exists for the plant; none is required at this time.

Bank Monkeyflower (*Mimulus clivicola*)

Species Description: A member of the Scrophulariaceae family, this small, generally single-stemmed annual plant seldom gets over 3–5 inches tall. Sticky, glandular hairs cover the entire plant and produce a strong, distinct musky odor. The pink flowers are showy and large in relation to the plant's overall size. Flowering begins in late May or early June and runs through mid July.

Habitat and Management Description: Bank monkeyflower occurs in moist microhabitats such as seeps, perched water tables, and runoff channels. Most sites have southerly aspects with basalt-based soil. It typically is found at elevations from 2,000 to 6,700 feet. Most populations occur on the west side of the Forest in grass/shrub communities.

This plant species is a regional endemic of the interior Pacific Northwest and is on the Region 4 sensitive species list. Populations on the Forest appear stable and are not trending towards Federal listing. Currently no conservation strategy exists for the plant; none is required at this time.

Whitebark Pine (*Pinus albicaulis*)

Species Description: A member of the Pinaceae family, whitebark pine is a five-needled conifer species typically 16–60 feet tall with a rounded or irregularly spreading crown shape. The largest recorded specimen is in the Sawtooth National Recreation Area of Idaho. It is 69 feet tall with a 27.6-foot circumference and a 47-foot crown spread (Fryer 2002). Whitebark pine is the only stone pine occurring in North America. Its characteristic dark brown-to-purple seed cones are 2–3 inches long and grow at the outer ends of upper branches.

Habitat and Management Description: Whitebark pine occurs in subalpine and timberline zones from west-central British Columbia east to west-central Alberta and south to central Idaho, southwestern Wyoming, and southern California. In Idaho, whitebark pine occurs in association with subalpine fir and/or lodgepole pine (Fryer 2002). Typical elevation range for whitebark pine on the Forest is from 7,400 feet to timber line. Small inclusions of whitebark pine habitat and trees occur in the Project area.

Whitebark pine is a Federal candidate species and a Region 4 sensitive plant. On July 18, 2011, the FWS determined that whitebark pine warrants protection under the ESA, but that adding the species to the Federal list of endangered and threatened wildlife and plants is precluded by the need to address other listing actions of higher priority. Subsequently, whitebark pine was added to the list of candidate species eligible for ESA protection and annual review of its status. The species was assigned a listing priority number of 2, meaning threats are high-magnitude and imminent.

Threats to the whitebark pine include habitat loss and mortality from white pine blister rust, mountain pine beetle, and catastrophic fire and fire suppression, environmental effects resulting from climate change, and the inadequacy of existing regulatory mechanisms. On a landscape scale, the species appears to be in danger of extinction, potentially within as few as 2–3 generations, with generation time of whitebark pine approximating 60 years (USDI Fish and Wildlife Service 2014).

3.8.4. Environmental Effects

3.8.4.1. Alternative 1 (No Action)

Alternative 1 does not propose any new management actions for the Project area. Natural processes and ongoing management activities such as recreation, public firewood gathering, fire suppression, and routine road and trail maintenance are expected to continue in the Project area. Additional management objectives, such as whitebark pine restoration, culvert replacement to improve fish passage, and road decommissioning/obliteration, would not occur, thus leaving weed corridors, sediment sources, and the overall ecosystem restoration unchanged.

3.8.4.2. Alternatives 2, 3, 4 and 5

The vegetation treatments, prescribed fire, road use, and decommissioning proposed under Alternatives 2, 3, 4, and 5 would result in a temporary to short-term risk of increased sediment, weed invasion, and trampling rare plants followed by a long-term decrease in potential erosion and weed invasion. Road decommissioning length would range from about 76 to 87 miles for all action alternatives and is expected to result in long-term weed risk reduction in all rare plant habitat across the Project area.

Alternatives 2, 4, and 5 meet the objective of maintaining unique habitats of the sensitive plant species whitebark pine by maintaining ecosystem processes and using prescribed fire and silvicultural prescriptions to restore habitat. Alternative 3 proposes no treatment acres for whitebark pine and has the least potential of all action alternatives to promote whitebark pine restoration. Alternatives 2, 4, and 5 propose whitebark pine restoration, with Alternatives 4 and 5 each treating about 357 acres of habitat restoration.

The unique habitats for the forest gap and scabland species bank monkeyflower, swamp onion, Tolmie's onion, and giant helleborine orchid may best be maintained by reducing weed corridors and soil disturbance that prompt nonnative plant invasion into rare habitats. Alternative 3 has the

least overall ground disturbance and most reduction of weed corridors through road decommissioning and reduction in road construction. However, in the long term these habitats will benefit from the increases in forest gaps proposed under Alternatives 2, 4, and 5.

Direct and Indirect Effects

Adverse impacts on sensitive and other rare plants species would be avoided by identifying populations and following mitigations built into the PDFs. All known rare plant sites would be avoided during ground-disturbing activities except for prescribed burns. On large-scale projects with many phases of implementation, there is some risk that individual plants and habitat would be impacted by casual trampling or incidental actions. None of these actions, however, would affect the viability of the rare plants addressed.

Timber harvest and thinning, road, and recreational related activities would not occur in known habitat for Tolmie's onion, swamp onion, or giant helleborine orchid. Direct effects from soil disturbance activities could occur to bank monkeyflower, an annual plant preferring open sites with mineral soils for germination. Moderate disturbances to soils and removal of over stories can enhance bank monkeyflower habitat. Because bank monkey flower is an annual, population locations and size are often highly variable making location of populations for avoidance difficult.

Direct effects from proposed timber treatments and prescribed fire would occur in whitebark pine habitat. Thinning and treatments of subalpine fir to release whitebark pine could result in some direct damage to individual trees of whitebark pine but provide benefits in the long term. Historically, fire played an integral role in providing suitable regeneration habitat for whitebark pine by removing competing species, such as subalpine fir

Prescribed burning and other fuel treatment activities could harm some individual plants of Tolmie's onion, swamp onion, giant helleborine orchid, and bank monkeyflower in areas with high fuels, but overall, impacts from burning should be minimal because this sensitive species grow in open habitats with sparse vegetation where fuel loading is low. Typically, prescribed burns result in low-to-medium severity burns where duff and debris are partly burned and deep roots, rhizomes, and root crowns survive and resprout. Some trampling of habitat and individual plants could occur from fire activities such as ignition, emergency fire lines, or patrols along perimeters. Both fire intensity and burn season can influence fire effects on rare and native plants. In general, the season of burn is not the deciding factor for fire's effects on native grasses and forbs; it is the severity of the fire (Kerns et al. 2006).

Risk of indirect effects from erosion and weed invasion should be minimal because mitigation application of PDFs should help avoid impacts. However, weed invasion into sensitive plant habitat can occur where exposed mineral soils are susceptible to invasion by nonnative species. The majority of the weed infestations and future risk of invasion correlate with ground-disturbance activities along road and trail corridors.

Implementation of regularly scheduled weed management plans should help contain invasion of nonnative plants and reduce the risk of invasion into surrounding areas. Noxious weeds within the Project area are managed with an Integrated Pest Management approach using mechanical, biological, and chemical methods. Currently, nonnative weed invasion is not occurring in the known populations of rare plants addressed in the Project area.

3.8.5. Minimum Road System

Alternative 1 would not designate an MRS for the Project area. All action alternatives implement the MRS as identified through the work of the IDT. Of the action alternatives, Alternative 3 does the most to move the Project area towards the maintenance of rare plant habitat by reducing road densities through decommissioning. Lower road densities reduce the risk of trampling, soil disturbance, habitat fragmentation, and alteration of hydrologic regimes in rare plant habitat. This alternative reduces road densities between 1.0 and 2.1 miles per square mile for NFS lands and is similar to Alternative 2, but it provides the most decommissioning within RCAs, thus reducing habitat fragmentation and alteration of hydrologic regimes. Alternative 4 does the least to reduce road densities through decommissioning.

3.8.6. Cumulative Effects

Cumulative effects occur when existing conditions from past, present, and reasonably foreseeable future land management activities overlap in both spatial and temporal scales with the direct and indirect effects associated with the proposed alternatives. A complete list of past, present, and reasonably foreseeable future actions in the cumulative effects analysis area can be referenced in Appendix 3.

Existing harvest units and roads, road maintenance, livestock grazing, and recreational activities may affect rare plant populations and their viability within the cumulative effects area, and these activities would be expected to continue to affect botanical resource values. In combination with the other activities in the cumulative effects area, the proposed Project is not expected to have any additional, detectable, negative cumulative effects on rare plant habitat or botanical resources. Road decommissioning planned within the cumulative effects area is expected to result in a reduction of weed corridors to rare plant populations and habitats.

When considered with past, current, and reasonably foreseeable future land management activities, this Project should not affect the long-term persistence of swamp onion, Tolmie's onion, bank monkeyflower, or giant helleborine orchid. All species appear secure throughout their ranges of distribution, except for whitebark pine, which is suffering long-term landscape-scale changes due to habitat loss and mortality from white pine blister rust, mountain pine beetle, catastrophic fire and fire suppression, environmental effects resulting from climate change, and the inadequacy of existing regulatory mechanisms.

Long-term climate change may impact over 20 rare endemic and disjunct plants on the Forest. Climate change can alter habitat conditions, reduce or extirpate populations, or force species to migrate to more suitable habitat. Rare species may be vulnerable to climate change because their limited geographic ranges, small population sizes, and low dispersal rates may make it difficult for them to migrate to more suitable areas as habitats shift. Using an ecosystem conservation approach provides one of the best opportunities to conserve rare plant species for which specific habitat relationships and dispersal rates are largely unknown. It provides for analysis and management efficiency by addressing characteristics of ecosystem diversity and is predicated on an understanding of the historic range of variability. Fule et al. (2009) contend that historical reference conditions remain useful when considering climate change because historic forests were likely more resilient to drought, insect pathogens, and severe wildfire. This approach maintains ecological diversity and provides an opportunity for rare plant species to adapt to changes.

3.8.6.1. Determination

No Federally listed threatened or endangered plant species occur within or adjacent to the Project area. Habitats for and populations of the Forest-listed sensitive and watch plants—swamp onion, Tolmie's onion, bank monkeyflower, whitebark pine, and giant helleborine orchid—occur throughout the Project area.

It was determined that the Project may impact individuals of swamp onion, Tolmie's onion, bank monkeyflower, whitebark pine, and giant helleborine orchid, but is not likely to contribute to a trend toward Federal listing. This determination would stand for all alternatives except for Alternative 1, the No Action alternative, under which natural disturbances and current management would continue with no whitebark pine restoration or the road decommissioning that reduces weed invasion.

Alternatives 2, 4, and 5 proposed actions would restore whitebark pine habitat by removing competing species, such as subalpine fir, and restoring ecological functions. This action could provide beneficial long-term restoration of whitebark pine.

3.8.6.2. Past, Ongoing, and Reasonably Foreseeable Future Actions

A combination of past management actions, including vegetation treatment and timber harvest, livestock grazing, recreation improvements and development, road building and maintenance, irrigation diversion and development, and land management on private and State property for fire suppression and prescribed burns, have altered the condition of rare plant habitat in the analysis area. Currently, the risk of weed invasion is an ongoing threat to maintaining rare plant habitat in the analysis area.

Reasonably foreseeable future actions in the analysis area include prescribed fire, NFS road use and maintenance, long-term closure and decommissioning of roads, recreational use, motorized OHV use, firewood cutting, livestock grazing on Forest and private lands, timber harvest on Forest and private lands, housing development on private lands, agriculture practices, noxious weed management, wildfires, and fire suppression. See Appendix 3 for a detailed summary of these actions.

3.8.7. Irreversible and Irretrievable Commitments

The Project is not expected to result in any irreversible or irretrievable commitments of habitat for ESA-listed, Regional sensitive, or desired native plant species. No ESA-listed threatened or endangered plant species are found in the Project area.

3.8.8. Forest Plan Consistency

All of the proposed alternatives meet Forest Plan Standards and Guidelines (USDA Forest Service 2003a).

3.9. Recreation

3.9.1. Analysis Scale, Data Sources, and Methodology

3.9.1.1. Analysis Scale

Direct and Indirect Effects Analysis Area

For all alternatives, the recreation analysis area is where proposed changes and improvements would occur on trails, developed and dispersed recreation areas, and the road system. The area for analyzing direct and indirect effects is the entire Project area because improvements of these items are spread throughout.

Cumulative Effects Analysis Area

The cumulative effects analysis area includes the entire Project area plus lands north of the Project area to NFS road 50172. These lands and the road were added because they influence recreational activities within, and access into, the Project area.

Temporal Scale of Analysis

Time frames were defined in the Forest Plan as temporary (0–3 years), short term (3–15 years), and long term (>15 years).

3.9.1.2. Data Sources and Methodology

Data on recreation components of the Project were collected from a variety of sources: the INFRA database for trails and developed recreation sites inventory; physical on-the-ground information collected in 2012, 2013, and 2014 for trails and developed and dispersed recreation sites; the Forest National Visitor Use Monitoring (NVUM) data from 2003, 2008, and 2013; the Forest ROS maps; the Forest VQO maps; and references listed in the Recreation Specialist Report (Project record).

3.9.1.3. Analysis Indicators

The indicators below are used to compare the alternatives and to determine compliance with PDFs and the 2003 Forest Plan's Standards and Guidelines (USDA Forest Service 2003a).

Measurements/Indicators:

- Miles of open motorized trail by vehicle class for motorized trails per MVUM, and miles of open and managed non-motorized trails
- Miles of open road
- Changes to existing dispersed recreation sites measured by changes to recreation facilities and/or resource improvements at the sites

3.9.2. Affected Environment

3.9.2.1. Current Condition

Developed and Dispersed Recreation Conditions and Opportunities

Developed Recreation

There is one developed fee campground within the Project area, Cabin Creek Campground, with 11 single-unit sites and a capacity of approximately 88 campers at one time. The campground has had hazardous trees removed recently and needs maintenance work, including heavy maintenance within the camp sites, to bring it to a higher standard. A new vault restroom is needed (Figure 3.9-1) and a new entrance kiosk is also recommended (Figure 3.9-2).

The following needs have been identified for the Cabin Creek Campground:

- Placing new markers/numbers at the campsites
- Graveling the main loop road
- Building a new single vault restroom at the far end of the campground
- Widening the road and turn at the entrance so that full size RVs can turn and reenter the loop road (Figure 3.9-3).
- Adding accessible tables
- Creating an accessible pathway to the water system
- Constructing a new entrance site sign, entrance kiosk, and fee tube

Figure 3.9-1. Existing outhouse at Cabin Creek Campground, which needs to be replaced.

Figure 3.9-2. Existing information kiosk at Cabin Creek Campground.

Figure 3.9-3. Location of proposed road-widening project. An increased turn radius for larger recreational vehicles is needed.

Dispersed Recreation

Dispersed recreation occurs throughout the Project area and includes berry picking, hunting, motorized and non-motorized trail use, firewood cutting, sightseeing, and camping. The area's visitors come from nearby towns including Weiser, Council, Cambridge, and New Meadows, but use from residents of the Treasure Valley (Boise, Meridian, Nampa, and Caldwell) is increasing. Deer and elk hunting seasons draw visitors from across the western United States.

To support recreation in the area, many dispersed campsites exist along open roads; these campsites have no facilities. Off-road dispersed camping—in which a visitor can drive up to 300 feet off the road, where it is safe to do so, for the purpose of camping—is allowed on 69 of the 71 miles of open road in the Project area. Unauthorized motorized use is occurring on annually and seasonally closed roads. Furthermore, some dispersed sites have sustained damage from unrestricted motorized use.

Horse Cabin Flat (Figure 3.9-4), a dispersed camping area used moderately in spring and summer and more heavily in fall, has potential for moderate development, including the establishment of four to five graveled campsites with designated parking and campfire rings. Additional improvements needed include building a vault restroom to manage sanitation issues, adding hitch rails for stock, and reconstructing the entrance road to accommodate large RVs. Damage from unauthorized motorized use in the area could be managed by the placement of barrier rock. A fee for use of the area should be considered, especially given its location near Cabin Creek Campground, which is already a fee site.

Figure 3.9-4. Horse Cabin Flat.

A large, dispersed camping area and motorized unauthorized route system located adjacent to NFS road 50591 straddle NFS and private lands, making management of dispersed camping on NFS lands difficult. Use of these areas in the spring is associated with camping and bear hunting; in the fall it is associated with deer and elk big game hunting. Dispersed camping sites desired

for retention, located on NFS lands, could be identified for potential minor development (e.g., site graveling, minimal fire rings, and barrier rock) to better define the sites and minimize site expansion.

The Jungle Creek Dispersed Camping Site, located just off the Middle Fork Weiser River, needs to be hardened to accommodate stock use and minimize resource damage occurring as vehicles cross the river.

Trails

Most trails in the Project area are open to some form of OHV use, but trail access onto the Forest is restricted due to private land ownership. There are approximately 28 miles of existing, open-designated trail in the Project area, including 3.8 miles of non-motorized trail, 21.8 miles of two-wheel vehicle motorized trail, and 2.4 miles of OHV trail accommodating vehicles up to 50 inches wide. All trails need improved signing and require maintenance as many of them have lost tread and trail definition. Table 3.9-1 displays trail numbers and lengths of trails by type of use in the Project area.

Table 3.9-1. Trails by use type (miles) in the Project area.

Trail Number	Non-motorized	Two-wheel Motorized	OHV (trails 50 inches wide and less)	Total
198	2.0	3.0	0	5.0
201	0	2.2	0	2.2
203	1.8	0	0	1.8
205	0	1.9	0	1.9
210	0	3.9	0	3.9
332	0	5.4	0	5.4
213	0	0.9	0	0.9
518	0	4.5	0	4.5
209	0	0	2.4	2.4
Total	**3.8**	**21.8**	**2.4**	**28.0**

Use of trails not designated during the 2009 travel planning process is occurring. Although open in the past, NFS trail 212 was not designated as open during the travel planning process. Nevertheless, it remains an important trail for horse users in the area, who would like to see it reopened and maintained for non-motorized use.

All-terrain vehicles and utility task vehicles (UTVs) are creating and using unauthorized routes throughout the Project area. With the development of larger OHVs, there is a demand for off-road motorized trails for vehicles 70 inches wide or wider, even though there is ample opportunity for riding these larger OHVs on the open road system.

National Forest System trail 198 leads into the Council Mountain area. As the trail passes below Council Mountain, it travels through wet meadows and becomes braided and scattered. In addition, numerous trail junctions, many created by visitors and livestock, make finding routes extremely confusing. Because of these issues, the trail needs to be made discernable throughout its length, rerouted in places, and signed to avoid confusion.

The trailhead for NFS trail 209 is located on NFS road 50186 and is open to OHVs up to 50 inches wide, but a gate crosses the trailhead that causes some OHV users to simply drive around the gate to get on the trail, as can be seen in Figure 3.9-5. The trailhead may need to be relocated because of private land access issues. It also needs to be accurately mapped and correctly

displayed on future maps. Once the location of the trailhead is finalized, a sign marker is needed at the trailhead with additional information warning the riders that there could be cattle along the trail. Figure 3.9-6 shows additional unauthorized OHV trail creation along NFS road 50186.

Figure 3.9-5. National Forest System trail 209 trailhead.

Figure 3.9-6. This unauthorized OHV route along National Forest System road 50186 is approximately 200 feet long and cut a switchback in the road.

National Forest System trail 205 begins on private land but, without any type of trailhead, the typical user does not know where to access the trail. To alleviate the situation, a trail easement is needed from the landowner so the trail can be promoted and used, or the trail should be rerouted

to exist only on NFS lands. The trail forms a loop with the east end of NFS trail 198. This eastern portion of trail 198 also begins on private land and is similarly difficult for visitors not familiar with the area to locate. Similar work is needed to remedy this situation via either an easement or reroute.

National Forest System trail 210—Granite Creek Trail—is located along NFS road 50186 and is in good condition (Figure 3.9-7). However, old logging roads farther up the trail make it difficult for the user to identify which direction to go (Figure 3.9-8). Though this trail receives low use, an opportunity exists for rerouting and/or adding to signage at these trail and road intersections.

Figure 3.9-7. Granite Creek trailhead and the Middle Fork Weiser River.

Figure 3.9-8. Granite Creek Trail rail logging road crossing.

West Mountain Road 1763, known as a "jeep trail," is used by operators of four-wheel drive vehicles, UTVs, ATVs, motorcycles, and horses. Currently identified as an open road, this popular route needs repair in places where it is very rocky and steep, making it difficult to ride—even for experts. For its entire length, the road crosses in and out of the Project area and back and forth between the Boise National Forest and PNF along the West Mountain ridge.

A large, unauthorized road enters the Forest at the junction of NFS roads 50206 and 50186. The need for access on this road should be determined. If access is not needed, the road should be decommissioned. Along NFS road 50206 to the Project area boundary, both sides of the road occur on steep ground with signs of dispersed campsites. This area is likely used for firewood cutting. Warm Springs Trail (NFS trail 203) and the newer relocated Sheep Creek Trail (NFS trail 332) begin from NFS road 50186. Both trails receive low-to-moderate use.

The Project area does not currently support any outfitter guide permits. The area has recently hosted two annual recreation event Special Use Permits: a portion of the Cascade Gravel Grinder Challenge bike race and Donnelly Snowmobile Club's Fun Run.

Winter Trails

There are approximately 46 miles of authorized groomed over-snow trail in the Project area, but because there are no formal parking areas for winter sports in the Project area, snowmobile users access the area using trailheads outside the Project area boundary.

Recreation Desired Condition Description

Dispersed recreation is emphasized in MA3. Dispersed camping opportunities are maintained and resource protection measures are used where needed. Other types of dispersed recreation uses offer a mix of roaded and unroaded opportunities. Roads, areas, and trails are signed to notify users of motorized access restrictions.

Developed recreation sites are maintained at current or improved levels. Renovation of existing developed sites occurs when facility conditions no longer effectively serve the public.

Trail maintenance is emphasized. Trail funding is used to maintain trails at current or improved levels. The most heavily used trails and those with resource damage have maintenance priority. Trailhead signage indicates the types of trail use allowed.

Listed below (Table 3.9-2) are the MA3 Forest Plan recreation resource Objectives and Standards that pertain to the Project area.

3.9.3. Environmental Effects

3.9.3.1. Direct and Indirect Effects

Alternative 1: No Action

Recreation Improvements

Under the No Action alternative, recreational opportunities in the Project area would not change from their current conditions and would be maintained to the degree discussed above. Recreational use and activities would continue as they have in the past; recreational improvements proposed for the action alternatives would not be implemented.

Table 3.9-2. Management Area 3 Forest Plan recreation resource Objectives and Standards pertaining to the Project area (USDA Forest Service 2003a).

Direction	Number	Management direction description
Objective	0346	Remove existing pit toilets and evaluate new locations for new or replacement vault toilets to reduce resource impacts from existing facilities.
Objective	0348	Evaluate developed campgrounds and upgrade as needed to provide universal access and to accommodate larger camp trailers and recreational vehicles.
Objective	0350	Develop and maintain a group camping area at Horse Cabin Flats to enhance recreational opportunities.
Objective	0352	Evaluate the need for dispersed campsites and establish sites within areas where they will have relatively low impacts to important biophysical resources.
Objective	0353	Construct parking areas and provide information signs at key trailhead locations to provide parking and information for trail users. Parking for a minimum of two or three vehicles is needed in most cases.
Objective	0354	Repair trails where erosion and water-caused resource damage is occurring. Repairs may include rehabilitating eroded trail sections, rerouting sections away from streams, and installing bridges.
Objective	0355	Seek to acquire trail easements through private lands to improve recreation access.
Objective	0357	Improve trail signing especially in areas near Council Mountain, Cuddy Mountain, and Sturgill Peak where past management activities have made trail location difficult.
Objective	0359	Achieve or maintain the following Recreation Opportunity Spectrum strategy: semi-primitive non-motorized – summer 1%, winter 10%; semi-primitive motorized – summer 11%, winter 37%; roaded natural – summer 16%, winter 1%, roaded motorized – summer 72%, winter 52%.
Standard	0360	All new developed recreation facilities shall be located outside occupied northern Idaho ground squirrel habitat.

Developed and Dispersed Recreation

Cabin Creek Campground, the only developed fee campground within the Project area, would remain open and available as is, with no new improvements proposed. Larger RVs would continue to have difficulties driving around the loop road because of its current design. The older restroom located to the back of the campground would not comply with Forest Service standards or be fully accessible. Additionally, the rotting wooden portions of the restroom would continue to deteriorate. The fee tube at the entrance kiosk would continue to be difficult for the recreation technicians to empty; they would continue to get onto the ground to empty the fee envelopes— a safety issue when they are on patrol alone.

The dispersed campsite known as Horse Cabin Flat would continue to accommodate camping throughout the year, but it would not have the needed recreation and sanitation facilities including a toilet, fire rings, and hitch rails for stock. The site would continue to expand over time, potentially causing resource damage including the delivery of sediment into the nearby stream.

The dispersed camping site near Jungle Creek would continue to be used, with resource damage continuing without the needed site hardening and rehabilitation.

Using a motorized vehicle up to 300 feet off of roads for the purposes of dispersed camping would continue along open road corridors, where authorized on the MVUM. High-use areas would likely continue to expand and lose vegetation, as unrestricted use contributes to sparse ground cover and potentially contributes to delivery of sediment into nearby streams.

Trails

Open-road and trail opportunities would remain the same and likely continue to be reduced on some trails due to lack of signage and trail maintenance, poor trail location (in many areas), and numerous user-created trails. Trail maintenance would be accomplished on the existing trail system as scheduled by the District trail crews and District recreation program managers. Existing trails and their associated opportunities would continue to be provided within the Project area. Unauthorized OHV routes would likely continue to be developed throughout the Project area and existing routes would continue to be used, continuing the resource damage caused by these unauthorized routes.

Visitors would continue to have difficulty locating and using NFS trails 198 and 205 because of the lack of signed and maintained access at both ends of these trails. This is a detriment to trail users because without proper access, the trails cannot be used to their full potential. National Forest System trail 198 through the Council Mountain area would continue to pass through wet areas and have numerous side braided trails, without one main trail through the area. Needed repairs to the popular West Mountain jeep trail would not be accomplished, making this open road difficult to ride for many OHV users. There would be no new OHV opportunities developed in the Project area under the No Action alternative.

Other Resource Management Actions

With no Project implementation, there would be no change to the existing effects on recreation from other resources.

Alternative 2: Proposed Action

Recreation Improvements

Recreation improvements proposed for Alternative 2 address recreation objectives. Proposed improvements for developed and dispersed recreation and trails include the following:

Developed and Dispersed Recreation

1. Cabin Creek Campground
    - Install one single-unit vault toilet to replace the existing toilet. Relocate to meet all required health and safety codes.
    - Add new site markers to individual campsites.
    - Replace the existing fee tube with a more accessible and safer tube, enabling fees collected to be removed while keeping the surrounding area in view.
    - Replace the existing kiosk with a new and improved kiosk and information board.
    - Install accessible tables.
    - Build an accessible pathway to the water system and the new toilet.
    - Gravel the main campground loop road and widen the road and turn area at the entrance to accommodate the turn radius of larger RVs.
2. Horse Cabin Flat Dispersed Camping Site
    - Install up to four hitch rails.

- Designate up to five camping sites by placing boulders and install fire rings and gravel each site.
- Install site signs to mark the allowed camping locations.
- Install one single-unit vault toilet.

3. Jungle Creek Dispersed Camping Site
   - Harden the crossing of the Middle Fork Weiser River at the Jungle Creek dispersed camping area to accommodate stock use and to minimize resource damage.
   - Install barriers to focus motorized access to the existing bridge approximately 300 feet from the Middle Fork Weiser River crossing.
   - Make general improvements to the site (e.g., hardening and installing physical barriers) in order to minimize impacts to the adjacent Middle Fork Weiser River.
4. Roads Identified for Decommissioning
   - Evaluate roads identified for decommissioning for site-specific dispersed recreation opportunities (both motorized and non-motorized) within 300 feet of NFS open or seasonally open road junctions if no resource concerns are identified.
   - Improve sites, as needed, for resource protection by surfacing or other hardening, and evaluate for barriers where streams are impacts are found.

<u>Trails</u>

1. Reroute the southern portion of NFS trail 198 (4.4 miles) and the eastern portion of NFS trail 205 (2.0 miles)—avoiding sections currently on private land and without an easement held by the Forest Service—to provide legal access to these trails. Establish new trailheads with parking (and potentially hitch rails for stock). For NFS trail 198, the new trailhead would be established at the Cabin Creek Campground. For NFS trail 205, the new trailhead would be 0.5 mile north of Lake Creek on NFS road 186. Maps displaying the proposed reroutes (located in the Project record) show approximate routes for this trail construction. Specific routes and design features and/or mitigations would be established in conjunction with Forest watershed, fisheries, and heritage program personnel. Stream crossings would use fords and/or trail bridges as appropriate to protect SWRA resources.
2. Change the designation of a short section (2 miles) of NFS trail 198 from non-motorized to two-wheel motorized use to accommodate continued two-wheel motorized access on the entire trail (two-wheeled motorized use is currently present and allowed within the Council Mountain IRA).
3. Perform trail maintenance (including proper signage) to bring all 28 miles of existing open designated trail to approved trail class and standards, as defined in the TMO, for specific trails within the Project area. Maintenance levels would vary from routine to heavy to some reconstruction, depending on trail condition and trail class. National Forest System trail 518 needs to be reestablished in several sections.
4. Construct and formally designate for seasonal use a new motorized OHV loop trail approximately 3 miles long and open to vehicles up to 70 inches wide using closed NFS

roads 50166 and 50485. This new OHV loop would require 0.5 mile of new trail construction to complete and close the loop.

5. Sign and formally designate NFS trail 212 as open for non-motorized use; renumber it as NFS trail 212. Complete needed switchback construction to mitigate steep sections.
6. Relocate the trailhead for the NFS ATV trail 209 onto NFS lands, and construct a short section of trail (less than 0.25 mile) to join the new trailhead. Correct the MVUM to coincide with actual trail location on the ground. Change the designation of the trail from "open year round" to "open seasonally" to coincide with other seasonal trail and road designations in the immediate area.
7. Reroute portions of NFS trail 198 near the base of Council Mountain to reduce resource impacts and improve sustainability. Work to reduce congestion of multiple trail junctions in this sensitive upper-elevation trail network.
8. Convert 3.4 miles of the West Mountain Jeep Road 1763 from OML 2 open road to a "trail open to all vehicles." This change would add 3.4 miles of trail to the trail system.

Effects from Proposed Recreation Improvements

Developed and Dispersed Recreation

Recreational users' experiences at the Cabin Creek Campground would be improved by implementing the proposed changes. The new toilet, built in a manner and location compliant with health and safety codes, would be fully accessible and easier to clean and maintain. Other features of the proposed improvements at the campground include accessible tables at campsites and an upgraded pathway to the water pump.

Safety of the recreation technicians working at the Cabin Creek Campground would be improved with the addition of a new metal fee tube with easier access for removing fee collections. The existing fee tube is difficult and potentially dangerous to use. It requires the technician to lie on the ground to empty the contents, which makes the technician vulnerable to someone approaching unnoticed. A new informational kiosk—with updated information, a location map, and area highlights—would improve communication between the Forest and the campground's visitors.

Widening the existing turn radius on the Cabin Creek Campground loop road would accommodate larger RVs better by making their travel easier and safer around the loop road. This improved access may attract more recreationists with larger RVs.

Improvements proposed for the Horse Cabin Flat dispersed camping area would provide improved recreation experiences. Sanitation at the site would improve with the addition of a single-unit vault toilet and metal hitch rails for stock tie up. Designating camping sites with boulders and site identification markers would help minimize unwanted site expansion. Site designation would also facilitate motor vehicle management and lessen compaction to soils and vegetation. Adding metal fire rings would reduce the proliferation of visitor-constructed rock fire rings and help keep fires contained in a safer enclosure. Hardening the site with gravel would both improve vehicle access and lessen site erosion. There is potential for the Forest to charge a fee at this site once the improvements are completed to help offset costs associated with the maintenance of the site. Any new recreation site fee proposals would go through all required approvals and reviews.

Similar improvements regarding site hardening and control of vehicle use are proposed for the crossing at the Middle Fork Weiser River (near Jungle Creek). Similar resource improvements to those addressed above for Horse Cabin Flat would be expected. However, no fees would be considered for this site.

Future dispersed camping sites could be identified on roads selected for decommissioning that are located at intersections with NFS open or seasonally open roads. These sites would be evaluated for site-specific, dispersed recreation opportunities within 300 feet of the NFS road junction if no resource concerns are identified. If necessary for resource protection, sites would be improved by surfacing or other hardening and evaluated for barriers where stream impacts are found. The specific number of potential sites is not known at this time but was estimated during on-site field trips by the recreation specialist to be no more than 10 sites in the Project area.

In addition to any potential new dispersed camping sites created by road decommissioning as mentioned above, up to 10 existing dispersed camping sites throughout the Project area may need improvement through site hardening and rock barriers to better delineate sites and control access. Thus, up to 20 dispersed camping sites may receive recreational site improvements to help mitigate soil and other resource impacts caused by existing recreational use of these areas.

Trails

Currently, no signage identifies trailhead locations from private lands on the current routes for NFS trails 198 and 205, nor does trail maintenance take place on the private land sections. Lack of signage and maintenance makes finding and using these trails difficult. Under the Proposed Action, new trail construction would relocate the trials entirely onto NFS Lands, which would make access and parking possible for recreational trail users. In addition, signing identifying the trails would be present. The combination of better access, parking, and signage would increase recreational trail opportunities and enjoyment for both motorized and non-motorized users in these areas and would likely cause use to increase. Resources specialists would survey and review trail rerouting prior to construction.

By changing the 2-mile, non-motorized section of NFS trail 198 to two-wheel motorized, a continuous two-wheel motorized route along the full length of the trail—from the Middle Fork of the Weiser River Road past Council Mountain to Mill Creek Road—would be created. This new route would be a major benefit to those wanting the opportunity for a two-wheel motorized experience on a longer, high-quality trail. It would also eliminate potential confusion created when use designation changes over the course of the trail. It is recognized that the change in designation could diminish the recreation experience for some visitors currently using the short motor-free section. Yet, because motorized use is allowed on either end of the non-motorized section, enforcement to keep motorized activity away would be difficult to manage effectively.

Associated with the two-wheel motorized designation change, a trail realignment on the section of NFS trail 198 passing below Council Mountain proper would be completed. Establishing a clear route and appropriate directional signage would benefit all trail users traveling through the area. Relocating the route from wet areas and meadows would mitigate impacts of motorized use allowed on the central portion of the trail. It would also provide stock users with a safer route through the area without the current wet spots and water seeps. Finally, it would benefit soil resources by establishing one mainline trail and rehabilitating the spur routes through the area. Signs marking the new route would give users better direction.

Completing heavy trail maintenance (e.g., installing water bars, rock crib walls, turnpikes, puncheon through wet areas, and signage, reestablishing the trail tread, and reestablishing vegetation clearing limits) on 28 miles of trail within the Project area would improve recreational

enjoyment for motorized and non-motorized trail users. The completion of this maintenance would likely lead to an increase in recreational use by pack and saddle stock, motorcycles, and hikers. The Recreation Specialist Report in Project record contains definitions and descriptions of trail terms, trail class features, and related standards.

Reopening the old NFS trail 202 (becoming NFS trail 212 after official designation) to non-motorized use presents an added opportunity to stock trail riders, hikers, and other non-motorized users, but it could contribute to the current backlog of existing trail maintenance by adding miles to the open trail system. In addition, the trail would require construction of switchbacks to mitigate an otherwise excessively steep trail grade, adding cost to the trail construction budget.

Constructing and designating 3 miles of new OHV trail (open to vehicles up to 70 inches wide) using closed NFS roads 50166 and 50485 would give OHV users desiring an off road experience a short loop ride with the opportunity to view scenic country without having to compete with larger, faster moving vehicles on the main open road system. Similarly, this new trail would provide an opportunity for younger or beginning users to ride in an environment free of larger vehicles. However, designation of this new trail could contribute to the current backlog of existing trail maintenance by adding miles to the open trail system.

Relocating the trailhead for NFS trail 209 (an ATV trail) onto NFS lands, including realignment of several hundred feet of trail to connect the new trailhead with the existing trail, and placing the new route on the trail map would help recreational users find the trail and would eliminate the chance of losing trails to future private land development.

Converting the 3.4-mile section of West Mountain Jeep Road 1763 within the Project area to a trail open to all vehicles would better prepare motorized riders using four-wheel drive vehicles, UTVs, ATVs, and motorcycles for riding on a rough, four-wheel drive trail that is not maintained to road standards. The road-to-trail conversion would add to the Forest's trail maintenance backlog because significant work would be required to make the trail passable by average OHV riders. This conversion would not add to the inventory of available recreational opportunities.

The trail realignments and reconstruction described above will add mileage to the existing trail system, which in turn adds future maintenance. These new trails would be built to appropriate trail standards and would be easier to maintain. In addition, these trail projects would improve resource conditions in the long term because of better erosion-control structures along the trail tread and fewer erosion-prone alignments.

Effects from Other Resource Management Actions

This section addresses effects on recreation from proposed mechanical treatments, prescribed fire, watershed improvements and restoration treatments, and aquatic passage and habitat connectivity projects.

Commercial and Noncommercial Logging Treatments

During implementation of the proposed commercial and noncommercial logging treatments, recreational users in the area would be displaced to some degree, depending on the units being treated. Road maintenance, reconstruction, and use associated with Alternative 2 would also impact recreational use. Roads could be closed during blading, installing drainage features, and installing or improving water passages (culvert installation). Once the unit work is completed, recreational use of the area would return to its former condition. Project Design Features and mitigation measures would be in place to limit Project operations and thereby reduce impacts from logging and associated traffic on hunters during peak periods of the hunting seasons.

In general terms, effects from timber harvest would be the greatest in areas where little or no timber management has occurred. Conversely, additional timber cutting in areas showing clear evidence of past timber management activities could result in much lower levels of impacts. The latter scenario would be the case for the Project area because roads are, for the most part, already in place and there are visible signs of past logging events.

Mechanical vegetation treatments proposed for Alternative 2 would affect the general public's use of roads and trails in the Project area for the duration of harvest. Safety issues from logging truck activity on shared roads, increased amounts of dust, elevated noise levels, and temporary road closures are all potential impacts to recreational use within the Project area.

If authorized, winter logging and hauling in the Project area would affect recreational use of haul roads that are also groomed over-snow trails used by the public in the winter months. Though PDFs would be in place to minimize the effects, the snowmobile riding experience would likely decline due to compromised snow floor quality on roads used to haul timber. Still, keeping the over-snow routes passable would allow snowmobile access to the rest of the groomed system.

Harvest-related activities (felling, yarding, loading, road building, log hauling, planting, and fuel treatments) would likely have a negative impact on the experiences of recreationists using dispersed camping sites in the immediate vicinity of harvest sites, especially for those seeking a more peaceful or primitive experience. Consequently, recreationists would likely use other areas. Logging slash left on site for firewood would increase availability to firewood gatherers. These impacts would be short-term (0–5 years) and seasonal in nature, primarily affecting summer and fall use.

Prescribed Burning

Prescribed burning proposed for Alternative 2 would have no long-term effect on recreational road and trail access in the Project area. However, during prescribed fire treatments, recreational use would likely be modified or eliminated, depending on the proximity of the fire to open roads.

There could be temporary road and trail closures during the implementation of the burning and slash piling for public safety, but the duration would be limited to several days during the burn period. Any trails damaged by the prescribed fire treatments enough to warrant additional trail maintenance would be repaired by the fire/fuels crews to trail standards specified in the recreation PDFs (Table 2.4-10).

Prescribed fire would result in temporary air visibility and quality impairment within the Project area; burned landscapes would be visible to recreationists for the short- to long-term. Prescribed fire would also create impacts to recreationists in the fall when burning windows occur during peak big game and bird hunting season. These effects would be localized and short in duration.

The prescribed fire treatments proposed for Alternative 2 would have no measurable effect on recreational use of dispersed recreation sites in the long term. Recreational camping opportunities could be temporarily disrupted during the actual burning period, altering which sites recreationist may use during the treatments. Displacement would be short-lived and only during the burn period. Smoke and ash could also be expected during the actual burn period and, depending on the areas being burned, could affect campers sensitive to smoke. Some recreational sites would have blackened trees and ground vegetation for the first year, but the groundcover would be expected to return to green grass the following season. A recreation PDF (Table 2.4-10) would be implemented requiring fuels staff to work with the District recreation specialist on the timing of burning and notification of the public about these burns. Trails in the Project area closed during hunting season would be a concern, as would closing any dispersed camping sites during hunting season when the sites are typically full.

Watershed Improvement and Restoration Treatments

Proposed watershed improvement and restoration treatments include decommissioning roads and trails; improving trail reroutes; improving (hardening) dispersed recreation sites; and implementing vegetation treatments designed to restore or enhance native riparian vegetation through mechanical or hand treatment, prescribed fire, and planting and seeding.

Approximately 16 miles of NFS roads and 64 miles of unauthorized routes would be decommissioned under this alternative. Of the 16 miles of NFS roads proposed for decommissioning, only 1.4 miles are open roads. Currently, approximately 73 miles of authorized roads are open year-round, and 27 miles are open seasonally, to motorized use within the Project area, which is a total of approximately 100 miles of open road. The reduction of 1.4 miles of open road for the driving public would not make a difference to recreational use. Decommissioning the unauthorized routes would make it clearer to OHV users that the roads are closed. Most of the unauthorized roads are currently closed under the travel plan, but because they are highly visible to OHV users, their use has continued. The proposed decommissioning would increase the likelihood that OHV users would follow the travel plan.

Three miles of new OHV trail would be developed under Alternative 2. The 3 miles of new OHV trail access would mitigate the 1.4 miles of open road access lost with the road decommissioning, as the trail would be open to all vehicles up to 70 inches wide. Approximately 100 miles of open road would continue to be available for hunting, scenic driving, berry picking, and firewood gathering; 27 of these miles are currently closed seasonally.

Trail reroutes designed to improve riparian conditions would also improve recreational use of the trails by placing them in better locations, getting water off the trails in the wet meadow reroutes, consolidating use onto a single pathway, and better orienting trail users to the correct trail.

There would be both positive and negative effects on existing recreational dispersed camping opportunities with implementation of the watershed treatments proposed for Alternative 2. The positive effects would be to the dispersed camping sites identified and chosen for hardening. These hardened (graveled) sites would better facilitate vehicle ingress and egress, reduce dust at the site, and allow for better use of the site during wet conditions. Some of the negative effects on dispersed recreation would be the loss of available dispersed camping spots along the 1.4 miles of NFS road that would be closed to motorized vehicle use.

Use of prescribed fire for watershed improvements to riparian areas would be similar to those discussed in the prescribed burning section above.

Aquatic Organism Passage (AOP)/Habitat Connectivity Projects

Aquatic organism passage/habitat connectivity projects proposed for fish would replace culverts on open FRS 50186 at the Middle Fork Weiser River near the junction with NFS road 50245 and NFS road 50186 at Big Creek. This work would delay and/or eliminate use of the roads to recreationists for scenic driving, dispersed camping using motorized vehicles, and trail access during installation. This is only expected to affect recreational use of these roads for several days during culvert installation, and thus the impact on recreationists would be temporary. Watershed and fisheries improvement actions could include construction of structures for streambank stabilization (e.g., rock gabions and rock riprap), slope stabilization, and fish habitat improvement. Some structural improvements may be visually evident and could detract from the natural landscape. Negative impacts could be mitigated through design and location options, and vegetative cover plantings, where possible. Generally, improvement structures would be small and localized, and result in little or no effect on recreation settings and facilities (USDA Forest Service 2003a, p. III-734).

Alternative 3

Alternative 3 proposes a greater watershed restoration effort than Alternative 2 and addresses wildlife security. This alternative emphasizes watershed restoration treatments in the Granite Creek subwatershed.

Effects from Proposed Recreation Improvements

All proposed recreation and trail components and associated effects on recreation would be the same as those described for Alternative 2, except a 3-mile OHV loop trail would not be constructed and designated under this alternative.

Alternative 3 would not provide a new opportunity for beginner-level OHV riders because no new OHV trails would be constructed. National Forest System trail 209 would continue to provide opportunities for OHV riders, although this trail contains sections requiring advanced riding skills.

There are no designated OHV trails in the Project area open to vehicles up to 70 inches wide. Trails are only available to vehicles 50 inches in width or less. However, there is a lengthy open road system offering many riding opportunities for OHVs of all types. As for all action alternatives, the proposed road-to-trail conversion of the West Mountain Jeep Road NFS road 51763 would continue to provide a riding trail for UTV users.

Other Resource Management Actions

Effects on recreation from proposed mechanical treatments, range improvements, prescribed fire, and watershed improvements and aquatic passage projects are similar to those described for Alternative 2.

Under Alternative 3, 4.4 miles of open road would be closed and decommissioned (as opposed to 1.4 miles closed under Alternatives 2 and 4). Road closure would leave approximately 95 miles of road open to motorized use. Therefore, closure of 4.4 miles is not expected to measurably affect access for recreational driving or firewood gathering.

Alternative 4

Effects from Proposed Recreation Improvements:

The recreation-related effects of proposed recreation improvements would be the same as addressed for the Proposed Action (Alternative 2).

Other Resource Management Actions:

While the intensity level of mechanical treatment proposals and other resource activities under Alternative 4 would differ from those under Alternative 2, recreation effects from proposed mechanical treatments, range improvements, prescribed fire, and watershed improvements and aquatic passage projects would be similar to those described for Alternative 2.

Alternative 5

Effects from Proposed Recreation Improvements:

The recreation-related effects of proposed recreational improvements would be the same as addressed for the Proposed Action (Alternative 2) with the following exceptions:

- National Forest System trail 205 would not be rerouted around private land and would instead be removed from the NFS. This will result in a net loss in mileage of trails open to motorbikes, hikers, equestrians, and mountain bikers (1.9 miles less than under Alternative 1, the No Action alternative). However, this area is already accessible to both motorized and non-motorized users via NFS trails 332, 198, 210, and 201.
- Alternative 5 would not provide a new opportunity for beginner-level OHV riders because no new OHV trails would be constructed. National Forest System trail 209 would continue to provide opportunities for OHV riders, although this trail contains sections requiring advanced riding skills.

  There are no designated OHV trails in the Project area open to vehicles up to 70 inches wide. Trails are only available to vehicles 50 inches in width or less. However, there is a lengthy open road system offering many riding opportunities for OHVs of all types. As for all action alternatives, the proposed road-to-trail conversion of the West Mountain Jeep Road NFS road 51763 would continue to provide a riding trail for UTV users.

Other Resource Management Actions:

Effects on recreation from proposed mechanical treatments, range improvements, prescribed fire, and watershed improvements and aquatic passage projects are similar to those described for Alternative 2.

Under Alternative 5, fewer miles of open NFS roads would be closed than under Alternatives 2, 3, or 4. This would result in a slightly more opportunities for recreational driving, hunting access, and firewood-gathering opportunities than the other action alternatives.

3.9.4. Minimum Road System

All alternatives, including the No Action alternative, provide a sufficient MRS for both motorized and non-motorized recreation access opportunities including dispersed camping, hunting, trail access, and developed camping. Alternative 4 retains the most open NFS roads and provides the greatest access to motorized recreational opportunities. Alternative 3 provides the least access for recreational opportunities on open NFS roads.

3.9.5. Cumulative Effects

This list, though comprehensive, may contain unintended omissions due to lack of records or knowledge. The listing is intended to demonstrate that relevant past, present, and reasonable foreseeable activities are identified and considered in the analysis of cumulative effects. Past effects in the Project area addressed in this recreation discussion are:

- Past timber harvest in cumulative effects analysis area—9,816 acres of harvest on NFS lands and 8,495 acres on private lands within the Project area
- Water diversions 1939–1941
- NFS roads 1900–present
- Road and trail maintenance—past and ongoing
- Fire suppression, including the Grays Creek Fire in 2007 that burned 17,790 acres
- Livestock management

- Floods—impacted roads and streams in the Project area in 1997 and 2010
- Firewood harvest
- Noxious weed treatment
- Recreational use including dispersed camping; developed camping in fee sites or sites with recreation facilities; trail use, maintenance, and construction; livestock use within recreation sites and on the trails
- Forestwide over-snow grooming decision in 2013
- Recreational use, including camping, hunting, hiking, ATVs, fishing, horses on trails, motorcycles on trails, and scenic driving
- Implementation of the PNF Council and New Meadows Ranger Districts Snow-free Season Travel Management Plan ROD (February 2009).

Regardless of the alternative selected as a result of this process, recreational use is likely to increase in the years to come. At the same time, and at a national scale, access to recreational opportunities on private lands is decreasing, creating greater demand on public lands to supply recreational opportunities, especially in locations near urban areas. Both undeveloped and developed areas would be pushed closer toward their capacity limits. Conflict levels and resource impacts from recreational use are likely to continue to increase. Use restrictions resulting from attempts to resolve conflicts and efforts to mitigate resource impacts are also likely to increase. These effects are also likely to affect non-National Forest recreation providers to some extent (USDA Forest Service 2003b).

In addition, the expected effects of climate change are likely to alter recreational use and management within the Project area. Longer, warmer snow-free seasons (CEQ 2016) are likely to result in across-the-board increases in summer recreational use as the public seeks to avoid high summer temperatures. Longer seasons will also increase the expense of properly maintaining facilities as the seasonal workforce would need to be employed for longer periods of time to accommodate the lengthened snow-free use season. Predicted increases in wildfire frequency and severity (CEQ 2016) also have the potential to create larger burned areas, displacing recreationists from these areas to unburned areas. Conversely, shortened winter seasons would limit opportunities for snow-dependent recreation, such as skiing and snowmobiling, shortening the period of time available for these activities, decreasing snow depths and the amount of terrain that provides high quality opportunities, and likely decreasing overall participation in these activities. In spite of a potential decrease in snow-dependent recreation, concentration of recreationists in a compressed period of time and into smaller high-quality areas has the potential to increase user conflicts and perceptions of crowding.

If more developed facilities are provided, the resulting change to the natural landscape would increase developed opportunities. Conversely, the change would decrease opportunities for recreationists seeking a more primitive setting and experience. Improvements to recreational facilities and site hardening proposed in the action alternatives would help provide for any increases in overall use associated with increased temperatures and longer snow-free use seasons.

3.9.6. Irreversible and Irretrievable Commitments

There would be no irreversible or irretrievable commitments to the recreation resource with implementation of any of the action alternatives.

3.9.7. Forest Plan Consistency

All recreation-related portions of the alternatives would be consistent with Forest Plan direction. The Proposed Action (Alternative 2) would meet the Forest Plan Goals and Objectives of General Recreation (USDA Forest Service 2003a, p. III-62, REGO03), which is to: "Address current and emerging recreation conflicts, while maintaining recreation opportunities when possible."

3.10. Roadless

3.10.1. Analysis Scale, Data Sources, and Methodology

3.10.1.1. Analysis Scale

Direct and Indirect Effects Analysis Area

The Council Mountain IRA and the Poison Creek IRA are in MPC 4.1c. Management actions in this MPC must be designed and implemented in a manner consistent with the unroaded landscape.

The Council Mountain RNA is located at the peak of Council Mountain within the Council Mountain IRA in MPC 2.2. The RNA is comprised of sagebrush and subalpine meadow communities and small stringers of subalpine fir plant communities on basalt substrates.

The Poison Creek IRA is small in size, only 5,243 acres, with 4,854 acres on the Boise National Forest and only 389 acres on the PNF. The Poison Creek area lies within the West Mountain range, west of the Cascade Reservoir. Elevations range from 5,200 feet to 7,836 feet at Lone Tree Summit. Overall, the Poison Creek roadless area is marked by dense timber at lower elevations, giving way to alpine vegetation, meadows, exposed rock outcroppings, and steep nonforested slopes.

The analysis area for direct and indirect effects on the roadless resources comprises the Council Mountain and Poison Creek IRAs and other uninventoried roadless lands adjacent to the IRAs within the Project area.

This analysis includes the environmental consequences, including irreversible and irretrievable commitment of resources on roadless area attributes, and the effects for potential designation as wilderness under the Wilderness Act of 1964. In 2008 the 9th Circuit reaffirmed that the analysis must also encompass uninventoried roadless lands. This analysis must consider the effects on the entire roadless expanse—that is, both the roadless area and the unroaded lands contiguous to the roadless area.

Cumulative Effects Analysis Area

The cumulative effects analysis area is the entire Project area.

Temporal Scale of Analysis

Time frames as defined in the Forest Plan were used for analysis of effects: temporary (0–3 years), short term (3–15 years), and long term (15 or more years).

3.10.1.2. Data Sources and Methodology

Data sources used include the 2003 Southwest Idaho Ecogroup Land and Resource Management Plan FEIS Appendix C, Volume 3: Roadless Area Re-evaluation (USDA Forest Service 2003b) and the Idaho Roadless Rule of 2008. The purpose of the analysis on the roadless resource is to disclose potential effects on roadless and wilderness attributes and determine if or to what extent the Project might affect future consideration for wilderness recommendations. This analysis focuses on the potential effects of Project activities on wilderness characteristics as defined in the

FSH 1909.12 (72.1). The following wilderness characteristics were evaluated (FSH 1909.12 [72.1]):

- Natural—The extent to which long-term ecological processes are intact and operating.
- Undeveloped—The degree to which the impacts documented in natural integrity are apparent to most visitors.
- Outstanding opportunities for solitude or primitive unconfined recreation—Solitude is a personal, subjective value defined as the isolation from sights, sounds, and presence of others and from developments and evidence of humans. Primitive recreation is characterized by meeting nature on its own terms, without comfort and convenience of facilities.
- Special Feature and values—Unique ecological, geographical, scenic, and historical features of an area.
- Manageability—The ability to manage an area for wilderness consideration and maintain wilderness attributes.

The analysis for the effects on other roadless resource attributes, such as water resources, soils, and wildlife habitat, are found in other sections of the FEIS.

3.10.1.3. Analysis Indicators

The indicators for analysis to the roadless resource are the five wilderness characteristics described in Section 3.10.1.2. The analysis indicators were used to compare the alternatives and determine compliance with PDFs, Forest Plan Standards and Guidelines (USDA Forest Service 2003a), and the 2008 Idaho Roadless Rule.

3.10.2. Affected Environment

3.10.2.1. Current Condition

Council Mountain Inventoried Roadless Area (IRA)

The Council Mountain IRA is 16,567 acres in size; over half of the IRA (9,437 acres) lies within the Project area. The Council Mountain RNA is 111 acres in size; 67 acres of the RNA occur in the Project area; the rest are still within the IRA but outside the MFWR Project area. Recreational use of the RNA is not encouraged.

The Council Mountain IRA covers the top of Council Mountain, which is bordered on the west by Council Valley and on the east by the Middle Fork Weiser River. The Middle Fork Weiser River Road, East Fork Weiser River Road, and Cottontail Creek Road provide principal access. A few primitive trails crisscross the area. The area is surrounded by a combination of private and public lands, with the Snowbank IRA located several miles to the south (on the Boise National Forest). Cirque basins with granite intrusions and steep, grassy, basaltic slopes characterize the area.

Recreational use in the Council Mountain IRA is mainly dispersed recreation, including hunting, hiking, fishing, horseback riding, trail riding, and scenic viewing. Six NFS trails occur in the area. The IRA has approximately 14.6 miles of trail: 12.6 miles are motorized and 2.0 miles

(portion of NFS trail 198) are non-motorized. Inventoried ROS is primarily roadless motorized (RM) and semi-primitive motorized (SPM).

The IRA contains bull trout rearing habitat, rainbow trout, and introduced brook trout. Many terrestrial wildlife species also make their home in the IRA.

A portion of one cattle allotment covers 100% of the roadless area. No mining claims and no approved plans of operation exist within the Council Mountain IRA.

Lands Contiguous to the Roadless Areas

Numerous miles of existing open roads and heavily logged private lands are located within several acres of all sides of the Council Mountain IRA boundary. This does not leave a sufficient block of additional acres; therefore, no acres of unroaded lands contiguous to the roadless area needed to be analyzed.

Capability/Wilderness Characteristics

Natural Integrity and Appearance: The natural integrity and appearance of the Council Mountain IRA are medium to high. The area is somewhat affected by grazing-related developments, such as fencing and water ponds, as well as other developments occurring near the border. An estimated 2.1 miles of unauthorized road and 0.2 mile of NFS road occur within the IRA boundary. These mentioned facilities cover only several acres, leaving thousands of acres unaffected by their presence. Upon leaving the above mentioned features, visitors experience a natural, untrammeled area.

Opportunities for Solitude and Primitive Recreation: Due to the visibility of the town of Council and easy access to the IRA, this area provides only a moderate opportunity for solitude and primitive recreation. Two-wheel motorized use is allowed, designated, and prevalent throughout the IRA. The IRA is a combination of RM and SPM Recreation Opportunity Spectrum. Roadless motorized opportunities provide easy access and use of motorized equipment. Semi-primitive motorized promotes a moderate probability of experiencing solitude along with risk in using motorized equipment. The open ridges and deep snow pack in the area make it popular for winter sports, including challenging ski mountaineering. The majority of the IRA is open to over-snow motorized use.

Special Features: As stated above, the Council Mountain RNA is within the Council Mountain IRA.

Manageability and Boundaries: The IRA has fairly irregular and complex boundaries along much of its perimeter and is less than 1.0 mile wide at one point. More manageable boundaries could be defined but would reduce acreage. Established motorized use within the roadless area, as well as on private lands, along the south and southeast perimeter could complicate managing this area as wilderness.

Public interest to designate the Council Mountain IRA as wilderness has been low. No portion of the Council Mountain IRA was recommended for wilderness in the 2003 Forest Plan ROD (USDA Forest Service 2003d).

Poison Creek IRA

A very small portion of the Project area is in the Poison Creek IRA. The IRA is 5,243 acres, of which 4,854 are located on the Boise National Forest and 389 are located on the PNF. Only 75 of the 389 acres of the IRA on the PNF are within the Project area boundary.

Two motorized trails occur within the roadless area; however, all trail miles are located within the Boise National Forest portion of the IRA. Trail use is low and generally occurs during the fall big game season.

The IRA is open to over-snow travel. Inventoried ROS is primarily RM in the summer and SPM in the winter. Roadless motorized opportunities provide easy access and use of motorized equipment. Semi-primitive motorized promotes a moderate probability of experiencing solitude along with risk in using motorized equipment.

The ridgetop provides an important raptor migration corridor. Multiple game and nongame wildlife species occupy the IRA. No bull trout occur in any of the streams in the IRA, no fishery is located in Poison Lake, and no grazing allotments are located in the area. However, five mining claims occur in the IRA.

Lands Contiguous to the Roadless Areas

Forest Road 51763 is located directly at the southern, northern, and western boundaries of the Poison Timber IRA, preventing any contiguous unroaded lands analysis. The Boise National Forest is located to the east; since no projects are planned on that end of the IRA, the east side is not discussed in this analysis.

Capability/Wilderness Characteristics

Natural Integrity and Appearance: The Poison Creek IRA appears primarily affected by the forces of nature, with little evidence of human imprint. The natural integrity of the area is intact. Two short segments of unauthorized roads, totaling 0.35 mile, can be found within the perimeter of the IRA.

Opportunities for Solitude and Primitive Recreation: Opportunities for solitude and primitive recreation can be found due to the rugged terrain and forested cover over much of the area, but the relatively small size of the IRA diminishes the opportunities for challenge and risk. In some locations of the IRA a feeling of solitude or remoteness is diminished by the proximity of Cascade Reservoir, adjacent rural developments, and nearby communities of Cascade and Donnelly.

Special Features: The high-elevation Poison Lake is a special water feature. Lone Tree Summit is a notable landmark feature.

Manageability and Boundaries: The ridge along the western boundary would form a logical boundary as would land ownership boundaries along the northern, southern, and eastern IRA boundaries.

The degree of public interest for designating Poison Creek IRA as wilderness is unknown at this time; this area is a recently delineated roadless area and has not undergone any formal scoping or public comment relative to wilderness designation. The Forest Plan did not recommend any portion of the Poison Creek IRA for wilderness designation (USDA Forest Service 2003a) and stated that, essentially, all of the IRA would be available for low levels of development.

Idaho Roadless Rule

The Idaho Roadless Rule of 2008 designated a system of lands called Idaho Roadless Areas and established five MA themes for individual roadless areas. Council Mountain IRA was identified under a “Primitive” roadless management theme and Poison Creek IRA under a “Back Country/Restoration” theme. Allocation to a specific theme is not intended to mandate or direct

the Forest Service to propose or implement any action; rather, the themes provide an array of permitted and prohibited activities regarding timber cutting, sale, or removal; road construction and reconstruction; and mineral activities.

Under the Primitive theme, the Council Mountain IRA would be managed to remain relatively undisturbed by human management activities while allowing for limited forest health activities including preserving biological strongholds for a variety of species and protecting ecological integrity.

Under the Back Country/Restoration theme, the Poison Creek IRA would be managed to retain its undeveloped character, while providing a variety of recreational opportunities and allowing for limited forest health activities, including preserving biological strongholds for a variety of species and maintaining or restoring the characteristics of ecosystem composition and structure.

3.10.3. Environmental Effects

3.10.3.1. Direct and Indirect Effects to Inventoried Roadless Areas (IRAs)

Alternative 1

Under the No Action alternative, the large-scale Project implementation described for the Proposed Action would not be implemented; therefore, no new impacts to the IRAs would need to be addressed. Smaller site-specific projects, including trail maintenance and improvements, would be expected over the short and long term inside and adjacent to the roadless areas. These site-specific projects are outside the scope of this analysis and will be addressed under subsequent project-specific NEPA analyses.

Alternatives 2, 3, 4, and 5

Under Alternatives 2, 3, 4, and 5 the following actions are proposed within the Council Mountain and Poison Creek IRAs:

9. Sign and formally designate NFS trail 212 as open for non-motorized use. Complete needed switchback trail construction to mediate the steep sections of this 0.8-mile-long trail.
10. Reroute portions of NFS trail 198 near the base of Council Mountain to reduce resource impacts and improve sustainability. Work to reduce congestion of multiple trail junctions in this sensitive upper elevation trail network.
11. Change the designation of a 2-mile section of NFS trail 198 running through the Council Mountain IRA from non-motorized to two-wheel motorized to accommodate continued two-wheel motorized access on the entire trail.
12. Fully obliterate and decommission nine segments of unauthorized routes, totaling 0.8 mile.
13. Maintain 15 miles of trails.
14. Reroute the south portion of NFS trail 198 (4.2 miles within roadless) and the east portion of NFS trail 205 (1.7 miles within roadless) to avoid sections currently located on private land without an easement held by the Forest Service to provide legal access to these trails. Establish new trailheads with parking and potential hitch rails for stock near Cabin

Creek Campground (NFS trail 198) and 0.5 mile north of Lake Creek on NFS road 186 (NFS trail 205).

No timber cutting, prescribed burning, fish passage projects, or hydrology projects are proposed within the Council Mountain IRA, but they are proposed adjacent to portions of the IRA.

Projects proposed within the Poison Creek IRA are:

15. Unauthorized route decommissioning: full obliteration – 1 segment, 0.2 mile.

Section 3.10.1.2 describes the wilderness characteristics analyzed for this IRA. Implementing items 1, 2, and 5 described above (trail signing, trail improvements, trail realignments, and trail maintenance), would not measurably change or impact the wilderness characteristics of natural, undeveloped, primitive recreation; special features; or manageability of the Council Mountain IRA. All trails exist on the ground, and trails are an acceptable feature in wilderness if this IRA were to ever be designated as such. The trail improvements could potentially increase visitor use in the area, which can impact solitude, but impacts would still be acceptable within the SPM ROS standards for visitor use numbers.

The proposed trail designation change from non-motorized to motorized listed above in item 3 for NFS trail 198 is for a 2-mile section; both ends of this section are currently designated as two-wheel motorized. The Council Mountain IRA existing condition includes primarily two-wheel motorized use on the trail system. Changing the designation of a 2.0-mile section of NFS trail 198 from non-motorized to two-wheel motorized should not measurably add to impacts from motorized use to the wilderness characteristics of the Council Mountain IRA. Additionally, the proposed designation change from non-motorized to two-wheel motorized would not likely add to noise impacts in the area as they are already occurring, for the most part, under existing conditions.

Rerouting NFS trails 198 and 205 onto NFS lands (proposed in item 6 above) would require constructing several miles of new trail in the Council Mountain IRA. However, trails are an accepted part of and feature within IRAs. Both trail reroutes would occur directly adjacent to the IRA boundary, so they would not introduce new impacts on solitude or naturalness in large undeveloped areas within the IRA.

None of the proposed recreation trail-related changes would affect the potential to manage the Council Mountain IRA for wilderness consideration. If the area were to be designated by Congress as wilderness, all trails would remain and designated use would be changed to non-motorized.

The proposed route decommissioning of unauthorized routes proposed for the Council Mountain IRA (0.8 mile) and the Poison Creek IRA (0.2 mile) would improve wilderness characteristics and attributes by making the area more natural and undeveloped.

None of the proposed activities within the Council Mountain IRA would change or alter the existing ROS, as all proposed trail activities support the continued recreation opportunities of SPM, semi-primitive non-motorized (SPNM), roadless natural (RN), and RM.

Completing the projects listed above in the Council Mountain IRA would be within allowable improvements and activities under the Idaho Roadless Rule and meet Forest Plan Standards and Guidelines (USDA Forest Service 2003a) for activities within IRAs.

No road construction or reconstruction is proposed under Alternative 2. Approximately 1.0 mile of unauthorized routes are proposed for decommissioning; these routes would be obliterated. Some timber would be felled to facilitate this obliteration. Incidental timber cutting would occur

during trail rerouting, trail maintenance, and road obliteration. Trees would be submerchantable in size to small-diameter trees. These would be left on site and used for erosion-control measures where needed. Timber cutting to facilitate trail maintenance would occur on all trails within the Project area, including those trails within the IRA.

Alternatives 2, 3, 4, and 5 all propose some type of timber thinning—commercial thin, free thin, patch cuts, modified Shelterwood, and/or prescribed burning—outside but adjacent to portions of the Council Mountain IRA boundary. The noise generated by timber operations has the potential to effect recreational users' solitude within the IRA during implementation, but the existing ROS in the IRA along the boundaries is RM, an area where users can expect noise generated from motorized use. If users are well within the IRA, the noise is not likely to travel long distances. Smoke during burning activities also has the potential to affect recreational users within the IRA boundaries when that activity would occur.

Only Alternative 4 proposes thinning and nonforested treatments outside but adjacent to the western boundary of the Poison Creek IRA. The noise generated by timber operations has the potential to effect recreational users' solitude within the IRA during implementation. If users are well within the IRA, the noise is not likely to travel long distances. Smoke during burning activities also has the potential to affect recreational users within the IRA boundaries when that activity would occur.

Idaho Roadless Rule

The "rules" within the Idaho Roadless Rule would not be violated by any actions proposed under Alternative 2. Trail maintenance and construction activities are proposed in the Council Mountain IRA, but all proposed activities meet the intent of the Idaho Roadless Rule (36 CFR 294.26(a)). Minimal timber cutting to clear the proposed trail reroutes could occur on NFS trails 212, 198, and 205; but timber cutting would be incidental to implementing a management activity not otherwise prohibited (trail clearing). Proposed items 1, 2, 4, 5, and 6 would include timber cutting of incidental small trees; cut timber would be left in place on the ground (36 CFR 294.24).

3.10.4. Minimum Road System

The IRAs in the Project area do not have NFS roads. The designation of an MRS would not affect the roadless character under any of the alternatives.

3.10.5. Cumulative Effects

Future vegetative treatments, including timber harvesting and prescribed fire adjacent to IRAs on NFS, State, and private lands, could impact users within the IRAs with noise and/or smoke. Continued recreational trail improvements within the IRA could bring additional visitors into the IRA but are not expected to have a negative effect on the IRA's wilderness character or attributes.

None of the proposed projects within the IRA would have a measurable cumulative effect on either the Council Mountain or Poison Creek IRA's wilderness capability or wilderness characteristics.

3.10.6. Irreversible and Irretrievable Commitments

None of the proposed activities within the Council Mountain and Poison Creek IRAs would have irreversible and/or irretrievable commitments to make the IRAs ineligible for future wilderness

designation under the 1964 Wilderness Act. While there is existing motorized use within the IRAs, if the IRAs were designated as wilderness, motorized use would revert to non-motorized use on the trails, and existing motorized over-snow use would no longer be allowed.

3.11. Transportation

3.11.1. Analysis Scale, Data Sources, and Methodology

3.11.1.1. Analysis Scale

Direct, Indirect, and Cumulative Effects Analysis Area

The analysis area for transportation is the Project area within the Middle Fork Weiser River watershed.

A TAP was prepared for this Project in 2013 and a MRS recommendation identified by the IDT (USDA Forest Service 2013b). The MRS identified NFS roads needed for the protection, administration, and utilization of NFS lands and the use and development of their resources, while reflecting likely funding and minimizing adverse effects associated with road construction, reconstruction, and maintenance.

A significant amount of mixed ownership occurs in the Project area. Much of the area is held by DF Development LLC, a private land owner. Access is complex and involves miles of cost-shared roads and other easements similar to cost sharing, which may limit Forest Service options for managing these roads.

Currently, 83 miles of existing easements occur on NFS lands accessing private lands in the Project area.

Temporal Scale of Analysis

The Project is expected to occur over a 10-year period (2017–2027). The long-term impact analysis related to changes in the transportation system is for more than 15 years.

3.1.1.2 Analysis Process/Measurements and Indicators

The following issue was identified as affecting transportation in the Project area, and the indicator described below was used to compare alternatives.

Issue Statement:

Proposed activities to the road system (i.e., road closures and decommissioning) may reduce the amount of access to the areas identified in the Forest Plan for active management.

Indicators:

- Suited timberlands within 0.25 mile of an NFS road (includes closed roads).

3.11.1.2. Data Sources and Methodology

Forest Plan Direction

The Forest Plan (USDA Forest Service 2003a), contains the Goals, Objectives, Standards, and Guidelines for roads (Table 2.2-19). Land suitable for timber harvest is also described in the Forest Plan based on a combination of PVGs (PVGs 2–10), MPCs (MPCs 4.2, 5.1, 5.2, 6.1, 6.2, and nonwild segments of 2.1), and RCA buffers (RCAs of 240 feet for perennial streams and 120 feet for intermittent streams).

GIS Data

The Forest-specific GIS library of roads, suited timber lands, MPC, and RCA was used to derive suitable timber lands within 0.25 mile of systems roads for the Project area.

3.11.1.3. Desired Condition

The road network matches the level of management activities occurring on the Forest and supplies the transportation system needed for recreation, special uses, timber harvest, range management, minerals development, fuels reduction, and fire protection. The transportation network is managed through the use of a variety of tools to reduce degrading effects on resources. Roads needed for long-term objectives are maintained to provide for user safety and resource protection. Roads not needed for long-term objectives are decommissioned and stabilized (USDA Forest Service 2003, p. 3-58).

The Project area is located completely within MA 3, Weiser River. Management Area 3 has additional management direction in the form of Road Guideline 0311, which states the following (USDA Forest Service 2003a, p. 3-130):

Road construction or reconstruction may occur where needed:

e. To provide access related to reserved or outstanding rights;

f. To respond to statute or treaty;

g. To achieve restoration and maintenance objectives for vegetation, water quality, aquatic habitat, or terrestrial habitat;

h. To support management actions taken to reduce wildfire risks in WUI areas; or

i. To meet access and travel management objectives as described in the Forest Plan

3.11.2. Affected Environment

3.11.2.1. Current Condition

The Middle Fork Weiser River watershed road system was primarily developed for timber harvest access. The majority of the road system was constructed within the last 60–70 years, with most activity occurring in 1950s, 1960s, and 1970s. The main access route through the area is Middle Fork Weiser River Road (NFS road 50186). This county road is a single to one-and-a-half lane with crushed aggregate surface. The watershed contains about 385 miles of road, of which 159 miles are NFS road and 164 miles are identified unauthorized roads on NFS lands. Additional unclassified roads exist within the area but have not been mapped. The NFS roads have been identified as needed for protecting, administering, and using the Forest and using and developing its resources. Unauthorized roads are defined as roads other than an NFS road or temporary road and are not included in a Forest transportation atlas (36 CFR 212.1). Most unauthorized roads in the Project area are the result of past timber harvest, primarily in the 1950s and 1960s. Currently, 36 miles of NFS road (22%) are managed as closed. Ninety-three miles (59%) of the NFS road system maintained for high-clearance vehicles are open, seasonally open, or open to administrative use only. Thirty miles (19%) of NFS roads are maintained for passenger car travel.

3.11.3. Environmental Effects

3.11.3.1. Direct and Indirect Effects

Road Actions

All Alternatives

Table 3.11-1 displays road actions by alternative occurring in the Project area in support of harvesting biomass and sawtimber. Routine road maintenance would occur on other roads that are not connected to those included in the Proposed Action.

Table 3.11-1. Road actions in support of timber and biomass harvest.

Type of Road	Road Activity	Miles by Alternative			
		Alternative 2	Alternative 3	Alternative 4	Alternative 5
Temporary Roads	New Construction	9.7	8.1	8.3	8.9
	Use and Decommission	34.3	27.0	43.6	39.9
National Forest System Roads	Maintain or Improve	78.3	75.8	78.5	78.3
	Add to System	0	0	4.0	3.9
	Realignment	2.2	0.0	4.5	3.9
	Use and Close	21.3	17.3	21.5	29.0
	Long-Term Closure	27.3	22.9	27.4	34.7
	Convert to Trail	4.5	4.5	4.5	4.5
	Use and Decommission	12.9	19.6	12.9	12.8
	Decommission	16.1	23.3	16.1	16.0

Alternative 1 is not displayed in Table 3.11-1 as no Project-related road work would occur under the No Action alternative. However, yearly road maintenance not connected to the Project would continue to occur in the Project area.

Temporary roads are needed to access units for timber harvest where existing NFS road access is not available. Two types of temporary roads are identified for this Project: new construction and existing unauthorized roads. Both types of temporary roads would be obliterated after harvest activities are completed for the Project. Road obliteration is a decommissioning technique used to eliminate the functional characteristics of a travelway and reestablish the natural resource production capability. The intent is to make the corridor unusable as a road or a trail and stabilize it against soil loss, which can involve recontouring and restoring natural slopes (USDA Forest Service 2003a, GL-32). Refer to Sections 3.4 through 3.7 for further information on the effects and need for road obliteration. Alternative 2, compared with the other action alternatives, would require the most new temporary road construction to access the acres planned for harvest (Table 3.11-14). Alternative 4 would harvest the most timber, but the proposed addition of existing roads to the system would reduce the miles of new construction required and allow for obliterating the most miles of unauthorized roads. Alternative 3 would require nearly the same temporary road construction as Alternative 4, but it would obliterate the fewest miles of unauthorized roads used as temporary roads due to the least amount of harvest activities.

Alternatives 4 and 5 propose to add 4.0 miles of existing unclassified road to the NFS that were associated with past land exchanges as well as relocate 1.7 miles of unclassified road to connect to the existing road system. The road network in these areas has never been classified because

harvest activities have not occurred since the land exchange. The opportunity to reduce road density through decommissioning unneeded roads and enhance the management opportunities for these areas by relocating portions of other roads would increase the accessible acres within the Project area. The roads added to the system and relocated will be brought up to standard to haul commercial timber and remain closed to the public.

Two categories of NFS road obliteration are proposed for the Project (Table 3.11-1). One category would be used to obliterate existing NFS roads used for timber harvest. This is much like temporary road use and obliteration of unauthorized roads, except planned construction of the road occurred in the past in anticipation for future use. The other category would be to obliterate the road without using it. Alternative 3 would decommission the most miles of NFS road, while Alternatives 2, 4, and 5 would decommission the fewest miles. Decommissioning would remove the road from the Forest's transportation system, which could require constructing new roads or temporary roads to access those lands in the future.

The category of maintain or improve (Table 3.11-1) includes NFS roads that are to remain drivable after completing Project activities. Work on these roads would be classified as maintenance and would replace or improve drainage structures, remove encroaching brush, replace surfacing where needed, and add drainage features such as armored dips, spot gravel, and reshaping road surfaces where needed. The main gravel roads would be maintained for passenger car use, while secondary roads would be maintained for high-clearance vehicle use and designed to make the road as self-maintaining as possible while reducing impacts to other resources. Alternative 3 proposes to close all NFS roads designated as administrative use only by pulling culverts and constructing barriers to prohibit vehicle use.

The category of "use and close" (Table 3.11-1) is for roads that are currently open for administrative use only that would be used and then put into long-term closure (OML 1) status. Alternative 5 proposes the most miles of use and close roads since most of the administrative-use only roads would remain on the NFS and the roads added to the system would be stored after use. Alternative 3 would decommission some of those roads and Alternative 4 would keep those roads as administrative closures. The category "long-term closure" is the total road miles in the Project area that will be closed (OML 1) after Project completion. Alternative 3 has the least amount due to the increased decommissioning, whereas Alternatives 2, 4, and 5 retain more system roads for future access needs. Alternative 5 stores more roads than Alternative 2 because the roads are not added to the NFS like under Alternative 4, but Alternative 4 keeps the roads open to administrative use.

Gravel is proposed for stream crossings or where roads are within RCA buffers. Graveling would occur on roads that are to remain open to vehicle use or roads used for hauling logs. Alternatives 2, 4, and 5 would gravel more miles than Alternative 3 since these alternatives would retain administrative use-only roads and close fewer roads to public traffic.

Road-to-trail conversion is proposed under all alternatives and would move management of a 4.5-mile portion of West Mountain Jeep Trail (NFS road 51763) from NFS roads to the NFS trails. The trail would remain open to all vehicles.

Road Access for Management

All Alternatives

Proposed road system activities (e.g., road closures and decommissioning) could reduce the access to the areas identified in the Forest Plan for active management. Road access is needed for economical active management activities, such as timber and biomass harvest, thinning, and

fuels treatments. The public has identified access as an issue to be evaluated. Refer to Section 3.9 for effects of alternatives on road access for public recreation.

Roads are needed to transport goods and services to and from the Forest. Economical harvest of saw logs and biomass requires roads within a reasonable distance for ground-based and skyline logging. Helicopter logging requires much less road but is usually uneconomical, especially for thinning and biomass removal.

Acreage of suited timberland within 0.25 mile of a NFS road was used to evaluate the level of access provided for economic harvest of saw logs and biomass. Logging systems vary by terrain. Ground-based skidding is primarily downhill on ground slopes less than 45%, with maximum skidding distances of 800–2,500 feet. Sometimes, skidding distances of 3,500 feet or more occur, but distances are not often this long due to terrain constraints and juxtaposition of the land. Skyline logging occurs uphill to roads, usually on slopes greater than 45%. Skyline logging depends on terrain, as it requires the slope beneath the skyline to be a concave shape to allow cable deflection. The deflection provides lift so logs can be suspended while yarding. Typical yarding distance for skyline logging on the Forest is between 800 and 1,500 feet, with some distances up to 2,500 feet.

Suitable timberlands within 0.25 mile from an existing road were used as an approximation to account for terrain variability. The Project area has an estimated 17,151 acres of land within the suited timber base. Currently, 12,455 acres (73%) are within 0.25 mile of an existing NFS road. This acreage is considered a reasonable estimate of current condition given the past intensive timber harvest in the area between the 1950s and 1980s. A decrease in acreage of suited timber base within 0.25 mile of a road would likely increase the need for new road construction or temporary road construction in order to economically manage the suited timber base.

Table 3.11-2 shows the changes to suited timberland proposed within 0.25 mile of an NFS road. Alternatives 2 and 3 propose decommissioning 29 and 34 roads, respectively, which would decrease the currently accessible suited timberland. Alternatives 4 and 5 would add 13 existing roads to the system and decommission the same 29 roads as under Alternative 2, which would decrease the loss of accessible suited timber land.

Table 3.11-2. Suited timber lands within 0.25 mile of National Forest System roads (includes closed roads).

	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Acres	12,455	11,567	10,933	12,218	12,175
Change in Acreage	0	–888	–1,522	–237	-280
Percent Change (%)	0.0	–7.1	–12.2	–1.9	-2.2

Open road access is needed for noncommercial management activities including thinning, fuels treatments, firewood gathering, weed control, improvement maintenance, and fire suppression. Generally, the closer these activities occur to drivable roads the less they cost. Roads that are put into long-term closure usually have culverts pulled and are not drivable and would require activities similar to construction prior to use. Opening roads in long-term closure would normally require installing culverts, removing barriers, and compacting the driving surface in order to access the Forest for NCT, fuels reductions, controlled burning, firewood gathering, and mechanical fire suppression. Long-term road closures usually are not returned to service unless in conjunction with commercial harvest activities. The further people have to walk or be flown in, the more these management activities cost. Fire engines are usually restricted to open roads,

making engine use for controlled burning and fire suppression limited to areas close to open roads. Table 3.11-3 displays the suited timberlands within 0.25 mile of an open NFS road. Alternative 1 (No Action) would not reduce access. Alternative 2 would reduce access by 1,061 acres (-9.7%). Alternative 3 would reduce access by 1,630 acres (-14.9%), the largest access reduction of the action alternatives due to increased decommissioning and closing existing administrative use only roads. Alternative 4, with the addition of existing non-NFS roads, would only reduce access by 162 acres (-1.5%). Alternative 5, with the long-term closure of the Add to System roads and road 50166, reduces access by 1,377 acres (-12.6%).

Table 3.11-3. Suited timber lands within 0.25 mile of an open National Forest System road (includes administrative use only roads).

	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Acres	10,972	9,911	9,342	10,810	9,595
Change in Acres	0	-1,061	-1,630	-162	-1377
Percent Change (%)	0.0	-9.7	-14.9	-1.5	-12.6

Road Graveling and Gravel Pits

All Alternatives

All alternatives propose spot-graveling, where needed, on roads to be used for hauling logs or biomass. Project-related gravel placement would include 5.0 miles on Granite Creek (NFS road 50245), 2.5 miles on King Hill–Fall Creek (NFS road 50214), and 1.2 miles on Little Creek (NFS road 50692). Spot-graveling would be used to stabilize soft spots and armor drivable dips and road surfaces at stream crossings. The source of gravel for the Project would be from existing and identified potential gravel pits adjacent to or within the Project area. A brief description of the gravel pits follows.

Five Corners

The Five Corners Pit site is located in the SW ¼ of the NE ¼ of Section 29, T. 17 N., R. 2 E. on diced upper basalt geology. The pit has been used for pit run and crushed aggregate in the upper Middle Fork Weiser and upper East Fork Weiser River areas. The pit is about 2.5 acres in size and is accessed by NFS road 51817.

Wolf Creek Crossing

Wolf Creek Crossing Pit is located on NFS road 50326 to the west of Wolf Creek in the Upper Little Weiser River drainage. The pit is on lower basalt geology. The legal location is the SW ¼ of the NE ¼ of Section 33, T. 15 N., R. 2 E. The pit is about 2 acres in size and has been used as a crushed rock and pit-run source. The pit would require expansion up to 2 acres for removal of additional rock.

Jungle Pit

Jungle Pit is located in the Upper Jungle Creek drainage on Forest Service lands. The site is located in T. 16 N., R.2 E., Section 23 at the end of NFS road 51796. The 0.1-acre site is a large exposure of diced lower basalt bedrock developed with the previous Middle Fork Weiser River EIS and planned for 2 acres of disturbance. Rock from this site is suitable for pit-run or crushing and will likely be used for gravel in the area.

Fall Creek Pit

Fall Creek Pit site is located in the NE ¼ of the NE ¼ of Section 23, T. 15 N., R. 2 E., along NFS road 50436. The undeveloped site is located on gently sloped lower basalt scabland; no tree removal would be necessary and about 2 acres of disturbance would be expected. Rock from the pit would make suitable crushed aggregate and pit-run surfacing. The pit site would likely be used for future aggregate needs within the Project area and was identified in the previous Middle Fork Weiser River Watershed Project FEIS (USDA Forest Service 2001).

Warm Bar Pit

Warm Bar Pit is located north of NFS road 50186 between Warm Spring Creek and Bar Creek in the NW ¼ of the SE ¼ of Section 11, T. 15 N., R. 1 E., on lower basalt rock. The 0.5-acre pit was developed in conjunction with the 2010 Emergency Relief for Federally Owned Roads repair work on the Middle Fork Weiser River and closed after the work was completed. Rock from this pit would make suitable rip-rap and possibly suitable crushed aggregate surfacing if fines are present, but it would likely require blasting to reduce the rock in place. The pit would require expansion up to 1 acre for removal of additional rock.

All of the gravel pits have suitable rock for present and foreseeable future expansion needs. The pits would continue to be used for road maintenance activities. Activities in the pits would be coordinated with the Forest Wildlife biologist for any restrictions or constraints for protection of wildlife. Expansion of the gravel pits outside of the existing disturbed area would require additional coordination with resource specialists such as heritage, botany, and wildlife. Alternate or additional pit locations could be considered when the impacts of developing a new rock source would be less or equal to using an existing source.

3.11.4. Minimum Road System

Alternative 1 would not designate an MRS for the Project area. The MRS identified by each action alternative is needed for the protection, administration, and utilization of NFS lands and the use and development of their resources, while reflecting likely funding and minimizing adverse effects associated with road construction, reconstruction, and maintenance. Alternative 3 decreases the MRS the greatest while Alternative 4 decreases the MRS the least.

3.12. Economics/Socioeconomics

3.12.1. Analysis Scale, Data Sources, and Methodology

3.12.1.1. Analysis Scale

Direct, Indirect, and Cumulative Effects Analysis Area

The Project area is located entirely within Adams County, Idaho. Although all restoration activities would occur in Adams County, there are economic linkages between the NFS lands within the Project area and neighboring communities in Idaho and Valley counties. To analyze how the proposed Project may affect the local economy, the economic study area includes all of Adams, Idaho, and Valley counties and a number of incorporated and unincorporated communities in the vicinity of the Project area. Because the Project area is near the Lost Creek–Boulder Creek Landscape Restoration Project FEIS project area (USDA Forest Service 2014b), on the New Meadows District of the Forest, significant overlap occurs between the existing conditions of the two projects. This overlap enables this Project to draw heavily from the Economics Report prepared for the Lost Creek–Boulder Creek Landscape Restoration Project FEIS. Additional information and updates have been provided, as needed, based on information from the Forest IDT and public interests.

Temporal Scale of Analysis

Implementation of the Project in its entirety is expected to occur between 2016 and 2026 (including pre- and post-treatment). The analysis covers annual quantitative and qualitative effects (direct, indirect, and cumulative) throughout this time period. Within the overall implementation period, the span of activities and treatments will vary between 3 and 9 years. This type of accounting applied present net value with a 4% discount rate to reflect the current value of future financial transactions for Project activities.

3.12.1.2. Data Sources and Methodology

The analysis of economic effects considers market-related values in a financial efficiency analysis as well as job and labor income in an economic impact analysis. Nonmarket values, such as the value of recreation experiences and some ecosystem services, by their nature are difficult to quantify. Direction provided in 40 CFR 1502.23 and FSH 1909.15, (7/6/04) and 22.35 (01/14/05) provides for the use of qualitative analysis to evaluate the effects of these nonmarket values. The nonmarket aspects of each proposed activity will be described in other resource sections of the EIS and in specialist reports (available in the Project record).

Financial efficiency is a comparison of the costs and benefits that can be quantified in terms of actual dollars spent or received in the Project area over the life of the Project. As Forest Service Handbook 2409.18 indicates, this analysis compares anticipated costs and revenues that are part of Forest Service monetary transactions. Given the information provided, financial efficiency measures are calculated in this analysis to provide a means of comparing the financial efficiency of alternatives. This analysis offers a consistent measure for comparing alternatives. However, it should not be viewed as a complete answer but only an examination of trade-offs between costs and benefits. The financial efficiency measures discussed below, along with social, ecological, or other nonmarket values discussed throughout the document, provide a complete comparison of the alternatives.

The alternatives are compared using a financial efficiency measure called net present value (NPV). This measure is generated using a program developed by the USDA Forest Service called Project Economic Analysis Tool (PEAT) and depends on a principle called the "time value of money." The idea is that money received now is worth more than the same amount received in the future. This concept makes sense since the money received now could be put to some advantageous use or can accrue interest until the future date. Using this concept, estimates of benefits and costs occurring in the future were collected from resource specialists through data entry worksheets in PEAT and then discounted back to represent their current value. A 4% discount rate is commonly used for evaluations of long-term investments and operations in land and resource management by the Forest Service (Forest Service Manual 1971.21). This discount rate is used in the calculation of NPV.

According to Circular A-94 published by the Office of Management and Budget, NPV is the standard criterion for deciding whether a project is economically justifiable. The NPV compares all monetarily valued costs and benefits and is calculated by subtracting the discounted sum of costs from the discounted sum of benefits. A positive NPV suggests the discounted sum of benefits is greater than the discounted sum of costs; a negative NPV suggests the opposite.

Management of the Forest is expected to yield positive benefits but not necessarily financial ones. Costs for restoration activities are based on recent experienced costs from other projects on the Forest (e.g., prescribed burning, understory thinning) and from professional estimates provided by Project resource specialists. Non-harvest-related costs are included in the NPV analysis but are not included in the appraised timber value.

Economic impacts, in terms of employment and labor income, are used to evaluate potential direct, indirect, and cumulative effects on the Project area's economy. Economic impacts are estimated using input-output analyses. Input-output analyses are a means of examining relationships within an economy, both between businesses and between businesses and final consumers; it captures all monetary market transactions for consumption in a given time period. The resulting mathematical representation allows one to examine the effect of a change in one or several economic activities on an entire economy, all else being constant. This examination is called impact analysis and the input-output modeling tool most commonly used by the Forest Service is IMPLAN (IMPLAN 2012). The IMPLAN modeling system allows the user to build regional economic models of one or more counties for a particular year. The model for this analysis used the 2013 IMPLAN data. IMPLAN translates changes in final demand for goods and services into resulting changes in economic effects, such as labor income and employment of the affected area's economy.

The economic impact effects are measured by estimating the direct jobs and labor income generated by (1) the processing of the timber volume from the Project and (2) the dollars from any restoration activities of the Project going into the local economy affected by the treatments proposed. Additional indirect and induced multiplier effects (ripple effects) are generated by the direct activities. Together, the direct and multiplier effects comprise the total economic impacts to the local economy and are measured through response coefficients unique to the Project area's economy.

Response coefficients estimated by IMPLAN report the impacts to jobs and income per a specified unit of a restoration treatment activity. After measuring multiplier effects in IMPLAN, local response coefficients are imported into a Microsoft Excel workbook known as Forest Economics and Analysis Spreadsheet Tool (FEAST). Developed by the Forest Service for impact analysis, FEAST serves as the interface between user data and IMPLAN. When project design data collected from resource specialists in PEAT are entered into FEAST, FEAST uses the

imported response coefficients to measure how restoration activities proposed under the Project would cause ripples through the economy, impacting employment and income levels.

The data used to estimate the direct effects from the timber harvest and processing were provided by the University of Montana's Bureau of Business and Economic Research (BBER) (Morgan et al. 2014). These national data are broken into multistate regions and are considered more accurate than those available from IMPLAN. The BBER Region for Idaho and Montana is used for this analysis, given the concentration of sawmills in Idaho expected to receive volume from this Project. The BBER data represent the results of mill censuses that correlate production, employment, and labor income.

The discussion of potential jobs and income impacts should occur alongside consideration of nonmarket values and financial efficiency. Changes in final demand for goods and services provided by the Forest Service can contribute to employment and income in the area. However, this demand could be disproportionately impacted by availability of substitute or complementary goods and services available. Therefore, it is important to consider the efficiency of using these resources alongside potential job and income generation from their use.

3.12.1.3. Analysis Indicators

The socioeconomic analysis indicators used are described in Table 3.12-1.

Table 3.12-1. Socioeconomic analysis indicators.

Indicator	Measure	Source
Financial Efficiency (Quantitative)	Net Present Value of Treatments (10-Year Period)	Specialist Interviews Estimated Costs Adjusted for 4% Discount Rate Timber Revenue (based on Predicted High Bid and Yield)
Regional Economic Impact (Quantitative)	Employment Labor Income	Economic Profile System – Human Dimensions Toolkit IMPLAN modeling American Community Survey 2013b
Ecosystem Services (Qualitative)	*Avoided Cost* Wildfire Suppression Property Damage Water Quality Air Quality Tourism Timber	
Environmental Justice (Qualitative)	Potential Adverse Effects	Various literature reviews (see references in text)

3.12.2. Affected Environment

3.12.2.1. Current Condition

Existing social and economic conditions are necessary to establish a baseline from which to estimate potential consequences of the Project. The proceeding section analyzes the current conditions and trends related to the social and economic environment of the economic study area, including population and demographic changes, potential environmental justice populations, and employment and income conditions.

Population and Demographics

Population is an important consideration in managing natural resources. In particular, population structure (e.g., size, composition, density) and population dynamics (how the structure changes over time) are essential to describing the consequences of forest management on the social environment (Seesholtz et al. 2004). This section highlights population and demographic trends in the relevant study area.

Population Growth

Population growth can fluctuate considerably over time and across geographic regions. Table 3.12-2 shows historic population counts for the counties, State, and nation in 1990, 2000, and 2010, and growth rates for these regions between 1990 and 2010. Idaho's population has grown more than twice as fast as the general U.S. population during that time period. Relative to the State, the three-county study area experienced moderate growth during the 1990s and increasingly rapid growth between 2000 and 2010. In 2010 there were approximately 30,105 people living within the analysis area (USDC Census Bureau 2010). While the study area experienced considerable growth over the last 30 years, the rate at which communities within Adams, Idaho, and Valley counties grew varied. In the 1990s Idaho Valley County grew more rapidly (25%) than Adams (6%) and Idaho (11%) counties. By the early 2000s, growth in Idaho County tapered off to 4% while Adams and Valley counties experienced 12% and 29% growth, respectively (Table 3.12-2; USDC Census Bureau 2010).

Changes in a region's population can be attributed partly to natural increases (births minus deaths) and in part to net migration, which can affect the availability of housing, services, and jobs. Amenities (the natural, cultural, and social characteristics of an area) have played an increasing role in U.S. migration. Areas characterized as having high levels of natural amenities (unique land and water features, mild temperatures, scenic qualities, and recreation opportunities of a geographic region) have been shown to experience greater population growth than areas with fewer natural amenities (Rudzitis and Johansen 1991; Johnson and Beale 1994; Johnson and Beal 1998; McGranahan 1999; Hunter et al. 2005; Frentz et al. 2004). Furthermore, this growth occurs increasingly at the boundaries of public lands (Radeloff et al. 2001). In recent years, communities surrounding these Forest Service lands have become increasingly attractive to many U.S. residents because of the proximity to open spaces and natural settings, which provide residents with easy access to year-round recreational opportunities. A portion of population growth in this region can be attributed to the scenic beauty and outdoor recreation supported by the Project area.

Table 3.12-2. Historical population counts and growth rates: 1990, 2000, and 2010.

	1990	2000	Percent Growth, 1990–2000 (%)	2010	Percent Growth, 2000–2010 (%)
United States	248,709,873	281,421,906	13	308,745,538	9
Idaho	1,006,749	1,293,953	22	1,567,582	17
Study Area	**23,146**	**26,638**	**15**	**30,105**	**29**
Adams County	3,254	3,476	7	3,976	12
Idaho County	13,783	15,511	11	16,267	4
Valley County	6,109	7,651	25	9,862	29

Source: U.S. Census Bureau, 1990, 2000, and 2010.

Population Density

Population density measures the number of people living per square mile within a given area. This measure can serve as a valuable indicator of the socioeconomic and living conditions of a region including urbanization, availability of open space, socioeconomic diversity, and civic infrastructure (Horne and Haynes 1999). In general, more densely populated areas are more urban, diverse, and offer more access to public infrastructure. In contrast, less densely populated areas provide greater access to open spaces and wildlands, which may offer natural amenity values to residents and visitors. Table 3.12-3 displays the number of people per square mile at the national, State, and county levels (USDC Census Bureau 2010).

In general, population densities across Idaho remain low relative to the nation. Although the study area experienced considerable growth over the last 30 years, communities surrounding the Payette National Forest continue to have very low population densities. In 2010 there were 2.9 people per square mile in Adams County, 2.7 in Valley County, and 1.9 in Idaho County. Low population densities suggest that the area is very rural and may have low levels of private land ownership. The majority of land in the study area's three counties is publicly owned, with 64% in Adams County, 83% in Idaho County, and 86% in Valley County under Federal ownership (USDI Geological Survey 2012). The close proximity of communities in the study area to Federally owned lands makes them more susceptible to changes in resource management on public lands.

Table 3.12-3. Population density.

Location	People per Square Mile
United States	86.6
Idaho	19.0
Adams County	2.9
Idaho County	1.9
Valley County	2.7

Source: USDC Census Bureau 2010, Table DP-1.

Age

A population's age may affect community values and uses associated with Forest lands, making it relevant to Forest management decisions. From 2009 to 2013, the median age was estimated to be 37.3 years in the United States and 34.9 years in Idaho (USDC Census Bureau 2013), making Idaho's population slightly younger than the general U.S. population. Populations surrounding the Project area tend to be considerably older than the general population at both national and State levels.

The median age of residents living in proximity to the Project area is 51.0 years in Adams County, 48.4 years in Idaho County, and 47.6 years in Valley County (Table 3.12-4). A high median age commonly indicates that an area has a relatively large number of retirees. Large populations of retirees may influence the relationships local communities have with Forest resources in the Project area. In general, older users of the Forest have a higher demand for leisurely recreational experiences that also provide access to facilities. In addition, a smaller share of their personal income comes from wages in Forest-related industries. This makes communities with a high level of retirees less vulnerable to changes in resource management on the Forest.

Table 3.12-4. Median age.

Location	Median Age
United States	37.3
Idaho	34.9
Adams County	51.0
Idaho County	48.4
Valley County	47.6

Source: USDC Census Bureau 2013.

Educational Attainment

Educational attainment measures the number of people within a region who have earned a high school diploma or bachelor's degree. Levels of education can be an important indicator of an area's social and economic opportunities and its ability to adapt to change. Table 3.12-5 lists the percent of the adult population 25 years or older with a high school diploma and the percent with a bachelor's degree.

Table 3.12-5. Educational attainment, percent of persons greater than 25 years old.

Location	High School Graduate (%)	Bachelor's Degree or Higher (%)
United States	85.6	28.2
Idaho	88.5	24.6
Adams County	86.2	19.5
Idaho County	87.8	13.9
Valley County	93.5	36.8

Source: USDC Census Bureau 2010, Table DP02.

The majority of adults 25 years or older in the United States have obtained at least a high school diploma and approximately 28% possess a bachelor's degree or higher. While the high school diploma attainment rate for Idaho is slightly higher than that of the nation, Idaho's attainment rate of post-secondary education degrees is lower than the national rate. Approximately 89% of the State's residents have earned a high school diploma and nearly one-quarter have earned a bachelor's degree or higher. Educational attainment within the Project study area tends to be low relative to the State, with the exception of Valley County.

In 2010 it was estimated that 86% of Adams County residents and 88% of Idaho County residents had completed high school, and only 20% and 14% of residents in these respective counties possess the equivalent of a bachelor's degree or higher. Low educational attainment in rural areas is not uncommon. Because rural communities normally offer few opportunities for educational or occupational advancement, they often struggle to attract and retain educated and highly skilled individuals. Frequently, residents interested in pursuing advanced education move from these rural communities to more economically advanced areas that support greater educational opportunities.

Educational attainment of residents in Valley County is high relative to rates at the State and national level. In 2010 approximately 93% of adults 25 years or older held a high school diploma and nearly 37% had obtained a bachelor's degree or higher. High levels of educational attainment may be a result of increased amenity migration. Often, new migrants to rural regions do not follow traditional economic theories of migration, have higher incomes, more education, occupations that are nontraditional by rural standards, and are not seeking socioeconomic gains (Shumway and Davis 1996; Rudzitis 1999).

Economic Conditions

The previous section discussed demographics and population trends in the counties surrounding the Project area relative to the State and nation. The following section focuses on economic conditions within the study area to further develop a baseline against which potential impacts can be measured.

Unemployment

Unemployment rates measure the percent of the local work force that is jobless but actively seeking employment. Though public officials strive for full employment, structural unemployment (mismatch between labor skills and available jobs within a region) and frictional unemployment (people moving or transitioning employment) cause rates to persist even in times of economic prosperity. The existence of structural and frictional unemployment implies that there is an inherent "natural" rate of unemployment.

The natural rate of unemployment is believed to fall between 5% and 6% and allows workers to move between jobs and industries without signaling broad economic distress. Figure 3.12-1 shows the annual unemployment rate of the study area relative to the State and nation between 1990 and 2014.

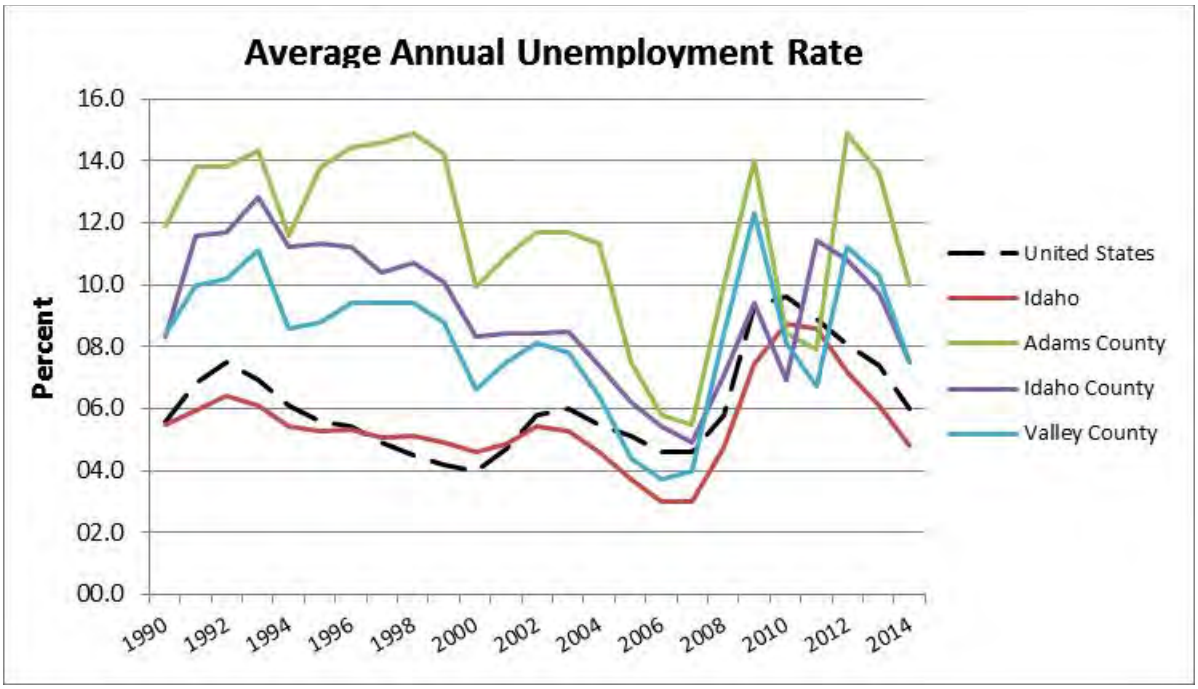


Figure 3.12-1. Average annual unemployment, 1990–2014 (Source: USDOL Bureau of Labor Statistics 2014). Note: Unemployment rates are not seasonally adjusted.

Although the average annual unemployment rate for the State has generally mirrored that of the nation, unemployment in Adams, Idaho, and Valley counties has historically been higher than that of the State and the nation. While recent trends in Idaho County's annual average unemployment rate show a gradual convergence with State and national rates, average annual unemployment in Adams and Valley counties remains high relative to other reference areas. In general, trends at the county level show greater variation in annual unemployment rates than those for the State and nation. Considerable variation in annual rates suggests that these counties may be more vulnerable to changes in social and economic conditions. It is important for Forest

management to recognize the vulnerability of Forest-dependent communities to changes in economic conditions, as changes in resources management on NFS lands may adversely affect the economic environment of local communities.

Employment and Specialization

Employment can generally be classified as being either services related or non-services related. Services-related sectors support jobs in utilities; wholesale trade; retail trade; transportation and warehousing information; finance and insurance; real estate, rental, and leasing; professional; scientific and technology; management of companies and enterprises; administrative and support services; educational services; health care and social assistance; arts, entertainment, and recreation; accommodation and food services; and other services sectors. Employment in non-services-related sectors include mining, construction, manufacturing, agriculture, forestry, fishing, and hunting.

Between 1998 and 2013, total employment in the three-county study area increased from 5,583 to 6,674 jobs (USDC Census Bureau 2015). Though job creation is perceived as desirable, much of this growth can be attributed to jobs in services-related industries that typically pay lower wages than those in non-services sectors. Study area jobs in service-related sectors paid on annual average approximately $6,000 less than jobs in non-service- related fields (U.S. Department of Labor [USDOL] Bureau of Labor Statistics 2014). Between 1998 and 2013, employment in non-services related sectors increased by 1% while employment in services-related sectors increased by 22%. In 1998 services-related sectors supported 73% of employment in Adams, Idaho, and Valley counties and grew to 77% of total employment in 2013(USDC Census Bureau 2015).

The local economy surrounding the Project area is diverse and supports employment in 194 industries (IMPLAN 2013 data, available in the Project record). Assessing employment by industrial sectors helps identify industries that are important to the local economy. Economies with higher levels of diversification normally offer greater employment opportunities to local residents and foster greater stability because the region's economic activity is more evenly distributed across industrial sectors. Employment in aggregated industrial sectors as a share of total employment within Adams, Idaho, and Valley counties is shown in Figure 3.12-2 (IMPLAN 2013 data, available in the Project record). Although employment in the study area is supported by numerous industrial sectors, approximately 25% of all local employment is supported by the government (14%) and retail trade (11%) sectors. While the government and retail trade sectors are the two largest employment sectors within the study area, the construction (9%); agriculture, forestry, fishing, and hunting (10%); and accommodation and food services (9%) sectors are also large employers within the Project area.

Highly specialized economies (i.e., those that depend on a few industries for the bulk of employment and income) are more prone to cyclical fluctuations and generally support limited job opportunities. The Interior Columbia Basin Ecosystem Management Project identified communities with specialized employment using the ratio of the percent employment in each industry in the region of interest (Adams, Idaho, and Valley counties) to the percent of employment in that industry for a larger reference region (the State of Idaho). For a given industry, when the percent employment in the analysis region is greater than in the reference region, local employment specialization exists in that industry (USDA Forest Service 1998). Applying this criterion to 2013 employment data for the Project area reveals that the region is most specialized with respect to agriculture, forestry, fishing and hunting (+6.3%), real estate and rental (+6.6%), and construction (+2.5%). While these sectors collectively support 11% of total employment across the State, these sectors support more than 26% of all jobs in Adams, Idaho,

and Valley counties. Relative to the State of Idaho, the three-county local economy is less specialized with respect to health and social services, professional services, administrative and waste services, and manufacturing (Figure 3.12-3).

Identifying important industries and regional specialization is of particular interest when sectors relating to current and proposed forest management actions are shown to support a large share of local employment. The largest employers within the study area are industries classified under the government and natural resources sectors (agriculture, forestry and fishing). The strong presence of these sectors highlights the importance of forest-related resources to local economic vitality. While the Project area accounts for only a small portion of the National Forest, it is likely that forest management contributes to overall employment in these sectors. For a more detailed discussion of how activities under the alternatives contribute to local employment see the Environmental Consequences discussion below.

Personal Income

Personal income is a key indicator of the economic well-being of a county and provides a measure of all sources of income within Adams, Idaho, and Valley counties. High personal income may be a signal of greater job opportunities, highly skilled residents, greater economic resiliency, and well-developed infrastructure. Conversely, low personal income is often a reflection of poor economic conditions and relatively few job opportunities available within a region. Total personal income (TPI) in the study area exceeded $1 billion dollars in 2013. Between 1990 and 2013, TPI in Adams, Idaho, and Valley counties grew by 71% (adjusted for inflation and reported in 2013 dollars) (USDC Census Bureau 2013).

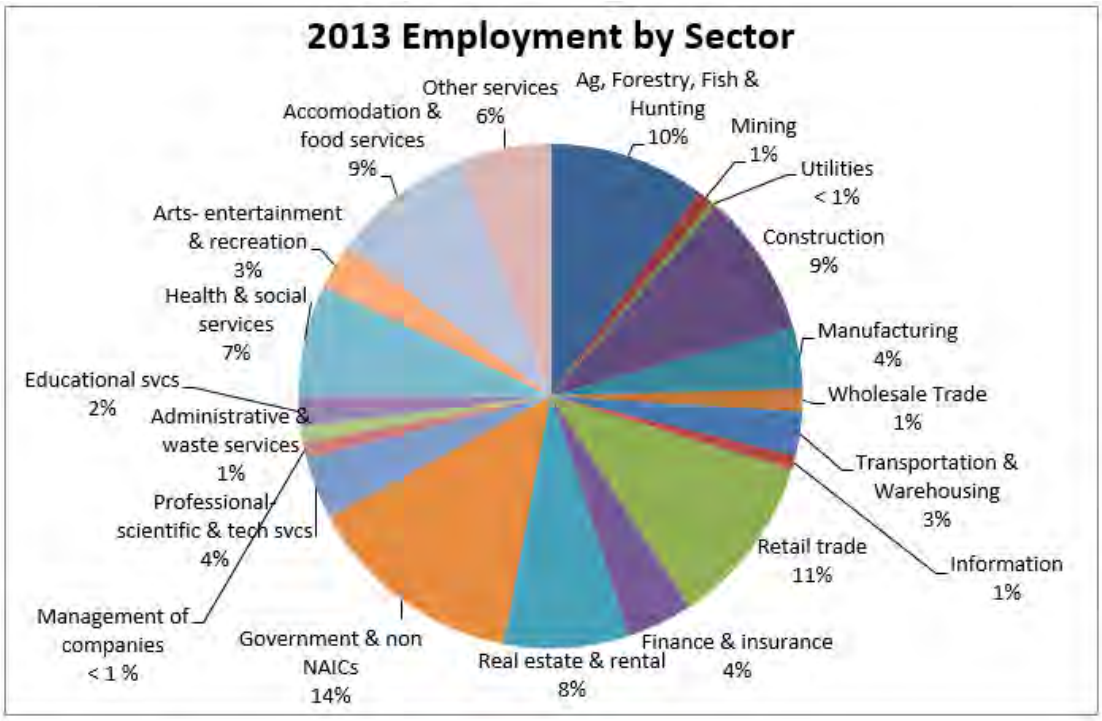


Figure 3.12-2. Employment in 2013. (Source: IMPLAN 2013 data, available in the Project record).

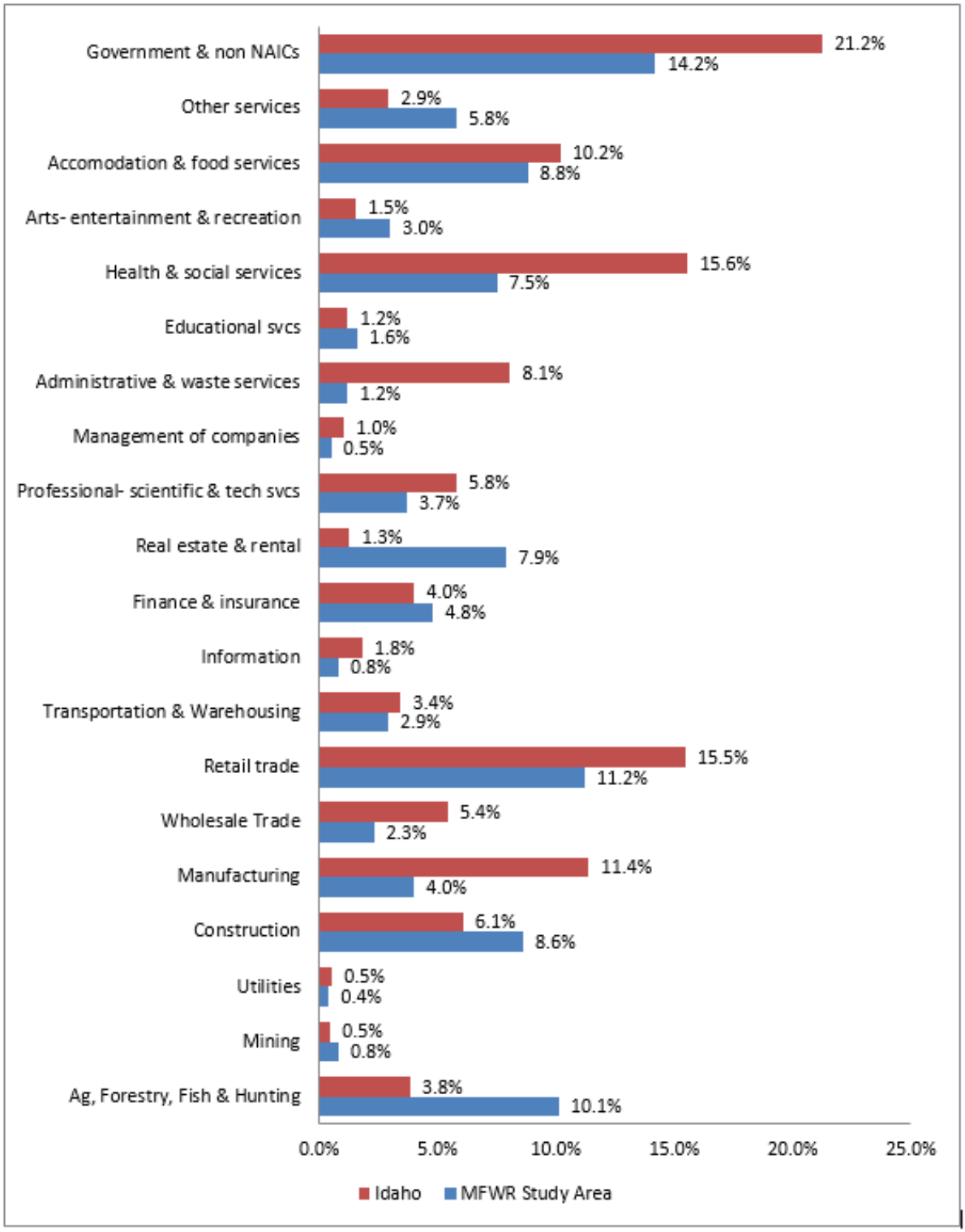


Figure 3.12-3. Sector employment as share of total State and county employment. (Source: IMPLAN 2013 data, available in the Project record).

Per capita personal income (PCPI) measures personal income per person in a region. Historically, PCPI in Project study area has been lower than PCPI nationally. As shown by Table 3.12-6, PCPI in the United States steadily increased between 1990 and 2013. Growth in PCPI at the State level was similar to national PCPI growth, while PCPI growth in the three-county study area was slightly higher. Between 1990 and 2013, PCPI (after being adjusted for inflation) grew by 47% in Adams County, 52% in Idaho County, and 50% in Valley County. Though personal income in the study area has increased, average PCPI within Adams and Idaho counties remains moderately lower than that of the State and the nation (USDC Census Bureau 2015).

Table 3.12-6. Per capita personal income (PCPI), 1990 and 2013 (adjusted for inflation and reported in 2013 dollars).

Location	1990	2013	Percent change in PCPI 1990-2013 (%)
United States	$19,591	$42,453	46
Idaho	$15,962	$33,544	48
Adams County	$13,793	$29,468	47
Idaho County	$14,092	$26,848	52
Valley County	$18,006	$36,203	50

Source: USDC Bureau of Economic Analysis 2013.

There are two major sources of personal income: (1) labor earnings or income earned through employment and (2) nonlabor income. Labor earnings, or wages, were supported by a wide range of industrial sectors and represented approximately 50% of the study area's TPI in 2013. Although wages can fluctuate between counties and across industries, average annual wage in the Project study area remain below those of the State and the nation (Table 3.12-7). On average, study area jobs in services related sectors paid 16% less than jobs in non-services related fields.

Table 3.12-7. Average annual wages.

Location	All Sectors	Services	Non-Services
United States	$49,808	$51,520	$58,367
Idaho	$36,839	$38,640	$45,405
Adams County	$32,309	$28,360	$35,154
Idaho County	$33,549	$30,762	$34,930
Valley County	$32,659	$29,010	$37,741

Source: U.S. Department of Labor Bureau of Labor Statistics, Quarterly Census of Employment and Wages, 2010

While the local economy surrounding the Project area supports a large share of lower-paying service jobs, the unique natural and cultural amenities of the Forest may provide additional benefits that help offset these low wages. Living in near NFS lands provides residents with greater access to open spaces, wildlands, and a wide range of recreational opportunities. While local residents may forego higher-paying jobs in areas with fewer natural amenities, they gain personal enjoyment from the outdoor experiences they have on the PNF. In this manner, some residents may earn a "secondary income" from local natural amenities that complements the income they earn through traditional employment. Natural amenities, often provided by public lands, have been found to influence population and employment changes in amenity-rich communities (Knapp and Graves 1989; Clark and Hunter 1992; Treyz et al. 1993; Mueser and Graves 1995; McGranahan 1999; Lewis and Plantinga 2002). Although the Project area encompasses only a small portion of the Forest, its unique natural and cultural amenities contribute to the attractiveness of local communities and increases regional well-being.

Nonlabor Income

Personal income also includes nonlabor income individuals receive from sources other than an employer. In general, there are two categories of nonlabor income: investment income (dividends, interest, and rent payments), and transfer payments from the government to individuals (retirement and disability insurance, medical payments, welfare assistance, unemployment, and veteran's benefits). Given the importance of older populations as noted above (see Table 3.12-4 and related discussion) transfer payments are further broken down into age-related transfer payments (social security and Medicare), income maintenance (Medicaid, welfare, and unemployment insurance compensation) and other transfer payments (veterans benefits, education, and training assistance and all other payments, including workers' compensation).

Nonlabor income's share of TPI has grown significantly in recent years. In 1970 nonlabor income accounted for nearly 26% of TPI within the study area. By 2013 nonlabor income had grown to represent approximately 52% of TPI in the three-county study area (USDC Census Bureau 2015). Nonlabor income's increasing share of regional TPI can be attributed to increases in both investment income and transfer payments. Between 1970 and 2013, investment income as a share of TPI within the study area grew from 17% to 30%, while transfer payments increased from 9% to 23%. As shown in Table 3.12-8, nonlabor income's share of TPI in all study area counties exceeds shares at the State and national level (USDC Census Bureau 2015).

Table 3.12-8. Nonlabor income.

	Total Personal Income ($1000)	Nonlabor Income Share (%)	Percent of Total Personal Income		
			Percent Investment Income (%)	Percent Age Related Transfer Payments (%)	Percent Other Transfer Payments (%)
United States	$14,683,147,000	36	19	10	7
Idaho	$60,040,758	39	21	11	8
Study Area	$1,063,563	53	30	16	7
Adams County	$131,272	57	31	19	7
Idaho County	$515,698	51	25	18	8
Valley County	$416,593	54	37	12	5

As discussed earlier in the demographics section, the population surrounding the Project area is slightly older than the general population and the region's median age is likely to rise as baby boomers age and more retirees relocate to the area. As the region's baby boomer population grows, age-related transfer payments as a share of income from nonlabor sources are likely to rise. Because communities with more retired residents are typically less dependent on employment as a source of income, communities with aging populations may be more resilient to economic downturns (Allen and Lu 2003).

Rural county population change, the development of rural recreation, and retirement-destination areas are all related to natural amenities (McGranahan 1999; Henderson and Wang 2005; Saint Onge et al. 2007). As a steward of natural amenities, the Forest can be attributed with attracting a portion of retirees and age-related nonlabor income to the region. Thus, the Project area plays a role in fostering a more resilient economy.

Environmental Justice

In 1994 President Clinton issued EO 12898. This order directs Federal agencies to focus attention on the human health and environmental conditions in minority and low-income communities. The purpose of EO 12898 is to identify and address, as appropriate, disproportionately high and adverse human health or environmental effects on minority and low-income populations.

Environmental Justice is the fair treatment and meaningful involvement of people of all races, cultures, and incomes, with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. The goal of Environmental Justice is for Federal agency decision-makers to identify impacts that are disproportionately high and adverse with respect to minority and low-income populations and identify alternatives that will avoid or mitigate those impacts. According to USDA DR5600-002 (USDA 1997), Environmental Justice, minority, minority population, low-income, and human health and environmental effects are defined as follows:

Environmental Justice means that, to the greatest extent practicable and permitted by law, all populations are provided the opportunity to comment before decisions are rendered on, are allowed to share in the benefits of, are not excluded from, and are not affected in a disproportionately high and adverse manner by government programs and activities affecting human health or the environment.

Minority means a person who is a member of the following population groups: American Indian or Alaskan Native; Asian or Pacific Islander; Black, not of Hispanic origin; or Hispanic.

Minority Population means any readily identifiable group of minority persons who live in geographic proximity to—and, if circumstances warrant, migrant farm workers and other geographically dispersed/transient persons who will be similarly affected by—USDA programs or activities.

Low-Income Population means any readily identifiable group of low-income persons who live in geographic proximity to—and, if circumstances warrant, migrant farm workers and other geographically dispersed/transient persons who will be similarly affected by—USDA programs or activities. Low-income populations may be identified using data collected, maintained, and analyzed by an agency or from analytical tools such as the annual statistical poverty thresholds from the Bureau of the Census' Current Population Reports, Series P-60 on Income and Poverty.

Human Health and/or Environmental Effects as used in this Departmental Regulation include interrelated social and economic effects.

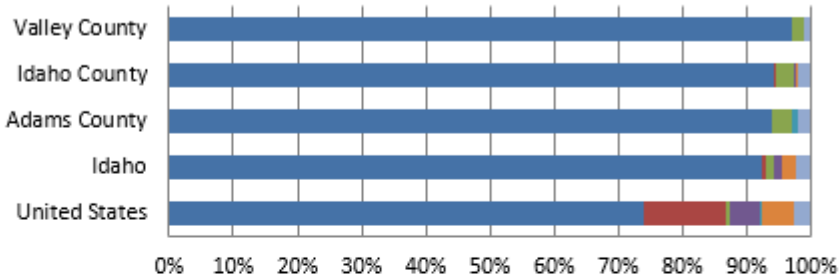
The emphasis of Environmental Justice is on health effects and/or the benefits of a healthy environment. The CEQ has interpreted health effects with a broad definition: "Such effects may include ecological, cultural, human health, economic or social impacts on minority communities, low-income communities or Indian Tribes …when those impacts are interrelated to impacts on the natural or physical environment" (CEQ 1997).

Race and Ethnicity

As shown in Figure 3.12-4, Idaho's population is predominately white and significantly less diverse than the general U.S. population. All three counties are even less racially diverse than the general population of the State. In 2013 the overwhelming majority of residents in Adams, Idaho, and Valley counties were reported to be white alone. Although minority racial groups account for only a small portion of the study area's total population, many local residents identify themselves

as Native American, Native Hawaiian or some other Pacific Islander, or being belonging to two or more races.

Many U.S. residents identify with racial groups based on physical attributes but continue to be proud of the cultural heritage from which they descend. Although U.S. residents may appear to look White, Black, Asian, or belong to some other racial group, they often continue to speak the native language and follow cultural traditions of the region(s) where their families originated. People identifying with the term "Hispanic" or "Latino" had less of a presence in the State (11%) and study area (3%) in 2013 than the national average (USDC Census Bureau 2013).



	United States	Idaho	Adams County	Idaho County	Valley County
White alone	74%	92%	95%	94%	98%
Black or African American alone	13%	1%	0%	0%	0%
American Indian alone	1%	1%	3%	3%	2%
Asian alone	5%	1%	0%	0%	0%
Native Hawaiian & Other Pacific Is	0%	0%	1%	0%	0%
Some other race alone	5%	2%	0%	0%	0%
Two or more races	3%	2%	2%	2%	1%

Figure 3.12-4. Racial composition comparison of the United States, State of Idaho, and Valley, Idaho, and Adams counties, 2013. (Source: USDC Census Bureau 2013).

Poverty

Poverty is an important indicator of both economic and social well-being. Individuals with low incomes are more vulnerable to a number of hardships that may negatively affect their health, cognitive development, emotional well-being, and school achievement. It may also promote socially unacceptable behavior (Williams 1984; Patterson 1991; Haan et al. 1987; Battistich and Hom 1997; Farrington 1995; Chung 2004; Hopson and Lee 2011). In general, low-income individuals tend to rely more heavily on natural resources and depend more directly on NFS lands for sustenance and home heating. Since these individuals will be more vulnerable to changes in the management of local resources, it is important for Forest management to understand how these Forest users may be affected by restricting Forest uses. Following the Office of Management and Budget's Directive 14, the Census Bureau uses a set of income thresholds that vary by family size and composition to detect who is poor (Office of Management and Budget 1978). If the total income of an individual or family falls below the relevant poverty threshold, then the individual or family is classified as being "below the poverty level."

As illustrated by Figure 3.12-5, poverty rates for the State of Idaho mirror those of the general U.S. population. Between 2009 and 2013, it was estimated that approximately 15% of individuals and 11% of families in Idaho and across the United States fell below the poverty line. Poverty rates for individuals and families living in the three counties of interest varied. While poverty rates for Adams County are comparable to rates at the State and national levels, there was greater divergence between poverty rates in Adams and Idaho counties: approximately 18% of individuals and 13% of families fell below the poverty line in Idaho County, while 9.5% of individuals and 8% of families in Valley County were reported to be living below the poverty line.

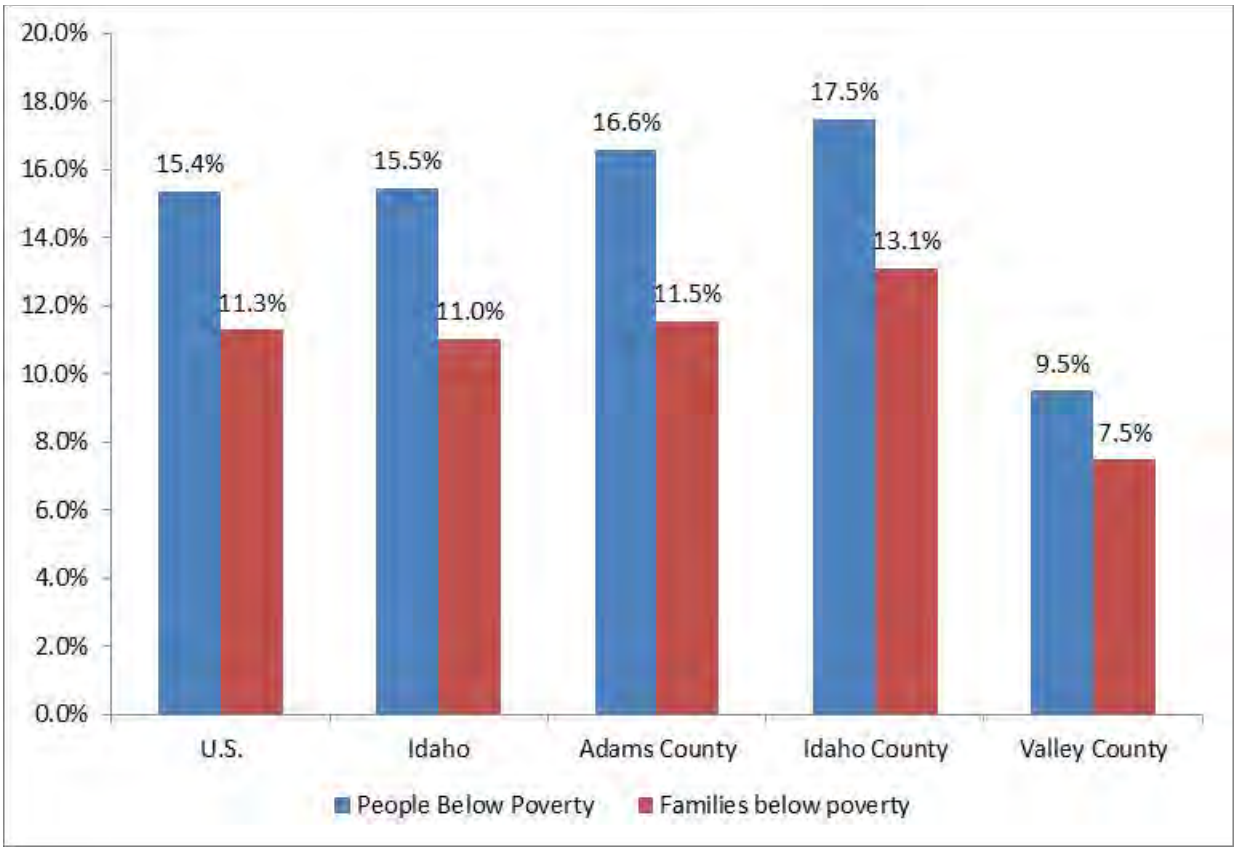


Figure 3.12-5. Poverty rates between 2009 and 2013. (Source: USDC Census Bureau 2013).

Table 3.12-9 shows people below the poverty line by race and ethnicity. These statistics highlight the racial composition of low-income populations living below the poverty line. Populations in Adams, Idaho, and Valley counties are predominately white and account for the overwhelming majority of individuals living below the poverty line. Although minority racial groups accounted for 5%, 6%, and 3% of the population in Adams, Idaho, and Valley counties, respectively (Figure 3.12-4), minority groups accounted for 11% of all people living in poverty in Adams County and 12% in Idaho County. Between 2009 and 2013, biracial and multiracial U.S. residents accounted for 2% of the population and nearly 11% of all people living below the poverty line in Adams County. In Idaho County, Native Americans accounted for 3% of the population but nearly 8% of all Idaho County residents living in poverty (USDC Census Bureau 2013). These statistics suggest that Native Americans in Idaho County and biracial/ multiracial individuals in Adams County are disproportionately poor and have the potential to experience disproportionately high and adverse effects related to changes in the management of Forest resources. To mitigate

adverse impacts to Environmental Justice populations, Forest management may need to facilitate additional public outreach in these communities to ensure that Environmental Justice populations are involved in scoping and alternative development.

Table 3.12-9. Poverty by race and ethnicity, 2011.

	U.S. (%)	Idaho (%)	Adams County (%)	Idaho County (%)	Valley County (%)
White alone	60.5	86.9	88.8	88.1	98.3
Black or African American alone	21.8	0.8	—	0.2	—
Native American alone	1.5	2.2	—	7.9	—
Asian alone	4.0	1.6	0.8	—	0.3
Native Hawaiian & Other Pacific Island	0.2	0.2	—	0.1	—
Some other race	8.3	4.4	—	0.2	—
Two or more races	3.6	3.9	10.5	3.5	1.3
Hispanic or Latino (of any race)	26.8	20.8	7.5	3.1	4.1

Source: USDC Census Bureau 2013.

3.12.3. Environmental Effects

3.12.3.1. Effects Common to all Alternatives

Economic Consequences

The economic analysis of Project used two types of analysis: (1) regional economic impact analysis and (2) financial efficiency analysis.

Regional Economic Impact

Economic impact analysis measures how Project activities would affect employment, income, and economic activity in the regional economy. Business patterns in the regional economy create a constant flow of goods, services, and people between counties surrounding the Forest and the Project area. To analyze how restoration treatments in the Forest would affect the local economy, three counties adjacent to the National Forest were examined. The counties included in the study area are Adams, Idaho, and Valley.

Employment and labor income supported by Forest management actions under the action alternatives are displayed below in Table 3.12-10 and Table 3.12-11. Alternatives 2, 3, 4, and 5 propose commercial logging and road work activities to be carried out in the Project area over a 10-year treatment period (with the exception of a few recreational site updates and regeneration exams and planting, which will occur over a 20-year period). Results for Alternatives 2, 3, 4, and 5 reflect an increase in employment and income generated by activities under the alternatives. These are not new jobs or income, but rather jobs and income that can be attributed to this Project. These activities include construction associated with recreation improvements, harvesting and processing of commercial and noncommercial forest products, other activities associated with restoration treatments, and road work.

Table 3.12-10. Annual employment by activity type under the alternatives.

Proposed Activities	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Commercial forest products:				
Logging and processing	33	30	36	34
Associated activities[a]	4	4	5	5
Recreation	>1	>1	>1	>1
Restoration	1	1	1	1
Road work	1	1	1	1
Total employment contribution	39	36	43	41

[a]Associated logging activities include biomass removal, weed spraying, precommercial thinning, and marking.

Table 3.12-11. Annual labor income by activity type under the alternatives (thousands of dollars).

Proposed Activities	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Commercial forest products				
Logging and processing	$1,267	$1,168	$1,373	$1,311
Associated activities[a]	$103	$93	$118	$127
Recreation	$3	$3	$3	$3
Restoration	$29	$27	$30	$31
Road work	$18	$18	$20	$21
Total labor income contribution	$1,420	$1,306	$1,544	$1,493

[a]Biomass removal, weed spraying, precommercial thinning, and marking.

Recreation-Related Improvements

The recreation analysis is conducted at the Forest level for consistency with recreational use reporting methods undertaken in the NVUM effort in 2008. The Forest is estimated to support 810,000 visits each year. Although the Project area accounts for only a small share of the Forest, it is unknown what portion of these visits occurs in the Project area. And, though treatments considered under the action alternatives may negatively affect the quality of developed and dispersed recreation visits temporarily, they are not anticipated to cause a net change to Project area visitation. In addition to restoration activities, improvements to facilities associated with outdoor recreation are proposed under Alternatives 2, 3, 4, and 5. While investments to increase the quality and quantity of recreation-related facilities are not anticipated to affect use levels in the Project area, improvements to trails, restrooms, and camp sites will increase the quality of recreational experiences. The effects on the quality of recreational experiences are discussed in the Recreation section of the EIS and Recreation Specialist Report (Project record). Economic consequences of recreation-related contracts and improvements are discussed here.

Restoration Treatments and Forest Products

Restoration treatments produce commercially valuable forest products. Table 3.12-12 shows the expected Forest product volumes from treatments under each alternative. These are the total volumes over the life of the restoration Project. Approximately one-tenth of the volume would be harvested and processed annually.

Table 3.12-12. Forest product volumes by alternative over the life of Project.

	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Timber (100 cubic feet [ccf])	83,080	76,656	90,016	85,944
Biomass (tons)	2,077	1,916	2,250	2,252

Economic Efficiency

Economic efficiency analysis measures the ratio of economic benefits to economic costs resulting from Project activities. Forest restoration projects are designed primarily to meet noncommodity objectives, making it difficult to monetize project benefits to fit within the NPV framework. Although Forest restoration is anticipated to lead to positive outcomes, not all benefits realized through Project restoration treatments can be monetized due to data limitations and uncertainty. Therefore, the following discussion of economic efficiency is primarily descriptive in its analysis of tradeoffs.

Table 3.12-13 summarizes the NPV of restoration treatments from the Forest Service's perspective. The first NPV indicates the financial efficiency of the timber sale including all costs and revenues associated with the timber harvest and required design criteria. The second NPV includes all costs for proposed activities, including other restoration activities. A 4% discount rate was used over a period of 10 years (2016–2026), the estimated time required for full implementation of the Project. Over the 10-year treatment period, assuming a 4% discount rate, the Project is expected to cost the Forest Service between $10.9 and $8.2 million (Table 3.12-13). This is the discounted cost to the government of the Project. This figure can be viewed as a lower-bound proxy for the economic value of restoration activities and treatments. The full economic value of restoration and logging activities far exceeds the monetary revenue provided by jobs in timber, roads, or restoration. Rather, the full disclosure of benefits to society also includes immeasurable ecosystem services resulting from cleaner water, avoided costs of wildfire, aesthetic and cultural benefits, and other nonmarket values that represent consumer surplus beyond market prices for traditional commercial, noncommercial, and recreational treatments and upgrades covered under the action alternatives.

Table 3.12-13. Present value (PV) of Project treatments over a 10-year period, with a 4% discount rate.

	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Timber Harvest & Required Design Criteria				
PV costs	$ 3,625,196	$ 3,259,878	$ 4,042,464	$ 4,058,576
PV revenue	$ 5,256,730	$ 4,688,650	$ 5,505,812	$ 5,256,776
Net present value	$ 1,631,534	$ 1,428,772	$ 1,463,348	$ 1,198,200
All Project Activities				
PV costs	$ 9,769,108	$ 8,227,298	$ 10,870,161	$ 9,565,873
PV revenue	$ 5,256,730	$ 4,688,650	$ 5,505,812	$ 5,256,776
Net present value	$ (4,512,377)	$ (3,555,641)	$ (5,364,348)	$ (4,309,097)

Treatments proposed under the Project are intended to restore the structure and function of forests and watersheds in the study area. Benefits of these treatments include reduced fire hazard and increased ecosystem services and wood product removal.

Central to the economic efficiency analysis of forest treatment is the relationship between treatment (prescribed burning and mechanical thinning) and wildfire risk (incidence) and hazard (severity) reduction. Mercer et al. (2000) note that treatment is associated with a decrease in wildfire suppression costs and a decrease in net resource damage. However, the precise relationship between treatment and wildfire cost reduction is not identified. The proceeding section analyzes direct costs and effects on health, tourism, ecosystem services, and the timber market.

Treatment Costs

Treatment is associated with a decrease in wildfire suppression costs and a decrease in net resource damage (Mercer et al. 2000). Prescribed burning is often preferred to mechanical thinning due to its lower cost. However, depending on proximity to urban centers, a full accounting of the costs of prescribed burning may reveal that mechanical thinning is more economically efficient in some circumstances. The cost of smoke exposure, for instance, is higher when prescribed burning occurs near population centers. Mechanical treatment also has costs that are not accounted for in implementation, such as soil erosion. However, the indirect consequences of prescribed burning are more easily observable, which generally make it a less publicly popular treatment option.

Fuel-reduction projects can significantly reduce the risk of catastrophic wildfire (WFLC 2010). Assessing the benefit-cost ratio of fuel-reduction projects is questionable without information on the degree to which treatment reduces the risk of wildfire. Furthermore, the scale and cost of prevented wildfires is uncertain and hugely variable. Anticipated reductions in the threat to human life and decreases in wildland fire-related costs such as property loss, lost revenues, and suppression costs are not included in the analysis of NPV for the alternatives. Fuels treatments under these action alternatives would improve fuel conditions and make the surrounding area more resistant to large-scale wildfires like the 2012 Wesley Fire. While the NPV of restoration treatments appears to be negative under all action alternatives, the prevention of even one fire similar in size and severity to the Wesley Fire would make the NPV of restoration activities significantly less negative.

Wildfire Costs

Suppression costs are generally only a small component of the total cost of a wildfire. The Western Forestry Leadership Coalition finds that the total cost of wildfire ranges from 2 to 30 times greater than the suppression cost (WFLC 2010). Wildfire costs are very difficult to predict because wildfires range enormously in size, terrain, and proximity to local communities. All of these factors affect the direct cost of dealing with a wildfire. The direct costs of fire suppression include only expenses associated with personnel and supplies used to administer a prescribed burn or extinguish a wildfire. While fire-suppression costs are generally only a small component of the total cost of a wildfire, the direct cost associated with fire suppression can exceed $1 million per acre. According to the Incident Status Summary Report for the 2012 Wesley Fire on the PNF, the Forest Service spent more than $16.2 million to fight the 16,405-acre blaze (ISSR-109).

Fire is a natural part of the landscape and unnecessary wildfire suppression leads to fuel buildup and increased fire risk and hazard. As a result, NPV benefits do not often include the additional benefits of proactive fuels treatment. A joint Forest Service-Sierra Nevada Conservancy study examined the economic analysis of impacts of a wildfire equivalent in severity of the 2013 Sierra Nevada Rim Fire (Buckley et al. 2014). It concluded that the benefits of restoration activities (with a value estimated conservatively at $126–$228 million over a 30-year period) exceeded the cost of treatment ($68 million). These benefits stem from saved structures and timber, avoided costs of fire cleanup, road repairs and sediment removal for utilities, and carbon sequestered. The study does not even include the additional impacts of wildlife habitat loss or recreational expenditures foregone. Generally, the avoided costs of water treatment from increased turbidity or erosion following wildfire near municipal water sources cannot be overstated—a statistically significant positive relationship exists between sediment or turbidity levels and drinking water treatment costs. Assuming fixed costs in capital do not vary over the short term, a 1% increase in

sediment or turbidity levels would lead to a 0.07–0.30% increase in treatment costs (Gartner et al. 2013). This estimate does not include the increased treatment costs for nutrient runoff and short-term mobilization of nitrogen and phosphorus following high-severity wildfire (Miller et al. 2013).

Health Impacts

Smoke is inevitable in the airsheds of Idaho, whether from wildfire or prescribed fire. Smoke can travel great distances and affect communities located far from the burn unit, sometimes persisting after the burn has been completed. Fires burning under historic conditions (wildfire or prescribed fire) produce behavior and effects that are low to moderate. Fires that burn under more extreme conditions (most/all fires in this category are wildfires) produce behavior and effects that are moderate to severe.

Ambient particulate matter (PM) concentrations increase substantially during a wildfire (Kochi et al. 2010). A dose-response function is an equation that estimates the health consequences of exposure to pollution. Compared with conventional PM studies (based on urban air pollution), wildfire studies are "less likely to find a significant positive mortality effect in spite of the substantial increases in PM levels during the wildfire period" (Kochi et al. 2010). There are several probable reasons for this finding, including: (1) urban air pollution and wildfire smoke are chemically different (wildfire smoke is generally less toxic), and (2) wildfire events are more likely to promote averting behavior, such as evacuation (Kochi et al. 2010). However, the wildfire studies did find increased hospital admissions linked to asthma and respiratory problems during wildfire events (Kochi et al. 2010). The PM studies find that the dose-response function is not linear. In other words, a doubling of PM concentration more than doubles the health consequences. Furthermore, at low levels, an increase in PM may result in no measureable health consequences (Kochi et al. 2010).

Five key health outcomes are considered in the literature: (1) mortality, (2) restricted activity days, (3) hospital admissions, (4) respiratory symptoms, and (5) self-treatment. Kochi et al. (2010) estimate that the cost of health effects due to smoke from wildfire events range from $0.26 million to $1.2 billion, depending on the scale of the fire and the health outcomes considered.

The timing of prescribed fires is predictable, the volume of smoke produced is far less than in a wildfire, and there is time to notify the public when burns will be implemented. As a result, adverse health consequences are less likely to result from prescribed fires.

Cost to Tourism

During wildfire events, tourism decreases due to evacuations, road closures, and negative publicity (Mercer et al. 2000). Depending on the size and intensity of the wildfire, impacts to tourism may be long-lasting. Recreation and tourism displacement can reduce contributions to the local economy. In addition to the costs to local businesses, individuals may have lower consumer surplus[3] values if they must recreate at a substitute site due to the presence of fire or smoke.

Knotek et al. (2008) found that local visitors are more accepting of prescribed fire than are nonlocal visitors. This finding may be due to (1) better communication between Federal agencies

[3] Consumer surplus is the value that individuals receive above what is paid to consume the good or service. For instance, if an individual pays $10 to recreate at a site, but would be willing to pay $25, his/her consumer surplus is $15.

and local residents, (2) more local familiarity with the role of fire in the landscape, and (3) more opportunities to engage in substitute behavior.

Ecosystem Services

Wildland fire is an integral natural process essential to sustaining healthy forest ecosystems. Periodic low-severity fires serve as a catalyst for plant growth and reproduction and promote biodiversity of plant and animal communities. These fires reduce understory and debris buildup along the forest floor, but rarely kill overstory trees or substantially alter forest structure (Smith 2000; Schoennagel et al. 2004). Low-severity fires open up thickly treed areas and release nutrients locked in older vegetation. Increased nutrient cycling and exposure to sunlight after surface disturbance fires increases soil productivity and facilitates the rapid regeneration of grasses, shrubs, and newly germinated fire-dependent seeds (DeBano 1991; Moench 2002). Fire, as part of a forest's natural disturbance regime, can also increase stand resiliency to the destructive insects and diseases that have become endemic in many parts of the country (Parker et al. 2006).

Although large fire events are consistent with all fire regimes, the frequency and severity of wildfires in the West have risen. High-severity fires are exceedingly destructive and cause widespread mortality. Often referred to as stand-replacing fires, these fires alter forest structure, composition, and function (Smith 2000; Saab and Powell 2005). The destruction caused by high-severity fires can adversely affect a wide range of forest resources, and these fires have the potential to reduce ecosystem service values through (1) destruction of wildlife habitat, (2) water quality and watershed impacts, (3) damage to cultural and archaeological sites, and (4) soil erosion and impacts to water quality (Morton et al. 2003).

Restoration treatments under the action alternatives have been developed to improve ecological conditions of fire-prone landscapes within the Project area. Rather than eliminating wildland fire, the restoration plans have been designed to alter fire behavior conditions from high-severity crown fires to low-severity surface fires. In doing so, the Project will increase the area's resilience to catastrophic fires and increase the benefits of ecosystem services it realizes through low-severity fires.

The following ecosystem service benefits can be expected from Project treatments:

- Reduction of unnaturally large wildfires.
- Protection of watersheds, leading to increases in surface water and decreases in soil loss.
- Diversification of understory composition and protection of rare habitat from fire.
- Better management of wildlife habitat.
- Enhanced recreation that is aesthetically pleasing.
- Sequestering carbon in large trees and soils (Combrink et al. 2012).

Timber Market

Prescribed burning allows for measured and controlled use of fire to manage forest density and health. Wildfire events, however, are unplanned and have the potential to cause extreme destruction. Wildfires can be a substantial shock to timber markets. Following a wildfire, some of the killed timber is salvaged and brought to market. This can flood markets, temporarily decreasing the price of timber. While processing capacity is generally too low to lead to a

substantial price shock, the price of timber may increase over the long run due to reduced timber inventories (Mercer et al. 2000).

3.12.3.2. Alternative 1: No Action

Under the No Action alternative, no direct effects on the local economy would occur from the Project.

Indirect effects on local economic conditions could occur as a result of the No Action alternative; however, estimates of these changes are not available. For example, the lack of fuels treatment could increase wildland fire-related costs such as property loss, lost revenues, and fire-suppression costs. Fire-suppression costs and risks to life and property should be less when wildland fires occur where hazardous fuels have been treated compared with untreated areas. It's commonly accepted that fires in nontreated areas are more likely to burn hotter, have longer/higher flame length, and burn tree canopies. However, it is not possible to predict the level and costs of nonprescribed wildland fire under the No Action alternative.

Cumulative Effects

The lack of measurable direct and indirect effects translates to a lack of measurable cumulative effects on economic conditions under the No Action alternative.

3.12.3.3. Alternative 2: Proposed Action

The Forest proposes to implement restoration treatments over a 15-year period to restore the structure and function of forests and watersheds within the Project area. This alternative includes commercial and noncommercial vegetation treatments on approximately 20,713 acres and prescribed burning on approximately 24,200 acres over the life of the Project.

Financial Efficiency

As discussed above, the NPV is the discounted sum of benefits minus discounted costs associated with each scenario. The financial efficiency analysis is specific to the timber harvest and ecosystem management associated with the Project (as directed in Forest Service Manual 2400-Timber Management and Guidance found in the FSH 2409.18). Costs for sale preparation, sale administration, regeneration, and ecosystem restoration are included. All costs, timing, and amounts were developed by the specialists on the Project's IDT. The expected revenue is the corresponding predicted high bid of $70 per centum cubic foot (CCF or 100 cubic feet). The predicted high bid is used for the expected revenue (rather than the appraised stumpage rate) because the predicted high bid is the best estimate of the high bid resulting from the timber sale auction. The actual timber value will depend on the market when the timber is sold, and it may be higher or lower than the predicted high bid. The NPV was calculated using PEAT, a program for economic analysis of long term, on-the-ground resource management projects.

Table 3.12-13 indicates that Alternative 2 would result in a net surplus for the timber harvest and required design criteria, but it would fall below the break-even point for cost efficiency when taking into account all activities, as indicated by the negative NPV. The NPV for Alternative 2 is $1.6 million for the timber harvest and required design criteria and negative $4.5 million for all planned activities. As discussed above, there are many indirect effects that are not captured in the analysis of financial efficiency. Fuels treatments under this alternative would contribute to fuels conditions that would have more resistance to wildland fire. Treatments proposed under this alternative could reduce the threat to human life and decrease wildland fire-related costs such as

property loss, lost revenues, and fire-suppression costs. If treatments proposed under this alternative successfully prevented even one fire in size and severity similar to the Wesley Fire, the NPV of these restoration activities would be significantly less negative.

Employment and Labor Income Impacts

Economic impacts, in terms of employment and labor income associated with Project activities (timber harvest, restoration activities, road work, and recreation improvements), are estimated with the IMPLAN input-output model described above. Timber production, restoration activities, road work, and recreation improvements from this Project would have direct and indirect effects on local jobs and labor income.

For timber harvest, the direct employment and labor income response coefficients (e.g., jobs and labor income per million cubic feet) were derived by the University of Montana's Bureau of Business and Economic Research (Morgan et al. 2014). The indirect and induced multiplier effects were estimated using the IMPLAN model for the three-county study area. For restoration, road work, and recreational improvements, the direct, indirect, and induced effects were derived using IMPLAN.

Commercial Forest Products

While there is potential to harvest between 83 and 103 million cubic feet of sawtimber and 1,400 to 2,200 tons of biomass under Alternative 2, it is anticipated that 83 million cubic feet of sawtimber and 2,077 tons of biomass would be harvested (Table 3.12-12). The harvesting and processing of these commercial forest products would support 33 jobs and provide $1.27 million in local labor income on annual average. These estimates assume that timber market prices are high enough to encourage the sale and harvesting of forest products in the Project area. In addition to the employment and income contributions of logging and processing, the precommercial thinning and marking, weed spraying, and biomass removal associated with these commercial forest products would support an additional four jobs and provide $103,000 in labor income on annual average over the life of the Project. This analysis assumes that 80 percent of the timber would be processed within the designated study area.

Recreation-Related Improvements

Although treatments will likely create noise, dust, and smoke that may negatively affect the short-term quality of recreational experiences during Project treatment days, proposed treatments are not anticipated to affect overall Forest visitation. As Section 4.6 of the NVUM surveys for the forests demonstrates, when individuals are unable to visit their preferred site, most will engage in substitute behavior that will continue to have an effect in the local economy (USDA Forest Service 2012b). As a result, treatments considered under Alternative 2 are not expected to measurably reduce the economic contributions of recreation within the study area.

Alternative 2 proposes to upgrade two camp sites and make trail improvements to increase the quality of recreational experiences supported by the Project area and will likely result in higher nonmarket values associated with Project area lands. The construction of new and improvements to existing recreation-related facilities will also generate new work for private contractors. The creation improvements included under this alternative would support a portion of one job and approximately $3,000 in labor income in the local economy on annual average over the life of the Project.

Restoration Activities

Restoration activities proposed under Alternative 2 would include post-harvest vegetation treatments on approximately 5,340 acres. Treatments under this alternative include regeneration exams, planting, and noncommercial thinning. These activities are expected to support an estimated one job and approximately $29,000 in labor income across the three-county study area on annual average over the next 10 years. Additionally, restoration vegetation treatments include an estimated 20,713 acres of prescribed burning that is expected to be completed by an existing Forest Service workforce, so this is not accounted for under direct and indirect economic impacts (economic consequences of Forest Service workforce are considered under the Forest Plan EIS [USDA Forest Service 2003a]).

Road Work

While some road work would be associated with the commercial harvesting of forest products, Alternative 2 proposes additional road work to relocate, improve, maintain, and decommission roads within the Project area. Additional road work associated with long-term road closure, BMPs, graveling, campsite shoreline hardening, and AOP are proposed under this alternative. Forest specialists have indicated that the majority of road work would be contracted to firms operating out of the three-county study area. Road work proposed under this alternative is estimated to support one job and $18,000 in labor income across Adams, Idaho, and Valley counties on annual average over the life of the Project.

IMPLAN estimates that all activities proposed under Alternative 2 would support approximately 39 jobs and $1.4 million in local labor income (direct, indirect, and induced) on an annual average over the life of the Project (Table 3.12-13 and Table 3.12-14). Since the expenditures occur over a 10-year period, the estimated impacts of jobs and labor income would be spread out over the life of the Project. These are not new jobs or income but rather jobs and income that can be attributed to activities carried out by this Project.

Cumulative Effects

Past and present cumulative economic activity has already been absorbed by the local economy and is represented in the Affected Environment section presented above. Cumulative economic effects related to past and present economic activity are discussed below. However, estimating the direct and indirect effects specific to future reasonably foreseeable projects (listed in Appendix 3 on Cumulative Effects) is not possible due to unavailable information. Individually, these projects would likely have a minimal impact on economic conditions; however, cumulatively they may substantially affect employment and income levels in the study area. The degree to which the economic environment would be impacted, as well as the distribution of effects, cannot be determined from the information available.

Neither the Project feasibility nor financial efficiency of Alternative 2 would be affected by actions and projects listed in Appendix 3. In addition, current feasibility and economic efficiency of other projects within the three-county study area would not be affected since past and present cumulative economic activity has already been absorbed by the local economy. However, cumulative impacts from the Project to the feasibility and economic efficiency of reasonably foreseeable projects within the study area would occur. The degree to which the economic environment would be impacted, as well as the distribution of effects, cannot be determined from the information available. Past and present levels of employment and labor income associated with other projects, occurring in the area listed Appendix 3, have the potential to accrue

alongside the employment and labor income impacts from the Project as depicted in Table 3.12-13 and Table 3.12-14 above. The direct and indirect effects specific to these projects is unknown; however, past and present economic activity has already been absorbed by the local economy and is represented in the Affected Environment section presented above. Effects from the Project would accrue alongside other projects to the individual sectors depicted in Figure 3.12-3, above. The effects on these sectors, alongside past and present economic activity, are depicted in Table 3.12-14 below.

Table 3.12-14. Annual employment contributions to Project area sectors for Alternative 2.

Sectors	Study Area Totals	Commercial forest products	Recreation	Restoration	Road Work	Percent of Study Area Total
Agriculture, forestry, fishing, and hunting	1,596	17.3	0.0	1.1	0.0	1.2
Mining	133	0.0	0.0	0.0	0.0	0.0
Utilities	61	0.1	0.0	0.0	0.0	0.1
Construction	1,357	0.4	0.1	0.0	0.4	0.1
Manufacturing	627	11.5	0.0	0.0	0.0	1.8
Wholesale trade	364	1.5	0.0	0.0	0.0	0.4
Transportation and warehousing	1,763	1.1	0.0	0.0	0.0	0.1
Retail trade	455	1.3	0.0	0.0	0.1	0.3
Information	126	0.2	0.0	0.0	0.0	0.2
Finance and insurance	752	0.8	0.0	0.0	0.0	0.1
Real estate, rental, and leasing	1,241	0.9	0.0	0.0	0.0	0.1
Professional, scientific, and technical services	577	0.7	0.0	0.0	0.0	0.1
Management of companies	86	0.3	0.0	0.0	0.0	0.4
Administrative, waste management, and removal services	184	0.3	0.0	0.0	0.0	0.2
Educational services	258	0.3	0.0	0.0	0.0	0.1
Health care and social assistance	1,179	1.4	0.0	0.0	0.0	0.1
Arts, entertainment, and recreation	477	0.3	0.0	0.0	0.0	0.1
Accommodation and food services	1,391	1.4	0.0	0.0	0.0	0.1
Other services	963	1.2	0.0	0.0	0.0	0.1
Government	2,179	0.0	0.0	0.0	0.0	0.0
Totals[a]	**15,768**	**41**	**0.1**	**1.2**	**0.6**	**0.3**

[a]Totals have been rounded.

The largest contributions, alongside other sector-specific economic activities, are experienced in the agriculture, forestry, fishing and hunting, and manufacturing sectors (Table 3.12-14). As shown in Figure 3.12-3, the three-county study area is most specialized, relative to all other sectors, in the agriculture, forestry, fishing, and hunting sector. While this sector is important to the economic vitality of the three-county study area, the Project's contributions represent a relatively small cumulative economic impact on past and current activities. Impacts associated with all activities under this alternative would constitute less than a half of one percent (0.3%) of employment totals in the three-county study area (Table 3.12-14). Consequently, actions under this Project would have small cumulative economic impacts relative to past and present economic conditions. Cumulative employment and labor income impacts to the three-county study area from reasonably foreseeable projects would occur. The degree to which the economic environment would be impacted, as well as the distribution of effects, cannot be determined from the information available. However, the small cumulative economic impact from past and present activities indicates that cumulative economic effects related to reasonably foreseeable activities are likely to be small.

3.12.3.4. Alternative 3

The Forest proposes to implement restoration treatments over a 10-year period to restore the structure and function of forests and watersheds within the Project area. Alternative 3 is designed to treat PVGs 2, 5, and 6 but not Groups 7–11 and emphasizes watershed restoration treatments in the Granite Creek subwatershed. This alternative was developed in response to comments that requested more effective watershed restoration and expressed wildlife security concerns. This alternative includes commercial and noncommercial vegetation treatments on approximately 18,031 acres and prescribed burning on approximately 16,600 acres over the life of the Project.

Financial Efficiency

As discussed above, the NPV is the discounted sum of benefits minus discounted costs associated with each scenario. The financial efficiency analysis is specific to the timber harvest and ecosystem management associated with the Project (as directed in Forest Service Manual 2400-Timber Management and guidance found in the FSH 2409.18). Costs for sale preparation, sale administration, regeneration, and ecosystem restoration are included. All costs, timing, and amounts were developed by the specialists on the Project's IDT. The expected revenue is the corresponding predicted high bid of $70 per CCF. The predicted high bid is used for the expected revenue (rather than the appraised stumpage rate) because the predicted high bid is the best estimate of the high bid resulting from the timber sale auction. The actual timber value will depend on the market when the timber is sold and may be higher or lower than the predicted high bid. The NPV was calculated using PEAT, a program for economic analysis of long term, on-the-ground resource management projects.

Table 3.12-12 indicates that Alternative 3 would result in a net surplus for the timber harvest and required design criteria, but it would fall below the break-even point for cost efficiency when taking into account all activities, as indicated by the negative NPV. The NPV for Alternative 3 is $1.4 million for the timber harvest and required design criteria and negative $3.5 million for all planned activities. As discussed above, there are many indirect effects that are not captured in the analysis of financial efficiency. Fuels treatments under this alternative would contribute to fuels conditions that would have more resistance to wildland fire. Treatments proposed under this alternative could reduce the threat to human life and decrease wildland fire-related costs such as property loss, lost revenues, and fire-suppression costs. If treatments proposed under this

alternative successfully prevented even one fire similar in size and severity to the Wesley Fire, the NPV of these restoration activities would be significantly less negative.

Employment and Labor Income Impacts

Economic impacts, in terms of employment and labor income, associated with Project activities (timber harvest, restoration activities, road work, and recreation improvements), were estimated with the IMPLAN input-output model described above. Timber production, restoration activities, road work, and recreation improvements from this Project would have direct and indirect effects on local jobs and labor income.

For timber harvest, the direct employment and labor income response coefficients (e.g., jobs and labor income per million cubic feet) were derived by the University of Montana's Bureau of Business and Economic Research (Morgan et al. 2014). The indirect and induced multiplier effects were estimated using the IMPLAN model for the three-county study area. For restoration, road work, and recreation improvements, the direct, indirect, and induced effects were derived using IMPLAN.

Commercial Forest Products

While there is potential to harvest between 75.3 and 95.3 million cubic feet of sawtimber and 1,300 to 2,100 tons of biomass under Alternative 3, it is anticipated that 76.6 million cubic feet of sawtimber and 1,916 tons of biomass would be harvested (Table 3.12-12). The harvesting and processing of these commercial forest products would support 30 jobs and provide $1.17 million in local labor income on annual average. These estimates assume that timber market prices are high enough to encourage the sale and harvesting of forest products in the Project area. In addition to the employment and income contributions of logging and processing, the precommercial thinning and marking, weed spraying, and biomass removal associated with these commercial forest products would support an additional four jobs and provide $93,000 in labor income on annual average over the life of the Project. This analysis assumes that 80 percent of the timber would be processed within the designated study area.

Recreation-Related Improvements

Although treatments would likely create noise, dust, and smoke that may negatively affect the short-term quality of recreational experiences within the Project area during treatment days, proposed treatments are not anticipated to affect overall Forest visitation. As Section 4.6 of the NVUM surveys for the forests demonstrates, when individuals are unable to visit their preferred site, most will engage in substitute behavior that will continue to have an effect in the local economy (USFS 2012b). As a result, treatments considered under Alternative 3 are not expected to measurably reduce the economic contributions of recreation within the study area.

Alternative 3 proposes to upgrade two camp sites and make trail improvements to increase the quality of recreational experiences supported by the Project area, and it will likely result in higher nonmarket values associated with Project area lands. The construction of new and improvement to existing recreation-related facilities would also generate new work for private contractors. The creation improvements included under this alternative would support a portion of one job and provide approximately $3,000 in labor income in the local economy on annual average over the life of the Project.

Restoration Activities

Restoration activities proposed under Alternative 3 would include post-harvest vegetation treatments on approximately 4,940 acres. Treatments under this alternative include regeneration exams, planting, and noncommercial thinning. These activities are expected to support an estimated 1 job and provide approximately $27,000 in labor income across the three-county study area on annual average over the next 10 years. Additionally, restoration vegetation treatments include an estimated 16,600 acres of prescribed burning that is expected to be completed using an existing Forest Service workforce, so is not accounted for in direct and indirect economic impacts (economic consequences of Forest Service workforce are considered under the Forest Plan EIS [USDA Forest Service 2003a]).

Road Work

While some road work would be associated with the commercial harvesting of forest products, Alternative 3 proposes additional road work to improve, maintain, and decommission roads within the Project area. Additional road work associated with long-term road closure, BMPs, graveling, campsite shoreline hardening, and AOP are proposed under this alternative. Forest specialists have indicated that the majority of road work would be contracted to firms operating within the three-county study area. Road work proposed under this alternative is estimated to support one job and provide $18,000 in labor income across Adams, Idaho, and Valley counties on annual average over the life of the Project.

IMPLAN estimates that all activities proposed under Alternative 3 would support approximately 36 jobs and provide $1.3 million in local labor income (direct, indirect, and induced) on an annual average over the life of the Project (Table 3.12-10 and Table 3.12-11). Since the expenditures occur over a 10-year period, the estimated impacts of jobs and labor income would be spread out over the life of the Project. These are not new jobs or income but rather jobs and income that can be attributed to Project activities.

Cumulative Effects

Past and present cumulative economic activity has already been absorbed by the local economy and is represented in the Affected Environment section presented above. Cumulative economic effects related to past and present economic activity are discussed below. However, estimating the direct and indirect effects specific to future reasonably foreseeable projects (listed in Appendix 3 on Cumulative Effects) is not possible due to unavailable information. Individually, these projects would likely have a minimal impact on economic conditions; however, cumulatively they may substantially affect employment and income levels in the study area. The degree to which the economic environment would be impacted, as well as the distribution of effects, cannot be determined from the information available.

Neither the Project feasibility nor financial efficiency of Alternative 3 would be affected by actions and projects listed in Appendix 3. In addition, current feasibility and economic efficiency of other projects within the three-county study area would not be affected since past and present cumulative economic activity has already been absorbed by the local economy. However, cumulative impacts from the Project on the feasibility and economic efficiency of reasonably foreseeable projects within the study area would occur. The degree to which the economic environment would be impacted, as well as the distribution of effects, cannot be determined from the information available.

Past and present levels of employment and labor income associated with other projects, occurring in the area listed Appendix 3, have the potential to accrue alongside the employment and labor income impacts from the Project depicted in Table 3.12-10 and Table 3.12-11, above. The direct and indirect effects specific to these projects are unknown; however, past and present economic activity has already been absorbed by the local economy and is represented in the Affected Environment section presented above. Effects from the Project would accrue alongside other projects to the individual sectors depicted in Figure 3.12-3 above. The effects on these sectors, alongside past and present economic activity, are depicted in Table 3.12-15 below.

Table 3.12-15. Annual employment contributions to study area sectors for Alternative 3.

Sectors	Study Area Totals	Commercial Forest Products	Recreation	Restoration	Road Work	Percent of Study Area Total
Agriculture, forestry, fishing, and hunting	1,596	15.8	0.0	1.0	0.0	1.1
Mining	133	0.0	0.0	0.0	0.0	0.0
Utilities	61	0.1	0.0	0.0	0.0	0.1
Construction	1,357	0.3	0.1	0.0	0.4	0.1
Manufacturing	627	10.5	0.0	0.0	0.0	1.7
Wholesale trade	364	1.4	0.0	0.0	0.0	0.4
Transportation and warehousing	1,763	1.0	0.0	0.0	0.0	0.1
Retail trade	455	1.2	0.0	0.0	0.1	0.3
Information	126	0.2	0.0	0.0	0.0	0.1
Finance & insurance	752	0.8	0.0	0.0	0.0	0.1
Real estate, rental, and leasing	1,241	0.8	0.0	0.0	0.0	0.1
Professional, scientific, and technical services	577	0.6	0.0	0.0	0.0	0.1
Management of companies	86	0.3	0.0	0.0	0.0	0.3
Administrative, waste management, and removal services	184	0.3	0.0	0.0	0.0	0.1
Educational services	258	0.3	0.0	0.0	0.0	0.1
Health care and social assistance	1,179	1.3	0.0	0.0	0.0	0.1
Arts, entertainment, and recreation	477	0.3	0.0	0.0	0.0	0.1
Accommodation and food services	1,391	1.3	0.0	0.0	0.0	0.1
Other services	963	1.1	0.0	0.0	0.0	0.1
Government	2,179	0.1	0.0	0.0	0.0	0.0
Totals[a]	**15,768**	**37.5**	**0.1**	**1.1**	**0.6**	**0.2**

[a]Totals have been rounded.

The largest contributions, alongside other sector-specific economic activity, would be experienced in the Agriculture, Forestry, Fishing, and Hunting, and Manufacturing sectors (Table 3.12-15). As shown in Figure 3.12-3, the three-county study area is most specialized, relative to all other sectors, in the agriculture, forestry, fishing, and hunting sector. While this sector is important to the economic vitality of the three-county study area, the Project's contributions would represent a relatively small cumulative economic impact on past and current activities. Impacts associated with all activities under this alternative would constitute less than a half of one percent (0.2%) of employment totals in the three-county study area (Table 3.12-15). Consequently, actions under this Project would have small cumulative economic impacts relative to past and present economic conditions. Cumulative employment and labor income impacts to the three-county study area from reasonably foreseeable projects would occur. The degree to which the economic environment would be impacted, as well as the distribution of effects, cannot be determined from the information available. However, the small cumulative economic impact from past and present activities indicates cumulative economic effects related to reasonably foreseeable activities are likely to be small.

3.12.3.5. Alternative 4

The PNF proposes to implement restoration treatments over a 10-year period to restore the structure and function of forests and watersheds within the Middle Fork Weiser River area. Alternative 4 is designed to respond to comments requesting the maximum level of vegetation treatments to produce the most economic benefit (most jobs and financial return from commercial product revenue) and to comments relating to the intensity and benefit of treatments in managing for spruce budworm and other insects to promote diameter growth. This alternative includes commercial and noncommercial vegetation treatments on approximately 23,393 acres and prescribed burning on approximately 27,400 acres over the life of the Project.

Financial Efficiency

As discussed above, the NPV is the discounted sum of benefits minus discounted costs associated with each scenario. The financial efficiency analysis is specific to the timber harvest and ecosystem management associated with the Project (as directed in Forest Service Manual 2400-Timber Management and guidance found in the FSH 2409.18). Costs for sale preparation, sale administration, regeneration, and ecosystem restoration are included. All costs, timing, and amounts were developed by the specialists on the Project's IDT. The expected revenue is the corresponding predicted high bid of $70 per CCF. The predicted high bid is used for the expected revenue (rather than the appraised stumpage rate) because the predicted high bid is the best estimate of the high bid resulting from the timber sale auction. The actual timber value will depend on the market when the timber is sold and may be higher or lower than the predicted high bid. The NPV was calculated using PEAT, a program for economic analysis of long term, on-the-ground resource management projects.

Table 3.12-13 indicates that Alternative 4 would result in a net surplus for the timber harvest and required design criteria, but it will fall below the break-even point for cost efficiency when taking into account all activities, as indicated by the negative NPV. The NPV for Alternative 4 is $1.46 million for the timber harvest and required design criteria and negative $5.4 million for all planned activities. As discussed above, there are many indirect effects that are not captured in the analysis of financial efficiency. Fuels treatments under this alternative would contribute to fuels conditions that would have more resistance to wildland fire. Treatments proposed under this alternative could reduce the threat to human life and decrease wildland fire related costs such as property loss, lost revenues, and fire-suppression costs. If treatments proposed under this

alternative successfully prevented even one fire similar in size and severity to the Wesley Fire, the NPV of these restoration activities would be significantly less negative.

Employment and Labor Income Impacts

Economic impacts, in terms of employment and labor income, associated with Project activities (timber harvest, restoration activities, road work, and recreation improvements) were estimated with the IMPLAN input-output model described above. Timber production, restoration activities, road work, and recreation improvements from this Project would have direct and indirect effects on local jobs and labor income.

For timber harvest, the direct employment and labor income response coefficients (e.g., jobs and labor income per million cubic feet) were derived by the University of Montana's Bureau of Business and Economic Research (Morgan et al. 2014). The indirect and induced multiplier effects were estimated using the IMPLAN model for the three-county study area. For restoration, road work, and recreation improvements, the direct, indirect and induced effects were derived using IMPLAN.

Commercial Forest Products

While there is potential to harvest between 91.6 and 111.6 million cubic feet of sawtimber and 1,800 to 2,400 tons of biomass under Alternative 4, it is anticipated that 90.1 million cubic feet of sawtimber and 2,250 tons of biomass would be harvested (Table 3.12-12). The harvesting and processing of these commercial forest products would support 36 jobs and provide $1.37 million in local labor income on annual average. These estimates assume that timber market prices are high enough to encourage the sale and harvesting of forest products in the Project area. In addition to the employment and income contributions of logging and processing, the precommercial thinning and marking, weed spraying, and biomass removal associated with these commercial forest products would support an additional five jobs and provide $118,000 in labor income on annual average over the life of the Project. This analysis assumes that 80 percent of the timber would be processed within the designated study area.

Recreation-Related Improvements

Although treatments will likely create noise, dust, and smoke that may negatively affect the short-term quality of recreational experiences within the Project area during treatment days, proposed treatments are not anticipated to affect overall Forest visitation. As Section 4.6 of the NVUM surveys for the forests demonstrates, when individuals are unable to visit their preferred site, most will engage in substitute behavior that will continue to have an effect on the local economy (USFS 2012b). As a result, treatments considered under Alternative 4 are not expected to measurably reduce the economic contributions of recreation within the study area.

Alternative 4 does propose to upgrade two camp sites and make trail improvements to increase the quality of recreational experiences supported by the Project area, and it will likely result in higher nonmarket values associated with Project area lands. The construction of new and improvements to existing recreation-related facilities will also generate new work for private contractors. The creation improvements included in this alternative would support a portion of one job and provide approximately $3,000 in labor income in the local economy on annual average over the life of the Project.

Restoration Activities

Restoration activities proposed under Alternative 4 would include post-harvest vegetation treatments on approximately 6,076 acres. Treatments under this alternative include regeneration exams, planting, and noncommercial thinning. These activities are expected to support an estimated one job and provide approximately $30,000 in labor income across the three-county impact area on annual average over the next 10 years. Additionally, restoration vegetation treatments include an estimated 23,393 acres of prescribed burning that is expected to be completed using the existing Forest Service workforce, so it is not accounted for in direct and indirect economic impacts (economic consequences of Forest Service workforce are considered under the Forest Plan EIS [USDA Forest Service 2003a]).

Road Work

While some road work will be associated with the commercial harvesting of forest products, Alternative 4 proposes additional road work to relocate, improve, maintain and decommission roads within the Project area. Additional road work associated with long term road closure, best management practices, graveling, campsite shoreline hardening and aquatic organism passage are proposed under this alternative. Forest specialists have indicated that the majority of road work would be contracted out to firms operating out of the three-county study area. Road work proposed under this alternative is estimated to support 1 job and $20,000 in labor income across Adams, Idaho and Valley counties on annual average over the life of the Project.

IMPLAN estimates all activities proposed under Alternative 4 would support approximately 43 jobs and $1.54 million in local labor income (direct, indirect and induced) on an annual average over the life of the Project (Table 3.12-10 and Table 3.12-11). Since the expenditures occur over a 10-year period, the estimated impacts of jobs and labor income would be spread out over the life of the Project. These are not new jobs or income, but rather jobs and income that can be attributed to activities carried out for this restoration Project.

Cumulative Effects

Past and present cumulative economic activity has already been absorbed by the local economy and is represented in the affected environment section presented above. Cumulative economic effects related to past and present economic activity is discussed below. However, estimating the direct and indirect effects specific to future reasonably foreseeable projects (listed in Appendix 3 on Cumulative Effects) is not possible due to unavailable information. Individually, these projects would likely have a minimal impact on economic conditions; however, cumulatively they may substantially affect employment and income levels in the study area. The degree to which the economic environment would be impacted, as well as the distribution of effects, cannot be determined from the information available.

Neither the Project feasibility nor financial efficiency of Alternative 4 would be affected by actions and projects listed in Appendix 3. In addition, current feasibility and economic efficiency of other projects within the three-county study area would not be affected since past and present cumulative economic activity has already been absorbed by the local economy. However, cumulative impacts from the MFWR Project to the feasibility and economic efficiency of reasonably foreseeable projects within the study area would occur. The degree to which the economic environment would be impacted, as well as the distribution of effects, cannot be determined from the information available.

Past and present levels of employment and labor income associated with other projects, occurring in the area listed Appendix 3, have the potential to accrue alongside the employment and labor income impacts from the MFWR Project depicted in Table 3.12-10 and Table 3.12-11 above. The direct and indirect effects specific to these projects is unknown however, past and present economic activity has already been absorbed by the local economy and is represented in the Affected Environment section presented above. Effects from the Project would accrue alongside other projects to the individual sectors depicted in Figure 3.12-3 above. The effects on these sectors, alongside past and present economic activity, are depicted in Table 3.12-16 below.

Table 3.12-16. Annual employment contributions to study area sectors under Alternative 4.

Sectors	Study Area Totals	Commercial Forest Products	Recreation	Restoration	Road Work	Percent of Study Area Total
Agriculture, forestry, fishing, and hunting	1,596	19.1	0.0	1.1	0.0	1.3
Mining	133	0.0	0.0	0.0	0.0	0.0
Utilities	61	0.1	0.0	0.0	0.0	0.2
Construction	1,357	0.4	0.1	0.0	0.4	0.1
Manufacturing	627	12.5	0.0	0.0	0.0	2.0
Wholesale trade	364	1.6	0.0	0.0	0.0	0.5
Transportation and warehousing	1,763	1.2	0.0	0.0	0.0	0.1
Retail trade	455	1.4	0.0	0.1	0.1	0.3
Information	126	0.2	0.0	0.0	0.0	0.2
Finance & insurance	752	0.9	0.0	0.1	0.0	0.1
Real estate, rental, and leasing	1,241	0.9	0.0	0.1	0.0	0.1
Professional, scientific, and technical services	577	0.7	0.0	0.0	0.0	0.1
Management of companies	86	0.3	0.0	0.0	0.0	0.4
Administrative, waste management, and removal services	184	0.3	0.0	0.0	0.0	0.2
Educational services	258	0.3	0.0	0.0	0.0	0.1
Health care and social assistance	1,179	1.5	0.0	0.1	0.0	0.1
Arts, entertainment, and recreation	477	0.3	0.0	0.0	0.0	0.1
Accommodation and food services	1,391	1.5	0.0	0.1	0.0	0.1
Other services	963	1.4	0.0	0.1	0.0	0.1
Government	2,179	0.1	0.0	0.0	0.0	0.0
Totals[a]	**15,768**	**45.0**	**0.1**	**1.2**	**0.7**	**0.3**

[a]Totals may not add due to rounding.

The largest contributions, alongside other sector specific economic activity, are experienced in the Ag, Forestry, Fishing & Hunting and Manufacturing sectors (Table 3.12-16). As shown in Figure 3.12-3, the three-county study area is most specialized, relative to all other sectors, in the agriculture, forestry, fishing & hunting sector. While this sector is important to the economic

vitality of the three-county study area, the Project's contributions represent a relatively small cumulative economic impact on past and current activities. Impacts associated with all activities under this alternative would constitute less than a half of one percent (0.3%) of employment totals in the three-county study area (Table 3.12-16). Consequently, actions under this EIS would have small cumulative economic impacts relative to past and present economic conditions. Cumulative employment and labor income impacts to the three-county study area from reasonably foreseeable projects would occur. The degree to which the economic environment would be impacted, as well as the distribution of effects, cannot be determined from the information available. However, the small cumulative economic impact from past and present activities indicates cumulative economic effects related to reasonably foreseeable activities are likely to be small.

3.12.3.6. Alternative 5

The PNF proposes to implement restoration treatments over a 15–20 year period to restore the structure and function of forests and watersheds within the Middle Fork Weiser River area. Alternative 5 was developed in response to DEIS public comments and IDT member recommendations to optimize priority restoration opportunities. Alternative 5 was designed as a blend of Alternatives 2–4; it includes all Alternative 2 vegetation treatments and some of the Alternative 4 treatments that emphasize whitebark pine regeneration, aspen regeneration, and wet meadow restoration.

Financial Efficiency

As discussed above, the NPV is the discounted sum of benefits minus discounted costs associated with each scenario. The financial efficiency analysis is specific to the timber harvest and ecosystem management associated with the Project (as directed in Forest Service Manual 2400-Timber Management and guidance found in the FSH 2409.18). Costs for sale preparation, sale administration, regeneration, and ecosystem restoration are included. All costs, timing, and amounts were developed by the specialists on the Project's IDT. The expected revenue is the corresponding predicted high bid of $70 per CCF. The predicted high bid is used for the expected revenue (rather than the appraised stumpage rate) because the predicted high bid is the best estimate of the high bid resulting from the timber sale auction. The actual timber value will depend on the market when the timber is sold, and it may be higher or lower than the predicted high bid. The NPV was calculated using PEAT, a program for economic analysis of long term, on-the-ground resource management projects

Table 3.12-17 indicates that Alternative 5 results in a net surplus for the timber harvest and required design criteria, but it will fall below the break-even point for cost efficiency when taking into account all activities, as indicated by the negative NPV. The NPV for Alternative 5 is $1.2 million for the timber harvest and required design criteria and negative $4.3 million for all planned activities. As discussed above, there are many indirect effects that are not captured in the analysis of financial efficiency. Fuels treatments under this alternative would contribute to fuels conditions that would have more resistance to wildland fire. Treatments proposed under this alternative could reduce the threat to human life and decrease wildland fire-related costs such as property loss, lost revenues, and fire-suppression costs. If treatments proposed under this alternative successfully prevented even one fire similar in size and severity to the Wesley Fire, the NPV of these restoration activities would be significantly less negative.

Employment and Labor Income and Impacts

Economic impacts, in terms of employment and labor income, associated with Project activities (timber harvest, restoration activities, road work, and recreation improvements) are estimated with the IMPLAN input-output model described above. Timber production, restoration activities, road work, and recreation improvements from this Project would have direct and indirect effects on local jobs and labor income.

For timber harvest, the direct employment and labor income response coefficients (e.g., jobs and labor income per million cubic feet) were derived by the University of Montana's Bureau of Business and Economic Research. The indirect and induced multiplier effects were estimated using the IMPLAN model for the three-county study area. For restoration, road work, and recreation improvements, the direct, indirect, and induced effects were derived using IMPLAN (Morgan et al. 2014).

Commercial Forest Products

It is estimated under Alternative 5 that 85.9 million cubic feet of sawtimber and 2,252 tons of biomass would be harvested. (Table 3.12-17). The harvesting and processing of these commercial forest products would support 34 jobs and provide $1.3 million in local labor income on annual average. These estimates assume that timber market prices are high enough to encourage the sale and harvesting of forest products in the Project area. In addition to the employment and income contributions of logging and processing, the precommercial thinning and marking, weed spraying, and biomass removal associated with these commercial forest products would support an additional five jobs and provide $127,000 in labor income on annual average over the life of the Project. This analysis assumes that 80 percent of the timber would be processed within the designated study area.

Recreation-Related Improvements

Although treatments will likely create noise, dust, and smoke that may negatively affect the short-term quality of recreational experiences within the Project area during treatment days, proposed treatments are not anticipated to affect overall forest visitation. As Section 4.6 of the NVUM surveys for the forests demonstrates, when individuals are unable to visit their preferred site, most will engage in substitute behavior that will continue to have an effect in the local economy (USFS 2012b). As a result, treatments considered under Alternative 5 are not expected to measurably reduce the economic contributions of recreation within the study area.

Alternative 5 does propose to upgrade two camp sites and make trail improvements to increase the quality of recreational experiences supported by the Project area, which will likely result in higher nonmarket values associated with Project area lands. The construction of new and improvements to existing recreation-related facilities would also generate new work for private contractors. The creation improvements included in this alternative would support a portion of one job and provide approximately $3,000 in labor income in the local economy on annual average over the life of the Project.

Restoration Activities

Restoration activities proposed under Alternative 5 would include post-harvest vegetation treatments on approximately 5,530 acres. Treatments under this alternative include regeneration exams, planting and non-commercial thinning. These activities are expected to support an estimated 1 job and approximately $31,000 in labor income across the three-county study area on

annual average over the next 10 years. Additionally, restoration vegetation treatments include an estimated 27,200 acres of prescribed burning, which is expected to be completed using existing Forest Service workforce so are not accounted for in direct and indirect economic impacts (economic consequences of Forest Service workforce are considered under the Forest Plan EIS [USDA Forest Service 2003a]).

Road Work

While some road work would be associated with the commercial harvesting of forest products, Alternative 5 proposes additional road work to relocate, improve, maintain, and decommission roads within the Project area. Additional road work associated with long-term road closure, BMPs, graveling, campsite shoreline hardening, and AOP are proposed under this alternative. Forest specialists have indicated that the majority of road work would be contracted to firms operating out of the three-county study area. Road work proposed under this alternative is estimated to support one job and provide $21,000 in labor income across Adams, Idaho, and Valley counties on annual average over the life of the Project.

IMPLAN estimates all activities proposed under Alternative 5 would support approximately 41 jobs and provide $1.5 million in local labor income (direct, indirect and induced) on an annual average over the life of the Project (Table 3.12-10 and Table 3.12-11). Since the expenditures occur over a 10-year period, the estimated impacts of jobs and labor income would be spread out over the life of the Project. These are not new jobs or income but rather jobs and income that can be attributed to activities carried out for this restoration Project.

Cumulative Effects

Past and present cumulative economic activity has already been absorbed by the local economy and is represented in the affected environment section presented above. Cumulative economic effects related to past and present economic activity are discussed below. However, estimating the direct and indirect effects specific to future reasonably foreseeable projects (listed in Appendix 3 under Cumulative Effects) is not possible due to unavailable information. Individually, these projects would likely have a minimal impact on economic conditions; however, cumulatively they may substantially affect employment and income levels in the study area. The degree to which the economic environment would be impacted, as well as the distribution of effects, cannot be determined from the information available.

Neither the Project feasibility nor financial efficiency of Alternative 5 would be affected by actions and projects listed in Appendix 3. In addition, current feasibility and economic efficiency of other projects within the three-county study area would not be affected since past and present cumulative economic activity has already been absorbed by the local economy. However, cumulative impacts from the Project on the feasibility and economic efficiency of reasonably foreseeable projects within the study area would occur. The degree to which the economic environment would be impacted, as well as the distribution of effects, cannot be determined from the information available.

Past and present levels of employment and labor income associated with other projects, occurring in the area listed Appendix 3, have the potential to accrue alongside the employment and labor income impacts from the Project depicted in Table 3.12-10 and Table 3.12-11, above. The direct and indirect effects specific to these projects are unknown; however, past and present economic activity has already been absorbed by the local economy and is represented in the Affected Environment section presented above. Effects from the Project would accrue alongside

other projects to the individual sectors depicted in Figure 3.12-3, above. The effects on these sectors, alongside past and present economic activity, are depicted in Table 3.12-17, below.

Table 3.12-17. Annual employment contributions to study area sectors under Alternative 5.

Sectors	Study Area Totals	Commercial Forest Products	Recreation	Restoration	Road Work	Percent of Study Area Total
Agriculture, forestry, fishing, and hunting	1,596	17.2	0.0	1.2	0.0	1.2
Mining	133	0.0	0.0	0.0	0.0	0.0
Utilities	61	0.1	0.0	0.0	0.0	0.2
Construction	1,357	0.3	0.1	0.0	0.5	0.1
Manufacturing	627	10.6	0.0	0.0	0.0	1.7
Wholesale trade	364	1.4	0.0	0.0	0.0	0.4
Transportation and warehousing	1,763	1.0	0.0	0.0	0.0	0.1
Retail trade	455	1.2	0.0	0.0	0.1	0.3
Information	126	0.2	0.0	0.0	0.0	0.2
Finance & insurance	752	0.8	0.0	0.0	0.0	0.1
Real estate, rental, and leasing	1,241	0.8	0.0	0.0	0.0	0.1
Professional, scientific, and technical services	577	0.6	0.0	0.0	0.0	0.1
Management of companies	86	0.3	0.0	0.0	0.0	0.4
Administrative, waste management, and removal services	184	0.3	0.0	0.0	0.0	0.2
Educational services	258	0.3	0.0	0.0	0.0	0.1
Health care and social assistance	1,179	1.3	0.0	0.0	0.0	0.1
Arts, entertainment, and recreation	477	0.3	0.0	0.0	0.0	0.1
Accommodation and food services	1,391	1.3	0.0	0.0	0.0	0.1
Other services	963	1.2	0.0	0.0	0.0	0.1
Government	2,179	0.1	0.0	0.0	0.0	0.0
Totals[a]	**15,768**	**39.1**	**0.1**	**1.2**	**0.7**	**0.3**

The largest contributions, alongside other sector-specific economic activity, would be experienced in the Agriculture, Forestry, Fishing, and Hunting and Manufacturing sectors (Table 3.12-17). As shown in Figure 3.12-3, the three-county study area is most specialized, relative to all other sectors, in the agriculture, forestry, fishing, and hunting sector. While this sector is important to the economic vitality of the three-county study area, the Project's contributions represent a relatively small cumulative economic impact on past and current activities. Impacts associated with all activities under this alternative would constitute less than one-half of one percent (0.3%) of employment totals in the three-county study area (Table 3.12-17). Consequently, actions under this Project would have small cumulative economic impacts relative to past and present economic conditions. Cumulative employment and labor income impacts on the three-county study area from reasonably foreseeable projects would occur. The degree to which the economic environment would be impacted, as well as the distribution of effects, cannot be determined from the information available. However, the small cumulative economic

impact from past and present activities indicates cumulative economic effects related to reasonably foreseeable activities are likely to be small.

3.12.4. Minimum Road System

Alternative 1 would not designate an MRS for the Project Area. The MRS identified by each action alternative is needed for the protection, administration, and utilization of NFS lands and the use and development of their resources, while reflecting likely future funding. Decommissioning of roads would add short-term increases to the economy while reducing the need for long-term maintenance. Alternative 3 decreases the MRS the greatest with the most decommissioning while Alternative 4 decreases the MRS the least and would require the most future maintenance. Reduction of NFS roads within the Project area would require temporary road construction in the future to provide access to develop resources. Alternative 3 would require the most future temporary road construction while Alternative 4 would require the least.

3.13. Range Management and Noxious Weeds

3.13.1. Analysis Scale, Data Sources, and Methodology

3.13.1.1. Analysis Scale

Direct, Indirect, and Cumulative Effects Analysis Area

The rangeland resource may be directly, indirectly, and cumulatively affected by projects proposed within the 49,276-acre Project area. Although rangelands consist of timbered areas, riparian areas, shrublands, grasslands, and rocky scablands, the analysis of direct and indirect effects on the rangeland resource focuses mainly on the condition of nontimbered grasslands (strata 60) and shrublands (strata 70) on NFS lands within the following HUC 6 subwatersheds (U.S. Geological Survey watershed boundary data set): East Fork Weiser River, Granite Creek–Middle Fork Weiser River, Jungle Creek–Middle Fork Weiser River, Mica Creek–Middle Fork Weiser River, and Little Fall Creek–Middle Fork Weiser River.

Temporal Scale of Analysis

Time frames as defined in the Forest Plan were used for the direct and indirect effects analysis: temporary (1–3 years), short term (3–15 years), and long term (15+ years) (USDA 2003a). Time frames for the cumulative effects analysis are specified in the Cumulative Effects section. The time frames defined above are considered appropriate time scales for analysis because maintenance and future management will need to determine the appropriate objectives for managing the Project area within the 15–30 year time frame.

3.13.1.2. Data Sources and Methodology

Data sources used for collecting information for rangeland resources and noxious weed components of the Project include the natural resource manager system for range and noxious weeds; the PNF GIS reference layer file; physical on-the-ground observations; information collected in 2013, 2014, and 2015 for the Council and Indian Mountain C&H Allotments; Council Ranger District 2210 rangeland management planning files; and references listed in the Range and Noxious Weeds Specialist Report (Project record).

3.13.2. Affected Environment

3.13.2.1. Current Condition

Natural events and human-caused disturbances have influenced the current rangeland vegetation condition of the Project area. Natural disturbance patterns such as precipitation, floods, droughts, and wildfires influence vegetation composition, quality, and quantity. Ground-disturbing management activities directly affect vegetation composition, quality, and quantity, and indirectly affect livestock movement. Past and current ground-disturbing management activities include livestock grazing, timber harvest, reforestation plantation fencing, road construction, road obliteration, and recreational uses such as camping, motorcycling, and riding ATVs.

Livestock grazing has occurred within the Project area for centuries. The first livestock users in Idaho were Native Americans. Spaniards brought horses to the southwest in 1541, and by 1700

horses were widespread. Trappers and early settlers recalled seeing vast numbers of horses grazing in the Council and Indian valleys (Jones 1989).

Discovery of the excellent rangelands in Idaho led to a livestock boom beginning in the 1870s. Heavy livestock use during the early 1900s resulted in severe impacts on soils and native vegetation. Regulation of livestock grazing began with the establishment of the Weiser National Forest in 1905 when approximately 150,000 sheep and 25,000 cattle and horses were grazed on NFS lands (Lafferty 1963).

The earliest records (1909) of livestock grazing on the District show that most of the present allotments were grazed by sheep. In 1940 there were three cattle allotments and one sheep allotment. Today, 1,179 cow/calf pairs are permitted to graze the Council Mountain C&H Allotment from June 20 through October 15 and 1,758 cow/calf pairs are permitted to graze the Indian Mountain C&H Allotment from July 1 through October 15.

Rangelands in the Project area's subwatersheds have been used primarily for forage by livestock (cattle, sheep, and horses) and wildlife (elk, deer, and bear). Since the turn of the century, livestock grazing has affected the composition and function of the shrub/grass group. Where grazing was excessive, perennial grasses have been replaced by less desirable annual grasses, thereby shortening the fire-return interval. Conversely, fire suppression in shrub communities has increased the shrub component and decreased plant diversity. Fire suppression has played a role in allowing the overstory of plant communities to progress to late-seral ecological status without interference, decreasing plant diversity and productivity. Upland areas that were not heavily grazed in the past reveal that large segments of the desirable forage for livestock and wildlife have large accumulations of dead plant material and are progressing toward late-seral ecological status. These areas will return to a more productive, mid-seral ecological status with prescribed fire and more intensive grazing.

Fire was a common disturbance factor in rangelands prior to settlement of the area, but the historical fire-return interval varied greatly due to differences in elevation, fuel flammability, and ignition sources. High-elevation mountain big sagebrush communities had fire-return intervals ranging from 25 to 50 years. Low-elevation grasslands, often dominated by annual grasses, experienced fires every 5–25 years. In general, fire events in rangelands maintained herbaceous plants and limited the establishment of woody plants.

Current Rangeland Management

The Project area contains two grazing allotments—the Council Mountain C&H Allotment (82,980 acres) and the Indian Mountain C&H Allotment (86,725 acres). The allotments also include Idaho Department of Lands and DF Development LLC land ownership. Permitted cattle numbers from June 20 through October 15 include 1,179 cow/calf pairs on NFS lands and 31 cow/calf pairs on Idaho Department of Lands within the Council Mountain C&H Allotment. Permitted cattle numbers from July 1 through October 15 include 1,758 cow/calf pairs on NFS lands, 30 cow/calf pairs on Idaho Department of Lands, and 156 cow/calf pairs on DF Development LLC lands within the Indian Mountain C&H Allotment.

The allotments are managed under deferred grazing rotation systems in which forage use by livestock is influenced by topography and water. The low country is ready for grazing in early June and July, but the high country is not ready until mid-to-late July. By the time the high country is ready, the low-country forage and some water sources have dried up. The area between the low and high country is steep and dominated by trees and shrubs. Much of the allotments' areas are receiving proper (less than or equal to the Forest Plan grazing standard of

45% utilization for riparian areas and early use pastures and 50% utilization for late-season pastures) grazing use, though some areas receive little-to-no use.

Livestock impacts are associated mainly with trailing, stock driveways, and concentrated use areas where vegetation is removed or trampled. Concentrated use is also evident in some riparian areas where use is associated with watering, trailing, and bedding sites. Some high-elevation basins have been grazed prior to range readiness of soils and vegetation in the past. These kinds of livestock grazing problems have been mitigated through construction of drift fences and water developments (USDA Forest Service 1997).

Continued maintenance and development of water sources is very beneficial to the allotments. Use of alternate water sources, combined with salting and riding, will draw livestock and wildlife out of the creek bottoms and improve animal distribution in the uplands.

As a result of excessive livestock use from the late 1800s through the early 1900s, herbaceous plants decreased in the watershed. It is not known how much the vegetative composition was altered. Plant composition probably remained similar to historical levels but the relative abundance changed and plants that tolerate higher levels of use probably increased. The decrease in native vegetation created an opportunity for introduced species to become established. Upland sites that were grazed too heavily in the past, and too early in the year, are composed largely of early seral plant species and include annuals and undesirable forbs and grasses that have shallow root systems and do not provide stability to soils. Early seral plants provide little cover and forage for wildlife and livestock. In contrast, large areas of the allotments are not subject to enough grazing activity and the plant community is in a late-seral status composed of decadent brush with little understory. Proper livestock grazing can help maintain brush community types in a mid-seral status that are composed of a greater variety of grasses and forbs in the understory and less ground cover by decadent brush. A mid-seral status is more productive than late seral and provides greater habitat and forage for wildlife and livestock.

The subwatersheds located in the Project area are composed of three basic vegetation habitat types: Douglas-fir/snowberry, subalpine fir/huckleberry, and sagebrush/grass. The suitable acres for livestock grazing are primarily in the sagebrush/grass habitat types with an ecological status of late seral to Potential Natural Community, with some localized areas in early- to mid-seral status. Cattle use in these subwatershed uplands has been moderate, with many areas grazed lightly or not at all. Perennial grasses with areas of basin big sagebrush (*Artemisia tridentata* subspecies *tridentata*) and antelope bitterbrush (*Purshia tridentata*) dominate low-elevation grasslands. On some of the lower, drier sites, the perennial plants are more widely spaced, resulting in an abundance of introduced plants such as cheatgrass (*Bromus tectorum*), bulbous bluegrass (*Poa bulbosa*), rattlesnake chess (*Bromus brizaeformis*), and medusahead rye (*Taeniatherum caput-medusae*). Annual forbs and thistles have also become established on these sites. Mixed communities of mountain big sagebrush, forbs, and grasses occur at mid elevations. Sod-forming perennial grasses dominate high-elevation grasslands.

While livestock numbers have decreased since the early 1900s, big game, particularly elk, have increased, resulting in more year-long grazing and increased grazing in less accessible areas. This use by wildlife is generally slight to moderate across the watersheds. Adverse impacts from deer and elk occur early in the year during spring green-up when the snow is just melting. At that time, the soils are wet and the herbaceous plants are in an early growth stage. Also, some areas, particularly the south-facing slopes near the Forest boundary, receive heavy use on browse species by wildlife during the winter and early spring months. Big game/livestock competition is usually evaluated in terms of forage use patterns and habitat overlap. Because of similar forage use patterns and habitat overlap (especially in winter/spring range), competition is most likely to

exist between elk and cattle. Deer and cattle use can be complementary when combined because of differences in forage preferences; however, dry spring weather following heavy grazing may reduce available bluebunch wheatgrass (*Pseudoroegneria spicata*), leading to competition between cattle and white-tailed deer (*Odocoileus virginianus*) or mule deer (*Odocoileus hemionus*) and/or elk and deer. Winter range is characterized by elevations of up to 5,000 feet that provide winter range habitat (forage and cover in the winter) for big game. Identified big game winter range occurs in the Project area.

No existing reforestation plantation fences exist in the Project area. Grasses in reforested areas and along the associated road network are comprised mainly of perennial erosion-control grass species that were seeded in the closeout phase of the various timber sales. Intermixed on these lands are the native warm-season plants with an occasional isolated cool-season species. Introduced grasses (e.g., wheatgrasses [Poaceae], bromes [*Bromus* species], and orchard grass [*Dactylis* species]) have supported the majority of the grazing pressure since their introduction. While density of introduced grasses has diminished, these species have survived. On the sites adjacent to permanent water sources, continuous grazing and/or overgrazing by cattle, elk, and deer has removed the desirable vegetation, and in its place there exist annuals and/or nonpalatable species. Better livestock distribution, the reintroduction of fire, and range improvement installation would help improve upland range conditions.

Drought has had an effect on species composition in the Project area. The increase in annuals, such as bulbous bluegrass and cheatgrass, is directly related to the lack of water and competition from less drought-tolerant species such as bluebunch wheatgrass and the perennial bluegrasses (*Poa* species). Livestock grazing has also had an effect on plant composition in localized areas in the uplands of the Project area allotments. The distribution of livestock on the low-elevation units in the recent past has been poor due to lack of water developments and fencing to keep livestock from moving into the high units too early in the grazing season. Drought conditions have also contributed to livestock concentrating in certain areas due to the availability of water and forage in them. As a result of these factors, there are areas of concentration in the uplands that are grazed too much, yet other suitable areas that receive little-to-no use.

Noxious Weeds

Approximately 1,346 acres have been inventoried for noxious weed species in the Council Mountain C&H Allotment and 1,161 acres inventoried in the Indian Mountain C&H Allotment; this inventoried area includes the analysis area. Noxious weeds identified during these surveys include rush skeletonweed (*Chondrilla juncea*), Canada thistle (*Cirsium arvense*), yellow toadflax (*Linaria vulgaris*), Dalmatian toadflax (*Linaria dalmatica*), common St. Johnswort (*Hypericum perforatum*), houndstongue (*Cynoglossum officinale*), spotted knapweed (*Centaurea stoebe*), and sulfur cinquefoil (*Potentilla recta*). A majority of the infestations observed were associated with ground-disturbance activities from roads and trails.

3.13.3. Environmental Effects

3.13.3.1. Direct and Indirect Effects

Alternative 1—No Action

Under the No Action alternative, the nonforested rangelands would be expected to show continued improvement at a slower rate than the action alternatives due to the Forest Plan Standards and Guidelines for livestock grazing (USDA Forest Service 2003a).

Noxious weeds would continue to be controlled using an integrated management approach (USDA Forest Service 1987). Control methods include chemical, biological, cultural, or mechanical treatments, depending on the weed species present, cost of control, proximity to live water, or other elements applicable to the site. Funding for weed control would not depend on Knutson-Vandenburg funds. The Knutson-Vandenburg Act set up a trust, funded from timber sale receipts, to restore logged areas.

Effects Common to Action Alternatives (Alternatives 2, 3, 4, and 5)

Timber Management

Following timber harvest activities, the areas opened up would provide vegetation that may be used as forage by big game and livestock. This vegetation would be available until the tree canopy closes again and shades out the lower-growing vegetation. Unfenced harvest units would be considered transitory range as soon as the logging operations are complete. Transitory ranges would provide more forage than that occurring prior to timber harvest and more forage than under the No Action alternative; however, livestock grazing capacities are not based on transitory range.

Timber harvest has the potential to facilitate livestock access to the higher elevations, causing livestock to move to the higher elevations too soon in the summer. Higher-elevation soils are too wet and the grasses are still in an early, fragile stage. This could have adverse effects on the grasses due to timing and duration of use. Higher-elevation soils would be more susceptible to compaction and the streambanks more susceptible to sloughing.

Prescribed Fire

Prescribed fires are proposed to reduce the risk of wildland fire to forestland, investments, adjacent private lands, and facilities, as well as to cleanup timber slash and decadent vegetation. Known populations of noxious weeds would be monitored and treated in burned areas, as the effects of burning on each species are uncertain.

Prescribed fires generally take place in the spring or fall when conditions are conducive to slow, cool, low-intensity burns. Under these circumstances, burned vegetation should not require rest from grazing. Monitoring data collected on prescribed burns over the past 8 years indicates that rest from livestock grazing was needed only on a few occasions for one growing season.

Coordination between the fuels specialist, range specialists, and affected permittee would take place prior to burning each block to determine the objective of each burn. Each prescribed fire would be monitored and evaluated to determine the severity of the burn, and a proper livestock grazing rest period would be applied. Rest periods following prescribed fires can range from no rest to numerous growing seasons of rest depending upon the severity of the burn. If it is determined that a prescribed fire treatment area needs to be rested from livestock grazing, several options are available to facilitate this action. The annual grazing rotation can be changed to defer grazing in the burned area. Livestock management practices, such as watering, salting, herding, and temporary fencing, would be used to keep livestock away from the burned area.

The proposed prescribed fires would cleanup dead and decadent plant material and stimulate growth of old and new plants. The use of prescribed fire would eventually lead to increased forage quality and quantity for wildlife and livestock.

Noxious Weeds

Noxious weeds would continue to be controlled using an integrated management approach. Control methods include chemical, biological, cultural, or mechanical treatments, depending on the weed species present, cost of control, proximity to live water, or other elements applicable to the site. The majority of noxious weeds in the Project area are associated with roads and trails. Therefore, it is expected that proposed new road construction and road obliteration would account for additional acres of noxious weed infestations and subsequent management. New infestations of noxious weeds could become established in the logging units, skid trails, and landings, as well as with new road construction, improvement, reconstruction, and graveling. Knutson-Vandenburg Act dollars, if available, would be requested for treatment of noxious weeds.

Depending on funding, all roads scheduled for decommissioning through this Project would be inventoried and treated prior to obliteration. Treatment sites would be recorded and revisited, on a road-by-road basis as needed, after completion of the Project. Some weed infestations may persist for many years and would require follow up treatment.

The following NFS roads in the Project area are proposed for decommissioning under Alternatives 2, 3, 4, and 5. They either have known weed infestations or provide access to weed infestations within the Project area: 50186, 50219, 50233, 50258, 50277, 50517, 50521, 50538, 50701, 50706, 51305, 51517, 51541, 51896, 501861500, 501868000, 502145000, 502332000, 504911000, and 507012000.

Roads

Livestock permittees use old and new logging roads for a variety of livestock management practices including transporting salt and supplements to salting grounds; moving and distributing livestock throughout the allotment; and for access to range improvement projects for maintenance. Some of the roads currently used by the permittees for these activities are proposed for decommissioning under the action alternatives. Decommissioning these roads could have dramatic impacts on current livestock operations and management.

Coordination between Forest Service employees and the permittees should be conducted prior to and during decommissioning to ensure permittee needs are met, where possible. The following roads proposed for decommissioning common to Alternatives 2, 3, 4, and 5 pose livestock management concerns to the permittees and would need more discussion before decommissioning commences: 50166, 501841000, 502183000, 502187000, 50256, 50258, 50485, 504853000, 50489, 50496, 504961000, 50566, 505911000, 50677, and 51549. Additional roads proposed for decommissioning under Alternative 3 that would pose concern for livestock management include 50197, 50277, and 51547.

Cattle are creatures of habit and learn to use grazing areas based on forage preferences, time of year, ease of access, ease of movement, and repetition. If movement and distribution of livestock on the allotments are interrupted or blocked, cattle would have to be taught new routes to areas that they previously accessed. Consequently, some areas could become overgrazed while areas that were previously accessible could receive little-to-no use. This interruption in movement and distribution could take several years to overcome and, in some cases, areas previously grazed could become unusable based on loss of access.

Decommissioned roads that have been seeded would provide vegetation that may be used as forage by big game and livestock after the first year. Depending on the location of the roads

identified for each alternative, the decommissioning could draw livestock away from riparian areas by blocking or discouraging access.

The road construction identified under the action alternatives would not have a big effect on livestock grazing and movement because the roads are accessing timbered areas identified for harvest. A minimal amount of forage would be lost.

Use of roads identified to remain open would have minimal effect on livestock movement. Livestock on the allotments are used to vehicular traffic and generally will move out of the way of oncoming vehicles. The amount of traffic on these roads is not considered heavy.

3.13.4. Minimum Road System

Alternative 1 would not designate an MRS for the Project area. The MRS identified by each action alternative is needed for the protection, administration, and utilization of NFS lands and the use and development of their resources, while reflecting likely future funding. Decommissioning of roads would add short-term increases to the economy while reducing the need for long term maintenance. Alternative 3 decreases the MRS the greatest with the most decommissioning while Alternative 4 decreases the MRS the least and would require the most future maintenance. Reduction of NFS roads within the Project area would require temporary road construction in the future to provide access to develop resources. Alternative 3 would require the most future temporary road construction while Alternative 4 would require the least.

3.13.5. Cumulative Effects

The rangeland resource may be directly, indirectly, and cumulatively affected by projects proposed in the Project area. Although rangelands consist of timbered areas, riparian areas, shrublands, grasslands, and rocky scablands, the analysis of direct and indirect effects on the range resource focused on the condition of the nontimbered grasslands (strata 60) and shrublands (strata 70) on all NFS lands within the watershed. Therefore, the cumulative effects analysis also is focused on nontimbered grasslands and shrublands.

Past actions that have cumulatively affected rangeland resources in the watershed are described in Section 3.13.2.1. The subwatersheds have been actively managed for timber production in the past. The cumulative effects of this management have been to provide improved access for livestock movement. However, much of the older road system was constructed within riparian areas, which could have increased the level of use within these areas by livestock. Access to high country prior to range readiness has also increased as a result of timber sale roads. The old road system has contributed to increased levels of noxious weed infestations by providing a ready seedbed on the disturbed soil and by increasing the volume of vehicular traffic, which could introduce noxious weeds through the dispersal of seeds and plant parts that become affixed to the undercarriage of vehicles.

Decommissioning of roads in riparian areas could result in a decrease in livestock use of riparian areas in the short term (3–15 years). Cumulatively, this would lead to improved vegetative and soil conditions in situations where livestock are currently adversely affecting these resources.

Effects of implementing the action alternatives, when combined with effects from other past, present, and reasonably foreseeable actions and events, would not have any major adverse impacts on the rangeland resource. The action alternatives have indirectly been designed to improve rangeland conditions overall, whether it be by decommissioning roads in riparian areas or harvesting timber and opening up areas for foraging and livestock movement.

3.13.6. Forest Plan Consistency

Impacts to uplands, meadows, or riparian areas would be consistent with Forest Plan direction for rangeland resources (USDA Forest Service 2003a).

Noxious weed-control treatments are designed to meet Forest Plan Standards and Guidelines by preventing new infestations and controlling existing infestations. An integrated approach, considering all methods of treatment, would be implemented.

All action alternatives would be consistent with Forest Plan management direction for rangeland resources "To provide a sustainable level of forage, consistent with other resource management direction, through the Forest Service grazing permit system."

All action alternatives would be consistent with Forest Plan management direction for nonnative plants: "To primarily restrict noxious weed infestations to locations along roads, trails, river corridors, and air strips."

3.13.7. Irreversible and Irretrievable Commitment of Resources

Roads that are constructed would cause an irreversible and irretrievable commitment of some rangelands for forage production. The total amount of rangeland resources lost from road construction would be minimal. There would be a minimal decrease in the amount of forage available to wildlife or livestock.

Chapter 4 — List of Preparers, References, Glossary, and Acronyms

4.1. List of Preparers

Jon Almack	Wildlife (Wildlife Biologist)
Mary Bresee	Vegetation (Silviculturist)
Andy Bumgarner	Weeds and Range (Range Management Specialist)
Jane Cropp	Recreation, Roadless and Visuals (Recreation Staff Officer)
Jascha Zeitlin	Recreation (Recreation Specialist)
John Dixon	Soils (Soil Scientist)
Jennifer Dobb	Economics (Economist)
Henry Eichman	Economics (Economist)
Debbie Ellis	Vegetation (Timber Management Assistant)
Jonas Epstein	Economics (Economist)
Mark Fox	Team Leader (Environmental Coordinator)
Trisha Giambra	Fish (Fisheries Biologist)
Alma Hanson	Botany and Rare Plants (Forest Botanist)
Deliliah Jaworski	Socioeconomics (Social Scientist)
Dave LaChapelle	Fuels (Fuels Management Specialist)
Stephen Penny	Team Leader/GIS (Environmental Coordinator/ GIS Specialist)
Samuel Prentice	Soils (Soil Scientist)
Nikki Sandhoff	Economics (Economist)
Melanie Vining	Hydrology (Hydrologist)
Erik Whiteman	Cultural Resources (Archaeologist)
Jason Wright	Transportation (Engineer)
Becky Wroblewski	GIS Data Analysis and Cartography (Resource Information Specialist)

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4.3. List of Acronyms

°C	°Celsius
°F	°Fahrenheit
ACS	Aquatic Conservation Strategy
AIRFA	American Indian Religious Freedom Act
AOI	Annual Operating Instructions
AOP	Aquatic Organism Passage
APE	Area of Potential Effects
AqS	National Aquatic Survey
ARPA	Archaeological Resources Protection Act
ASQ	Allowable Sale Quality
ATV	All-Terrain Vehicle
BA/PL	Burned Areas/Plantations
BBER	Bureau of Business and Economic Research
BMP	Best Management Practice
CA	Core Area
CCF	Hundred Cubic Feet
CDC	Conservation Data Center
CEQ	Council on Environmental Quality
CFLR	Collaborative Forest Landscape Restoration
CT-ASP	Conifer Removal in Aspen Stands
CT-FT	Commercial Thin-Free Thin
CT-MP	Commercial Thin/Mature Plantations
CWA	Clean Water Act
CWD	Coarse Woody Debris
DBH	Diameter at Breast Height
DD	Detrimental Soil Disturbance
DEIS	Draft Environmental Impact Statement
DFC	Desired Future Conditions
DNA	Deoxyribonucleic Acid
ECA	Equivalent Clearcut Area
eDNA	Environmental DNA
EIS	Environmental Impact Statement

EO	Executive Order
ERU	Ecological Reporting Units
ESA	Endangered Species Act
FA	Functioning Appropriately
FEAST	Forest Economics and Analysis Spreadsheet Tool
FEIS	Final Environmental Impact Statement
FID	Fisheries Inventory Database
FR	Functioning at Risk
FRCC	Fire Regime Condition Class
FSH	Forest Service Handbook
FT-PC-MSw	Free Thin-Patch Cut-Modified Shelterwood
FUR	Functioning at Unacceptable Risk
FWS	Fish and Wildlife Service
GFSS	Grass/Forb/Shrub/Seedling
GIS	Geographic Information System
GRAIP	Geomorphic Road Analysis and Inventory Package
HRV	Historical Range of Variability
HUC	Hydrologic Unit Codes
ICB	Interior Columbia Basin
ICBEMP	Interior Columbia Basin Ecosystem Management Project
IDEQ	Idaho Department of Environmental Quality
IDFG	Idaho Department of Fish and Game
IDT	Interdisciplinary Team
IFPA	Idaho Forest Practices Act
IFWIS	Idaho Fish and Wildlife Information System
IPM	Integrated Pest Management
IRA	Inventoried Roadless Area
KEC	Key Environmental Correlates
KEF	Key Ecological Functions
KV	Knutson-Vandenburg Act
LAU	Lynx Analysis Unit
LCAS	Lynx Conservation Assessment and Strategy
LCBC	Lost Creek-Boulder Creek
LSI	Land System Inventory

LSP	Landslide Prone
LSQ	Low Site Quality
LWD	Large Woody Debris
MA	Management Area
MCCM	Mill Creek-Council Mountain
MIS	Management Indicator Species
MPC	Management Prescription Categories
MRS	Minimum Road System
MVUM	Motor Vehicle Use Map
MWMT	Maximum Weekly Maximum Temperature
NCT	Noncommercial Thinning
NEPA	National Environmental Policy Act
NFMA	National Forest Management Act
NFS	National Forest System
NFT	Nonforested Treatment
NHPA	National Historic Preservation Act
NRHP	National Register of Historic Places
NIDGS	Northern Idaho Ground Squirrel
NPV	Net Present Value
NRCS	National Resources Conservation Service
NRIS	Natural Resources Inventory System
NRM	Natural Resource Manager
NVUM	National Visitor Use Monitoring
OHV	Off-Highway Vehicle
OF	Old Forest
OML	Operational Maintenance Level
PCE	Primary Constituent Elements
PCT	Pre-Commercial Thinning
PCPI	Per Capita Personal Income
PDF	Project Design Feature
PEAT	Project Economic Analysis Tool
PFA	Post-Fledging Areas
PFC	Payette Forest Coalition
PFT	Prescribed Fire Treatments

PIBO	PACFISH/INFISH Biological Opinion
PM	Particulate Matter
PNC	Potential Natural Community
PNF	Payette National Forest
PR	Partial Retention
PVG	Potential Vegetation Group
RCA	Riparian Conservation Areas
RM	Roaded Modified
RMRS	Rocky Mountain Research Station
RN	Roaded Natural
RNA	Research National Area
ROD	Record of Decision
ROS	Recreation Opportunity Spectrum
RUIP	Recovery Unit Implementations Plans
SA	Elk Security Area
SFB	Shaded Fuelbreak
SHPO	State Historic Preservation Office
SINMAP	Stability Index Mapping
SOPA	Schedule of Proposed Actions
SOSI	Species of Special Interest
SPM	Semi-Primitive Motorized
SPNM	Semi-Primitive Non-Motorized
SWCP	Soil Water Conservation Practices
SWRA	Soil, Water, Riparian, and Aquatic
TAP	Travel Analysis Process
TE	Threatened and Endangered
TEPC	Threatened, Endangered, Proposed, Candidate (species)
TEPCS	Threatened, Endangered, Proposed, Candidate, Sensitive (species)
TES	Threatened, Endangered, Sensitive (species)
TMA	Timber Management Assistant
TMDL	Total Maximum Daily Load
TMO	Trail Management Objective
TPI	Total personal income
TSRC	Total Soil Resource Commitment

USDA	United States Department of Agriculture
USDI	United States Department of the Interior
USDOL	United States Department of Labor
UTV	Utility Terrain Vehicle
VQO	Visual Quality Objectives
VSS	Vegetation Structural Stages
WARS	Watershed and Aquatic Recovery Strategy
WBD	Watershed Boundary Dataset
WCF	Watershed Condition Framework
WCI	Watershed Condition Indicators
WLSH	Weiser-Little Salmon Headwaters Project
WMT	Wet Meadow Treatment
WUI	Wildland-Urban Interface

4.4. Glossary

303(d)—Section of the Clean Water Act that defines standards for State water quality. States are required to submit updated lists of water bodies that do not meet section 303(d) standards to the Environmental Protection Agency every 2 years. States must also develop plans for improving the water quality of listed water bodies with the goal of "delisting" them.

Air quality—The composition of air with respect to quantities of pollution therein; used most frequently in connection with "standards" of maximum acceptable pollutant concentrations.

Allotment (grazing)—Area designated for the use of a certain number and kind of livestock for a prescribed period of time.

Alternative—In an Environmental Impact Statement (EIS) or Environmental Assessment (EA), one of a number of possible options for responding to the purpose and need for action.

Analysis area—One or more areas grouped for purposes of analysis based on common impacts, effects, and social or economic factors.

Aquatic Conservation Strategy (ACS)—"A long-term strategy to restore and maintain the ecological health of watersheds and aquatic ecosystems contained within lands administered by National Forests," page B-48, Forest Plan, 2003 as amended.

Aspect—The direction a slope faces. A hillside facing east has an eastern aspect.

Beneficial use—An actual or potential use that may be made of the waters of the State that are protected against quality degradation. Beneficial uses contained in the State Water Quality Standards include domestic, agricultural, and industrial water supplies, recreation, aquatic life, and salmonid spawning.

Best Management Practice—Practices, techniques, or measures developed, as determined by the State of Idaho Division of Environmental Quality and identified in the State water quality management plan, that are determined to be the cost-effective and practicable means of preventing or reducing the amount of pollution generated by nonpoint sources to a level compatible with water quality goals (IAC-IDEQ 2007).

Biological Assessment (BA)—A document required by the Endangered Species Act, prepared by the Fisheries and Wildlife Biologists to determine the effects of the proposed Project on Federally listed fish and wildlife species, as well as species proposed for Federal listing, and designated and proposed critical habitat for listed species. The fisheries and wildlife BAs are usually prepared separately. Each document provides an official determination of effects for each species. Following review by the District Ranger and the Forest Fisheries or Wildlife Biologist, the BA is reviewed by the U.S. Fish and Wildlife Service (FWS) through a process called "consultation." The FWS can suggest changes to the project or concur with the biologists' determinations and mitigations.

Biological Evaluation (BE)—A document required by the Endangered Species Act, prepared by the Fisheries and Wildlife Biologists to determine if there are effects on listed species. If so, then a BA is completed. The BE also is used to determine the effects of the proposed project on Region 4 sensitive species and migratory bird species habitats.

Biological Opinion (BO)—A document resulting from formal consultation that states the opinion of USDI, Forest Service or NOAA fisheries as to whether a Federal action is likely to jeopardize the continued existence of listed species or its habitat.

Biomass—A renewable energy source, a biological material from living or recently living organisms such as wood, waste, (hydrogen) gas, and alcohol fuels. Relevant to this Project, biomass includes forest product material derived from woody material not meeting sawlog specifications that is typically chipped at landings and removed for burning in a plant that utilizes the energy produced during combustion for electricity generation. This material is typically tops of trees, branches, and cull material or trees smaller in diameter than those that meet sawtimber specifications (see Sawtimber).

Board foot—A measurement of wood equivalent to a board 1-foot square and 1 inch thick. Usually expressed in terms of thousand board feet (MBF) or million board feet (MMBF).

Broadcast burning—Burning forest fuels as they are, with no piling or windrowing.

Candidate species—Plant or animal species being considered for listing as endangered or threatened under the Endangered Species Act, in the opinion of the FWS or the National Marine Fisheries Service (NMFS). Category 1 candidate species are groups for which the FWS or NMFS has sufficient information to support listing proposals; category 2 candidate species are those for which available information indicates a possible problem but that need further study to determine the need for listing.

Canopy—The more-or-less continuous cover of branches and foliage formed collectively by the crown of adjacent trees and other woody growth.

Canopy closure—Canopy closure represents the total nonoverlapping crown closure of all trees in a stand, excluding the seedling tree size class. Trees in the seedling tree size class are used to estimate canopy closure class only when they represent the only structural layer present. Canopy closure classes are based on the following (USDA Forest Service 2003a):

- Low = 10–39% canopy closure
- Moderate = 40–69% canopy closure
- High = 70% or more canopy closure

Canopy cover—For the purposes of this document, canopy cover is used interchangeably with canopy closure.

Cavity—The hollow excavated in trees by birds or other natural phenomena that is used for roosting and reproduction by many birds and mammals.

Channel stability—The ability of a stream channel to resist the effects of natural- and human-caused disturbance.

Chain—A measurement of distance equivalent to 66 feet.

Climax conditions—The highest ecological development of a plant community capable of perpetuation under the prevailing climactic conditions.

Coarse woody debris (CWD)—Pieces of woody material having a diameter of at least 3 inches and a length greater than 6 feet (also referred to as large woody debris [LWD]).

Cold water biota—Animal and plant life that grows best in water temperatures below 18 °C.

Commercial thin—Any type of thinning that produces merchantable material at least equal to the value of the direct cost of harvesting.

Condition class—The degree of departure from historical fire regimes and vegetation characteristics. Condition Classes are a method to quantify the amount of area that has uncharacteristic or undesirable fire risk. Condition Class 1 shows no departure from historical fire regimes, Condition Class 2 shows moderate alterations, and Condition Class 3 shows the greatest amount of departure.

Corridor (landscape)—Landscape element that connects similar patches of habitat through an area with different characteristics. For example, streamside vegetation may create a corridor of willows and hardwoods between meadows or through a conifer forest.

Cover type—The current or existing vegetation of an area, which is determined by the dominant vegetation.

Critical Habitat—Endangered Species Act—Designated by the FWS or NMFS, specific areas within a geographical area occupied by a threatened or endangered species on which are found physical or biological features essential to conservation of the species. These areas may require special management consideration or protection and can also include specific areas outside the occupied area that are deemed essential for conservation.

Cultural resource—An object or definite location of human activity, occupation, or use identifiable through field survey, historical documentation, or oral evidence. Cultural resources are prehistoric, historic, archaeological, or architectural sites, structures, places, or objects and traditional cultural properties. Cultural resources include the entire spectrum of resources for which the Forest Service Heritage Program (see Heritage Program) is responsible, from artifacts to cultural landscapes without regard to eligibility for listing on the National Register of Historic Places (FSH 2309.12 (05)).

Cumulative effects—Impacts on the environment that result from the incremental impact of an action when added to other past, present, and reasonably foreseeable future actions. Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time.

Current condition—The present condition of a resource or resource area.

Cut slope—That portion of the slope that is excavated for road construction, trails, landings, or skidtrails.

Diameter at breast height (DBH)— The diameter of a tree measured 4 feet 6 inches above the ground, uphill side.

Decommission—see Road Decommissioning.

Degrade—To “degrade” is to measurably change a resource condition for the worse within an identified scale and time frame. Where existing conditions are within the range of desired conditions, degrade means to move the existing condition outside of the desired range. Where existing conditions are already outside the range of desired conditions, degrade means to change the existing condition to anything measurably worse. The term degrade can apply to any condition or condition indicator at any scale of size or time, but those scales need to be identified. This definition of degrade is not intended to define degradation for the State of Idaho as it applies to its Antidegradation Policy (IDAPA 16.01.02.051).

Demographic—Related to the vital statistics of human populations (size, density, growth, distribution, etc.).

Denning habitat or sites—Habitat and locations used by mammals during reproduction and rearing of their young, when the young are highly dependent on adults for survival.

Desired Condition (DC)—Also called Desired Future Condition, a portrayal of the land, resource, or social and economic conditions that are expected in 50–100 years if management goals and objectives are achieved; a vision of the long-term conditions of the land.

Detrimental soil disturbance (DD)—The alteration of natural soil characteristics that results in immediate or prolonged loss of soil productivity and soil-hydrologic conditions. Detrimental disturbance can occur from soil that has been displaced, compacted, puddled, or severely burned.

Disturbance—Any event, such as wildfire or a timber sale, that alters the structure, composition, or function of an ecosystem.

Ecosystem—A naturally occurring, self-maintained system of living and nonliving interacting parts that are organized into biophysical and human dimension components.

Ecosystem health—A condition where the components and functions of an ecosystem are sustained over time and where the system's capacity for self-repair is maintained, such that goals for ecosystem uses, values, and services are met.

Effective cover— (in Forest Plan glossary, listed as "effective ground cover")—Vegetation, litter, and rock fragments larger than 0.75 inch in diameter. Expressed as the percentage of material, other than bare ground, covering the land surface. May include live vegetation, standing dead vegetation, litter, cobble, gravel, stones, and bedrock. This cover helps prevent soil erosion.

Endangered species—Designated by the FWS or the National Oceanic and Atmospheric Administration Fisheries, in accordance with the Endangered Species Act, an animal or plant species, or critical habitat, that has been given Federal protection status because it is in danger of extinction throughout all or a significant portion of its natural range.

Endemic—A plant or animal native to the local area.

Environmental Impact Statement (EIS)—A document required of Federal agencies by the National Environmental Policy Act for major projects or legislative proposals significantly affecting the environment. A tool for decision-making, it describes the positive and negative effects of the undertaking and analyzes alternative actions.

Ephemeral stream—A stream or portion of a stream that flows only in direct response to precipitation or run-off events and that receives little or no continuous water from springs, snow, or other sources. Unlike intermittent streams, an ephemeral stream usually does not have a defined stream channel or banks, and its channel is at all times above the water table.

Equivalent clearcut area (ECA)—The unit of measurement relating to modifications due to forest management. It includes areas harvested, cleared (e.g. landings or roads), or burned. The unit is modified to consider silvicultural systems, regeneration, and location within the watershed.

Erosion—This includes processes of weathering, solution, corrosion, and transportation of earth and rock materials. The forces involved may be water, ice, wind, and/or gravity.

Executive Order (EO)—Executive orders are official documents, numbered consecutively, through which the President of the United States manages the operations of the Federal government.

Family—A collection of focal species that share similarities in source habitats, with the similarities arranged along major vegetative themes.

Fill—Earth or rock moved during road construction and used to build up portions of the roadway.

Fill slope—The sloping earth surface on the downhill side of a road resulting from roadway excavation.

Fine fuels—Cured grasses, leaves, needles, twigs, and small branches that ignite easily and carry fire rapidly.

Firefighter effectiveness—The ease at which firefighters are able to suppress a fire, based on the flame lengths and rates of spread, which are dependent on the fuel loading and horizontal and vertical continuity of the fuels.

Fire regimes—The characteristics of fire in a given ecosystem, including factors such as frequency, intensity, severity, and patch size. The terms used for the different fire regimes are: nonlethal, mixed1, mixed2, and lethal. See table below for description.

Fire Regime	Fire Interval	Fire Intensity	Vegetation Patterns (Agee 1998)
Nonlethal	5–25 years	Low: 10% mortality or less	Relatively homogenous with small patches generally <1 acre of different seral stages, densities, and compositions created from mortality
Mixed1	5–70 years	Low-to-moderate: 10–50% mortality	Relatively homogenous with patches created from mortality ranging in size from <1 to 600 acres of different seral stages, densities, and compositions
Mixed2	70–300 years	Moderate-to-high: 50–90% mortality	Relatively diverse with patches created by mixes of mortality and unburned or underburned areas ranging in size from <1 to 25,000 acres of different seral stages, densities, and compositions
Lethal	100–400 years	High: over 90% mortality	Relatively homogenous with patches sometimes >25,000 acres of similar seral stages, densities, and compositions. Small inclusions of different seral stages, densities, and compositions often result from unburned or underburned areas.

Fire intensity—The effects of fire on the above-ground vegetation, generally described in terms of mortality.

Fire return interval—The average time between wildfires in a given ecosystem.

Fire Return Interval Departure (FRID) —is defined as the based on the historical fire return interval (the historical interval between fires, in years) for the vegetation type of interest and the years that have elapsed since the last fire. From maps of where and when past fires have occurred, average fire return intervals for each vegetation type class can be determined. Average fire return intervals combined with years that have elapsed since the last fire can be used to derive an index to calculate the departure of an area from its average fire return interval. (The University of Arizona 2005, Fire Return Interval Departure.)

Fire scar—A healing or healed-over injury caused or aggravated by fire on a woody plant.

Fire severity—Fire effects at and below the ground surface. Describes the impacts to organic material on the ground surface, changes to soils, and mortality of below-ground vegetative buds, roots, rhizomes, and other organisms.

Focal species—Species that represent the varying characteristics of a landscape's attributes that must be represented in the landscape.

Forage—Plant material (usually grasses, forbs, and brush) that is available for animal consumption.

Forbs—Broadleaf ground vegetation with little or no woody material.

Forest Plan—In this document, the Payette National Forest Land and Resource Management Plan (Forest Service 2003a).

Forest Road—As defined in Title 23, Section 101 of the United States code, any road wholly or partly within, or adjacent to, that serves the National Forest System (NFS) and that is necessary for the protection, administration, and utilization of the NFS and the use and development of its resources (Forest Plan page GL-15).

Forest Vegetation Simulator (FVS) —A model used to compare changes in stand growth, tree mortality, and average diameters over time.

Fragmentation—The splitting or isolation of habitat into smaller patches because of human actions. Habitat can be fragmented by management activities such as timber harvest and road construction, and changes such as agricultural development, major road systems, and reservoir impoundments.

Fuel—Any substance or composite mixture susceptible to ignition and combustion.

Fuel loading—The weight per unit area of downed woody material (Brown et al. 1982).

Fuels Management Analyst (FMA) Plus—A computer modeling program used to predict and model fire behavior. Inputs include weather conditions, stand data, and fuel models.

Fuel model—A set of numerical values that describe a fuel type for the mathematical model that predicts spread rate and intensity. The parameters that can be varied in a fuel model are: loading, surface area-to-volume ratio, fuel bed depth, and heat content of fuel and moisture of extinction.

Fuel moisture—The amount of moisture in the fuel. Dead fuels can absorb or lose moisture from the air. Small-diameter fuels can change in moisture content rapidly because they have large surface area compared to their volume.

Fuel profile—The properties that describe wildland fuel including chemistry, compaction, continuity, loading, moisture content, and size. The fuel profile consists of aerial fuels as well as surface and ground fuels.

Fuel treatment—The rearrangement or disposal of natural or activity fuels to reduce the fire hazard. Fuels are defined as both living and dead vegetative materials consumable by fire.

Fuelbreak—Areas manipulated for the common purpose of altering surface fuels, decreasing ladder fuels, and reducing tree densities (opening the tree canopy) to reduce the risk of uncharacteristic wildfire and the potential for crown fire (adapted from Agee et al. 2000).

Geographic Information System (GIS)—A computer system that stores and uses spatial (mapable) data.

Goal—As Forest Plan management direction, a goal is a concise statement that helps describe a desired condition, or how to achieve that condition. Goals are typically expressed in broad, general terms that are timeless, in that there are no specific dates by which the goals are to be achieved. Goal statements form the basis from which objectives are developed.

Granitics—Soils derived from granite. Pertaining to relatively coarse-grained, light-colored rocks.

Ground cover—All vegetative material within 3 feet of the exposed soil surface, as well as any additional litter, rock, and rock fragments that are in contact with the soil surface.

Ground fire—A fire that burns the organic material in the upper soil layer (DeBano et al. 1998).

Guideline—As Forest Plan management direction, a guideline is a preferred or advisable course of action generally expected to be carried out. Deviation from compliance does not require a Forest Plan amendment (as with a standard), but rationale for deviation must be documented in the project decision document.

Habitat—A place that provides seasonal or year-round food, water, shelter, and other environmental conditions for an organism, community, or population of plants or animals.

Habitat family—See family.

Habitat security—The protection inherent in any situation that allows big game to remain in a defined area despite an increase in stress or disturbance associated with the hunting season or other human activity. The components of security may include, but are not limited to: vegetation, topography, road density, general accessibility, hunting season timing and duration, and land ownership. Habitat security is area specific, while hiding cover (see definition below) is site specific.

Habitat type—The aggregate of all areas that support or can support the same primary vegetation at climax.

Harvest—Removal of timber (or a portion of an animal population) to achieve a desired condition.

Herbaceous—Referring to grasses and small annual and perennial plants.

Heritage Program—The comprehensive Forest Service program of responsibilities related to historic preservation. The purpose of the Heritage Program is to manage prehistoric and historic cultural resources for the benefit of the public through preservation, public use, and research. (FSM 2360.5)

Hiding cover—Vegetation capable of hiding 90% of a standing adult ungulate (deer, elk, moose) from the view of a human at a distance equal to or less than 200 feet; generally, any vegetation used by ungulates for security or to escape from danger.

Historic Properties—36 CFR 800.16 defines historic properties as "any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places. This term includes artifacts, records, and remains that are related to and located within such properties. The term includes properties of traditional religious and cultural importance to an Indian tribe or Native Hawaiian organization and that meet the National Register criteria." (FSM2360.5)

Historical Range of Variability (HRV)—The natural fluctuation of healthy ecosystem components over time. In this document, HRV refers to the range of conditions and processes that likely occurred prior to settlement of the area by people of European descent (around the mid 1800s), and that would have varied within certain limits over time.

Home range—The area that an animal habitually uses during nesting, resting, bathing, foraging, and roosting.

Hydrologic—Refers to the properties, distribution, and effects of water. "Hydrology" is the study of water; its occurrence, circulation, distribution, properties, and reactions with the environment.

Hydrologic Unit Code (HUC)—A hierarchal coding system developed by the U.S. Geological Service to map geographic boundaries of watersheds of various sizes.

Interdisciplinary Team (IDT)—A team of individuals with skills from different disciplines that focus on the same task or project.

Idaho Batholith—A great mass of intruded igneous rock that is primarily granite and covers much of central Idaho.

Indicator—In effects analysis, a way or device for measuring effects from management alternatives on a particular resource or issue.

Indirect effects—Impacts caused by an action but occurring later in time or farther removed in distance.

Insignificant effect—An insignificant effect is one that cannot be detected, measured, or evaluated in any meaningful way.

Intermittent stream—A stream or portion of a stream that flows only in direct response to precipitation or seasonal run-off and that receives little or no water from springs or other permanent sources. Unlike ephemeral streams, an intermittent stream has a well-defined channel and banks, and it may seasonally be below the water table.

Irretrievable commitments—Losses of production or use for a period of time. An example is suited timberland being used for a skid trail. Timber growth on the land is irretrievably lost while the land is a skid trail, but the timber resource is not irreversibly lost because the land could grow trees again in the near future.

Irreversible commitments—Permanent or essentially permanent resource uses or losses that cannot be reversed, except in the extreme long term. Examples include minerals that have been extracted or soil productivity that has been lost.

Issue—A public or agency concern about a specific action or area that is addressed during the National Environmental Policy Act process.

Juxtaposition—The position of being side by side or close together. Relative position of forage, cover, and other important habitat components for big game.

Key Ecological Functions (KEF)—The set of ecological roles performed by a species in its ecosystem. These ecological roles are the main ways organisms use, influence, and alter their biotic and abiotic environments.

Key Environmental Correlates (KEC)—Biotic or abiotic habitat elements that species use on the landscape to survive and reproduce.

Knutson-Vandenburg Act (KVA)—In 1930 Congress passed the Knutson-Vandenburg Act to authorize collection of funds (KV Funds) for reforestation and timber stand improvement on areas cut over following a timber sale. Funds are to be used to protect and improve the future productivity of renewable resources on timber sale areas.

Ladder fuels—Continuous vertical vegetation that connects surface fuels to the crown fuels of overstory trees, forming a ladder by which a fire can spread into tree or shrub crowns (DeBano et al. 1998).

Landform—A natural feature of the land surface such as a mountain, valley, or ridge.

Landing—A location (usually cleared and level) where logs are stored or loaded onto logging trucks for transport.

Landslide prone (LSP)—Land that has a probability of mass movement greater than or equal to 10% during a period of 100 years.

Landtype—A portion of the landscape resulting from geomorphic and climatic processes with defined characteristics having predictable soil, hydrologic, engineering, productivity, and other behavior patterns.

Landtype associations—A grouping of landtypes similar in general surface configuration and origin.

Level I Maintenance—These are roads that have been placed in storage between intermittent uses. The period of storage must exceed 1 year. Basic custodial maintenance is performed to prevent damage to adjacent resources and to perpetuate the road for future resource management needs. Emphasis is normally given to maintaining drainage facilities and runoff patterns. Planned road deterioration may occur at this level. Appropriate traffic management strategies are “prohibit” and “eliminate” all traffic. These roads are not shown on motor vehicle use maps. Roads receiving level 1 maintenance may be of any type, class, or construction standard, and they may be managed at any other maintenance level during the time they are open to traffic. However, while being maintained at level 1, they are closed to vehicular traffic but may be available and suitable for non-motorized uses (FSH 7709.59).

Long-term—For environmental effects, greater than 15 years. See short term and temporary.

Long-term road closure—Roads currently in or converted to maintenance level 1 and receiving treatments to keep damage to adjacent resources to a minimum and to perpetuate the road to facilitate future management activities. These roads are identified as not needed for project use for more than 15 years. Closure activities could include removing man-made drainage structures, restoring stream channels and banks, providing for drainage (waterbars), scarifying, seeding, and fertilizing.

Lop and scatter—When branches are cut from fallen trees and scattered over the area rather than piled for burning. This allows the slash to lie close to the ground to reduce the fire hazard and accelerate decomposition.

Maintain—When used in a management goal or objective for biological and physical resources, "maintain" means to stay within the range of desired conditions.

The context is that resource conditions are already within their desired range, and the expectation is that management actions to achieve goals or objectives maintain resource conditions within their desired range in the planning period.

When used in a standard or guideline for biological and physical resources, maintain means that current conditions are neither restored or degraded, but remain essentially the same. The context is that resource conditions may or may not be in their desired range, and the expectation is that maintenance management actions do not degrade or restore current conditions.

This is an important distinction because most goal or objective management actions cannot be designed to achieve desired conditions for all resources. Specific actions are designed to achieve desired conditions for specific resources, but may simultaneously have effects on those or other resources. The intent behind maintain when used in a standard or guideline is to keep those effects from degrading resource conditions (i.e., moving conditions from functioning properly to functioning at risk or making conditions measurably worse when they are currently functioning at risk or not functioning properly). See definitions for degrade and restore in this Glossary.

For Recreation, Scenic Environment, Heritage, Lands, Special Uses, and Wilderness resources, maintain means to continue a current or existing practice, activity, management strategy, resource condition, or level of use.

For physical improvements managed under the Roads and Facilities programs, maintain means to keep the road or facility in a usable condition.

For resource inventories, databases, plans, maps, or other documents related to all resources, maintain means to periodically update these items to reflect current conditions and/or status.

Management Area—A land area with similar management goals and a common prescription, as described in the Forest Plan Forest Service 2003a).

Management direction—Activities that must be carried out to meet the goals of agency management.

Management Indicator Species (MIS)—Representative species whose habitat conditions or population changes are used to assess the impacts of management activities on similar species in a particular area. MIS are generally presumed to be sensitive to habitat changes.

Management Prescription Category (MPC)—Management prescriptions are defined as, "Management practices and intensity selected and scheduled for application on a specific area to attain multiple use and other goals and objectives" (36 CFR 219.3). MPCs are broad categories of management prescriptions that indicate the general management emphasis prescribed for a given area. They are based on Forest Service definitions developed at the national level, and represent management emphasis themes, ranging from Wilderness (1.0) to Concentrated Development (8.0). The national MPCs have been customized during Forest Plan revision to better fit the needs and issues of the Southwest Idaho Ecogroup Forests.

Market value—The price that timber and wood products would bring if sold today.

MBF and MMBF—One thousand board feet and one million board feet, respectively.

Merchantable (timber)—Trees or stands of size and quality suitable for marketing and utilization.

Mitigation—Actions to avoid, minimize, reduce, eliminate, or rectify the impact of a management practice.

Mixed conifer—Stands on the PNF composed primarily of ponderosa pine, Douglas-fir, and grand fir.

Monitoring—The process of collecting information to evaluate whether objectives and anticipated results of a management plan are being realized or implementation is proceeding as planned.

Mortality (stand)—The number or volume of trees that died because of fire, insects, disease, climatic factors, or competition from other trees or vegetation.

National Environmental Policy Act (NEPA)—The National Environmental Policy Act of 1969, which requires environmental analysis and public disclosure of Federal actions.

National Fire Plan (NFP)—Strategic and implementation goals, budget requests and appropriations, and agency action plans to address severe wildland fires, reduce fire impacts on rural communities, and ensure effective firefighting capability in the future.

National Forest Management Act (NFMA)—A law passed in 1976 as an amendment to the Forest and Rangeland Renewable Resources Planning Act requiring the preparation of Regional Guides and Forest Plans and the preparation of regulations to guide that development.

National Register of Historic Places (NRHP)—A list of cultural resources that have local, State, or national significance maintained by the Secretary of the Interior.

Native species—Animals or plants that originated in the area in which they live. Species that normally live and thrive in a particular ecosystem.

Natural fuel—The combustible material resulting from natural processes and not directly generated or altered by land management practices.

New road construction—Activity that results in the addition of forest classified or temporary road miles (36 CFR 212.1). This is the definition included in the Forest Plan (Forest Service 2003a); however, this CFR has been superseded.

Nonpoint pollution—Pollution that emanates from diffuse and intermittent sources.

Noxious weed—A State-designated plant species that causes negative ecological and economic impacts to both agricultural and other lands within the State.

Objective—As Forest Plan management direction, an objective is a concise time-specific statement of actions or results designed to help achieve goals. Objectives form the basis for project-level actions or proposals to help achieve Forest goals. The time frame for accomplishing objectives, unless otherwise stated, is generally considered to be the planning period, or the next 10–15 years. More specific dates are not typically used because achievement can be delayed by funding, litigation, environmental changes, and other influences beyond the Forest's control.

Open road density—Miles of open road per square mile.

Opening (created)—Related to vegetation management, openings are created only by planned, even-aged, regeneration timber harvesting. Only those even-aged timber harvest practices that reduce stocking levels to less than 10% create openings. Canopy closure will normally be used to determine stocking levels. Residual stands of mature trees will generally have less than 10% stocking when fewer than 10–15 trees per acre remain following harvest.

Overstory—That portion of the trees, in a forest of more than one story, forming the upper or uppermost canopy.

Overstory removal—Removal of most or all of the trees forming the uppermost canopy in a two- or multistoried stand. The remaining trees are of good quality and will be managed as the next crop of trees on the site.

Perennial stream—A stream that typically maintains year-round surface flow, except possibly during extreme periods of drought. A perennial stream receives its water from springs or other permanent sources, and the water table usually stands at a higher level than the floor of the stream.

Potential Vegetation Group (PVG)—Potential vegetation types grouped on the basis of a similar general moisture or temperature environment.

Prescribed fire—Any fire ignited by management actions to meet specific objectives.

Private Road—A road located on private land within the NFS boundary.

Project area—The area bounding all management activities associated with a project. This area is greater than the total acres treated; some analysis of effects on resources may be appropriate at this scale and others may occur at the activity area level and not include the entire project area.

Proposed action—A proposal made by the Forest Service or other Federal agency to authorize, recommend, or implement an action to meet a specific purpose and need.

Proposed species—Species that are proposed to the FWS for threatened or candidate status.

Proposed endangered—Taxa proposed to be listed as endangered.

Proposed threatened—Taxa proposed to be listed as threatened.

Recontour—Reestablish the natural slope of the land where a road has been located. This may involve pulling the fill material up onto the road surface and/or bringing in material to replace the material that was removed to build the road.

Recreation Opportunity Spectrum (ROS)—A framework for stratifying and defining classes of outdoor recreation environments, activities, and experience opportunities. The settings, activities, and opportunities for obtaining experiences are arranged along a continuum or spectrum divided into six classes: primitive, semi-primitive non-motorized, semi-primitive motorized, roaded natural, rural, and urban.

Reforestation—The natural or artificial restocking of an area with Forest trees.

Regeneration—The renewal of a tree crop, whether by natural or artificial means. Also, the young crop itself, which commonly is referred to as reproduction.

Restore—For biological and physical resources, restore means to repair, reestablish, or recover ecosystem functions, processes, or components so that they are moving toward or within their range of desired conditions. For the recreation, scenic environment, heritage, lands, special uses, wilderness, roads and facilities resources, restore means to use management actions to reestablish desired resource conditions.

Revegetation—The reestablishment of plant cover, either naturally or by manually seeding.

Riparian—Relating to the banks of natural watercourses such as rivers or streams.

Riparian Conservation Areas (RCAs)—Portions of watersheds where riparian-dependent resources receive primary emphasis and management activities are subject to specific goals, objectives, standards, and guidelines. The RCAs include traditional riparian corridors, perennial and intermittent streams, wetlands, lakes, springs, reservoirs, and other areas where proper riparian functions and ecological processes are crucial to maintenance of the area's water, sediment, woody debris, nutrient delivery system, and associated biotic communities and habitat.

Ripping—Breaking up a compacted surface to a depth of at least 16 inches.

Road—A motor vehicle travelway over 50 inches wide, unless designated and managed as a trail. A road may be classified, unclassified, or temporary.

Road construction—see New road construction.

Road decommissioning—Activities that result in the stabilization and restoration of unneeded roads to a more natural state (36 CFR 212.1, FSM 7703). Decommissioning for this Project is based on achieving ecological restoration objectives and includes the following:

- Reestablishing former drainage patterns, stabilizing slopes, and restoring vegetation;
- Blocking entrance, removing culverts, reestablishing drainages, removing unstable fills, pulling back road shoulders, and scattering slash on the roadbed; and
- Completely eliminating the roadbed by restoring natural contours and slopes.

Road maintenance—The ongoing upkeep of a road necessary to retain or restore the road to the approved road-management objective.

Road reconstruction—Activity that results in improvement or realignment of an existing classified road as defined below:

- Road improvement—Activity that results in an increase of an existing road's traffic service level expansion of its capacity or a change in its original design function.
- Road realignment—Activity that results in a new location of an existing road or portions of an existing road and treatment of the old roadway.

Road Obliteration—See Road Decommissioning. For this Project the terms are used synonymously.

Sawtimber—Trees containing at least one 8-foot sawlog with a top diameter of 6 inches and meeting regional specifications for freedom from defect.

Scale—Defined in this framework as geographic extent; for example, region, subregional, or landscape scale.

Scarification—Exposing or roughing mineral soil surface for better seed germination.

Scoping—The process the Forest Service uses to determine, through public involvement, the range of issues that the planning process should address.

Seasonally open road—Roads open to motorized use on a seasonal basis (e.g., closed during hunting season).

Section 106 review—A review required by the National Historic Preservation Act to determine effects of a Federal action on cultural resources.

Section 7 Consultation—Consultation required by the Endangered Species Act with the appropriate jurisdictional agency for a listed species.

Sediment—Any solid material (mineral and organic) that has been moved to a water body and is being transported or has been deposited.

Sensitive species—A Forest Service or Bureau of Land Management designation. Sensitive plant and animal species are selected by the Regional Forester or the Bureau of Land Management State Director because population viability may be a concern, as evidenced by a current or predicted downward trend in population numbers or density or a current or predicted downward trend in habitat capability that would reduce a species' existing distribution. Sensitive species are not addressed in or covered by the Endangered Species Act.

Seral—The unique characteristics of a biotic community that is a developmental, transitory stage in an orderly ecological succession involving changes in species, structure, and community processes with time.

Short term—For environmental effects, greater than 3 to less than 15 years. See temporary and long term.

Short-term road closure—Roads placed in maintenance level 1 and closed to vehicular traffic for greater than 1 year. Basic custodial maintenance is performed to keep damage to adjacent resources to an acceptable level and to perpetuate the road to facilitate future management activities. Emphasis is normally given to maintaining drainage facilities and runoff patterns.

Silvicultural prescription—The method selected to manage a forest stand. Silvicultural prescriptions are broken into broad types, including even aged and uneven aged. Even aged prescriptions include clearcut, seed tree, and Shelterwood. Uneven aged prescriptions include individual tree selection and group selection. Other nonregeneration prescriptions include thinning and sanitation/salvage cuttings.

Silviculture—The care and tending of stands of trees to meet specific objectives.

Site potential tree height—For delineating RCAs, a site potential tree height is the height that a dominant or codominant tree within a stand is expected to attain at an age of 200 years. Outside of RCAs, a site potential tree height is the average height that the dominant or codominant tree within a stand will attain within 100 years.

Site preparation—A general term for removing unwanted vegetation, slash, roots, and stones from a site before reforestation.

Skid trail—A route used by loggers to drag logs from stump to landing.

Skidding—A loose term for hauling trees by sliding, not on wheels, from stump to roadside, deck, skidway, or other landing.

Skyline logging—A logging system using steel cable, a tower, and a powered winch to elevate logs from their position in the woods and carry them suspended to a point where they can be loaded on to trucks.

Slash—The residue left on the ground after timber cutting and/or accumulation as a result of storm, fire, or other damage. It includes logs, uprooted stumps, broken or uprooted stems, branches, twigs, leaves, bark, and chips.

Slash filter windrow—Woody debris placed along a slope to trap and hold sediment coming off a hill or road above.

Snag—Standing dead tree.

Soil compaction—Where one or more of the following conditions occurs in relation to natural soil conditions: a 50% reduction in macropore space; less than 15% macropore space, total; 15% increase in soil bulk density; or a 40% reduction in hydraulic conductivity.

Soil erosion—Soil erosion is the detachment and transport of soil particles or aggregates by wind, water, or gravity. Management practices may increase soil-erosion hazard when they remove ground cover and detach soil particles.

Soil productivity—Soil productivity includes the inherent capacity of a soil under management to support the growth of specified plants, plant communities, or a sequence of plant communities. Soil productivity may be expressed in terms of volume or weight/unit area/year, percent plant cover, or other measures of biomass accumulation.

Source habitat—Source habitats are those characteristics of macrovegetation (i.e., cover types and structural stages) that contribute to stationary or positive population growth for a species in a specified area and time (Wisdom et al. 2000).

Species composition—The different tree species within a stand, usually expressed as a percentage within each age class.

Stand—An aggregation of trees or other vegetation occupying a specific area and sufficiently uniform in composition (species), age arrangement, and condition as to be distinguishable from the Forest or other vegetation of land cover on adjoining areas.

Stand density—A measure of how crowded a stand is. Measures of density include: trees per acre, square feet of basal area, stand density index (SDI), and percent of maximum SDI.

Stand initiation—A stage of stand development following a disturbance when new individuals and species continue to appear for several years (Oliver and Larson 1996).

Stand structure—The different sizes and ages of trees within a stand.

Standard—As Forest Plan management direction, a standard is a binding limitation placed on management actions. It must be within the authority and ability of the Forest Service to enforce. A project or action that varies from a relevant standard may not be authorized unless the Forest Plan is amended to modify, remove, or waive application of the standard.

State Historic Preservation Officer (SHPO)—A person appointed by a State's Governor to administer the State Historic Preservation Program.

Strata—Groups of stands that are relatively homogeneous in age, productivity, and density.

Structure—The size and arrangement, both vertically and horizontally, of vegetation.

Stumpage—Value of timber as it stands uncut in the woods.

Substrate—The composition of a streambed, including mineral and organic materials.

Subwatershed—An area of land that drains to a common point. A subwatershed is a smaller subdivision of a watershed but is larger than a drainage or site. Subwatersheds are often synonymous with 6th field hydrologic units, which are nested within larger watersheds (5th field hydrologic units) and comprised of smaller drainages, sites, and stream reaches.

Succession—The replacement in time of one plant community with another. The prior plant community (or successional stage) creates conditions that are favorable for the establishment of the next stage. These changes often occur in a predictable order. More specifically, the gradual and natural progression in composition and structure of an ecosystem toward a climax condition or stage.

Successional stage—A stage or recognizable condition of a plant community that occurs during its development from bare ground to climax.

Summer range—The area essential for big game to carry out their reproductive cycles.

Surface erosion—The wearing away of the land surface by running water or wind.

Surface fire—A fire that burns only surface fuels (DeBano et al. 1998).

Sustainability—The ability to maintain a desired condition or flow of benefits over time.

System roads (also termed classified roads)—Roads wholly or partially within or adjacent to NFS lands that are determined to be needed for long-term motor vehicle access. System roads can include State roads, county roads, privately owned roads, NFS roads, and other roads authorized by the Forest Service.

Temporary—For environmental effects, 0 to 3 years. See short term and long term.

Temporary road—A road authorized by contract, permit, lease, other written authorization, or emergency operation that is not intended to be a part of the forest transportation system, that is not necessary for long-term resource management, that is not a forest road or a forest trail, and that is not included in a forest transportation atlas (36 CFR 212.1).

Thinning—A cultural treatment made to reduce stand density of trees primarily to improve growth, enhance forest health, or recover potential mortality (Helms 1998). Types of thinning include the following:

- Crown thinning—the removal of trees from the dominant and codominant crown classes in order to favor the best trees of those same crown classes (synonym thinning, above).

- Free thinning—The removal of trees to control stand spacing and favor desired trees, using a combination of thinning criteria without regard to crown position.
- Low thinning—The removal of trees from the lower crown classes to favor those in the upper crown classes—synonym thinning from below.

Threatened species—Designated by the FWS or National Oceanic and Atmospheric Fisheries in accordance with the Endangered Species Act, a plant or animal species, or critical habitat, given Federal protection because it is likely to become endangered throughout all or a significant portion of its range within the foreseeable future.

Timber sale contract—The binding document between the Forest Service and timber purchaser that states, among other things, how the sale will be logged.

Timber Stand Improvement (TSI)—An intermediate treatment made to improve the composition, structure, condition, health, and growth of even or uneven aged stands.

Total Maximum Daily Load (TMDL)—The sum of waste load allocations for point sources, nonpoint sources, natural background, and a margin of safety. A TMDL specifies the amount of a pollutant that needs to be reduced to meet water quality standards set by the State. TMDL is used in a process to attain water quality standards that (1) identifies water quality problems and contributing pollutant sources, (2) allocates pollution-control responsibilities among sources in the watershed, and (3) provides a basis for taking actions needed to restore a water body.

Total Soil Resource Commitment (TSRC)—A measure of how much land in a project area is converted to a nonproductive condition (less than 40% of natural productivity rates) for 50 years or more. Examples are permanent skid trails, landings, roads, campgrounds, administrative sites, and recreational trails.

Tractor logging—Any logging method that uses a tractor as the motive power for transporting logs from the stumps to a collecting point, whether by dragging or carrying the logs.

Unauthorized Road or Trail—Roads on NFS lands that are not managed as part of the forest transportation system, such as unplanned roads, abandoned travelways, and off-road vehicle tracks that have not been designated and managed as trails. Nonsystem roads also include those roads that were once under permit or other authorization and were not decommissioned upon the termination of the authorization (36 CFR 212.1).

Uncharacteristic wildfire—A wildland fire that causes fire behavior and/or effects that are not within the historical fire regime for a given area. This may include fire intensity, severity, size, and landscape patterns.

Underburn—A light broadcast burn under an existing forest canopy. A fire prescribed to reduce fuels without damaging existing trees.

Undesirable wildland fire—An unwanted wildland fire. This type of fire differs from an uncharacteristic fire in that it may or may not be within its natural fire regime but, due to social or political reasons, it is not desired in a given area at a given time under certain circumstances.

Understory—The trees and other woody species growing under a more-or-less continuous cover of branches and foliage formed collectively by the upper portion of adjacent trees and other woody growth.

Viability—The ability of wildlife or plant populations to maintain a sufficient size so that it persists over time in spite of normal fluctuations in numbers. Viability is usually expressed as a probability of maintaining a specific population for a specified period.

Viable population—A population that is regarded as having the estimated numbers and distribution of reproductive individuals to ensure that it will continue to exist over time and will be well distributed within a given area.

Visual Quality Objective (VQO)—Categories of acceptable landscape alteration measured in degrees of deviation from the natural-appearing landscape. The categories include preservation, retention, partial retention, modification, and maximum modification.

Water quality—Refers to the chemical, physical, or biological characteristics that describe the conditions of a river, stream, or lake.

Water Quality Limited Segment (WQLS)—A stretch or area of surface water where technology-based controls are not sufficient to prevent violations of water-quality standards. In such cases, new permit limitations are based on ambient-water-quality considerations.

Waterbar—An earthen barrier across a road or skidtrail used to divert water and reduce erosion. It is usually designed to allow limited vehicle passage.

Watershed—The entire land area that contributes water to a drainage system or stream.

Watershed Condition Indicator (WCI)—An integrated suite of aquatic (including biophysical components), riparian (including riparian-associated vegetation species), and hydrologic (including uplands) condition measures that are intended to be used at a variety of watershed scales. They assist in determining the current condition of a watershed and should be used to help design appropriate management actions or to alter or mitigate proposed and or ongoing actions to move watersheds toward desired conditions. WCIs represent a diagnostic means to determine factors of current condition and assist in determining future conditions associated with implementing management actions or natural restoration over time.

West Zone (of the Payette National Forest)—Council and Weiser Ranger Districts, Payette National Forest, Idaho.

Wet Meadow—A type of marsh that commonly occurs in poorly drained soils. These wetlands, which often resemble grasslands, are typically drier than other marshes except during periods of seasonal high water. For most of the year wet meadows are without standing water, though the high water table allows the soil to remain saturated. A variety of water-loving grasses, sedges, rushes, and wetland wildflowers proliferate in the highly fertile soil of wet meadows.

Whole-tree yarding—Method of tree harvest where felled trees are yarded or skidded to landing locations with top and limbs intact. Trees are then limbed, topped, and bucked at the landing, and associated slash is then treated at the landing.

Wildland fire or wildfire—Any fire not involving a home or other structure, other than prescribed fire, that occurs in the wildland.

Wildland/Urban Interface (WUI)—For at risk communities that have not yet designated their WUI as part of a community wildfire protection plan, the Healthy Forests Restoration Act has a default definition of WUI (section 101 (16)(B(ii). It is an area extending 0.5 mile from the boundary of an at-risk community. The line, area, or zone where structures and other human developments meet or intermingle with undeveloped wildland or vegetative fuel.

Yarding—The operation of hauling timber from the stump to a collection point.